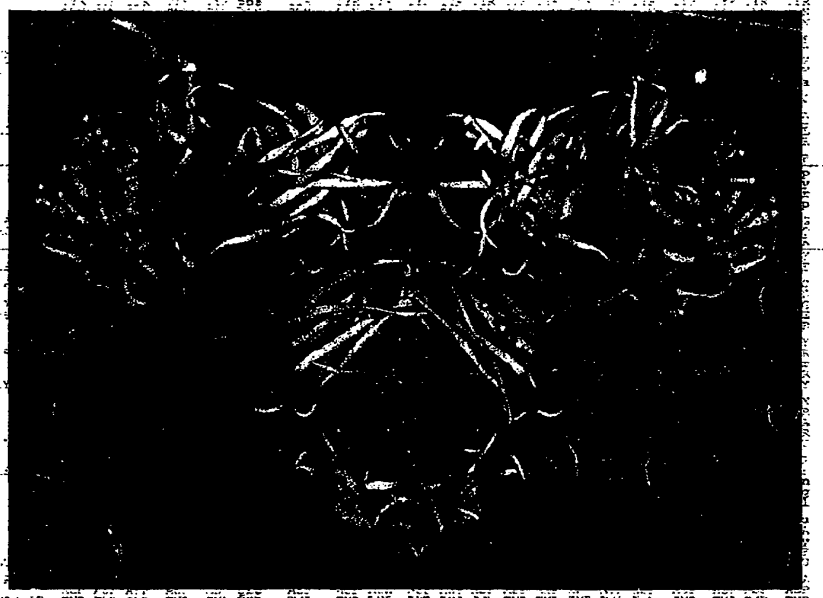
Exhibit B

# SEQUENCES OF PROTEINS OF IMMUNOLOGICAL INTEREST

## VOL. I

FIFTH EDITION



1991

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
National Institutes of Health

# SEQUENCES OF PROTEINS OF IMMUNOLOGICAL INTEREST

**FIFTH EDITION**

Tabulation and Analysis of
Amino Acid and Nucleic Acid Sequences of Precursors,
V-Regions, C-Regions, J-Chain, T-Cell Receptors for Antigen,
T-Cell Surface Antigens, $\beta_2$-Microglobulins,
Major Histocompatibility Antigens, Thy-1, Complement,
C-Reactive Protein, Thymopoietin, Integrins, Post-gamma Globulin,
$\alpha_2$-Macroglobulins, and Other Related Proteins

**1991**

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The collection and maintenance of this data base is sponsored under grant 5R01 AI-125616 to E.A. Kabat of Columbia University by the following components of the National Institutes of Health, Bethesda, MD 20892:

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National Center for Research Resources
National Cancer Institute
National Institute of Allergy and Infectious Diseases
National Institute of Diabetes, Digestive and Kidney Diseases
National Institute of General Medical Sciences
National Library of Medicine

Work with the PROPHET software package is supported by a subcontract from Columbia University to BBN Systems and Techologies, Cambridge, MA 02138

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES

Public Health Service
National Institutes of Health

NIH Publication No. 91-3242



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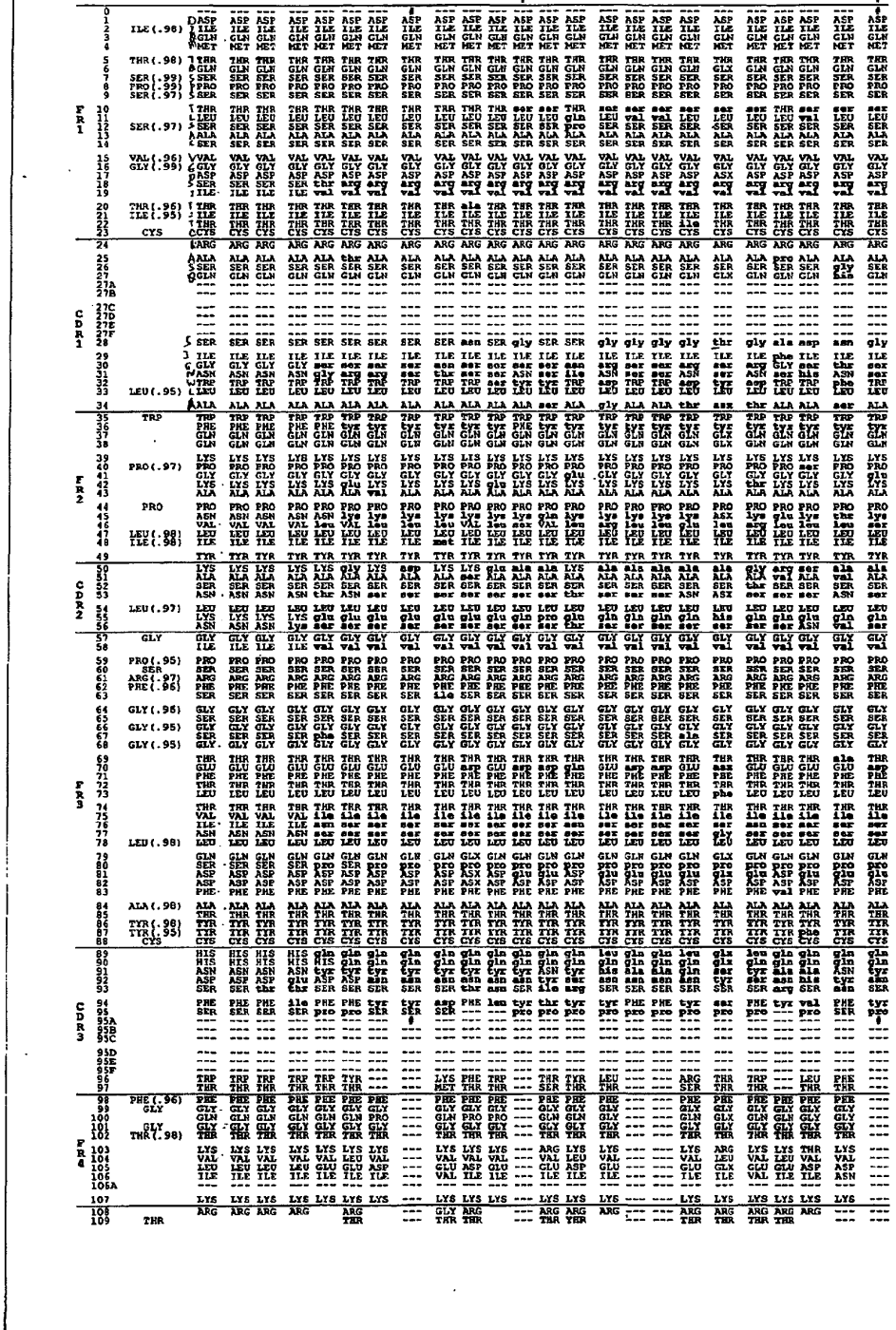
**MAN KAPPA LIGHT CHAINS**

| ALIGNMENT RESIDUES | 1 HK101 'CL | 2 HK 137 'CL | 3 VKI-CAM1 'CL | 4 HuVH CAMP 'CL | 5 VKI-2I 'CL | 6 3D6 'CL | 7 V108 'CL | 8 Vb 'CL | 9 Vb' 'CL | 10 HK102 'CL | 11 2AL2 'CL | 12 1R1 'CL | 13 2C12 'CL | 14 1B11 'CL | 15 Vd 'CL | 16 Va' 'CL | 17 Ve 'CL | 18 V13 'CL | 19 GM 607 'CL | 20 A3 'CL | 21 KFNI 6410 'CL # | 22 A2 'CL | 23 A19 'CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -28 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -27 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -26 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -25 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -24 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -23 | | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- |
| -22 | | MET | MET | --- | THR | MET | MET | MET | MET | MET | MET | | | | MET | MET | --- | MET | | --- | --- | --- | --- |
| -21 | | ASP | ASP | --- | ASP | ASP | GLU | ASP | ASP | ASP | ASP | | | | ASP | ASP | --- | ASP | | --- | --- | --- | --- |
| -20 | MET(.98) | MET | MET | MET | --- | VAL | MET | MET | MET | MET | MET | | | | MET | MET | MET | MET | | MET | MET | MET | MET |
| -19 | | ARG | ARG | ARG | MET | ARG | ARG | ARG | ARG | MET | ARG | ARG | | | ARG | ARG | ARG | ARG | | ARG | ARG | ARG | ARG |
| -18 | | VAL | VAL | ALA | GLY | ALA | VAL | VAL | VAL | VAL | VAL | VAL | | | VAL | VAL | VAL | VAL | | LEU | LEU | LEU | LEU |
| -17 | | LEU | LEU | PRO | TRP | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | LEU |
| -16 | | ALA | ALA | THR | SER | THR | ALA | ALA | ALA | ALA | ALA | ALA | | | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA |
| -15 | | GLN | GLN | GLN | CYS | GLN | GLN | GLN | GLN | GLN | GLN | LEU | LEU | | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN |
| -14 | | LEU | LEU | LEU | ILE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -13 | | LEU | LEU | LEU | ILE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -12 | | GLY | GLY | GLY | LEU | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | | GLY | GLY | GLY | GLY | | GLY | GLY | GLY | GLY |
| -11 | | LEU | LEU | LEU | PHE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -10 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -9 | | LEU | LEU | VAL | VAL | GLY | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | MET | MET | MET | MET |
| -8 | LEU(.95) | LEU | LEU | LEU | ALA | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -7 | TRP(.95) | CYS | CYS | TRP | THR | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP | TRP | TRP | TRP |
| -6 | | PHE | PHE | LEU | ALA | LEU | LEU | LEU | PHE | PHE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | VAL | VAL | ILE | VAL |
| -5 | | PRO | PRO | PRO | THR | PRO | PRO | ARG | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | SER | PRO | PRO | PRO |
| -4 | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| -3 | | ALA | ALA | ALA | VAL | ALA | ALA | ALA | SER | SER | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | SER | SER | SER | SER | SER |
| -2 | | ARG | ARG | ARG | HIS | ARG | LYS | ARG | ARG | ARG | LYS | LYS | LYS | LYS | LYS | ARG | ARG | ARG | SER | SER | SER | SER | SER |
| -1 | | CYS | CYS | CYS | SER | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | GLY | GLY | GLY | ALA | GLY |

| ALIGNMENT RESIDUES | 24 NG9 'CL | 25 HIC (BJ) 'CL # | 26 HAH 14.1 'CL # | 27 HAH 14.2 'CL # | 28 HAH 16.1 'CL # | 29 NOV 'CL # | 30 8E10 'CL # | 31 TH3 'CL # | 32 Humkv 325 'CL | 33 EV1-15 'CL | 34 IARC/ BL41 'CL | 35 Humkv 303 'CL | 36 LS1 'CL | 37 LS2 'CL | 38 LS4 'CL | 39 LS5 'CL | 40 LS6 'CL | 41 LS7 'CL | 42 LS8 'CL | 43 Vg 'CL | 44 Vh 'CL | 45 CLL 'CL # | 46 Hum kv328 'CL # | 47 Hum kv325 'CL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -28 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -27 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -26 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -25 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -24 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -23 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -22 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -21 | | --- | --- | --- | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -20 | | MET | MET | MET | MET | | | | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | | |
| -19 | | GLU | GLU | GLU | GLU | GLU | | | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | | |
| -18 | | THR | THR | THR | THR | THR | | | THR | THR | THR | THR | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | |
| -17 | | PRO | PRO | PRO | PRO | PRO | | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | |
| -16 | | ALA | ALA | ALA | ALA | ALA | | | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | |
| -15 | | GLN | GLN | GLN | GLN | GLN | | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | |
| -14 | | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -13 | | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -12 | | PHE | PHE | PHE | PHE | PHE | | | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | | |
| -11 | | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -10 | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -9 | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -8 | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -7 | | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | |
| -6 | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -5 | VAL | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| -4 | PRO | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| -3 | SER | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| -2 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | ARG | GLY | GLY | GLY |

| ALIGNMENT RESIDUES | 48 GF4 /2.1 'CL | 49 K- EV15 'CL | 50 VKAPPA IV GERMLINE 'CL | 51 PB17IV 'CL | 52 FK-001 'CL # | 53 WALKER 'CL | 54 DAUDI 'CL | 55 VJ1 'CL | 56 HK100 'CL | 57 Va V2 'CL | 58 V2 'CL | 59 V14 'CL | 60 V52 'CL | 61 V55 'CL | 62 K- EVJK11 'CL | 63 PSEUDO VKAPPA 24'CL | # OF SEQUENCES | # OF AMINO ACIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -22 | --- | --- | --- | --- | --- | MET | MET | --- | MET | MET | --- | --- | MET | | --- | --- | | |
| -21 | --- | --- | --- | --- | --- | ASP | ASP | --- | ASP | ASP | --- | --- | ASP | | --- | --- | 17 | 2 |
| -20 | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | | MET | MET | 52 | 2 |
| -19 | GLU | GLY | VAL | VAL | VAL | ARG | ARG | VAL | ARG | ARG | GLN | GLN | ARG | | GLU | ARG | 53 | 6 |
| -18 | ALA | SER | LEU | LEU | LEU | VAL | VAL | LEU | VAL | VAL | VAL | VAL | ALA | | THR | CYS | 53 | 7 |
| -17 | PRO | GLN | GLN | GLN | GLN | PRO | PRO | GLN | PRO | PRO | PRO | PRO | PRO | | PRO | SER | 54 | 5 |
| -16 | ALA | VAL | THR | THR | THR | ALA | ALA | THR | ALA | ALA | THR | THR | ALA | | ALA | PRO | 54 | 5 |
| -15 | HIS | HIS | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | HIS | 54 | 4 |
| -14 | VAL | LEU | VAL | VAL | VAL | LEU | LEU | VAL | LEU | LEU | LEU | LEU | LEU | | LEU | PHE | 54 | 4 |
| -13 | LEU | LEU | PHE | PHE | PHE | LEU | LEU | PHE | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | 54 | 3 |
| -12 | PHE | SER | ILE | ILE | ILE | GLY | GLY | ILE | GLY | GLY | GLY | GLY | GLY | GLY | PHE | GLU | 55 | 6 |
| -11 | LEU | PHE | SER | SER | SER | LEU | LEU | SER | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | 55 | 3 |
| -10 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | 58 | 1 |
| -9 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | VAL | VAL | LEU | PRO | LEU | VAL | 58 | 5 |
| -8 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | SER | LEU | PHE | 58 | 4 |
| -7 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | 59 | 3 |
| -6 | LEU | ILE | ILE | ILE | ILE | LEU | LEU | ILE | LEU | LEU | LEU | LEU | PHE | | LEU | ILE | 59 | 5 |
| -5 | PRO | SER | SER | SER | SER | ARG | ARG | SER | SER | PRO | PRO | PRO | PRO | | PRO | LEU | 59 | 5 |
| -4 | GLU | ASP | GLY | GLY | GLY | GLY | ARG | GLY | GLY | GLY | GLY | GLY | ASP | GLY | ASP | GLU | 63 | 5 |
| -3 | THR | THR | ALA | ALA | ALA | ALA | VAL | ALA | ALA | ALA | ALA | ALA | THR | THR | THR | VAL | 63 | 5 |
| -2 | SER | ARG | TYR | TYR | TYR | ARG | ARG | TYR | ARG | ARG | ARG | ARG | ARG | ARG | THR | SER | 63 | 6 |
| -1 | GLY | ALA | GLY | GLY | GLY | CYS | CYS | GLY | TYR | CYS | CYS | CYS | CYS | SER | GLY | GLY | 63 | 6 |

GET CHAINS SUBGROUP I






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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | | 25 Vd 'CL | 26 WALKER 'CL | 27 HK101 'CL' # | 28 Va' 'CL | 29 VK1-CHE1 'CL | 30 AMYLOID BAN # | 31 Ve 'CL | 32 V13 'CL | 33 DEE | 34 WIL (-) # | 35 ANG # | 36 V1GB 'CL # | 37 VK1-EI 'CL | 38 REI | 39 AU | 40 ROY | 41 SI | 42* HRVH CAMP 'CL | 43 AG # | 44 SCW | 45 REV | 46 KA | 47* LAY | 48 SEL | 49 NI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ala | ASP | ASP | ala | val | ASX | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 4 | MET | MET | MET | leu | MET | leu | MET | MET | MET | MET | MET | val | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | leu | MET | MET |
| | 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| FR1 | 10 | phe | asc | ser | ser | ser | ser | ser | leu | sec | THR | sec | leu | ser | ser | ser | pro | pro | ser | ser | ser | THR | ser | ser | ser | ser |
| | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | phe | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | SER | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| | 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | thr |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | thr | thr | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLN | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | gly | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 18 | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | SER | arg | arg | arg | arg | arg | arg | arg | arg |
| | 19 | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val |
| | 20 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ile | THR | THR | THR | THR | THR |
| | 21 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | phe | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | leu |
| | 22 | THR | THR | THR | THR | THR | THR | THR | asc | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | leu |
| | 23 | CYS | THR | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| | 24 | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | gln | gln | gln | gln | lys | gln | gln | ARG | glu | gln | gln | glu |
| | 25 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | asc | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 26 | SER | SER | SER | asn | SER | SER | SER | SER | glu | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 27 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 27A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | asc |
| | 27B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | val |
| CDR1 | 27C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | leu |
| | 27D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | gln |
| | 27E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 28 | gly | SER | gly | gly | gly | SER | gly | gly | SER | SER | SER | gly | gly | asp | asp | asp | asp | asn | asp | asp | SER | thr | asn | asn | SER |
| | 29 | ILE | ILE | ILE | ILE | val | ILE | ILE | val | val | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ser | val | val | ILE | gly |
| | 30 | ser | ser | ser | ser | ser | tyr | ser | ser | asn | ser | GLY | ser | ser | ile | ser | ser | asn | asp | asn | asp | val | leu | asn | ser | ssn |
| | 31 | asc | asc | asn | asn | ASN | ser | ser | ser | lys | gly | gly | ASN | ASN | lys | asp | ile | ser | lys | his | lys | asp | ser | asn | ile | thr |
| | 32 | tyr | TYR | ile | asn | tyr | tyr | tyr | tyr | TYR | ser | gly | asn | tyr | phe | asc | tyr | tyr | tyr | tyr | tyr | tyr | tyr | ser | leu | phe |
| | 33 | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| | 34 | ALA | asn | ALA | ALA | ALA | asn | ALA | ALA | asn | ALA | asn | asc | asn | asn | asn | asn | ile | asn | asn | asn | asn | asn | asn | asn | ALA |
| | 35 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP |
| | 36 | TYR | TYR | TYR | TYR | TYR | PHE | tyr | tyr | tyr | tyr | tyr | tyr | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | tyr | tyr | tyr | GLN |
| | 37 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | asp | GLN | GLN | GLN |
| | 38 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 39 | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | thr | LYS | LYS | LYS | LYS | ♦ | LYS | LYS | LYS | LYS | LYS | LYS |
| | 40 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | ♦ | PRO | PRO | PRO | PRO | PRO | PRO |
| FR2 | 41 | GLY | GLY | GLY | glu | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | ♦ | GLY | GLY | GLY | GLY | GLY | lys |
| | 42 | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | ♦ | LYS | LYS | LYS | LYS | LYS | LYS |
| | 43 | ALA | ALA | ALA | ALA | thr | ALA | ALA | ALA | ALA | ALA | ALA | ALA | thr | ALA | ALA | ALA | ALA | ALA | ♦ | ALA | ALA | ALA | ALA | pro | ALA |
| | 44 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 45 | lys | lys | lys | lys | lys | lys | glu | lys | ASN | asc | thr | lys | lys | lys | lys | lys | asp | lys | lys | lys | lys | glu | lys | glu | lys |
| | 46 | leu | leu | asc | leu | leu | asc | leu | VAL | leu | leu | leu | leu | leu | leu | leu | leu | glu | leu | leu | leu | leu | leu | leu | leu | leu |
| | 47 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| | 48 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 49 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | | TYR | phe | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | phe | TYR | TYR | TYR | TYR | TYR |
| | 50 | ala | ala | ala | asp | ala | asp | ala | ala | ala | glu | gly | ala | ala | glu | asp | asp | asp | asp | asp | gly | asp | ala | gly | asp | asp |
| CDR2 | 51 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | GLY | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | SER | ALA | ALA | ALA | ALA | ALA |
| | 52 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | GLY | SER | SER | SER | SER | SER | SER | glu | asn | SER | SER | SER | SER | SER | SER |
| | 53 | thr | asc | asc | asc | asc | thr | thr | thr | asc | ile | asc | asc | asc | asn | ASN | ASN | lys | ASN | ASN | thr | asn | asc | thr | thr | ASN |
| | 54 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | arg | LEU | LEU |
| | 55 | glu | glu | glu | glu | glu | glu | glu | glu | LYS | asp | glu | glu | glu | glu | glu | glu | glu | glu | glu | glu | glu | glu | LYS | glu | glu |
| | 56 | asc | asc | asc | asc | asc | asc | asc | asc | asc | ala | asp | asc | asc | ala | ile | asc | ile | thr | asc | thr | asc | asc | thr | thr | thr |
| | 57 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 58 | PRO | thr | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 59 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 60 | ARG | ARG | ARG | ARG | ARG | asn | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG |
| | 61 | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| | 62 | SER | SER | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | asp | SER | SER | SER | SER | SER | SER | SER |
| | 63 | GLY | GLY | GLY | GLY | asp | GLY | GLY | GLY | GLY | GLY | GLY | GLY | asp | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 64 | SER | SER | SER | SER | SER | SER | SER | SER | SER | asn | SER | SER | SER | SER | gly | thr | SER | GLY | GLY | GLY | GLY | GLY | SER | SER | SER |
| | 65 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | ile | GLY | GLY | GLY | GLY | GLY | GLY | GLY | asp | GLY | GLY | asp | GLY | GLY | GLY | GLY |
| | 66 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 67 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 68 | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | THR | ala | THR | ala | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 69 | GLU | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | ala | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp |
| | 70 | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| | 71 | THR | THR | THR | THR | ile | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | THR |
| FR3 | 72 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | phe | phe | phe | LEU | phe | phe | LEU | LEU | phe | phe | LEU | phe |
| | 73 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ser | THR | THR | THR | THR | THR | THR | THR | THR |
| | 74 | ile | ile | ser | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ser | ile | ile | ile | ile | ile | ile | ile | ile |
| | 75 | ser | ser | ser | ser | arg | ser | ser | ser | ser | ser | thr | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser |
| | 76 | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | gly | ser | ser | thr | ser | ser | ser | ser | gly |
| | 77 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU |
| | 78 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | leu | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX |
| | 79 | pro | PRO | PRO | PRO | pro | pro | SER | SER | PRO | pro | PRO | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro |
| | 80 | glu | glu | glu | glu | glu | glu | glu | glu | glu | ASP | glu | glu | glu | glu | glu | glu | glu | glu | glu | ASP | glu | glu | ala | pro | glu |
| | 81 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | asn | ASP | ASP | ile | ile | ile | ile | ASP | ASP | ASP | glu | ASX | asp | ASP | ASP | ASX |
| | 82 | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | asc | PHE | val | PHE | ile | ile | ile | ile | ile | ile | PHE | PHE | ile | PHE | PHE | PHE |
| | 83 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | gly | ALA | ALA | ALA | ALA | ALA | ALA |
| | 84 | THR | THR | THR | THR | THR | THR | THR | THR | THR | arg | ala | THR | ala | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | val | THR |
| | 85 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR |
| | 86 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | phe | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR |
| | 87 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| | 88 | gln | gln | gln | gln | gln | gln | gln | gln | leu | gln | gln | gln | gln | gln | gln | gln | leu | gln | gln | gln | gln | gln | gln | gln | gln |
| | 89 | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln |
| | 90 | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln |
| | 91 | leu | ser | tyr | phe | ser | tyr | tyr | tyr | ser | tyr | ser | asp | ser | tyr | tyr | phe | tyr | phe | tyr | ser | tyr | tyr | ser | tyr | tyr |
| | 92 | asn | tyr | ser | asn | ASP | ser | tyr | tyr | tyr | asn | ser | tyr | ASP | ser | ASP | ASP | tyr | ile | ASP | ASP | tyr | leu | asn | ASX | ASP |
| | 93 | SER | ser | SER | SER | SER | SER | SER | SER | SER | SER | SER | thr | SER | thr | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | thr |
| CDR3 | 94 | tyr | thr | tyr | tyr | thr | tyr | tyr | PHE | thr | tyr | ser | thr | thr | leu | leu | leu | leu | arg | leu | val | asn | leu | trp | PHE | leu |
| | 95 | pro | leu | pro | pro | pro | pro | pro | pro | pro | --- | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro |
| | 95A | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | GLU | --- | --- | --- | --- | --- |
| | 95B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 96 | --- | ILE | --- | --- | --- | TYR | --- | --- | TYR | --- | TRP | --- | --- | TYR | TRP | LEU | TYR | ARG | ARG | ILE | VAL | ARG | PRO | LEU | SER |
| | 97 | --- | THR | --- | --- | --- | THR | --- | --- | THR | --- | THR | --- | --- | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 98 | --- | PHE | --- | --- | --- | PHE | --- | --- | PHE | PHE | PHE | --- | --- | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| | 99 | --- | GLY | --- | --- | --- | GLY | --- | --- | GLY | GLY | GLY | --- | --- | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 100 | --- | GLN | --- | --- | --- | GLN | --- | --- | PRO | GLN | GLN | --- | --- | GLY | GLN | GLY | GLN | GLN | GLN | GLN | GLN | GLN | GLY | VAL | GLN |
| | 101 | --- | GLY | --- | --- | --- | GLY | --- | --- | GLY | GLY | GLY | --- | --- | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 102 | --- | THR | --- | --- | --- | THR | --- | --- | THR | THR | THR | --- | --- | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| FR4 | 103 | --- | ARG | --- | --- | --- | LYS | --- | --- | LYS | LYS | LYS | --- | --- | LYS | LYS | LYS | LYS | LYS | LYS | ARG | THR | LYS | LYS | GLU | LYS |
| | 104 | --- | LEU | --- | --- | --- | # | --- | --- | VAL | LEU | VAL | --- | --- | LEU | VAL | VAL | LEU | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 105 | --- | GLU | --- | --- | --- | # | --- | --- | GLU | GLU | GLN | --- | --- | GLN | GLN | ASP | GLU | GLU | GLU | ASP | ASP | GLU | GLU | GLU | GLU |
| | 106 | --- | ILE | --- | --- | --- | ILE | --- | --- | MET | ILE | ILE | --- | --- | ILE | ILE | PHE | ILE | ILE | ILE | ASN | ILE | LEU | VAL | VAL | SER |
| | 106A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 107 | --- | LYS | --- | --- | | LYS | --- | --- | THR | LYS | ARG | | | THR | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS |
| | 108 | --- | --- | --- | --- | | ARG | --- | --- | ARG | ARG | | | | ARG | ARG | ARG | ARG | ARG | ARG | GLY | ARG | ARG | ARG | | ARG |
| | 109 | --- | --- | --- | --- | | | --- | --- | THR | THR | | | | THR | THR | THR | THR | | THR | THR | | THR | | | THR |



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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | | 50 RE | 51* Ru RdV19 VK # | 52 RBJ 4 | 53 BJ 26 # | 54 BJ 19 # | 55 RFZ | 56 HA | 57 PAU | 58 PSM | 59 JBL # | 60 NE | 61 FRA | 62 BJ 48 | 63 MF3- 16/6 | 64 MF2- 1/13b | 65 MF24 18/2 | 66 GR' | 67 GL 'CL #' | 68 NOM | 69 KER | 70 ESM IGG | 71 ESM IGM | 72* DAV | 73* FIN | 74 PW # | 75 SHE | 76 ADA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | his | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | GLN | GLN | ala | GLN | GLN |
| | 4 | MET | MET | MET | MET | leu | MET | MET | MET | MET | MET | leu | MET | MET | MET | MET | MET | MET | | MET | MET | MET | MET | MET | MET | leu | val | val |
| | 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | SER | SER | thr | SER | SER |
| F | 10 | SER | SER | THR | SER | SER | SER | SER | THR | SER | SER | SER | THR | SER | SER | SER | THR | | | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| R | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 1 | 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | | ALA | ALA | ALA | ALA | thr | thr | ALA | ALA | val |
| | 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | tyr | SER | SER | SER | SER | SER | SER | | | SER | SER | SER | SER | val | val | SER | SER | phe |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | | | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP | | | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP |
| | 18 | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | | | val | pro | arg | arg | arg | arg | arg | arg | arg |
| | 19 | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | | | ile | ile | val | val | val | val | val | val | val |
| | 20 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 21 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | | ILE | ILE | ILE | ILE | ILE | ILE | val | phe | ILE |
| | 22 | THR | THR | THR | THR | THR | THR | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | | | THR | THR | THR | THR | THR | THR | arg | THR | THR |
| | 23 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | | | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| | 24 | gln | ARG | ARG | gln | gln | gln | gln | ARG | gln | ARG | glx | ARG | | ARG | ARG | ARG | ARG | | gln | gln | ARG | ARG | asp | asp | ARG | glx | glx |
| | 25 | ALA | ser | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 26 | asn | SER | SER | SER | SER | asn | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | | arg | SER | SER | SER | SER | SER | SER | SER | SER |
| | 27 | GLN | GLN | GLN | GLN | GLN | GLN | --- | GLN | GLN | GLN | GLX | GLX | | GLN | GLN | GLN | arg | | his | GLN | GLX | GLX | GLN | GLN | GLN | GLX | GLY |
| | 27A | --- | thr | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 27B | --- | leu | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 27C | --- | val | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C | 27D | --- | his | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| D | 27E | --- | thr | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| R | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 28 | val | asp | SER | SER | asp | val | --- | SER | asp | SER | asn | asx | | gly | gly | gly | SER | | asp | asp | SER | SER | asx | asx | SER | asn | asn |
| | 29 | ILE | gly | val | ILE | ILE | ILE | --- | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 30 | ser | ASN | asn | asn | ser | ser | arg | ser | arg | ser | ser | asx | | arg | arg | arg | ser | | ser | lys | ser | ser | ASX | ASX | GLY | ser | |
| | 31 | lys | thr | ASN | lys | thr | lys | ASN | ser | ser | thr | ASX | ASX | | ASN | ASN | ASN | ser | | ASN | | ser | ser | ser | ser | | ASX | ASX |
| | 32 | ser | tyr | TRP | tyr | phe | ser | tyr | ser | tyr | phe | tyr | tyr | | asp | asp | TRP | phe | | tyr | | LEU | LEU | TRP | TRP | tyr | tyr | tyr |
| | 33 | LEU | LEU | LEU | ala | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | | LEU | | LEU | LEU | LEU | LEU | ser | LEU | LEU |
| | 34 | asn | glu | ALA | asn | asn | asn | asn | ALA | asn | # | asx | ALA | | gly | gly | gly | ALA | | asn | | asx | asx | ile | ile | asx | asn | asx |
| | 35 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP | TRP | TRP | TRP | | TRP | | TRP | TRP | TRP | TRP | TRP | TRP | TRP |
| | 36 | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | | tyr | tyr | tyr | tyr | | PHE | | tyr | tyr | tyr | tyr | | tyr | tyr |
| | 37 | GLN | GLN | GLN | glu | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | | GLN | GLN | GLN | GLN | | GLN | | GLX | GLX | GLN | GLN | GLN | ala | GLY |
| | 38 | GLN | GLN | glu | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | | GLN | GLN | GLN | gly | | GLN | | | | GLN | GLN | GLN | GLX | tyr |
| | 39 | arg | LYS | LYS | # | # | arg | LYS | LYS | LYS | LYS | LYS | LYS | | LYS | LYS | LYS | arg | | LYS | | | | tyr | tyr | LYS | LYS | LYS |
| | 40 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | gln | PRO | PRO | | PRO | PRO | PRO | PRO | | PRO | | | | PRO | PRO | | PRO | PRO |
| F | 41 | GLY | GLY | GLY | # | # | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | | | GLY | | | | | | | | |
| R | 42 | gln | LYS | glx | LYS | LYS | gln | arg | glx | LYS | LYS | glx | | | | | | | | | | | | | | | | |
| 2 | 43 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | ALA | | | | | | | | | | | | | | |
| | 44 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | | | | | | | | | | | | | | |
| | 45 | lys | lys | lys | lys | lys | lys | lys | lys | lys | lys | lys | | lys | | | | | | | | | | | | | | |
| | 46 | leu | leu | leu | leu | leu | leu | leu | leu | leu | leu | leu | | | | | | | | | | | | | | | | |
| | 47 | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | met | | | | | | | | | | | | | | | | |
| | 48 | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | | | | | | | | | | | | | | | |
| | 49 | TYR | TYR | ser | | TYR | TYR | TYR | TYR | TYR | TYR | TYR | | gly | | | | | | | | | | | | | | |
| | 50 | asp | arg | LYS | | asp | asp | asp | glu | asp | | | | asp | | | | | | | | | | | | | | |
| | 51 | ALA | val | thr | asp | ALA | ALA | ALA | | ALA | | | | ALA | | | | | | | | | | | | | | |
| C | 52 | SER | SER | SER | SER | SER | SER | ala | phe | SER | | | | SER | | | | | | | | | | | | | | |
| D | 53 | ASN | ASN | ser | arg | ser | ASX | ASN | | | | | | ser | | | | | | | | | | | | | | |
| R | 54 | LEU | asp | LEU | LEU | LEU | LEU | LEU | | LEU | | | | LEU | | | | | | | | | | | | | | |
| 2 | 55 | glu | phe | glu | glu | glu | glu | glu | | glu | | | | asx | | | | | | | | | | | | | | |
| | 56 | ser | ser | arg | thr | thr | | ala | | | | | | ser | | | | | | | | | | | | | | |
| | 57 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | GLY | | | | | | | | | | | | | | |
| | 58 | val | val | val | asn | val | val | val | | | | | | val | | | | | ILE | | | | | | | | | |
| | 59 | PRO | PRO | PRO | PRO | glx | PRO | PRO | | | | | | val | | | | | PRO | | | | | | | | | |
| | 60 | SER | SER | SER | SER | SER | | SER | | | | | | SER | | | | | SER | | | | | | | | | |
| | 61 | ARG | ARG | ARG | lys | ARG | ARG | ARG | | | | | | ARG | | | | | ARG | | | | | | | | | |
| | 62 | PHE | PHE | PHE | val | PRO | PHE | | | | | | | glu | | | | | PHE | | | | | | | | | |
| | 63 | thr | SER | ala | SER | leu | thr | | | | | | | SER | | | | | SER | | | | | | | | | |
| | 64 | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | | GLY | | | | | GLY | | | | | | | | | |
| | 65 | SER | SER | GER | SER | SER | | | | | | | | SER | | | | | SER | | | | | | | | | |
| | 66 | GLY | GLY | GLY | asx | GLY | | | | | | | | GLY | | | | | GLY | | | | | | | | | |
| | 67 | SER | SER | SER | phe | | | | | | | | | SER | | | | | SER | | | | | | | | | |
| | 68 | GLY | GLY | glu | asx | | | | | | | | | GLY | | | | | GLY | | | | | | | | | |
| | 69 | THR | THR | THR | THR | | | | | | | | | THR | | | | | THR | | | | | | | | | |
| | 70 | asp | asp | val | lys | | | | | | | | | asp | | | | | GLN | | | | | | | | | |
| | 71 | PHE | PHE | val | | | | | | | | | | pro | | | | | PHE | | | | | | | | | |
| F | 72 | phe | THR | THR | | | | | | | | | | ser | | | | | TER | | | | | | | | | |
| R | 73 | LEU | phe | val | | | | | | | | | | LEU | | | | | LEU | | | | | | | | | |
| 3 | 74 | THR | THR | asx | | | | | | | | | | ala | | | | | THR | | | | | | | | | |
| | 75 | ile | ile | gln | | | | | | | | | | VAL | | | | | VAL | | | | | | | | | |
| | 76 | ser | ser | asx | | | | | | | | | | ser | | | | | ILE | | | | | | | | | |
| | 77 | ser | ser | asx | | | | | | | | | | arg | | | | | ASN | | | | | | | | | |
| | 78 | LEU | LEU | LEU | | | | | | | | | | | | | | | LEU | | | | | | | | | |
| | 79 | arg | GLN | GLN | | | | | | | | | | | | | | | GLN | | | | | | | | | |
| | 80 | pro | pro | pro | | | | | | | | | | | | | | | SER | | | | | | | | | |
| | 81 | GLN | GLN | GLN | | | | | | | | | | | | | | | ASP | | | | | | | | | |
| | 82 | ASP | ASP | ASP | | | | | | | | | | | | | | | ASP | | | | | | | | | |
| | 83 | val | ile | ile | | | | | | | | | | | | | | | PHE | | | | | | | | | |
| | 84 | ALA | ALA | ALA | | | | | | | | | | | | | | | ALA | | | | | | | | | |
| | 85 | THR | THR | pro | | | | | | | | | | | | | | | THR | | | | | | | | | |
| | 86 | TYR | TYR | lys | | | | | | | | | | | | | | | TYR | TYR | | | | | | | | |
| | 87 | phe | TYR | | | | | | | | | | | | | | | | TYR | TYR | | | | | | | | |
| | 88 | CYS | CYS | | | | | | | | | | | | | | | | CYS | CYS | | | | | | | | |
| | 89 | gln | phe | gln | | | | | | | | | | | | | | | HIS | gln | | | | | | | | |
| | 90 | gln | gln | gln | | | | | | | | | | | | | | | HIS | gln | | | | | | | | |
| | 91 | tyr | gly | asp | phe | | | | | | | | | | | | | | ASN | tyr | | | | | | | | |
| | 92 | his | ser | ASP | asp | | | | | | | | | gly | | | | | ASP | | | | | | | | | |
| | 93 | asn | his | asp | asp | | | | | | | | | SER | | | | | thr | asp | | | | | | | | |
| C | 94 | leu | leu | leu | leu | | | | | | | | | asp | | | | | PHE | leu | | | | | | | | |
| D | 95 | pro | pro | pro | pro | | | | | | | | | SER | | | | | SER | pro | | | | | | | | |
| R | 95A | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| 3 | 95B | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 95C | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 95D | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 95E | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 95F | --- | --- | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 96 | LEU | ARG | TYR | TYR | | | | | | | | | ARG | | | | | TRP | PRO | | | | | | | | |
| | 97 | TRR | THR | THR | THR | | | | | | | | | THR | | | | | THR | THR | | | | | | | | |
| | 98 | PHE | PHE | LEU | PHE | | | | | | | | | PHE | | | | | PHE | PHE | | | | | | | | |
| | 99 | GLY | GLY | GLY | GLY | | | | | | | | | GLY | | | | | GLY | GLY | | | | | | | | |
| | 100 | GLY | GLY | GLY | PRO | | | | | | | | | GLN | | | | | GLN | PRO | | | | | | | | |
| | 101 | GLY | GLY | GLY | GLY | | | | | | | | | GLY | | | | | GLY | GLY | | | | | | | | |
| | 102 | THR | THR | THR | THR | | | | | | | | | THR | | | | | THR | THR | | | | | | | | |
| F | 103 | LYS | LYS | LYS | LYS | | | | | | | | | LYS | | | | | LYS | LYS | | | | | | | | |
| R | 104 | VAL | VAL | VAL | VAL | | | | | | | | | VAL | | | | | VAL | VAL | | | | | | | | |
| 4 | 105 | GLU | GLU | GLU | GLU | | | | | | | | | GLU | | | | | LEU | ASP | | | | | | | | |
| | 106 | ILE | ILE | MET | LEU | | | | | | | | | VAL | | | | | ILE | LEU | | | | | | | | |
| | 106A | --- | | --- | --- | | | | | | | | | --- | | | | | --- | --- | | | | | | | | |
| | 107 | LYS | | LYS | LYS | | | | | | | | | LYS | | | | | LYS | LYS | | | | | | | | |
| | 108 | | | | | | | | | | | | | | | | | | ARG | | | | | | | | | |
| | 109 | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | | 77 AMYLOID VIII-B | 78 PAUL | 79 RI # | 80 MAT | 81* LOM | 82 AMYLOID ES305 # | 83 OCO | 84 BOL | 85 AMYLOID X | 86 SAC | 87 BJ | 88 GO | 89 F- GUI # | 90 S- GUI # | 91 HF6- 21/28 | 92 DIE | 93 CAR A | 94 TEI | 95 MON | 96 ALE | 97 JOH | 98 POT | 99 CON | 100 TRA | 101* R-G2b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | pca | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | val | ILE | ILE | val | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | val | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| | 4 | MET | MET | MET | MET | MET | leu | MET | ile | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET |
| | 5 | THR | THR | THR | THR | THR | THR | THR | met | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLX | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | ala | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | ala | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | leu | SER | SER | SER | SER | SER | SER | ala | SER | SER | SER |
| F | 10 | ser | THR | THR | ser | ser | ser | ser | ser | ser | ser | | phe | ser | ser | ser | ser | ser | ser | THR | | ser | ser | ser | ser | ser |
| R | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU | | val | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| I | 12 | SER | SER | SER | SER | SER | SER | val | SER | SER | SER | | SER | SER | SER | pro | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ser | ala | ALA | ALA | | ALA | ALA | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 14 | SER | SER | SER | SER | SER | SER | pro | SER | SER | SER | | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | | VAL | VAL | VAL | leu | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | GLY | GLY | GLY | GLN | GLN | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASX | ASP | ASP | | ASX | ASX | ASX | glu | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 18 | arg | arg | gly | arg | arg | leu | arg | arg | arg | --- | arg | arg | arg | arg | pro | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg |
| | 19 | val | val | val | val | val | val | val | val | val | --- | val | val | val | val | ala | val | val | val | val | val | val | val | val | val | val |
| | 20 | THR | THR | THR | THR | THR | THR | THR | THR | ile | --- | THR | THR | THR | THR | ser | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 21 | ILE | ILE | ILE | ILE | ILE | ile | ILE | ILE | ILE | --- | ILE | ILE | ILE | ILE | ile | ILE | ILE | ILE | ILE | leu | ILE | ILE | ILE | ILE | ILE |
| | 22 | THR | THR | ser | THR | THR | THR | THR | THR | | --- | THR | THR | THR | THR | ser | THR | THR | THR | THR | THR | ser | THR | THR | ILE | THR |
| | 23 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | --- | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | | | |
| | 24 | gln | ARG | ARG | glx | ala | gln | glx | ARG | glx | --- | gln | ARG | | ARG | ARG | | | | | ARG | | | | | |
| | 25 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | --- | ALA | ALA | ALA | ALA | ser | | | | | | | | | | |
| | 26 | SER | SER | SER | SER | SER | SER | SER | SER | | --- | SER | SER | | | SER | | | | | | | | | | |
| | 27 | GLN | GLN | GLX | GLN | GLN | glu | GLX | GLX | GLX | --- | GLN | | | | GLN | | | | | | | | | | |
| | 27A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | ser | | | | | | | | | | |
| | 27B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | leu | | | | | | | | | | |
| | 27C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | val | | | | | | | | | | |
| C | 27D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | trp | | | | | | | | | | |
| D | 27E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | ser | | | | | | | | | | |
| R | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | --- | | | | | | | | | | |
| 1 | 28 | asx | SER | SER | asp | asx | ala | asx | gly | asx | --- | asp | | | | asp | | | | | | | | | | |
| | 29 | ILE | ILE | ILE | ILE | ILE | d | ILE | ILE | ILE | --- | ILE | | | | gly | | | | | | | | | | |
| | 30 | GLY | ser | ser | ser | ser | | ser | | | --- | asn | | | | asp | | | | | | | | | | |
| | 31 | | asp | | asp | | ASN | ASX | | pro | --- | lys | | | | ser | | | | | | | | | | |
| | 32 | tyr | ser | | tyr | | tyr | tyr | | tyr | --- | | | | | tyr | | | | | | | | | | |
| | 33 | LEU | | | val | | LEU | | | LEU | --- | | | | | LEU | | | | | | | | | | |
| | 34 | | | | asn | | | | | | --- | | | | | glu | | | | | | | | | | |
| | 35 | TRP | | | TRP | | TRP | | | | --- | | | | | TRP | | | | | | | | | | |
| | 36 | | | | | | tyr | | | tyr | --- | | | | | tyr | | | | | | | | | | |
| | 37 | | | | | | | | | | --- | | | | | GLN | | | | | | | | | | |
| | 38 | | | | | | | | | | --- | | | | | GLN | | | | | | | | | | |
| | 39 | | | | | | | | | | --- | | | | | LYS | | | | | | | | | | |
| | 40 | | | | | | | | | | --- | | | | | PRO | | | | | | | | | | |
| | 41 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| F | 42 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| R | 43 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| 2 | 44 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
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| | 50 | | | | | | | | | | LYS | | | | | | | | | | | | | | | |
| | 51 | | | | | | | | | | ser | | | | | | | | | | | | | | | |
| C | 52 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| D | 53 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| R | 54 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| 2 | 55 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
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| F | 72 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| R | 73 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| 3 | 74 | | | | | | | | | | --- | | | | | | | | | | | | | | | |
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| | 86 | | | | | | | | | | --- | TYR | | | | | | | | | | | | | | |
| | 87 | | | | | | | | | | --- | TYR | | | | | | | | | | | | | | |
| | 88 | | | | | | | | | | CYS | CYS | | | | | | | | | | | | | | |
| | 89 | | | | | | | | | | glx | gln | | | | | | | | | | | | | | |
| | 90 | | | | | | | | | | gln | gln | | | | | | | | | | | | | | |
| | 91 | | | | | | | | | | glx | tyr | | | | | | | | | | | | | | |
| | 92 | | | | | | | | | | ASX | glu | | | | | | | | | | | | | | |
| | 93 | | | | | | | | | | ala | asn | | | | | | | | | | | | | | |
| C | 94 | | | | | | | | | | ala | leu | | | | | | | | | | | | | | |
| D | 95 | | | | | | | | | | thr | pro | | | | | | | | | | | | | | |
| R | 95A | | | | | | | | | | --- | --- | | | | | | | | | | | | | | |
| 3 | 95B | | | | | | | | | | --- | --- | | | | | | | | | | | | | | |
| | 95C | | | | | | | | | | --- | --- | | | | | | | | | | | | | | |
| | 95D | | | | | | | | | | --- | --- | | | | | | | | | | | | | | |
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| | 95F | | | | | | | | | | --- | --- | | | | | | | | | | | | | | |
| | 96 | | | | | | | | | | ILE | TYR | | | | | | | | | | | | | | |
| | 97 | | | | | | | | | | PRO | | | | | | | | | | | | | | | |
| | 98 | | | | | | | | | | ILE | | | | | | | | | | | | | | | |
| | 99 | | | | | | | | | | GLN | | | | | | | | | | | | | | | |
| | 100 | | | | | | | | | | GLY | | | | | | | | | | | | | | | |
| | 101 | | | | | | | | | | GLY | | | | | | | | | | | | | | | |
| | 102 | | | | | | | | | | THR | | | | | | | | | | | | | | | |
| F | 103 | | | | | | | | | | LYS | | | | | | | | | | | | | | | |
| R | 104 | | | | | | | | | | VAL | | | | | | | | | | | | | | | |
| 4 | 105 | | | | | | | | | | ASX | | | | | | | | | | | | | | | |
| | 106 | | | | | | | | | | VAL | | | | | | | | | | | | | | | |
| | 106A | | | | | | | | | | --- | | | | | | | | | | | | | | | |
| | 107 | | | | | | | | | | LYS | | | | | | | | | | | | | | | |
| | 108 | | | | | | | | | | ARG | | | | | | | | | | | | | | | |
| | 109 | | | | | | | | | | THR | | | | | | | | | | | | | | | |



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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | 102* K-G2 | 103 BRA | 104 LUX | 105* HEI | 106 PAP | 107* H-G2a | 108 CRA | 109 AMYLOID LEP | 110* WAG | 111 MOE | 112 HBJ 1 | 113 AMYLOID 547 | 114 WEB | 115 RBJ 10 | 116 LOO | 117 BEN | 118 MAA | 119 GR | 120 MUR | 121 GMJ31 'CL 9 | 122 AMYLOID 594 | 123* MAR | 124 CL* |
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| 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | ASP | --- |
| 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | --- |
| 3 | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | leu | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | --- |
| 4 | MET | MET | leu | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET? | | MET | leu | MET | MET | | MET | leu | --- |
| 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | THR | THR | --- |
| 6 | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | --- |
| 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | --- |
| 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | --- |
| 9 | SER | SER | SER | PHE | SER | SER | SER | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | --- |
| 10 | SER | SER | Phe | THR | SER | SER | SER | SER | SER | THR | SER | SER | ser | SER | THR | ser | THR | ser | ser | | SER | SER | --- |
| 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | | LEU | LEU | LEU | LEU | | LEU | LEU | --- |
| 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | | | --- |
| 13 | ALA | val | ALA | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | val | | | | | --- |
| 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | | | | | | | | --- |
| 15 | VAL | VAL | VAL | VAL | VAL | VAL | leu | VAL | VAL | VAL | VAL | VAL | VAL | | VAL | | | | | | | | --- |
| 16 | GLY | GLY | GLY | GLY | GLY | GLY | asp | GLY | GLY | | GLY | | | | | | | | | | | | --- |
| 17 | ASP | glx | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | | | | | | | | | | | | --- |
| 18 | asp | asp | asp | asp | asp | asp | asp | asp | | | | | | | | | | | | | | | --- |
| 19 | val | val | val | val | val | val | val | val | | | | | | | | | | | | | | | --- |
| 20 | THR | THR | THR | THR | THR | | THR | THR | | | | | | | | | | | | | | | --- |
| 21 | ILE | THR | ILE | | ILE | ILE | ILE | | | | | | | | | | | | | | | | --- |
| 22 | THR | THR | THR | | ala | THR | THR | | | | | | | | | | | | | | | | --- |
| 23 | | CYS | | | | | | | | | | | | | | | | | | | | | --- |
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| 27D | | | | | | | | | | | | | | | | | | | | | | | --- |
| 27E | | | | | | | | | | | | | | | | | | | | | | | --- |
| 27F | | | | | | | | | | | | | | | | | | | | | | | --- |
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| 82 | | | | | | | | | | | | | | | | | | | ASP | | | | --- |
| 83 | | | | | | | | | | | | | | | | | | | PHE | | | | --- |
| 84 | | | | | | | | | | | | | | | | | | | ALA | | | | --- |
| 85 | | | | | | | | | | | | | | | | | | | THR | | | | --- |
| 86 | | | | | | | | | | | | | | | | | | | TYR | | | | --- |
| 87 | | | | | | | | | | | | | | | | | | | TYR | | | | --- |
| 88 | | | | | | | | | | | | | | | | | | | CYS | | | | --- |
| 89 | | | | | | | | | | | | | | | | | | | gln | | | | --- |
| 90 | | | | | | | | | | | | | | | | | | | glu | | | | --- |
| 91 | | | | | | | | | | | | | | | | | | | his | | | | --- |
| 92 | | | | | | | | | | | | | | | | | | | ASP | | | ASP | --- |
| 93 | | | | | | | | | | | | | | | | | | | his | | | ile | --- |
| 94 | | | | | | | | | | | | | | | | | | | leu | | | PHE | --- |
| 95 | | | | | | | | | | | | | | | | | | | PRO | | | PRO | --- |
| 95A | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 95B | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 95C | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 95D | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 95E | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 95F | | | | | | | | | | | | | | | | | | | --- | | | GLY | --- |
| 96 | | | | | | | | | | | | | | | | | | | LEU | | | GLY | --- |
| 97 | | | | | | | | | | | | | | | | | | | THR | | | THR | --- |
| 98 | | | | | | | | | | | | | | | | | | | PHE | | | PHE | --- |
| 99 | | | | | | | | | | | | | | | | | | | GLY | | | GLN | --- |
| 100 | | | | | | | | | | | | | | | | | | | GLY | | | GLN | --- |
| 101 | | | | | | | | | | | | | | | | | | | GLY | | | GLY | --- |
| 102 | | | | | | | | | | | | | | | | | | | THR | | | THR | --- |
| 103 | | | | | | | | | | | | | | | | | | | THR | | | LYS | --- |
| 104 | | | | | | | | | | | | | | | | | | | VAL | | | VAL | --- |
| 105 | | | | | | | | | | | | | | | | | | | GLU | | | GLU | --- |
| 106 | | | | | | | | | | | | | | | | | | | MET | | | ILE | --- |
| 106A | | | | | | | | | | | | | | | | | | | --- | | | --- | --- |
| 107 | | | | | | | | | | | | | | | | | | | LYS | | | LYS | --- |
| 108 | | | | | | | | | | | | | | | | | | | ARG | | | ARG | --- |
| 109 | | | | | | | | | | | | | | | | | | | THR | | | THR | --- |



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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | | 125 AMYLOID | 126 REI .6 | 127 AMYLOID MS # | 128 PEN | # OF SEQUENCES | # OF AMINO ACIDS | OCCURRENCES OF MOST COMMON AMINO ACID | VARIABILITY |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | --- | --- | 1 | 1 | 1(PCA) | |
| | 1 | ASP | ASP | ASP | ASP | 125 | 3,4 | 122(ASP),118(ASP) | 3.1,4.2 |
| | 2 | ILE | ILE | # | ILE | 123 | 2 | 120(ILE) | 2. |
| | 3 | glu | GLN | GLN | GLN | 123 | 7 | 116(GLN),112(GLN) | 7.4,7.7 |
| | 4 | MET | MET | MET? | MET | 124 | 4 | 109(MET) | 4.6 |
| | 5 | pro | THR | THR | | 124 | 3 | 122(THR) | 3. |
| | 6 | GLN | GLN | | | 123 | 1,2 | 123(GLN),118(GLN) | 1.,2.1 |
| | 7 | SER | | | | 121 | 2 | 120(SER) | 2. |
| | 8 | PRO | | | | 121 | 2 | 120(PRO) | 2. |
| | 9 | SER | | | | 121 | 4 | 117(SER) | 4.1 |
| FR1 | 10 | mar | | | | 120 | 5 | 89(SER) | 6.7 |
| | 11 | LEU | | | | 119 | 4 | 111(LEU) | 4.5 |
| | 12 | | | | | 118 | 3 | 113(SER) | 3.1 |
| | 13 | | | | | 117 | 4 | 107(ALA) | 4.4 |
| | 14 | | | | | 113 | 6 | 106(SER) | 6.4 |
| | 15 | | | | | 113 | 3 | 109(VAL) | 3.1 |
| | 16 | | | | | 109 | 2 | 108(GLY) | 2. |
| | 17 | | | | | 109 | 3,4 | 106(ASP),98(ASP) | 3.1,4.4 |
| | 18 | | | | | 106 | 6 | 97(ARG) | 6.6 |
| | 19 | | | | | 107 | 3 | 101(VAL) | 3.2 |
| | 20 | | | | | 106 | 4 | 102(THR) | 4.2 |
| | 21 | | | | | 104 | 4 | 99(ILE) | 4.2 |
| | 22 | | | | | 104 | 6 | 95(THR) | 6.6 |
| | 23 | | | | | 96 | 1 | 96(CYS) | 1. |
| | 24 | | | | | 88 | 6 | 57(ARG) | 9.3 |
| | 25 | | | | | 88 | 6 | 82(ALA) | 6.4 |
| | 26 | | | | | 85 | 4 | 79(SER) | 4.5 |
| | 27 | | | | | 84 | 4 | 79(GLN),66(GLN) | 4.3,5.1 |
| | 27A | | | | | 3 | 2 | 2(SER) | |
| | 27B | | | | | 3 | 2 | 2(LEU) | |
| | 27C | | | | | 3 | 2 | 2(VAL) | |
| CDR1 | 27D | | | | | 3 | 3 | 1( + ) | |
| | 27E | | | | | 2 | 2 | 1( + ) | |
| | 27F | | | | | | | | |
| | 28 | | | | | 84 | 7 | 29(SER) | 20. |
| | 29 | | | | | 83 | 5 | 72(ILE) | 5.8 |
| | 30 | | | | | 81 | 11 | 41(SER) | 22. |
| | 31 | | | | | 79 | 12 | 27(ASN),24(SER) | 35.,39. |
| | 32 | | | | | 79 | 9 | 34(TYR) | 21. |
| | 33 | | | | | 77 | 4 | 73(LEU) | 4.2 |
| | 34 | | | | | 73 | 7,8 | 30(ALA) | 17.,19. |
| | 35 | | | | | 76 | 1 | 76(TRP) | 1. |
| | 36 | | | | | 74 | 2 | 66(TYR) | 2.2 |
| | 37 | | | | | 73 | 4 | 58(GLN),61(GLN) | 4.3,4.8 |
| | 38 | | | | | 71 | 4 | 58(GLN),63(GLN) | 4.2,4.5 |
| | 39 | | | | | 68 | 4 | 62(LYS) | 4.4 |
| | 40 | | | | | 70 | 3 | 68(PRO) | 3.1 |
| | 41 | | | | | 58 | 3 | 54(GLY) | 3.2 |
| FR2 | 42 | | | | | 60 | 6 | 49(LYS) | 7.3 |
| | 43 | | | | | 61 | 4 | 57(ALA) | 4.3 |
| | 44 | | | | | 61 | 1 | 61(PRO) | 1. |
| | 45 | | | | | 61 | 7,8 | 46(LYS) | 9.3,11. |
| | 46 | | | | | 60 | 7 | 42(LEU) | 10. |
| | 47 | | | | | 59 | 2 | 58(LEU) | 2. |
| | 48 | | | | | 57 | 2 | 56(ILE) | 2. |
| | 49 | | | | | 59 | 4 | 55(TYR) | 4.3 |
| | 50 | | | | | 59 | 9 | 13(ALA) | 20. |
| | 51 | | | | | 59 | 5 | 50(ALA) | 5.9 |
| CDR2 | 52 | | | | | 58 | 6 | 53(SER) | 6.6 |
| | 53 | | | | | 57 | 6,7 | 26(SER) | 13.,15. |
| | 54 | | | | | 58 | 2 | 56(LEU) | 2.1 |
| | 55 | | | | | 58 | 6,9 | 23(GLU) | 17.,21. |
| | 56 | | | | | 56 | 8 | 34(SER) | 13. |
| | 57 | | | | | 57 | 1 | 57(GLY) | 1. |
| | 58 | | | | | 57 | 3 | 50(VAL) | 3.5 |
| | 59 | | | | | 57 | 4 | 54(PRO) | 4.2 |
| | 60 | | | | | 57 | 1 | 57(SER) | 1. |
| | 61 | | | | | 58 | 3 | 56(ARG) | 3.1 |
| | 62 | | | | | 57 | 3 | 55(PHE) | 3.1 |
| | 63 | | | | | 57 | 6 | 50(SER) | 6.8 |
| | 64 | | | | | 57 | 2 | 55(GLY) | 2.1 |
| | 65 | | | | | 56 | 5 | 51(SER) | 5.5 |
| | 66 | | | | | 57 | 4 | 54(GLY) | 4.2 |
| | 67 | | | | | 55 | 3 | 51(SER) | 3.2 |
| | 68 | | | | | 55 | 3 | 52(GLY) | 3.2 |
| | 69 | | | | | 55 | 2 | 51(THR) | 2.2 |
| | 70 | | | | | 55 | 5,6 | 33(ASP),31(ASP) | 8.3,11. |
| | 71 | | | | | 54 | 4 | 49(PHE) | 4.4 |
| FR3 | 72 | | | | | 54 | 5 | 50(THR) | 5.4 |
| | 73 | | | | | 54 | 3 | 43(LEU) | 3.8 |
| | 74 | | | | | 54 | 4 | 51(THR) | 4.2 |
| | 75 | | | | | 54 | 3 | 47(ILE) | 3.4 |
| | 76 | | | | | 53 | 5 | 43(SER) | 6.2 |
| | 77 | | | | | 54 | 6 | 40(SER) | 8.1 |
| | 78 | | | | | 54 | 2 | 53(LEU) | 2. |
| | 79 | | | | | 54 | 3,4 | 52(GLN),48(GLN) | 3.1,4.5 |
| | 80 | | | | | 54 | 2 | 46(PRO) | 2.3 |
| | 81 | | | | | 54 | 3,5 | 37(GLU),34(GLU) | 4.4,7.9 |
| | 82 | | | | | 54 | 2 | 53(ASP),50(ASP) | 2.,2.2 |
| | 83 | | | | | 54 | 4 | 40(PHE) | 5.4 |
| | 84 | | | | | 54 | 2 | 53(ALA) | 2. |
| | 85 | | | | | 54 | 6 | 48(THR) | 6.7 |
| | 86 | | | | | 56 | 2 | 52(TYR) | 2. |
| | 87 | | | | | 55 | 2 | 52(TYR) | 2.1 |
| | 88 | | | | | 56 | 1 | 56(CYS) | 1. |
| | 89 | | | | | 57 | 4,5 | 46(GLN),43(GLN) | 5.,6.6 |
| | 90 | | | | | 57 | 2,3 | 51(GLN),46(GLN) | 2.2,3.7 |
| | 91 | | | | | 55 | 13,12 | 20(TYR) | 23.,24. |
| | 92 | | | | | 60 | 9 | 20(ASN),19( + ) | 27.,28. |
| | 93 | | | | | 60 | 9 | 29(SER) | 19. |
| | 94 | | | | | 60 | 12 | 15(LEU) | 48. |
| CDR3 | 95 | | | | | 56 | 4 | 44(PRO) | 5.1 |
| | 95A | | | | | 1 | 1 | 1(GLU) | |
| | 95B | | | | | | | | |
| | 95C | | | | | | | | |
| | 95D | | | | | | | | |
| | 95E | | | | | | | | |
| | 95F | | | | | | | | |
| | 96 | | | | | 44 | 12 | 10(TRP) | 53. |
| | 97 | | | | | 43 | 4 | 39(THR) | 4.4 |
| | 98 | | | | | 46 | 3 | 44(PHE) | 3.1 |
| | 99 | | | | | 46 | 1 | 46(GLY) | 1. |
| | 100 | | | | | 46 | 4,5 | 28(GLN),27(GLN) | 6.6,8.5 |
| | 101 | | | | | 46 | 1 | 46(GLY) | 1. |
| | 102 | | | | | 46 | 2 | 45(THR) | 2. |
| FR4 | 103 | | | | | 46 | 4 | 38(LYS) | 4.8 |
| | 104 | | | | | 45 | 2 | 36(VAL) | 2.5 |
| | 105 | | | | | 45 | 4,5 | 29(GLU),28(GLU) | 6.2,8. |
| | 106 | | | | | 46 | 7 | 30(ILE) | 11. |
| | 106A | | | | | | | | |
| | 107 | | | | | 45 | 3 | 42(LYS) | 3.2 |
| | 108 | | | | | 33 | 2 | 31(ARG) | 2.1 |
| | 109 | | | | | 22 | 1 | 22(THR) | 1. |



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SEQUENCE LISTING

<110> ALEXION PHARMACEUTICALS, INC.

<120> TREATMENT OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA PATIENTS BY AN INHIBITOR OF COMPLEMENT

<130> P2913 EP/3

<150> 60/783,070
<151> 2006-03-15

<160> 10

<170> BiSSAP 1.3.6

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Trp Ile Gln Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45
Gly Glu Ile Leu Pro Gly Ser Gly Ser Thr Glu Tyr Thr Glu Asn Phe
50 55 60
Lys Asp Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65 70 75 80
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95
Ala Arg Tyr Phe Phe Gly Ser Ser Pro Asn Trp Tyr Phe Asp Val Trp
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Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
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20 25 30
Trp Ile Gln Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45
Gly Glu Ile Leu Pro Gly Ser Gly Ser Thr Glu Tyr Thr Glu Asn Phe
50 55 60
Lys Asp Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65 70 75 80



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```
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Tyr Phe Phe Gly Ser Ser Pro Asn Trp Tyr Phe Asp Val Trp
            100                 105                 110
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125
Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190
Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205
His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys
    210                 215                 220
Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser
225                 230                 235                 240
Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg
                245                 250                 255
Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp Pro
            260                 265                 270
Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala
        275                 280                 285
Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val Val
    290                 295                 300
Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr
305                 310                 315                 320
Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys Thr
                325                 330                 335
Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
            340                 345                 350
Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys
        355                 360                 365
Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
    370                 375                 380
Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp
385                 390                 395                 400
Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser
                405                 410                 415
Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala
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            20                  25                  30
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```
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45
Tyr Gly Ala Thr Asn Leu Ala Asp Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Asn Val Leu Asn Thr Pro Leu
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Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45
Tyr Gly Ala Thr Asn Leu Ala Asp Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Asn Val Leu Asn Thr Pro Leu
                85                  90                  95
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205
Phe Asn Arg Gly Glu Cys
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<210> 5
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<210> 6
<211> 17
<212> PRT
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<220>
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Asp

<210> 7
<211> 13
<212> PRT
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<210> 8
<211> 11
<212> PRT
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<400> 10
Gln Asn Val Leu Asn Thr Pro Leu Thr
1 5



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EP 16 19 5355.9
Alexion Pharmaceuticals, Inc.
Our Ref.: P2913 EP/3

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: May 12, 2017
Electronic Signature for Jill Gorny Sloper, Esq.: /Jill Gorny Sloper, Esq./

Docket No.: AXJ-114BUSCN2
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Leonard Bell *et al.*

Application No.: 15/148,839

Confirmation No.: 3159

Filed: May 6, 2016

Art Unit: 1644

For: TREATMENT OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA PATIENTS BY AN INHIBITOR OF COMPLEMENT

Examiner: J. L. Rogers

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**DECLARATION PURSUANT TO 37 C.F.R. § 1.132 BY DR. LAURAL BOONE**

I, Laural S. Boone, J.D., Ph.D., declare the following:

1. I am presently a Senior Director and Patent Counsel at Alexion Pharmaceuticals, Inc., (hereafter, "Alexion") which is located in New Haven, Connecticut. I have been employed in this capacity at Alexion for three years to date. Alexion is the Assignee of the above-referenced patent application. I received a B.A. in Chemistry from Barnard College, a M.S. and Ph.D. in Organic Chemistry from the University of Chicago, and a J.D. from the George Washington University Law School. I also completed a Postdoctoral Fellowship in Cellular and Molecular Biophysics at Rockefeller University. I am registered to practice as a patent attorney before the United States Patent & Trademark Office.



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2. I have reviewed the Examiner's request for additional information under 37 C.F.R. § 1.105 and provide the following statements.

3. I have reviewed Exhibits A through F cited by the Examiner on pages 7-8 of the April 4, 2017 Office Action, including each of the 37 documents listed in Exhibit F. These exhibits and the documents listed therein reference 17 different clinical studies using eculizumab that occurred prior to March 16, 2007. Of the 17 studies, 4 are referred to as "extension" studies, which are studies that are appended to a clinical study to prolong the treatment and/or monitoring period of the same patients that participated in the initial study.

4. Of these 17 clinical studies, one that is described in both Exhibits D and F, is entitled "A Randomized, Third-Party-Blind, Placebo-Controlled, Pilot Study of the Effect of h5G1.1-mAb in Patients with Bullous Pemphigoid." Based on my review of communications between Alexion employees and physicians participating in this study, I have determined that only one patient was enrolled in this study, and that the one patient was randomized to receive placebo. Thus, no patient received eculizumab in the course of this study, and the study was terminated.

5. For the remaining 16 clinical studies identified in Exhibits A through F, I have reviewed each of the clinical trial protocols and the following information from the protocols is shown in the table below: the full name of each study (and extension study thereof, if applicable, identified by an "E" or an "X" in the study number), the study number(s), the Exhibit(s) cited by the Examiner on pages 7-8 of the Office Action that each study was described in, and whether the study (including any extension study thereof) included a confidentiality provision (as described in further detail below).

| Study Name[1] | Study Number | Exhibit(s) | Explicit Confidentiality Provision |
|---|---|---|---|
| An Open-Label Study of the Effect of Eculizumab (h5G1.1-mAb) on Patients with Transfusion Dependent, Hemolytic, Paroxysmal Nocturnal Hemoglobinuria | C02-001 | F | Yes |
| Extension Study of Eculizumab in Patients with Transfusion Dependent, Haemolytic, Paroxysmal Nocturnal Haemoglobinuria Who Previously Participated in Study C02-001 | E02-001 | | |
| An Open-Label Extension Study of Eculizumab in Patients with Transfusion Dependent, Haemolytic, Paroxysmal Nocturnal Hemoglobinuria Who Previously Participated in Study E02-001 | X03-001 | | |
| A Hemoglobin Stabilization and Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multi-Center, Double-Blind, Placebo-Controlled, Using Eculizumab in Paroxysmal Nocturnal Hemoglobinuria Patients (TRIUMPH) | C04-001 | A[2], F | Yes |
| Safety in Hemolytic PNH Patients Treated with Eculizumab: A Multi-Center Open-Label Research Design Study (SHEPHERD) | C04-002 | A, C, F | Yes |
| A Phase III, Open-Label, Extension Study of Eculizumab in Patients with Transfusion Dependent, Hemolytic Paroxysmal Nocturnal Hemoglobinuria (PNH) Who Have Participated in the TRIUMPH (C04-001), SHEPHERD (C04-002) or X03-001 Studies | E05-001 | A, F | Yes |
| A Randomized, Double-Blind, Placebo-Controlled Pilot Study of the Effect of h5G1.1-mAb on Dermatomyositis Patients | C99-006 | B, D[3], F | Yes |

[1] Although some of these studies may not have occurred in the United States and thus are not available to give rise to public use under 35 U.S.C. § 102(b), all of the trials are included in this table (regardless of where they occurred).

[2] Of the studies referenced in Exhibit A, studies 41-43, 45-46, 52-54, 56-58 and 60 are all indicated as having been "received" or "started" *after* March 16, 2007, *i.e.*, the date eculizumab was first approved for commercial marketing and sale. Thus, only studies started before the marketing approval, identified as numbers 44, 47-51, 55, and 59 in Exhibit A, are included in this table.

[3] Item 445382 referenced in the Examiner's question regarding the Kaplan reference (Exhibit D) does not refer to an actual study. However, to address any potential questions the Examiner has with respect to

| Study Name[1] | Study Number | Exhibit(s) | Explicit Confidentiality Provision |
|---|---|---|---|
| Phase I Study of h5G1.1-mAb in Patients with Rheumatoid Arthritis | C97-001 | F | Yes |
| A Phase II Randomized, Double-Blind, Placebo-Controlled Study of the Effect of h5G1.1-mAb on Rheumatoid Arthritis Patients Receiving Methotrexate | C99-001 | D, F | Yes |
| A Phase IIB Randomized, Double-Blind, Placebo-Controlled Study of the Effect of h5G1.1-mAb on Rheumatoid Arthritis (RA) Patients with Active Disease Despite Receiving Methotrexate or Leflunomide | C01-004 | D, F | Yes |
| A Phase II Randomized, Double-Blind, Placebo-Controlled Study of the Effect of h5G1.1-mAb on the Reduction of Proteinuria in Patients with Idiopathic Membranous Glomerulopathy<br><br>An Open Label Study of the Long-Term Safety of h5G1.1-mAb on the Reduction of Proteinuria in Patients with Idiopathic Membranous Glomerulopathy | C99-004<br><br>E99-004 | D, E, F | Yes |
| Phase I Study of h5G1.1-mAb in Patients with Systemic Lupus Erythematosus | C97-002 | D, F | Yes |
| A Randomized, Double-Blind, Placebo-Controlled Pilot Study of the Effect of h5G1.1-mAb on Psoriatic Patients | C99-007 | D, F | Yes |
| The Paroxysmal Nocturnal Hemoglobinuria Early Access Treatment Protocol (EMBRACE) | C06-002 | F | Yes |
| PNH Registry | M07-001 | A, F | Yes |

Exhibit D, I reviewed the Kaplan reference in its entirety, and the clinical studies described therein that used eculizumab are also included in this table.

6. I have reviewed an alignment of the sequence of eculizumab that is listed in the Biologic License Application for Soliris®(eculizumab) ("BLA") with the heavy and light chain sequences of SEQ ID NOs: 2 and 4 of the parent of the pending application, PCT/US2007/006606 (published as WO 2007/106585). I have concluded that the antibody (eculizumab) used in each of the studies included in the above table contained the heavy and light chain sequences of SEQ ID NOs: 2 and 4. However, the protocols used to conduct those studies did not inform either doctors or patients of the sequences.

7. As indicated in the table above, in the course of conducting each of the clinical trials listed, participating physicians and other participants in the study were required to maintain Alexion's confidential and/or proprietary information in strict confidence. For example, these individuals were required to maintain the confidentiality of the clinical trial protocols themselves, as each protocol was marked "Confidential." These individuals were also bound by explicit confidentiality provisions in the protocol. The following language from the protocol for study number C04-001, which refers to the Phase III TRIUMPH study, provides a representative example of the confidentiality requirements set forth directly within these clinical study protocols (emphasis added):

> "THE INVESTIGATOR AND ALL EMPLOYEES AND COWORKERS INVOLVED WITH THIS STUDY SHALL NOT DISCLOSE OR USE FOR ANY PURPOSE, OTHER THAN PERFORMANCE OF THE STUDY, ANY DATA, RECORDS OR OTHER UNPUBLISHED, CONFIDENTIAL INFORMATION DISCLOSED TO THOSE INDIVIDUALS FOR THE PURPOSE OF THE STUDY. PRIOR WRITTEN AGREEMENT FROM THE SPONSOR OR ITS DESIGNEE MUST BE OBTAINED FOR THE DISCLOSURE OF ANY SAID CONFIDENTIAL INFORMATION TO OTHER PARTIES."

8. As another representative example, the protocol for the study in dermatomyositis (study number C02-002) stated:



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"THIS CONFIDENTIAL INFORMATION ABOUT AN INVESTIGATIONAL DRUG IS PROVIDED FOR THE EXCLUSIVE USE OF INVESTIGATORS OF THIS DRUG AND IS SUBJECT TO RECALL AT ANY TIME. THE INFORMATION IN THIS DOCUMENT MAY NOT BE DISCLOSED UNLESS SUCH DISCLOSURE IS REQUIRED BY FEDERAL OR STATE LAW OR REGULATIONS SUBJECT TO THE FOREGOING. THIS INFORMATION MAY BE DISCLOSED ONLY TO THOSE PERSONS INVOLVED IN THE STUDY WHO HAVE A NEED TO KNOW WITH THE OBLIGATION NOT TO FURTHER DISSEMINATE THIS INFORMATION. THESE RESTRICTIONS ON DISCLOSURE WILL APPLY EQUALLY TO ALL FUTURE ORAL OR WRITTEN INFORMATION SUPPLIED TO YOU BY ALEXION, WHICH IS DESIGNATED AS 'PRIVILEGED' OR 'CONFIDENTIAL'."

9. All confidentiality provisions in the protocols for the studies listed in the table above were substantively identical to these representative confidentiality provisions from studies C04-001 and C02-002.

10. In addition, each clinical trial protocol that I reviewed also required strict control over the physical drug product (eculizumab). For example, the clinical trial protocol for the TRIUMPH study described the secure storage and inventory and disposal requirements of each participating physician and study site as shown below:

"Eculizumab must be stored in a secure, limited-access storage area. . . .

Test Article Accountability... When a drug shipment is received at the site, the pharmacist at each site shall verify the contents, sign the packing invoice provided with the shipment, and maintain the original copy for review by the study monitor. The duplicate copy should be kept in the pharmacy binder.

Each shipment of investigational drug supplies will contain an accountability log to assist the pharmacist in maintaining current and accurate inventory records covering receipt, dispensing, and disposition of the investigational product. During the study, the following information must be noted in the accountability log: the identification number(s), initials of patient(s) who is dispensed investigational product, the date(s) that the investigational product is prepared and dispensed, and the initials of the pharmacist or designee who prepared the investigational product. Empty vials and vials with residual materials should be kept for inspection by the study monitor.

> The study monitor will examine the inventory records during study conduct. Additionally, the inventory records must be readily available and may be subject to regulatory authorities or an independent auditor's inspection at any time. At the completion of the study, to satisfy regulatory requirements regarding drug accountability, all remaining investigational product inventory will be reconciled and retained or destroyed according to applicable local, state, and federal regulations."

11. All of the protocols that I reviewed for the studies listed in the above table included similar (if not identical) drug storage and accountability provisions, except for the PNH Registry protocol (the last entry in the table above). The PNH Registry was not a study in which eculizumab was administered to any patients, but was a registry for all participating patients with PNH either treated or untreated. More particularly, it was a "non-interventional study designed to collect post-marketing pharmacovigilance and effectiveness data on patients treated with Soliris® (eculizumab)" and to "collect information on the progression of disease in the Soliris treated and untreated PNH patient population." Accordingly, the protocol for the PNH Registry did not contain drug storage or accountability provisions. The PNH Registry protocol did, however, include strict confidentiality provisions as indicated in the table above, *e.g.*, requiring all physicians to "agree to maintain the confidentiality of all information received or developed in connection with [the] protocol."

12. To participate in each clinical trial listed in the table above, each physician had to sign the protocol for the trial, committing to adhere to the respective clinical trial protocol's provisions. For example, the TRIUMPH study protocol, just prior to the physician's signature line, states:

> "I agree to conduct the study as outlined in the protocol entitled: "*TRIUMPH*: A Hemoglobin Stabilization and Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multi-Center, Double-Blind, Placebo-Controlled, Using Eculizumab in Paroxysmal Nocturnal Hemoglobinuria Patients" and in accordance with the guidelines and all applicable government regulations. I have read and understand all sections of the protocol including Section 11, Administrative Considerations."



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13. All of the other protocols that I reviewed similarly required each physician (or investigator) to agree to conduct the study in accordance with the protocol.

14. In response to the Examiner's Request (G), based on the BLA approval letter that I reviewed from the Food and Drug Administration Department of Health & Human Services to Alexion regarding eculizumab, the antibody having the heavy chain described by SEQ ID NO: 2 and the light chain described by SEQ ID NO: 4 was first approved for commercial marketing and sale on March 16, 2007.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or of any patent issued thereon.

Laural S. Boone 11 MAY 2017

Laural S. Boone, J.D., Ph.D. Date



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Page 3949

EP 16 19 5355.9
Alexion Pharmaceuticals, Inc.
Our Ref.: P2913 EP/3

## DECLARATION REGARDING DETERMINING THE STARTING RESIDUE OF THE ACTIVE LIGHT CHAIN SEQUENCE OF ECULIZUMAB

I, Bruce Andrien, Director, Early Assay Development, of Alexion Pharmaceuticals, Inc., of 100 College Street, New Haven, CT 06510, United States of America, make the following factual declaration concerning the signal peptide and n-terminal amino acid residue of the light chain of eculizumab:

1) I am Director, Early Assay Development, of Alexion Pharmaceuticals, Inc. ("Alexion"), as shown in my curriculum vitae, a copy of which is **attached** herewith and marked Exhibit A.

2) As also shown in my curriculum vitae, I have a Ph.D. from the University of California, San Diego in Engineering Physics. My Ph.D. training focused on designing materials and optimizing scientific instrumentation including mass spectrometers for use in determining accurate molecular weights of materials. Since my Ph.D. was completed in 1991, my career has been devoted to application of increasingly more precise methods for determining the molecular weight, protein sequence and chemical signature information of large molecular weight proteins in the biotechnology industry. In my 10 year role at Analytica of Branford, I developed electrospray sources and mass spectrometers for analyzing peptides, proteins and monoclonal antibodies under the supervision of John B. Fenn, the recipient of the 2002 Nobel Prize in Chemistry for the development of electrospray for the analysis of biological macromolecules.

3) Through my work at Alexion over the past 16 years, I have become very familiar with the protein sequences and structures of antibodies.

4) I understand that EP 16 17 2335.8 is a European patent application whose parent international application was filed on March 16, 2007.

5) I understand the pending claim 1 of EP 16 17 2335.8 reads as follows:

Claim 1. A pharmaceutical composition comprising an antibody that binds C5 or an active antibody fragment thereof for use in treating a patient suffering from paroxysmal nocturnal hemoglobinuria (PNH), wherein the antibody binds C5 or an active fragment thereof comprises a heavy chain and a light chain, wherein the heavy chain consists of SEQ ID NO:2 and the light chain consists of SEQ ID NO:4.

6) I understand that SEQ ID NO: 4 in EP 16 17 2335.8 reads as follows:

MDMRVPAQLLGLLLLWLRGARCDIQMTQSPSSLSASVGDRVTITCGASENIYGALNWYQQKPGK
APKLLIYGATNLADGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQNVLNTPLTFGQGTKVEIKRT
VAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLS
STLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

7) I was asked to determine whether one skilled in the art of antibody structure would have immediately recognized that the light chain identified by SEQ ID NO:4 includes the leader peptide of the light chain, and whether one of skill in the art could have easily determined where the leader peptide ends and the active fragment begins in SEQ ID NO:4.

8) Upon being shown the light chain of SEQ ID NO:4, I immediately recognized three features that indicated the leader peptide was included. The first two features were that the first residue was a methionine (M) and that this first methionine residue was followed by 21 amino acid residues, most of which are hydrophobic. Methionine is encoded in DNA as the ATG start codon and first amino acid in eukaryotic proteins. Methionine, is therefore, also the starting residue of signal peptides expressing the light chain of antibodies, but is cleaved off with the entire signal peptide in the cell from light chains as the multi-chain protein folds and is assembled into a fully formed antibody. The presence of Met as the first amino acid present in SEQ ID NO:4, combined with the length and amino acid content of this peptide, is characteristic of signal (leader) peptides of immature proteins and indicated the signal peptide was still present.

The third feature was that the entire peptide sequence of the light chain was 236 residues, which is longer than the average light chain of a mature antibody which ranges from about 211-217 amino acids. See Janeway *et al.*, Immunobiology, 5th

Edition New York, Garland Science 2001. Again, this factor reinforced to me that the signal peptide was present in SEQ ID NO:4. The signal peptide is naturally present on the N-terminus of immature antibody proteins and this fact is well-known and established amongst scientists who work with antibodies.

9) People familiar with the field of antibody sequences know that antibody sequences are usually numbered according to the "Kabat" numbering scheme. This is because the Kabat's database, which began in 1969, but was first published in 1976, was one of the oldest biological sequence databases maintained and free to the public. Kabat's database was also unique because it contained protein sequence alignments. Kabat's database was published in printed form in five growing editions between 1976 and 1991. Kabat's database continued online for a while after the last printed version in 1991 at http/kabatdatabase.com, but because the information contained in the database has grown with our ability to sequence more easily, it has increased to be more than five times larger than the last printed version containing 2387 pages. The database is still used today by practitioners in the art, but contains a convenient user interface. See Kabatman at www.bioinf.org.uk. To answer this question, I consulted an in-house copy of the iconic 2387 page, last printed version of "Sequences of Proteins of Immunological Interest" Volume 1, 5th Edition, published in 1991 by the U.S. Department of Health and Human Services and compiled by Elvin A. Kabat *et al.*, which is also known as NIH Publication No. 91-3242. See attached Exhibit B.

10) In the Table of Contents on page (iii) for "Sequences of Proteins of Immunological Interest" Volume 1, 5th Edition, the page indicated to show "Signal Sequences of Light Chains" for "Human Kappa Light Chains" is page 1. See Exhibit C. The active fragment sequences of "Human Kappa Chains Subgroup I" are indicated to be shown on page 103. See Exhibit C.

11) As directed by the Table of Contents in Exhibit C, on page 1, top table, **for 22-residue signal peptides** (1, 2, 5-11, 15, 16, & 18 sequences) of human kappa light chains the first three residues (sequences in columns) are predominantly Met-Asp-Met or MDM in single letter code, just as in the beginning of SEQ ID NO:4. See Exhibit D. The numbering system on the left column of this page in the top table uses a negative sign

in front of the signal peptide residue numbers; therefore Met-Asp-Met corresponds to -22 to -20. See Exhibit D. The final residues in **signal peptides having a 22 amino acid length** as shown in the top table on page 1 are predominantly Arg-Cys (RC), numbered as -2 and -1, just as in SEQ ID NO:4. Although there are three occurrences of Lys-Cys (KC) residues as -2 and -1 in **the 22 residue signal peptides** in the top table on page 1 of Exhibit D, the pattern is always a positively-charged residue followed by Cys (C) at the -1 position, just as in position 22 of SEQ ID NO:4.

12) As described above, the active peptide sequences for human kappa light chains begin on page 103 of "Sequences of Proteins of Immunological Interest" Volume 1, 5th Edition, published in 1991. Pages 103-108 are included as Exhibit E. The numbering system of Framework 1 is again on the left side of the page and is numbered downward from 0 to 23, for example, for Framework 1 (FR1). It is well-known to scientists working in the field of antibodies that Framework 1 is the N-terminus of the active antibody light chain. Here, even in 1991, it was evident that Asp-Ile-Gln-Met (DIQM) were the first 4 residues of an active human kappa light chain subgroup 1. See Exhibit E. Human kappa light chain subgroup I was examined first because it was known that subgroup 1 outnumbers each of the other subgroups in usage. See Solomon et al., American Journal of Pathology 137(4) 855-862 (1990).

I found that in SEQ ID NO:4, immediately following the 22-residue signal peptide, is the clear and unambiguous start site to the active antibody fragment, i.e., DIQM at positions 23-26. The vast majority of human kappa light chains catalogued in 1991 started with this sequence. The statistics on page 108 of Exhibit E show the number of full and/or partial sequences of kappa light chains known in 1991 that began with D (118/125), followed by I (120/123), followed by Q (112/123) and followed by M (109/124). Therefore, for all of the reasons above, I conclude that one skilled in the art in 2007 would have immediately recognized that the signal peptide is included in SEQ ID NO:4 and would have also found it straightforward and simple to delineate the signal peptide from the active N-terminus of the light chain in SEQ ID NO:4, as starting with (DIQM).

DECLARED at New Haven, CT
United States of America

This 23 Day of May 2017

Bruce A. Andrien Jr.

Bruce A. Andrien Jr., Ph.D.

Witness signature

J. Darrell Fontenot Ph.D., J.D.,
Sr. Dir., Patent Counsel,
Alexion Pharmaceuticals, Inc.
100 College Street, New Haven, CT, 06510,
United States of America

Witness Name, Capacity and Address

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: January 19, 2017
Electronic Signature for Jill Gorny Sloper, Esq.: /Jill Gorny Sloper, Esq./

EP 16 19 5355.9
Alexion Pharmaceuticals, Inc.
Our Ref.: P2913 EP/3

Docket No.: AXJ-114BUSCN3
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Leonard Bell *et al.*

Application No.: 15/260,888

Filed: September 9, 2016

For: TREATMENT OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA PATIENTS BY AN INHIBITOR OF COMPLEMENT

Confirmation No.: 2558

Art Unit: 1644

Examiner: J. L. Rogers

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**DECLARATION PURSUANT TO 37 CFR 1.132 BY DR. LEONARD BELL**

I, Leonard Bell, M.D., a co-inventor of the subject invention, declare that:

1. I founded Alexion Pharmaceuticals, Inc. and served as its Chief Executive Officer from 1992 until 2015. In that role, I was closely involved in the development of eculizumab and in the administration and monitoring of all clinical trials involving eculizumab.

2. Prior to March 15, 2007, which is the date the subject patent application was filed, eculizumab was not available to the public. In order to be approved for marketing, eculizumab was used in clinical trials before March 15, 2007, but only under strict control and conditions of confidentiality. Patients in clinical trials of eculizumab received intravenous infusions of eculizumab at hospitals and infusion clinics and never themselves possessed samples of eculizumab. Researchers and staff involved in clinical trials of eculizumab were not permitted to use or distribute eculizumab for



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purposes other than conducting the clinical trials, and were strictly accountable to Alexion for the inventory of eculizumab and for information about eculizumab.

3. Moreover, prior to March 15, 2007, the complete structure of eculizumab was not disclosed to the public. For example, the Hillmen reference (Hillmen et al., N. ENGL. J. MED., 350, pp. 552-59 (2004)) does not disclose any parts of the sequence of eculizumab and the '245 patent (U.S. Pat. No. 6,355,245) does not disclose or even hint at the unique non-naturally occurring, protein-engineered heavy chain (including the CH1-hinge-CH2-CH3 regions) of eculizumab.

4. Nor does the Thomas reference (Thomas et al., MOLECULAR IMMUNOLOGY, 33 (17/18), pp. 1389-1401 (1996)) describe eculizumab. The Thomas reference describes an antibody comprising the humanized variable region of eculizumab, but does not disclose or hint at the unique non-naturally occurring, protein-engineered heavy chain of eculizumab, which confers important functional effects (as discussed below). Rather, the antibody described in the Thomas reference contains a *naturally-occurring* IgG4 heavy chain. The antibody described in the Thomas reference therefore is <u>not</u> eculizumab. It is both structurally and functionally different from eculizumab.

5. As shown below, a sequence alignment of the heavy chain constant regions and hinge of eculizumab (shown in bold on the top line below) and that of the antibody described in the Thomas reference (shown on the bottom line below) demonstrates that the two antibodies are structurally very different, with <u>fourteen</u> different amino acid residues in the constant regions (underlined and highlighted) (four different residues in the CH1 domain, six different residues in the hinge region and four different residues in the CH2 domain):

```
----------------------------CH1-----------------------
ASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHT
ASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHT
```



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```
------------CH1-------------------------------|Hinge-
FPAVLQSSGLYSLSSVVTVPSSNFGTQTYTCNVDHKPSNTKVDKTVERKCCV
FPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGP

-Hinge--|-----------------CH2------------------
ECPPCPAPP-VAGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDP
PCPSCPAPEFLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDP

---------CH2-----------------------------------------
EVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKC
EVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKC

--------CH2-------|-------------CH3---------------
KVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKG
KVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKG

--------------------------CH3---------------------
FYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNV
FYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNV

---------CH3-------------
FSCSVMHEALHNHYTQKSLSLSLGK
FSCSVMHEALHNHYTQKSLSLSLGK
```

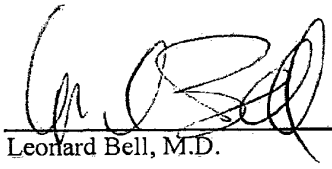
6. Also, the functional properties of eculizumab and the antibody described in the Thomas reference are very different. For example, eculizumab does not bind as strongly to Fcγ receptors as the Thomas antibody. Binding to the Fcγ receptors initiates and amplifies immune responses that are undesirable for an antibody intended to shut down the terminal complement pathway. Thus, engineering eculizumab to minimize binding to these receptors provided important advantages over the antibody described in the Thomas reference.

7. Eculizumab also has a much longer plasma half-life than the antibody described in the Thomas reference. It is advantageous for an antibody like eculizumab to remain in the circulation longer so that it does not need to be administered to patients as frequently.

8. Accordingly, as demonstrated by comparative data between eculizumab and the antibody described in the Thomas reference, the non-natural, protein-engineered, heavy chain of eculizumab reduces effector function activation, minimizes immunogenicity, and contributes to a longer half-life of eculizumab compared to the antibody described in the Thomas reference. These properties were surprising and unpredictable, and made eculizumab a better drug candidate than the antibody described in the Thomas reference.

9. In sum: the complete structure of eculizumab was not available to the public on or before March 15, 2007; eculizumab was not available to the public or being used by the public prior to that time; the unique protein-engineered heavy chain of eculizumab was not described in the Hillmen reference, the Thomas reference or the '245 patent; and the unique protein-engineered heavy chain of eculizumab could not be derived from the combined disclosures of the Hillmen reference, the Thomas reference and/or the '245 patent.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or of any patent issued thereon.



Leonard Bell, M.D. 1/18/2017 Date



Samsung Bioepis Exhibit No. 1002
Page 3958

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European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

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ALLEMAGNE

| Date |
| --- |
| 31.07.2017 |

| Reference | Application No./Patent No. |
| --- | --- |
| P2913 EP/3 | 16195355.9 - 1466 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

You are hereby informed that a decision on your request of 10.07.2017 for correction under Rule 139 EPC will be taken during examination proceedings by the competent Examining Division (Guidelines for Examination in the EPO, A-V, 3).

For the publication of the patent application according to Article 93 EPC the documents will be used as originally filed. If the request for correction has been filed before the technical preparations for publication pursuant to Rule 67 EPC have been completed, a reference to the request will be published on the front page.

**Receiving Section**

Europäisches Patentamt • European Patent Office • Office européen des brevets

**Registered letter**
EPO Form 1177 12.07



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Page 3959

Europäisches Patentamt
European Patent Office
Office européen des brevets

Application No.: 16195355.9

Substantive examination has started on 08.11.17 (see Notice from the European Patent Office dated 29.01.2013, OJ EPO 2013, 153).

**For the Examining Division**



VOSSIUS & PARTNER
Patentanwälte Rechtsanwälte mbB

EPO - Munich
102
09. Nov. 2017

VOSSIUS & PARTNER · POB 86 07 67 · 81634 München · Germany

European Patent Office

80298 M U N I C H

T1897/14-3.3.04
(05 71 2607.0 / 1720571)
Patentee: Alexion Pharmaceuticals, Inc.
Opposition by: Pfizer Inc.
Vossius Ref.: M2367 OPP(EP)

Appeal Number T1551/12-3.3.01
EP 07 75 3249.7
Alexion Pharmaceuticals, Inc.
Vossius Ref.: P2913 EP

EP 16 17 2335.8 – 1466
Alexion Pharmaceuticals, Inc.
Vossius Ref.: P2913 EP/2

EP 16 19 5355.9 - 1466
Alexion Pharmaceuticals, Inc.
Vossius Ref.: P2913 EP/3

EP 16 20 1244.7 - 1410
Alexion Pharmaceuticals, Inc.
Vossius Ref.: R1249 EP/3

München, November 9, 2017
WA/FLG/MUA

We herewith resign from representation of the five above-identified matters.

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Switzerland: HR Firmennummer CH-270.9.001.271-9

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Samsung Bioepis Exhibit No. 1002
Page 3961

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**GB**

It is respectfully requested that this change is registered in the official Register.

Dr. Joachim Wachenfeld
European Patent Attorney



Samsung Bioepis Exhibit No. 1002
Page 3962

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European Patent Office
Office européen des brevets

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| Application No. | Ref. | Date |
|---|---|---|
| 16 195 355.9 - 1466 | P2913 EP/3 | 17.11.2017 |
| Applicant: Alexion Pharmaceuticals, Inc. | | |

**Communication pursuant to Article 94(3) EPC**

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(2) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

**of 4 months**

from the notification of this communication, this period being computed in accordance with Rules 126(2) and 131(2) and (4) EPC. One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (R. 50(1) EPC).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the Examining Division requesting that you correct this deficiency (R. 137(4) EPC).

In case you withdraw the application within the above-mentioned period, the examination fee will be refunded at a rate of 50% (Art. 11 (b) RFees).

**Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Art. 94(4) EPC).**

**Registered letter**

Collura, Alessandra
Primary Examiner
**For the Examining Division**

Enclosure(s): 4 page/s reasons (Form 2906)
XP002262113

The examination is being carried out on the **following application documents**

**Description, Pages**

| | | | | |
|---|---|---|---|---|
| 1-43, 45-55 | as originally filed | | | |
| 44 | received on | 10-07-2017 | with letter of | 10-07-2017 |

**Sequence listings, SEQ ID NO**

| | | | | |
|---|---|---|---|---|
| 1-10 | received on | 10-07-2017 | with letter of | 10-07-2017 |

**Claims, Numbers**

| | |
|---|---|
| 1-3 | as originally filed |

**Drawings, Sheets**

| | |
|---|---|
| 1/4-4/4 | as originally filed |

Reference is made to the documents already cited in the course of the procedure.

Moreover, the following document is cited by the Examiner. A copy of the document is annexed to the communication and the numbering will be adhered to in the rest of the procedure.

D7 THOMAS T C ET AL: "Inhibition of complement activity by humanized anti-C5 antibody and single-chain Fv",
MOLECULAR IMMUNOLOGY, PERGAMON, GB,
vol. 33, no. 17-18, 1 January 1996 (1996-01-01), pages 1389-1401, XP002262113,
ISSN: 0161-5890, DOI: 10.1016/S0161-5890(96)00078-8

## 1. Articles 76(1) and 123(2) EPC

1.1 The objection raised in the European Preliminary Opinion (ESOP) under Article 76(1) EPC is presently maintained.

As already pointed out, the last paragraph on page 5, puts into relation sequence 2 with sequence 4 and not with sequences 8, 9 and 10.

The sequences 8, 9 **or** 10 of the heavy chain were put in relation with sequences 5, 6 **or** 7 of the light chain in a specific embodiment disclosed on page 5, lines 20-25.

No other passage of the application appears to disclose the subject-matter of present claim 1, in which the sequences 8, 9 and 10 have to be all part of the light chain.

It has to be noted by the applicant that the embodiments in which the heavy chain is characterised by sequences 5, 6 or 7 and the light chain by sequences 8, 9 **or** 10, actually include a plurality of embodiments which originate from the possibility of combining different alternative heavy chains (sequences 5, 6 or 7) with different light chains (sequences 8, 9 or 10).

Nowhere in the application as filed was the embodiment selected from these plurality of embodiments, i.e. the combination of sequences 8, 9 and 10, combined with the specific sequence 2.

1.2 With the letter dated 10.07.2017, the applicant filed amended sequences 3 and 4, in which the leader peptide has been deleted, and provided an explanation of the reason why the indicated amendments should be considered as the correction of an obvious mistake under Rule 139 EPC. He also enclosed a declaration by Bruce Andrien as technical expert.

The examining division has carefully considered the arguments of the applicant, but came to the conclusion that it cannot be excluded that the sequences 3 and 4 as originally filed were actually those for which protection was sought. No indication in the original application is present of the fact that sequences 3 and 4 did not have to include the leader peptide.

## 2. Article 54 EPC

As already objected in the European Search Opinion, the present application is considered not to meet the requirements of Article 54 EPC, because the subject-matter of the claims 1-3 is not new over the disclosure of D1-D4.

The applicant replied to this objection by saying that before the filing date of the parent/present application, i.e March 15, 2007, the sequence of eculizumab was not disclosed.

The arguments of the applicant are not considered to be correct for the following reasons.

All the cited prior art documents D1-D5 refer to eculizumab as a product available on the market. None of them contains an indication of the fact that the sequence of the antibody was secret or that any of the inventor of the patent D1 or of the members of the research group working on the studies published in D2 and D3 were bound to confidentiality with respect to the sequence of the antibody.

Therefore, the sequence of eculizumab was available to public since anybody skilled in the art could have performed a sequence listing of eculizumab with the knowledge available in the art.

D7 already discloses most of the sequence of the light and heavy chains of 5G1.1 (see Figure 1) and explains how the sequence was found. 5G1.1 is eculizumab (see D4).

Moreover, D6 teaches that eculizumanb was entered in the Registry Database on 14.02.1999.

For the reasons given above, the examining division concludes that the structure of eculizumab was available to the public well before the date of filing of the present application and that, as already pointed out in the ESOP the subject-matter of claims is anticipated by the disclosures of D1-D5 teaching eculizumab for use in the treatment of paroxysmal nocturnal hemoglobinuria by intravenous administration and according to the dosage regimen indicated in the present claims.

## 3. Article 56 EPC

The objection raised in the ESOP concerning inventive step (see point 3 of the communication) is presently maintained.

## 4. Article 83 EPC

In the description of the invention (see page 5 last paragraph), the applicant states that eculizumab is a specific embodiment of the described invention. The application also discloses examples in which eculizumab is tested. The complete structure of eculizumac has however not been disclosed in the application as filed. At most sequences 2 and 4 for the light and the heavy chain respectively have been said to be included in the sequence of eculizumab, but no indication is provided of the fact that the antibody contains also other sequences in the light and heavy chain.

In his letter dated 10.07.2017, the applicant argues that the structure of eculizumab had not been disclosed before the filing date of the present application.

The obvious consequence of this statement is that the skilled reader, at the filing date of the present application, did not know which antibody was actually tested and corresponded to the name "eculizumab".

Should the applicant therefore argue that the structure of the antibody was not known before the fining of the present application, than the application would be insufficiently disclosed.

If, on the contrary, the name "eculizumab" was known to indicate an antibody available to the public before the filing date of the present application, then the subject-matter of the claims would be not novel (see point 2 above).

## 5. Procedure

It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the applicant nevertheless regard some particular matter as patentable, an independent claim should be filed taking account of Rule 43(1) EPC. The applicant should also indicate how the subject-matter of the new claim differs from the state of the art and the significance thereof.

Care should be taken not to violate the requirement s of Article 123(2) EPC.

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**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

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| Date |
| --- |
| 20.11.17 |

| Reference | Application No./Patent No. |
| --- | --- |
| | 16195355.9 - 1466 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

**Communication of amended entries concerning the representative (R. 143(1)(h) EPC)**

As requested, for the above-mentioned European patent application / European patent the entries concerning the representative have been amended as follows:

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The amendment will be recorded in the Register of European Patents.

**For the Examining Division**

Europäisches Patentamt • European Patent Office • Office européen des brevets •



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**December 12, 2017**

**Third Party Observations**

| | |
|---|---|
| Application Number | 16 195 355.9 - 1466 |
| Publication Number | EP 3 167 888 |
| Title | TREATMENT OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA PATIENTS BY AN INHIBITOR OF COMPLEMENT |
| Applicant | Alexion Pharmaceuticals, Inc. |
| Our file reference | AMG17203ADV-EP888 |

## Third Party Observations

Amgen Inc. would like to bring the following to the Examining Division's attention:

**I. According to Alexion's own submissions, eculizumab and its structure were known in the prior art.**

Alexion has submitted in the brief dated July 10, 2017 with regard to the present patent application that D1 to D5 are not novelty-destroying, because only the name, not the structure of eculizumab was known in the prior art before the priority date.

This is in stark contrast to actions and statements made by Alexion in the past:

I.1 Previous patents and patent applications filed by Alexion

Alexion has filed and obtained a significant number of other European patents with one or more claims directed to the use of "eculizumab," e.g., EP2380907B1, EP1988882B1, EP1755674B1, EP2061810B1, EP1720571B9, and also filed various patent applications, all predating the

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PR-Nr. 1278



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present application, some with priority dates as early as 2004. A table of patents and patent applications is submitted herewith as **D8**. Of course, there are numerous further patents of Alexion on eculizumab in the USA and other countries. Alexion has thus obtained significant patent protection on the use of eculizumab prior to the filing date of the present application.

I.2 Alexion stated that eculizumab was available

I.2.1 Alexion also explicitly stated that eculizumab was publicly available before the presently relevant date, and accordingly, that the earlier patents were sufficiently disclosed. For example, in the submission dated December 30, 2013, attached herewith as **D9**, in opposition proceedings against EP 1720571, Alexion stated on page 14:

> **5. SUFFICIENCY OF DISCLOSURE (Articles 100(b) and 83 EPC)**
>
> 5.1. Eculizumab
>
> 5.1.1. The Opponent purports that the claims lack sufficiency of disclosure, because the complete sequence of eculizumab (or h5G1.1) would neither be disclosed by the application as filed nor any one of the prior art documents cited by the Opponent.
>
> 5.1.2. The Patentee asserts that the sequence for eculizumab was publicly available prior to the priority and filing date. A sequence for eculizumab was submitted to Chemical Abstracts Services (CAS) and entered into their STN database on 14 February 1999; please see the attached copy of the CAS entry No. 219685-560-4.

Thus, according to the present applicant, the sequence of eculizumab was publicly available on 14 February 1999, i.e., long before the filing date of the present application on 15 March 2007 or the claimed priority date of 15 March 2006.

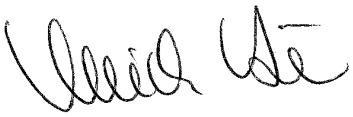
I.3 Furthermore, in light of Alexion's past actions, Alexion's declarations in the present case have to be considered to contravene against the generally accepted legal principle of good faith. In particular, in this case, the principle of *venire contra factum proprium* makes these declarations inadmissible.

**II. The subject-matter of the claims is not novel over D1-D5**

It logically follows that the subject matter of the claims lacks novelty over **D1** to **D5**, and for this reason, as well as other reasons, the application has to be refused.

dfmp

Respectfully,



Dr. H. Ulrich Dörries

UD/MO/KS

**Enclosures**

**D8** table of Alexion European patents and patent applications on eculizumab predating the present application

**D9** submission of Alexion dated December 30, 2013 in opposition proceedings against EP 1720571 of Alexion

Europäisches Patentamt
European Patent Office
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# Letter accompanying subsequently filed items


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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

| | |
|---|---|
| Application number | 16195355.9 |
| Applicant's or representative's reference | AMG17203-AV-888 |

| | Description of document | Original file name | Assigned file name |
|---|---|---|---|
| 1 | Citation for the limitation procedure | AMG17203ADV-EP888_D8.pdf | LIMDOC-1.pdf |
| 2 | Citations filed by a third party | AMG17203ADV-EP888_D9.pdf | TDOC-1.pdf |
| 3 | Observations by third parties (Art. 115 EPC) | AMG17203ADV-EP888_TPO.pdf | TIPA1-1.pdf |

| | Payment | |
|---|---|---|
| 1 | Method of payment | Not specified |

**Signatures**

| | |
|---|---|
| Place: | **Munich, Germany** |
| Date: | **12 December 2017** |
| Signed by: | **Hans Doerries 13689** |
| Representative name: | **H. Ulrich Dörries** |
| Capacity: | **(Representative)** |

| Publication Number | Title | Priority Date | Publication Date | Claims reciting "eculizumab" |
|---|---|---|---|---|
| EP2380907B1 | METHODS AND COMPOSITIONS FOR THE TREATMENT OF ANTIBODY MEDIATED NEUROPATHIES | 2006-09-05<br>2007-09-05 | 2016-11-30 | 6. The antibody or antigen-binding fragment thereof for use according to claim 5, wherein said antibody is eculizumab. |
| EP1988882B1 | PROLONGATION OF SURVIVAL OF AN ALLOGRAFT BY INHIBITING COMPLEMENT ACTIVITY | 2006-03-02<br>2007-03-02 | 2014-12-17 | 17. The anti-C5 antibody for use according to claim 13, wherein said whole antibody is eculizumab. 37. The use according to claim 34, wherein said antibody fragment is pexelizumab or said whole antibody is eculizumab. |
| EP1755674B1 | PROLONGATION OF SURVIVAL OF AN ALLOGRAFT BY INHIBITING COMPLEMENT ACTIVITY | 2004-05-14<br>2005-05-16 | 2014-11-19 (WO 2005/110481 published 11/24/2005) | 15. The antibody to C5 for use in prolonging survival of an allograft in a recipient mammal, the use, or the antibody to C5 and the at least one immunosuppressive drug for use in prolonging survival of an allograft in a recipient mammal according to claim 10, wherein said whole antibody is eculizumab. |
| EP2061810B1 | METHODS AND COMPOSITIONS FOR THE TREATMENT OF ANTIBODY MEDIATED NEUROPATHIES | 2006-09-05<br>2007-09-05 | 2014-11-12 | 5. The antibody for use according to claim 1 or 2, wherein said antibody is eculizumab. |
| EP1720571B9 | METHOD OF TREATING HEMOLYTIC DISEASE | 2004-02-03<br>2005-02-03 | 2012-10-24 (A2 published 11-15-2006; WO 2005/074607A2 published 8-18-2005) | 1. Eculizumab for use in treating a patient afflicted with paroxysmal nocturnal hemoglobinuria (PNH), wherein eculizumab is to be administered intravenously to the patient under the following dosing schedule: (i) 600 mg each week for four weeks; (ii) 900 mg 1 week later; (iii) 900 mg on a biweekly basis; and thereafter (iv) 900 mg every 12 days, wherein said patient exhibits breakthrough in serum hemolytic activity when treated under a dosing schedule according to items (i) to (iii). (All eight claims recite "eculizumab") |
| EP3056218A1 | PROLONGATION OF SURVIVAL OF AN ALLOGRAFT BY INHIBITING COMPLEMENT ACTIVITY | 2004-05-14<br>2005-05-16<br>2005-05-16 | 2016-08-17 | 10. The antibody to C5 according to claim 9 wherein said whole antibody is eculizumab. |
| EP2910253A1 | METHOD OF TREATING HEMOLYTIC DISEASE | 2004-02-03<br>2005-02-03<br>2005-02-03 | 2015-08-26 | 2. The anti-C5 antibody for use according to claim 1, wherein the anti-C5 antibody is eculizumab. 9. The use according to claim 8, wherein the anti-C5 antibody is eculizumab. |
| EP2815767A1 | PROLONGATION OF SURVIVAL OF AN ALLOGRAFT BY INHIBITING COMPLEMENT ACTIVITY | 2004-05-14<br>2005-05-16 | 2014-12-24 | 6. The composition according to claim 3, wherein the whole antibody is eculizumab. |
| EP2089058A2 | METHODS OF TREATING HEMOLYTIC ANEMIA | 2006-11-08<br>2007-11-08 | 2009-08-19 | 18. The method of claim 15, wherein said antibody is eculizumab. 34. The method of claim 32, wherein said antibody is eculizumab. 40. The method of claim 37, wherein said antibody is eculizumab. 59. The method of claim 56, wherein said antibody is eculizumab. 75. The method of claim 73, wherein said antibody is eculizumab. 100. The method of claim 97, wherein said antibody is eculizumab. 116. The method of claim 114, wherein said antibody is eculizumab. 122. The method of claim 119, wherein said antibody is eculizumab. 141. The method of claim 138, wherein said antibody is eculizumab. 157. The method of claim 155, wherein said antibody is eculizumab. 163. The method of claim 160, wherein said antibody is eculizumab. |
| EP2013235A1 | METHODS FOR THE TREATMENT OF MUSCULAR DYSTROPHY ASSOCIATED WITH DYSFERLIN-DEFICIENCY | 2006-05-01 | 2009-01-14 | 6. The method of claim 1, wherein said antibody is eculizumab. |
| EP1881993A2 | NEBULIZATION OF MONOCLONAL ANTIBODIES FOR TREATING PULMONARY DISEASES | 2005-05-11<br>2006-05-10 | 2008-01-30 | 7. The method of claim 1 , wherein the antibody is eculizumab or pexelizumab. |



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EPO - Munich
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30. Dez. 2013

European Patent Office

80298 M U N I C H

Opposition against EP 1720571
(Application No.: 05 71 2607.0)
Patentee: Alexion Pharmaceuticals, Inc.
Opposition by: Pfizer Inc.
Our Ref.: M2367 OPP(EP)

München, December 30, 2013
WA/ARO/FLG

This is in response to the Official Communication of April 19, 2013 issued by the European Patent Office in the above-referenced opposition proceedings.

It is requested that the patent EP-B1 1720571 is maintained on the basis of the claims as granted. As will be evident from our written submissions herein below, our request that the patent be maintained on the basis of the granted claims is fully justified. Since furthermore the Opponent, Pfizer Inc., formally and irrevocably has withdrawn its opposition on October 7, 2013, it is requested that the opposition proceedings are promptly terminated.

In case the Opposition Division would be inclined to proceed differently, we request oral proceedings in accordance with Article 116 EPC. In that case we request that we be allowed to submit one or more additional claim request(s).

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## 1. INADMISSIBLE BROADENING (Articles 100(c) and 123(2) EPC)

1.1. The then Opponent alleges that the subject-matter of independent claims 1 and 5 and the claims dependent thereon is not directly and unambiguously disclosed by the application a filed thereby contravening Article 123(2) EPC.

1.2. The second medical use claims 1 and 5 comprise identical features. Claim 1 is drafted as purpose-limited product claim in accordance with the EPC 2000 and claim 5 is drafted as a Swiss-type claim in accordance with the EPC 1973.

The Opponent has divided these claims into the following features:

(1) the use of eculizumab,
(2) the treatment of a patient afflicted with paroxysmal nocturnal hemoglobinuria (PNH),
(3) intravenous administration,
(4) administration of 600 mg each week for four weeks,
(5) administration of 900 mg 1 week later,
(6) administration of 900 mg on a biweekly basis,
(7) a breakthrough in serum hemolytic activity when treated under a dosing schedule according to (4) to (6), and
(8) administration of 900 mg every 12 days.

1.2.1. In more detail, the opponent is of the view that each of features (1) and (3) requires the selection of an item from a list of equally categorized items. In other terms, three selections from three lists are allegedly required in order to arrive at features (1) and (3) thereby violating Article 123(2) EPC.

1.2.2. The Opponent furthermore purports that feature (3) has no basis in the application as filed but only the more narrow feature "intravenous infusion by injection" (see page 20, lines 4-8 of the application as filed).

1.2.3. The Opponent considers that the general specification of the applications does not describe any specific dosage regimen. The Opponent concludes that the only basis for features (4) to (8) can be found in the Examples of the application as filed. However, the Opponent contends that features (4) to (8) are an undue

generalisation of the specific contents of the Examples and that in particular the following essential features of the Examples would have been omitted in claims 1 and 5:

(i) the PNH patients are transfusion-dependent and hemolytic

(ii) the meaning of transfusion dependency in the context of the application

(iii) the infusion time of approx. 30 min, and

(iv) the occurrence of the breakthrough between weeks 12 and 64.

1.2.4. With regard to feature (4) the Opponent further alleges that the term "600 mg each week for four weeks" only requires the administration of 600 mg once per week for four weeks, while the Examples would require that the 600 mg are administered at a time interval of exactly 7 days (i.e. weekly intervals) for four weeks.

1.2.5. Finally, the Opponent believes that it would not be clearly supported in the Examples whether the dosages according to features (5) and (6) were intravenously administered. The route of administration would not have been specified in the Examples.

1.3. <u>The new claims have a clear and unambiguous basis in the application as filed.</u>

1.3.1. Granted claim 1 reads:

> "Eculizumab for use in treating a patient afflicted with paroxysmal nocturnal hemoglobinuria (PNH), wherein eculizumab is to be administered intravenously to the patient under the following dosing schedule:
> (i) 600 mg each week for four weeks;
> (ii) 900 mg 1 week later;
> (iii) 900 mg on a biweekly basis; and thereafter
> (iv) 900 mg every 12 days,
> wherein said patient exhibits breakthrough in serum hemolytic activity when treated under a dosing schedule according to items (i) to (iii)."

As will be detailed herein below, granted claim 1 and consequently also granted claim 5 has a clear and unambiguous basis in the application as filed, because

(i) all features of these claims can be directly and unambiguously derived from the Examples of the application as filed, and

(ii) no technically essential feature of the examples has been omitted or changed.

In the following we will provide a clear and unambiguous basis for each of features (1) to (8) as classified by the Opponent.

1.3.2. *Feature (1) - use of eculizumab*

Eculizumab is the antibody which is used in the examples of the application as filed; see page 32, line 14 reading

> "The specific antibody used in the study was eculizumab."

Thus - in contrast to the allegations of the opponent - no selection from a list is required in order arrive at the anti-C5 antibody which is eculizumab. Hence, feature (1) is directly and unambiguously supported by the Examples of the application as filed.

1.3.3. *Feature (2) - treatment of a patient afflicted with PNH*

The Examples of the application as filed at page 32 start to read:

> "Eleven patients participated in therapy trials to evaluate the effects of anti-C5 antibody on PNH and symptoms associated therewith. PNH patients were transfusion-dependent and hemolytic. Patients were defined as transfusion dependent with a history of four or more transfusions within twelve months." (emphasis added)

Hence - contrary to the assertions of the opponent - no selection from a list is required in order to define the patient to be treated as patient being afflicted with PNH.

The Opponent further considers that the PNH patient has to be further defined as (i) being hemolytic and (ii) having a history of four or more transfusions within twelve months whereas these features are not reflected by the claim.

*(i) hemolytic anemia*

At page 2, lines 9 to 15 of the application as filed it is described that PNH is characterized by hemolytic anemia. Hemolytic anemia is one of the characterizing symptoms of the disease PNH.

The Patentee has informed us that every individual to a very slight extent has some PNH cells, but they are present at an extremely low level and of course these individuals are not considered to be PNH patients. In a very small number of individuals these PNH clones of cells begin to expand and when they expand enough, hemolysis becomes apparent. These individuals will be diagnosed as being a PNH patient. Consequently, every individual given a clinical diagnosis of PNH will show hemolysis.

In summary, a PNH patient is inherently hemolytic. The omission of an inherent feature cannot violate Article 123(2) EPC. Compliance of Article 123(2) EPC has to be assessed from the perspective of a skilled person.

*(ii) history of blood transfusions*

As is evident from the above-citation from page 32 of the application as filed, the PNH patients used in the examples of the application had a history of four or more blood transfusions within twelve months. In order to judge whether this information on the PNH patients has to be considered a technical feature which cannot be omitted in claims 1 and 5 without violating Article 123(2) EPC we refer to the pertinent case law. In T 331/87 the Board developed the following general three criteria for the replacement or removal of a feature from a claim:

> "The replacement or removal of a feature from a claim may not violate Article 123(2) EPC provided the skilled person would directly and unambiguously recognise that
> (1) the feature was not explained as essential in the disclosure,
> (2) it is not, as such, indispensable for the function of the invention in the light of the technical problem it serves to solve, and
> (3) the replacement or removal requires no real modification of other features to compensate for the change (cf. point 6 of the Reasons; following Decision T 260/85, "Coaxial connector/AMP" OJ EPO 1989, 105)." (see headnote of T 331/87)



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As regards requirement (1) of the above-described three-point test, we note that nothing in the application as filed conveys the impression that only PNH patients being transfusion-dependent can be treated by eculizumab.

In view of requirement (2) we note that administration of eculizumab prevents hemolytic events by blocking the complement cascade. Since all PNH patients suffer from hemolytic anemia, all PNH patients will benefit from the claimed use of eculizumab. It is of further note that the skilled person immediately understands from the Examples of the application as filed that all PNH patients showing a complement breakthrough should be treated by 900 mg of eculizumab every 12 days. A requirement of a certain transfusion history for the treatment to be successful is not apparent.

With regard to requirement (3) Patentee asserts that all PNH patients and not only transfusion dependent PNH patients may exhibits breakthrough in serum hemolytic activity when treated under a dosing schedule according to items (i) to (iii). In more detail, the Patentee has indicated that, to the best of its knowledge, the ability to show breakthrough appears to be independent of the severity of the disease. Instead, breakthrough is related to how rapidly eculizumab is cleared from the circulation. Some patients seem to clear eculizumab at a higher rate than other patients. The severity of the disease - which may be expressed at least in part by the blood transfusion history of a PNH patient - has therefore no technical effect on the other features of granted claims 1 and 5.

It is thus our firm believe that the PNH patient in claims 1 and 5 neither has to be further defined as (i) being hemolytic nor as (ii) having a history of four or more transfusions within twelve months in order to render these claims compliant with Article 123(2) EPC.

1.3.4. *Feature (3) - administered intravenously*

In the Examples on page 32, lines 12-16 it is stated:

> "Over the course of four weeks, each of 11 patients received a weekly 600 mg intravenous infusion of anti-C5 antibody for approximately thirty



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> minutes. The specific anti-C5 antibody used in the study was eculizumab. Patients received 900 mg of eculizumab 1 week later then 900 mg on a biweekly basis." (emphasis added)

Hence, in the Examples eculizumab is administered intravenously. Again - contrary to the statements of the opponent - no selection from any list in the specification is required in order to define that eculizumab is administered intravenously.

The allegation of the Opponent that only the first dosage of weekly 600mg for four weeks has been administered intravenously makes no technical sense. As the Opposition Division knows, an application has to be read with a mind willing to understand; see, e.g., decision T 190/99. Also the prior art cited by the opponent itself shows that eculizumab is routinely administered intravenously. For example, it is stated in D4 that

> "Patients received 600mg eculizumab by intravenous infusion over 30 minutes weekly for 4 doses and then 900 mg every other week". (emphasis added)

Essentially corresponding statements can be found in D3 and D6.

Granted claims 1 and 5 refer to intravenous administration and not intravenous infusion. The skilled person knows, though, that an intravenous administration is always by a "push" - which is a one-time, rapid injection of the medication into the bloodstream – or by an "infusion" - which is a slow drip of medication into the vein over a period of time. The technical effect is in both cases that eculizumab is delivered in the blood stream. The only difference is the time frame in which the complete dose of eculizumab is administered. However, the time is not characterized as being essential in the application as filed. The indication of the time is also certainly not indispensable in order to work the invention, and varying the infusion time does not require a modification of the other features of the claim. Hence, in connection with the omittance of the intravenous time the criteria of the "three-point test" developed in T 331/87 are clearly met. Omittance of the infusion time of approx. 30 minutes does not constitute a violation of Article 123(2) EPC.

1.3.5. *Feature (7) - breakthrough in serum hemolytic activity*

The study described in the Examples of the application as filed has been initially carried out for 12 weeks and then has been extended to 64 weeks (see, for example, Table 1 or Figure 3 of the application as filed). The breakthrough in 2 out of 11 PNH patients has been observed between weeks 12 and 64 of the study (see Figure 4 of the application as filed).

It is not essential with respect to the claimed dosage regimen when a PNH patient has a complement breakthrough. The essential step is to increase the dosage from 900mg/14d to 900mg/12d once a complement breakthrough is observed. As it is described in the Examples at page 38, lines 15-17, the complement blockade was permanently restored by shortening the interval of administration - although both PNH patients likely did not show the complement breakthrough at the same time point during the 64-weeks study.

Hence, it is not technically necessary to define in granted clams 1 and 5 at which particular point in time a breakthrough is observed in a PNH patient to be treated.

1.3.6. *Features (4) to (6) and (8)*

The fact that also the dosages according to features (5) and (6) were administered intravenously has been discussed herein above in connection with feature (3).

The Opponent's interpretation of the wording of feature (4) is a mere play on words and should not attract any attention.

Beyond these points the Opponent apparently does not contest that features (4) to (6) and (8) as such can be clearly and unambiguously derived from the Examples of the application as filed. Having said that, the Opponent alleges that these features would only find support in connection with further features of the Examples. These further allegedly omitted features have been discussed herein above in connection with features (1) to (3) and (7).

As is evident from the above discussion in connection with features (1) to (3) and (7) these features do not violate Article 123(2) EPC.

1.3.7. The Opponent does not consider that the features in the dependent claims give raise to any further violation of Article 123(2) EPC. Hence, all of the granted claims comply with Article 123(2) EPC.

## 2. PRIORITY (Article 87 EPC)

2.1. For essentially the same reasons put forward by the Opponent in section 4 entitled "added subject-matter", the Opponent believes that the subject-matter of the claims cannot be directly and unambiguously derived from the priority application.

The Opponent concludes that the effective date of the granted claims is not the priority date of February 3, 2004 but the international filing date of February 3, 2005.

2.2. As will be shown in the following the relevant contents in the Examples of the application as filed - which form a clear and unambiguous basis for the granted claims - are also comprised in the priority document US 10/771,552; compare page 30, lines 17-18 of the priority document and page 32, lines 16-20 of the application as filed.

In more detail, page 30 of US 10/771,552 reads:

> 5 **EXAMPLES**
>
> Eleven patients participated in therapy trials to evaluate the effects of anti-C5 antibody on PNH and symptoms associated therewith. PNH patients were transfusion-dependent and hemolytic. Patients were defined as transfusion dependent with a history of four or more transfusion within twelve months. The

and

> Over the course of four weeks, each of 11 patients received a weekly 600 mg intravenous infusion of anti-C5 antibody for approximately thirty minutes. The specific anti-C5 antibody used in the study was eculizumab. Patients received 900 mg of eculizumab 1 week later then 900 mg on a bi-weekly basis. The first twelve weeks of the study constituted the pilot study. All patients participated in an extension study conducted to a total of 48 weeks.

These two passages give rise to priority for features (1) to (6).

Page 30 of US 10/771,552 reads

> 0.001). As seen in Figure 4, break-through of complement blockade resulted in hemoglobinuria, dysphagia, and increased LDH and AST. At the next dose, symptoms resolved (Fig 5) and reduction from 900mg every 14 days to 900mg every 12 days resulted in a regain of complement control which was maintained for over 9 months in both patients. This patient shows a 24 hour resolution of

and page 34 of US 10/771,552 reads

> eculizumab treatment. Two patients exhibited a breakthrough in complement activity, but complement blockade was permanently restored by reducing the dosing interval to 12 days (See, Figure 4).

These two passages give rise to priority for features (7) and (8).

Otherwise arguments in favour of clear and unambiguous support in the application as filed as detailed in section 1, *supra* apply *mutatis mutandis* for entitlement of priority.

Hence, the subject-matter of granted claims 1 and 5 has also a clear and unambiguous basis in the priority application. The priority claim is valid.

## 3. NOVELTY (Articles 100(a) and 54 EPC)

3.1. The Opponent considers that the claims lack novelty in view of D1.

3.2. D1 has been published on February 5, 2004 and hence 2 days after the priority date of the patent. D1 is not prior art because the claims are entitled to the priority date; see section 2, *supra*.

## 4. INVENTIVE STEP (Article 100(a) and 56 EPC)

4.1. The Opponent alleges that the granted claims lack inventive step in view of D5 considered alone or in combination with any one of D2, D3, D4 or D6. The Opponent also contends that the granted claims are no inventive in view of any one of D2, D3, D4 or D6.

4.2. D5 may be considered as closest prior art in the assessment of inventive step of the granted claims. D5 describes:

> "We previously reported that eculizumab was very effective at acutely controlling intravascular hemolysis in a 3-month Pilot study of transfusion-dependent PNH patients. We now report that all 11 patients from the initial study entered an extension trial of 900mg eculizumab by i.v. infusion over 30 minutes every other week for one year. [...] Two patients experienced transient breakthroughs in complement activity associated with LDH, hemoglobinuria and mild symptoms; these resolves immediately upon next dose of eculizumab and further breakthroughs were prevented by a slight decrease in dosing interval." (emphasis added)

Details on the 3-months pilot study are, for example, described in D3, D4 and D6 (see page 53, left column). Hence, D5 (in combination with any one of D3, D4 and D6) could be seen as describing that 2 out of 11 PNH patients exhibited a complement breakthrough when treated under a dosage regimen similar, but not identical to that recited in the granted claims. D5 furthermore teaches that the complement breakthrough can be permanently prevented by a slight decrease in dosing interval.

4.3. Objective technical problem

Independent granted claims 1 and 5 are distinguished from D5 in that

(i) the dosing interval is the administration of 900 mg eculizumab every 12 days; and

(ii) feature (5) requiring "administration of 900 mg 1 week later" is absent from D5.

Accordingly, the objective technical problem underlying the granted claims in view of D5 may be seen as the determination of the specific dosing interval which prevents further breakthroughs in patients having the prior treatment history as defined in the claims.

The solution is the administration of 900 mg eculizumab every 12 days to patients having the prior treatment history as defined in the claims.

4.4. Non-obviousness

D5 neither teaches nor suggests the time interval of administration which is designated as a "slight decrease in dosing interval". Patentee submits that the skilled person would not have arrived at the exact dose of 900 mg eculizumab every 12 days without the need of inventive skills.

This is particularly evident when considering the prior art at the time of the invention in a comprehensive manner. Pursuant to the pertinent case law, e.g. T 24/81, second headnote, in the examination of inventive step all previously published embodiments must be taken into consideration which offered a suggestion to the skilled practitioner for solving the problem addressed, even where those embodiments were not particularly emphasized.

We enclose an article of Maria Kaplan in Current Opinion on Investigational Drugs 2002, 3(7):1472-4472. This article has been cited as document D10 during examination proceedings of the opposed patent and is introduced into the present opposition proceedings as document D13.

D13 describes at page 4, left column, fourth paragraph a Phase II trail on the treatment of RA patients with eculizumab:

> "Patients were treated with placebo, eculizumab (8 mg/kg iv) once per week for 4 weeks and then once every month (induction/monthly group); eculizumab (8mg/kg iv) one per week for 4 weeks followed by once every 2 weeks (induction/biweekly group); or eculizumab (8 mg/kg iv) once every 2 weeks (biweekly group). The results after 3 months of treatment showed that the induction/monthly group met the primary endpoint of the trial (improvement in American College of Rheumatology response criteria score (ACR) 20 after 3 months of treatment), while the induction/biweekly and biweekly groups did not statistically meet the endpoint."

Importantly, only patients receiving treatment every month, but not the patients receiving treatment every two weeks meet the endpoint of the trial – being an improvement of RA. In other words, an increase of the dose of eculizumab by increasing the dosing intervals did not have a beneficial effect. Hence, D13 shows that shortening of dosing intervals may not result in an effective treatment by eculizumab.

The inventors of the opposed patent have unexpectedly found that the 12-days period is sufficient to successfully treat PNH patients which suffer from breakthrough in serum hemolytic activity when treated under a dosing schedule according to the above-defined features (4) to (6), and at the same time is not too short such that an effective treatment by eculizumab is prevented, as observed in D13. This surprising key finding of the present invention is described at page 35, lines 5-23 of the application as filed:

> "Serum hemolytic activity in nine of the eleven patients was completely blocked throughout the 64 week treatment period with trough levels of eculizumab at equilibrium ranging from approximately 35 µg/ml to 350 µg/ml. During the extension study, 2 patients did not sustain levels of eculizumab necessary to consistently block complement. This breakthrough in serum hemolytic activity occurred in the last 2 days of the 14 day dosing interval, a pattern that was repeated between multiple doses. In one of the patients, as seen in FIG. 4, break-through of complement blockade resulted in hemoglobinuria, dysphagia, and increased LDH and AST, which correlated with the return of serum hemolytic activity. At the next dose, symptoms resolved (FIG. 5) and reduction in the dosing interval from 900 mg every 14 days to 900 mg every 12 days resulted in a regain of complement control which was maintained over the extension study to 64 weeks in both patients. This patient showed a 24 hour resolution of dysphagia and hemoglobinuria. A reduction in the dosing interval from 14 to 12 days was sufficient to maintain levels of eculizumab above 35 µg/ml and

> effectively and consistently blocked serum hemolytic activity for the remainder of the extension study for both patients." (emphasis added)

Hence, the critical point in order to consistently block serum hemolytic activity is maintaining levels of eculizumab above 35 µg/ml. Thus is achieved in accordance with the invention by the reduction of the dosing interval from 900 mg every 14 days to 900 mg every 12 days. Arriving at the 12-days period is consequently not a matter of routine but required due consideration and mindful experimentation. Applicant therefore submits that the granted claims are inventive over D5. The deficiencies of D5 cannot be cured by any one of D2, D3, D4 or D6. No prior art document teaches or suggests a 12-days dosing interval, let alone the superior efficacy in preventing complement breakthrough hemolysis in PNH patients associated with this dosing interval.

## 5. SUFFICIENCY OF DISCLOSURE (Articles 100(b) and 83 EPC)

### 5.1. Eculizumab

5.1.1. The Opponent purports that the claims lack sufficiency of disclosure, because the complete sequence of eculizumab (or h5G1.1) would neither be disclosed by the application as filed nor any one of the prior art documents cited by the Opponent.

5.1.2. The Patentee asserts that the sequence for eculizumab was publicly available prior to the priority and filing date. A sequence for eculizumab was submitted to Chemical Abstracts Services (CAS) and entered into their STN database on 14 February 1999; please see the attached copy of the CAS entry No. 219685-560-4.

### 5.2. The term "breakthrough in serum hemolytic activity"

5.2.1. The Opponent considers that the term "breakthrough in serum hemolytic activity" is not sufficiently disclosed by the application as filed, because it is allegedly not

> "[...] clear whether one, two, three, four of these events [breakthrough of complement blockade] are necessary and/or sufficient to characterize a

breakthrough according to the claims." (see the Opponent's Appeal Brief at section 7.2, end of second paragraph )

The Opponent concludes that the skilled person would not be able to characterize and identify a "breakthrough in serum hemolytic activity".

5.2.2. The argument put forward by the Opponent reads on a lack of clarity rather than on a lack of sufficiency of disclosure. An alleged lack of clarity is not a valid ground for opposition.

Notwithstanding we wish to submit that Figure 4 of the application as filed shows that a complement breakthrough can be identified by blood in the morning urine. Breakthrough in serum hemolytic activity which is the result of the complement activity can also be diagnosed using a blood sample (see page 35, lines 5-14 of the application as filed). As such, and for the mere sake of arguments we submit that the term "breakthrough" is clear for the skilled person and means for its determination are at the skilled person's disposal.

## 6. CONCLUSION

In view of the above we submit that the claims as granted fulfill the requirements of the EPC. Our request that the patent be maintained on the basis of the granted claims is therefore fully justified.

Dr. Joachim Wachenfeld
European Patent Attorney

**Enclosure:**
CAS entry
D13

L27 ANSWER 2 OF 2 REGISTRY COPYRIGHT 2009 ACS on STN
RN 219685-50-4 REGISTRY REGISTRY COPYRIGHT 2009 ACS on STN
RN 219685-50-4 REGISTRY
ED Entered STN: 14 Feb 1999
CN Immunoglobulin, anti-(human complement C5 .alpha.-chain) (human-mouse monoclonal 5G1.1 heavy chain), disulfide with human-mouse monoclonal 5G1.1 light chain, dimer (9CI) (CA INDEX NAME)
OTHER NAMES:
CN Eculizumab
CN h5G1.1
CN h5G1.1VHC+h5G1.1VLC
CN Soliris
FS PROTEIN SEQUENCE
MF Unspecified
CI MAN
SR US Adopted Names Council (USAN)
LC STN Files: ADISINSIGHT, BIOSIS, CA, CAPLUS, CBNB, CHEMCATS, EMBASE, IMSDRUGNEWS, IMSPATENTS, IMSPRODUCT, IMSRESEARCH, IPA, MRCK*, PHAR, PROUSDDR, TOXCENTER, USAN, USPATFULL
(*File contains numerically searchable property data)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
*** USE 'SQD' OR 'SQIDE' FORMATS TO DISPLAY SEQUENCE ***
59 REFERENCES IN FILE CA (1907 TO DATE)
2 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
59 REFERENCES IN FILE CAPLUS (1907 TO DATE)



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# Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

| | | |
|---|---|---|
| Submission number | 5868642 | |
| Application number | EP16195355.9 | |
| Date of receipt | 12 December 2017 | |
| Receiving Office | European Patent Office, The Hague | |
| Your reference | AMG17203-AV-888 | |
| Applicant | All applicants as on file | |
| Documents submitted | package-data.xml<br>epf1038.pdf (1 p.)<br>TDOC-1.pdf\AMG17203ADV-EP888_D9.pdf (16 p.) | ep-sfd-request.xml<br>LIMDOC-1.pdf\AMG17203ADV-EP888_D8.pdf (1 p.)<br>TIPA1-1.pdf\AMG17203ADV-EP888_TPO.pdf (3 p.) |
| Submitted by | CN=Hans Doerries 13689 | |
| Method of submission | Online | |
| Date and time receipt generated | 12 December 2017, 15:12 (CET) | |
| Message Digest | 1F:D1:F0:D2:2D:26:3B:94:97:54:65:66:E0:66:62:02:B8:6D:59:E6 | |

**Correction by the EPO of errors in debit instructions filed by eOLF**
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

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**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

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| Date |
| --- |
| 18-12-2017 |

| Reference | Application No./Patent No. |
| --- | --- |
| | 16195355.9 - 1466 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

**Communication pursuant to Rule 114(2) EPC**

Please find enclosed observations by a third party concerning the patentability of the invention of the above-mentioned patent application. That person is not a party to the proceedings before the EPO (Art. 115 EPC).

Under Rule 114(2) EPC you may comment on the observations.

**For the Examining Division**



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| Date |
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| 18-12-2017 |

| Reference | Application No./Patent No. |
| --- | --- |
| | 16195355.9 - 1466 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

**Acknowledgment of receipt of observations by third parties (Article 115 EPC)**

Receipt of your letter dated 12.12.2017 is hereby acknowledged.

Under Article 115 EPC you will not be a party to the proceedings before the European Patent Office.

☐ In your letter the following documents are mentioned which were not enclosed, and which are not available in the EPO:

☐ The third party observations have not been filed in an official language of the EPO (R. 114(1) EPC).

You are requested to file copy(ies) and/or translation(s) in one of the official EPO languages within **two months** of notification of this communication if they are to be taken into account.

**For the Examining Division**

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J A • K E M P

BY ONLINE FILING

The European Patent Office
Bayerstrasse 34
(entrance via Zollstrasse 3)
80335 Munich
Germany

16 January 2018

Dear Sirs

**European Patent Application No. 16195355.9**
**ALEXION PHARMACEUTICALS, INC.**
*Our Ref: N411599EP-B PXT*

In response to the Communication pursuant to Article 94(3) EPC dated 17 November 2017, please replace the claims currently on file with the new claims attached herewith. Please also replace description page 5 with new description page 5 attached herewith.

To assist the Examiner, a tracked changes version of the claims and a tracked changes version of description page 5 showing the amendments being made are also attached.

Also attached are: (i) a copy of a letter from the Department of Health and Human Services to Alexion Pharmaceuticals dated 16 March 2007; (ii) a copy of a press release made by Alexion Pharmaceuticals on 16 March 2007; (iii) a Declaration of Stephen Saxe; and (iv) an Experimental Report.

**Amendments**

Claims 1 and 2 have been combined as new claim 1. An obvious error in referring to the whole of SEQ ID NO: 4 in the definition of the light chain of the antibody has been corrected.

A corresponding correction has been made at page 5 of the description.

**Correction of Obvious Error**

In the response of 10 July 2017 to the Search Opinion, correction of the sequence listing was requested. In the corrected sequence listing, the leader peptide was deleted from SEQ ID NO: 3 and SEQ ID NO: 4. The Examining Division has determined

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that this correction of the sequence listing is not allowable under Rule 139 EPC because it considers that there is no indication in the original application that SEQ ID NO: 3 and SEQ ID NO: 4 did not have to include the leader peptide.

Rather than correcting the sequence listing, we now request correction of the statements in the description that:

> "*In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region consists of SEQ ID NO: 1 and the light chain variable region consists of SEQ ID NO: 3*"; and
>
> "*In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain and a light chain, wherein the heavy chain consists of SEQ ID NO: 2 and the light chain consists of SEQ ID NO: 4*".

It would be immediately evident to the skilled person that an antibody light chain variable region could not consist of SEQ ID NO: 3 and that the light chain of an antibody could not consist of SEQ ID NO: 4.

As established by the Enlarged Board of Appeal in G3/89 and G11/91:

> "T*he part of a European patent application or of a European patent relating to the disclosure (the description, claims and drawings) may be corrected under Rule 88, second sentence, EPC [now Rule 139, second sentence, EPC] only within the limit of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of these documents as filed. Such a correction is of a strictly declaratory nature and thus does not infringe the prohibition of extension under Article 123(2) EPC." (Head note 1)*

Reading the present application, the skilled person would immediately recognise, based on his common general knowledge, that each of SEQ ID NO: 3 and SEQ ID NO: 4 contain a leader sequence as explained in our letter of 10 July 2017 and accompanying declaration of Dr Bruce Andrien.

The skilled person would also know that leader sequences are not present in an antibody ready for binding an antigen because these sequences are cleaved off during antibody maturation and production in cells. Therefore, it would be immediately evident to the skilled person that the references at page 5 of the description to an antibody comprising a light chain variable region consisting of SEQ ID NO: 3 and an antibody comprising a light chain consisting of SEQ ID NO: 4 represent an error.

As previously explained in our letter of 10 July 2017 and accompanying declaration of Dr Bruce Andrien, using his common general knowledge, the skilled person would have no difficulty determining which of the amino acids shown in SEQ ID NO: 3 and SEQ ID NO: 4 correspond to a leader peptide.



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Therefore, the corrections being made to page 5 of the description to refer to the start and end positions of the light chain variable region and the light chain of the antibody would immediately be recognised by the skilled person as representing the intention of the Applicant. Accordingly, the correction of the light chain variable region and light chain sequences at page 5 of the description meets with the requirements of Rule 139 EPC.

It follows that the reference to the start and end positions of the mature part of the light chain sequence in SEQ ID NO: 4 in claim 1 complies with the requirements of Article 123(2) EPC.

**Novelty**

Claim 1 is novel because there was no public prior use of eculizumab before the filing date of the present application and no prior art document contains an enabling disclosure of eculizumab.

***Eculizumab was not available on the market at the filing date***

Contrary to the assertion in the Examination Report, none of D1-D5 indicate that eculizumab was a product available on the market prior to the filing date of 16 March 2007.

D1 is a US patent application which describes therapy trials to evaluate the effects of an anti-C5 antibody on the rare disease PNH and symptoms associated therewith. At page 9, paragraph [0082] of D1 it is stated that "*the specific anti-C5 antibody used in the study was eculizumab*". However, D1 does not say where eculizumab was obtained from, and does not indicate that eculizumab was commercially marketed or otherwise available to the public.

D2 is an abstract describing a clinical trial showing that eculizumab appears to be the first effective therapy for haemolysis in PNH. D2 discloses that "*eculizumab is a human monoclonal antibody that binds C5 and inhibits terminal complement activation*" (D2, lines 4-5). Like D1, D2 neither indicates from where eculizumab was obtained, nor does it indicate that eculizumab was commercially marketed or otherwise available to the public.

D3 is a paper describing the effect of eculizumab on haemolysis and transfusion requirements in patients with PNH. D3 states that: "*eculizumab is a recombinant humanised monoclonal antibody that was designed to block the activation of terminal complement components*". Again, no indication as to where eculizumab was obtained from is given, and there is no indication that eculizumab was commercially marketed or otherwise available to the public.

D5 is a report of an interview with Anita Hill relating to the use of eculizumab for the treatment of PNH. D5 does not provide any information as to how eculizumab may be obtained, nor does it suggest that eculizumab was commercially marketed or otherwise available to the public.

D4 is a paper describing eculizumab. D4 states that "*eculizumab (5G1.1) is a recombinant, fully humanised monoclonal antibody that inhibits the activation of*



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*terminal complement components*" (D4, Abstract, first sentence). D4 indicates that the source of eculizumab is Alexion Pharmaceuticals, Inc. (US) (D4 page 6-7, right column, third paragraph), but it does not indicate that eculizumab was commercially marketed or otherwise available to the public.

Eculizumab was, in fact, not commercially marketed or otherwise available to the public at the publication dates of any of these references. As explicitly stated in the Declaration of Laural Boone, a Senior Director and Patent Counsellor at Alexion Pharmaceuticals, Inc. filed with our response of 10 July 2017, eculizumab was first approved for commercial marketing and sale on 16 March 2007, which is the day after the filing date of the present application (see paragraph 14 of the Boone Declaration).

The Boone Declaration is further supported by the attached letter from the Department of Health and Human Services to Alexion Pharmaceuticals dated 16 March 2007, licensing Alexion Pharmaceuticals to manufacture the product eculizumab. The attached press release made by Alexion Pharmaceuticals on 16 March 2017 announcing that it had, that day, received marketing approval from the U.S. Food and Drug Administration (FDA) for eculizumab.

Therefore, it is a matter of fact that eculizumab was not a product available on the market at the filing date of the present application.

***The structure of eculizumab was not publically known at the filing date***

None of the cited documents disclose the full amino acid sequence of eculizumab.

Eculizumab is an antibody that does not correspond to any naturally occurring isotypes. Rather, eculizumab has a unique, non-naturally occurring, protein-engineered full heavy chain (including the CH1-hinge-CH2-CH3 regions). This unique heavy chain sequence is not disclosed in the prior art.

D7 provides sequence information for an anti-C5 designated antibody h5G1.1. Eculizumab is derived from h5G1.1. However, D7 only discloses the heavy and light chain variable region (VH and VL) sequences of the antibody (see Figure 1 of D7). Significantly, D7 does not disclose the full, uniquely-engineered heavy chain sequence of eculizumab. There is also an amino acid difference between the light chain variable region sequence shown in D7 and the light chain variable region sequence of eculizumab. A glutamine (Gln/Q) residue is present at position 60 of SEQ ID NO: 4 but an arginine residue (Arg/R) is present at this position in the light chain variable region sequence shown in D7 (position 38 of the mature sequence of "h5G1.1 VLC" in Figure 1 of D7).

Thus, D7 does not disclose an antibody comprising a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO: 4.

D1, D2 and D5 describe eculizumab by name only; they do not disclose the structure of eculizumab.

D3 and D4 each refer to Thomas et al. (1996) Mol. Immunol. 33: 1389-401 (reference 15 in D3) which is cited as D7 in the Examination Report of 17 November 2017. As



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discussed above, D7 does not disclose the full heavy and light chain sequences of eculizumab. Therefore, D3 and D4 do not enable the skilled person to make eculizumab.

The Examining Division notes that D6 indicates that eculizumab was entered in the CAS registry database on 14 February 1999. However, D6 is a copy of the CAS registry database on 6 March 2017. D6 cannot therefore be used as evidence that SEQ ID NO: 2 and SEQ ID NO: 4 were available to the public ten years earlier at the 15 March 2007 filing date.

The sequence information for eculizumab submitted to the CAS Registry on 14 February 1999 was incorrect. The correct sequence information for eculizumab was not entered on the registry database until May 2018, which is after the filing date of the present application.

The attached Declaration of Stephen Saxe, and its annexes, show that the sequences for CAS Registry Number 219685-50-4 as shown in D6 were not available in the CAS Registry database until May 2009. In particular, Annex C, the email sent from Lois Bishop at CAS Client Services to Stephen Saxe on 1 May 2009 confirms that changes were made to the sequence for CAS Registry Number 219685-50-4 that would appear on STN a couple of days after that email was sent. Annex B, an email and letter sent from Stephen Saxe to the CAS, shows that the CAS Registry Number 219685-50-4 heavy chain sequence in the database prior to May 2009 was 650 amino acids in length, whereas SEQ ID NO: 2 is a 448 amino acid sequence, and that a single error was corrected in the light chain sequence (see paragraph 3 of the letter and point 3 of the Saxe Declaration).

Thus, the heavy chain sequence in the CAS database at the filing date of the present application contained hundreds of amino acids that are not present in SEQ ID NO: 2 and there is one amino acid difference between the light chain sequence in the CAS database at the filing date of the present application and residues 23 to 214 of SEQ ID NO: 4. Therefore, D6 is not evidence that an antibody comprising the heavy chain sequence shown in SEQ ID NO: 2 and the light chain sequence shown in residues 23 to 214 of SEQ ID NO: 4 was available to the public at the filing date of the present application.

In addition, as set out in the Declaration of Laural Boone, the heavy and light chain sequences of eculizumab (SEQ ID NOs: 2 and residues 23 to 214 of SEQ ID NO: 4 in the present application) were not made available to doctors or patients participating in any of the trials using eculizumab prior to at least 16 March 2007 (see paragraphs 6 and 7 of the Boone Declaration).

Thus, the full amino acid sequences of the heavy and light chain sequences of eculizumab were not disclosed in any of the cited documents.

***The skilled person would not have been able to analyse the structure of eculizumab and reproduce it***

In G1/92, the Enlarged Board of Appeal concluded that the chemical composition of a product is state of the art when the product as such is available to the public and can be analysed and reproduced by the skilled person. However, none of the studies



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using eculizumab as described in D1-D5 made eculizumab available to the public such that the skilled person would have been able to analyse the structure of eculizumab and reproduce it.

As set out in the Declaration of Laural Boone, all physicians and participants in the eculizumab trials were required to maintain Alexion's confidential and/or proprietary information in strict confidence (see paragraphs 6 and 7 of the Boone Declaration). The clinical trials required strict controls to be placed over the use of eculizumab as explained in paragraphs 10 and 11 of the Boone Declaration. In particular, all eculizumab not administered to patients in the trials had to be accounted for (paragraph 10 of Boone Declaration).

Therefore, the skilled person would not have been able to obtain and analyse eculizumab to determine its structure, and would not have been able to reproduce eculizumab at the filing date of the present application.

***Third Party Observations***

The third party observations filed on 12 December 2018 are merely circumstantial and do not provide any evidence that eculizumab was publically available at the filing date of the present invention.

***Summary***

Although reports of trials describing eculizumab were available at the filing date of the present application, eculizumab was not made publically available until after the filing date. Eculizumab was not on the market at the filing date; the full structure of eculizumab was not published; and the skilled person would not have been able to analyse eculizumab and reproduce it.

Accordingly, there was no public prior use, public availability or enabling disclosure of eculizumab at the filing date. Claim 1 is therefore novel.

**Inventive Step**

The claimed antibody that binds C5 and comprises a heavy chain consisting of SEQ ID NO: 2 and light chain consisting of residues 23 to 214 of SEQ ID NO: 4 is inventive. In particular, SEQ ID NO: 2 is the full amino acid sequence of an engineered heavy chain that has a unique, non-naturally occurring protein engineered CH1-hinge-CH2-CH3 sequence. This unique sequence confers unexpected advantageous effects on the antibody eculizumab and to patients receiving eculizumab.

D7 may be taken to represent the closest prior art. D7 describes an antibody that has the same heavy chain variable region as the antibody of claim 1 and a light chain variable region sequence that differs from the variable region sequence of the antibody of claim 1 by just one amino acid position. The antibody of D7 is a human IgG4 isotype (see D7, page 1399, right column, line 27). The antibody of claim 1, however, is not an IgG4 isotype antibody, but has a unique, non-naturally occurring protein-engineered heavy chain.



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The amino acid differences between a human IgG4 constant and hinge region and the constant and hinge regions of SEQ ID NO: 2 are shown in paragraph 5 of the Bell Declaration filed with the letter of 10 July 2017. As shown in paragraph 5 of the Bell Declaration, there are 14 amino acid differences between the IgG4 constant region and the engineered constant region of SEQ ID NO: 2.

The technical effect of these differences is that eculizumab does not bind as strongly to Fc gamma receptors as the IgG4 isotype antibody disclosed in D7 as demonstrated in the attached Experimental Report, which compares binding of eculizumab with that of the IgG4 antibody of D7 to the FCγ receptor IIB using an ELISA assay. Weakened binding to Fc gamma receptors reduces the generation of undesirable immune responses and thus improves the ability of the antibody to selectively shut down the terminal complement pathway (see paragraph 6 of the Bell Declaration) and increases plasma half-life of the antibody (see paragraph 7 of the Bell Declaration).

Accordingly, the objective technical problem in view of D7 may be defined as the provision of an improved anti-C5 antibody for therapeutic use in humans.

The solution to this problem provided by claim 1 would not have been obvious to the skilled person from D7. D7 teaches that the human IgG4 isotype was chosen because it does not activate human complement as there is only one known allotype of IgG4 and would likely preclude the development of auto-antibodies in patients (see D7 page 1399, right column, lines 27 to 31). There is no teaching or suggestion in D7 that the CH1-hinge-CH2-CH3 region of the heavy chain should be modified to further improve the properties of the antibody, let alone by engineering the exact fourteen amino acid substitutions present in SEQ ID NO: 2 into the IgG4 constant region.

None of the other documents on file provide any information about the structure of eculizumab. Accordingly, it would not have been obvious to the skilled person from any of these documents to protein engineer the heavy chain CH1-hinge-CH2-CH3 region to produce SEQ ID NO: 2. Accordingly, claim 1 involves an inventive step.

**Sufficiency**

The application provides a sufficient description of the claimed invention. SEQ ID NO: 2 is the complete heavy chain amino acid sequence of eculizumab, and residues 23 to 214 of SEQ ID NO: 4 represent the complete light chain amino acid sequence of eculizumab. Therefore, the complete structure of eculizumab is disclosed in the application.

In contrast, as discussed above, the full heavy and light chain sequences of eculizumab were not disclosed before the filing date of the present application. Thus, the skilled person reading any of D1 to D5 did not know the structure of the antibody that was actually tested and corresponded to the name “eculizumab.” However, in view of the inclusion of the full heavy chain sequence of SEQ ID NO: 2 and the full light chain sequence in SEQ ID NO: 4 (residues 23 to 214), the present application provides the first enabling disclosure of the antibody eculizumab.

Accordingly, the requirements of Article 83 EPC are met by the present application.



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**Concluding Remarks**

It is believed that this application is now in an allowable form and the Examiner is asked to reconsider it favourably. If, however, there are any matters which remain outstanding, the Examiner is requested to issue a further Examination Report or telephone the undersigned. Merely as a precaution, in the event that the Examiner is minded to reject the application without first issuing a further Examination Report, oral proceedings are requested.

In addition, if the Examiner is minded to issue a Rule 71(3) Communication but wishes to propose amendments to the claims or description, it is requested that the Examiner telephones the undersigned to discuss this before the Rule 71(3) Communication is issued. I look forward to hearing from the Examiner in due course.

Yours faithfully

*Electronically Signed*
**DR PAMELA M TUXWORTH**
**ASSOCIATION NO. 811**



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Europäisches Patentamt
European Patent Office
Office européen des brevets

# Letter accompanying subsequently filed items


Representative:

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

| | |
|---|---|
| Application number | 16195355.9 |
| Applicant's or representative's reference | N411599EP-B |

| | Description of document | Original file name | Assigned file name |
|---|---|---|---|
| 1 | Amended description (clean copy) | Amended pg 5 (clean) N411599EP-B PXT.pdf | DESC-1.pdf |
| 2 | Amended claims (clean copy) | Amended claims (clean) N411599EP-B PXT.pdf | CLMS-1.pdf |
| 3 | Amended description with annotations | Amended pg5 (tracked) N411599EP-B PXT.pdf | DESC-HWA-1.pdf |
| 4 | Amended claims with annotations | Amended claims (tracked) N411599EP-B PXT.pdf | CLMS-HWA-1.pdf |
| 5 | Reply to examination report | Response to OA N411599EP-B PXT.pdf | EXRE3-1.pdf |
| 6 | Reply to examination report | Dept of Health & Human Services letter N411599EP-B PXT.pdf | EXRE3-2.pdf |
| 7 | Reply to examination report | Alexion Pharmaceuticals press release N411599EP-B PXT.pdf | EXRE3-3.pdf |
| 8 | Reply to examination report | Saxe Declaration re CAS Eculizumab Sequence N411599EP-B PXT.pdf | EXRE3-4.pdf |
| 9 | Reply to examination report | Experimental Report N411599EP-B PXT.pdf | EXRE3-5.pdf |

| | Payment | |
|---|---|---|
| 1 | Method of payment | Not specified |

**Signatures**

Place:

Date: **16 January 2018**

Signed by: **Elizabeth Davenport 55598**




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| | |
|---|---|
| Association: | **J A Kemp** |
| Representative name: | **DAVENPORT, Elizabeth** |
| Capacity: | **(Representative)** |

months. In certain embodiments, said patient has aplastic anemia or myelodysplastic syndrome.

In certain embodiments, said antibody that binds C5 or an active antibody fragment thereof is administered in a single unit dosage form. In certain embodiments, the single unit dosage form is a 300 mg unit dosage form. In certain embodiments, the single unit dosage form is lyophilized. In certain embodiments, the single unit dosage form is a sterile solution. In certain embodiments, the single unit dosage form is a preservative free formulation. In certain embodiments, the 300 mg single-use dosage form comprises 30 ml of a 10 mg/ml sterile, preservative free solution.

In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises an altered constant region, wherein said antibody or antigen-binding fragment exhibits decreased effector function relative to an anti-CDCPl antibody with a native constant region. In certain embodiments, decreased effector function comprises one or more properties of the following group: a) decreased antibody-dependent cell-mediated cytotoxicity (ADCC), and b) decreased complement dependent cytotoxicity (CDC), compared to an anti-CDCPl antibody with a native constant region. in certain embodiments, the altered constant region comprises a G2/G4 construct in place of the G1 domain.

In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region comprises one or more CDR regions having an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, or SEQ ID NO:?, and wherein the light chain variable region comprises one or more CDR regions having an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10. In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region consists of SEQ ID NO: 1 and the light chain variable region consists of residues 23 to 109 of SEQ ID NO: 3. In certain embodiments, the pharmaceutical composition comprises eculizumab. In certain embodiments, the pharmaceutical composition comprises pexelizumab. In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain and a light chain, wherein the heavy chain consists of SEQ ID NO: 2 and the light chain consists of residues 23 to 214 of SEQ ID NO: 4.

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## CLAIMS

1. An antibody that binds C5 comprising a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO: 4.

2. A pharmaceutical composition comprising the antibody of claim 1.



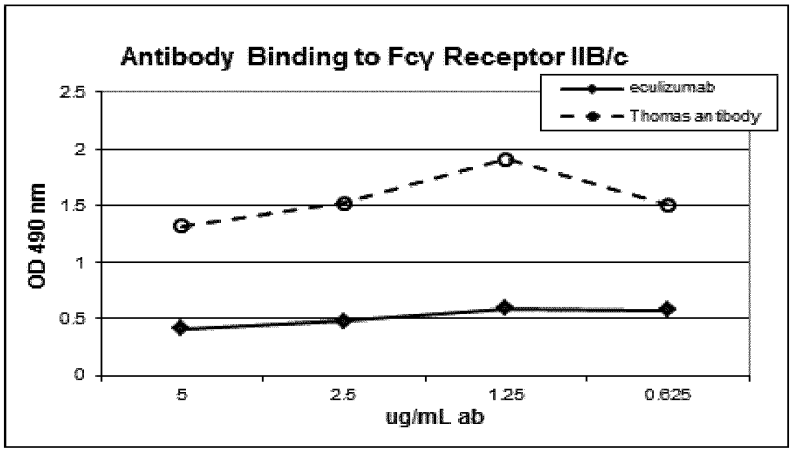
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**Experimental Report**

***Methods***

Ni-NTA pre-coated plates (Qiagen, Ca#35061) were incubated with 50 µL/well of His-tagged human FcγR IIb/c (R and D systems Cat# 1875-CD) at a receptor concentration of 5 µg/mL in PBS, overnight at 4°C. Following overnight incubation with receptor, the plates were washed 3 times with PBS buffer containing 0.02% Tween-20 using a multiwash advantage plate washer. After washing, 50 µL of complexed antibodies were diluted in PBS buffer containing 0.05% Tween-20 and incubated in the plate for 60 minutes at room temperature. Complexed antibody was prepared by prior incubation of antibodies (eculizumab and the anti-C5 IgG4 antibody described in Thomas et al. (1997) Mol. Immunol. 33: 1389-1401) overnight with a biotinylated $F(ab')_2$ fraction of goat-anti-human $F(ab')_2$ (Jackson Immunolabs Cat#109-066-006), at a 2:1 antibody: $F(ab')_2$ molar ratio in PBS. Following incubation of the plate wells with complexed antibody, the plates were washed as described above and followed by the addition of 50 µL/well of the secondary antibody streptavidin-HRP to detect biotinylated complexed antibodies (Zymed Cat#43-4323, diluted 1/2000 in PBS buffer containing 0.05% Tween-20). Incubation with secondary antibody was for 60 minutes at room temperature. Following this incubation, wells were washed and color development initiated with 100 µL/ well of *o*-phenylenediamine dihydrochloride (OPD, Sigma Cat#P 9187). Reactions were stopped with 25 µL/well 12.5% $H_2SO_4$ and the absorbance read at 490 nm.

***Results***




The Figure above shows the binding of the cross linked antibodies to Fcγ Receptors as immune complexes with $F(ab')_2$-anti-$F(ab')_2$, measured using an ELISA format. Concentration of antibody (µg/mL) is described on the X axis, and the Y axis reflects signal



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as measured via optical density at 490 nm. The binding profile of the IgG4 subtype antibody (Thomas antibody) to FcγRIIB, the inhibitory FcγR, is markedly different from the binding profile exhibited by eculizumab. Binding of eculizumab to FcγRIIB is weaker than the binding of the IgG4 antibody to FcγRIIB.



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**DECLARATION BY STEPHEN A. SAXE, PH.D., J.D.**

Dear Sir:

I, Stephen A. Saxe, Ph.D., J.D., was Associate General Counsel, Intellectual Property at Alexion Pharmaceuticals, Inc. ("Alexion") from October 2001 through May 2014. In that role, I was the primary intellectual property counsel at Alexion responsible for handling matters related to Soliris®(eculizumab) from at least 2001 through 2009. I declare that:

1. In late March 2009, in the course of reviewing papers related to a matter in Australia, I noticed that eculizumab had a registry number assigned to it from the Chemical Abstracts Service ("CAS"). I inquired internally at Alexion and learned that in early 1999 CAS had assigned the molecule that would later be called "eculizumab" the CAS Registry Number 219685-50-4. However, I also learned at that time that incorrect information had been submitted to CAS in 1999 to support the CAS registry entry. In particular, there were numerous errors in the sequence of the molecule described in CAS Registry Number 219685-50-4.

2. On April 20, 2009, I emailed CAS and explained that it had recently come to our attention that the entry information submitted in 1999 was incorrect, and I proposed that the registry entry should be corrected. (See attached Exhibit A.)

3. Following up to that email, on April 28, 2009, I sent another email with an attached letter to CAS, detailing the errors and requesting correction of CAS Registry Number 219685-50-4. (See attached Exhibit B.) For example, I explained that the heavy chain is in fact 448 amino acids long, not 650 amino acids in length as had initially been submitted in 1999. (See Exhibit B letter, 3rd paragraph.) I also explained that there was an error in the sequence of the light chain that was submitted in 1999. (See Exhibit B letter, 3rd paragraph.) I provided complete and accurate amino acid sequences for both the heavy chain and the light chain of eculizumab.



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4. On May 1, 2009, Ms. Lois Bishop at CAS responded to my April 28, 2009 communication and indicated that the changes I requested to CAS Registry Number 219685-50-4 had been made and that it would take a couple of days for these to appear on STN. (See attached Exhibit C.)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true.

Stephen A. Saxe — January 12, 2018

Stephen A. Saxe, Ph.D., J.D. — Date



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answers@cas.org
send new seqs, reference old order #
& disulfide bond change – let them know,
Lois Bishop 614-447-3600, x2863

**Saxe, Stephen**

**From:** Saxe, Stephen
**Sent:** Monday, April 20, 2009 4:35 PM
**To:** 'help@cas.org'
**Subject:** Registry Number 219685-50-4

Dear Sir or Madam,

About 10 years ago my company (Alexion Pharmaceuticals) obtained a registry number (219685-50-4) for our antibody called eculizumab. We submitted amino acid sequences which we stated were for the two chains of eculizumab. It has recently come to our attention that the sequences we submitted to you 10 years ago were incorrect. How can we have this corrected? At present, I am uncertain whether the sequences we submitted are publicly available in a database. Whether publicly available or not, we feel that we should correct the sequences that were erroneously sent to you in 1999 and which we only recently realized were sent in error. Can we simply submit the correct sequences and keep the same registry number or is it necessary to obtain a new registry number? If the latter, we would like the original registry number deleted since the sequence associated with it is incorrect. Please let me know how we should proceed to get this matter corrected. Thank you.

Stephen A. Saxe, Ph.D.
Associate General Counsel, Intellectual Property
Alexion Pharmaceuticals, Inc.
352 Knotter Drive
Cheshire, CT 06410
U.S.A.
Tel. 203-271-8289
Fax 203-271-8195

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**********

**Saxe, Stephen**

**From:** Saxe, Stephen
**Sent:** Tuesday, April 28, 2009 3:03 PM
**To:** 'answers@cas.org'
**Subject:** CAS Registry Number 219685-50-4
**Attachments:** Letter to CAS 04-28-09.pdf

Dear Sir or Madam:

Please see the attached letter regarding correcting information for CAS Registry Number 219685-50-4. Please contact me if you need additional information. Thank you.

Stephen A. Saxe, Ph.D.
Associate General Counsel, Intellectual Property
Alexion Pharmaceuticals, Inc.
352 Knotter Drive
Cheshire, CT 06410
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**********

ALEXION pharmaceuticals

Stephen A. Saxe, Ph.D.
Associate General Counsel, Intellectual Property

saxes@alxn.com
Direct Tel. 203-271-8289

April 28, 2009

Dear Sir or Madam:

On February 8, 1999 Alexion Pharmaceuticals, Inc. submitted an application form for a new CAS registry number for Alexion's whole monoclonal antibody named 5G1.1. This was processed under your Order Number 41875. The antibody was assigned CAS Registry Number 219685-50-4. It recently came to Alexion's attention that incorrect information was submitted in 1999. At this time Alexion would like to correct the error that was made in 1999. Attached is information showing the correct sequence information. In the 1999 filing, the antibody was described as follows:

> 5G1.1 is a fully humanized monoclonal antibody (originally of murine origin) specifically reactive with the fifth component of human complement (C5). 5G1.1 specifically binds to the alpha chain of C5. It blocks the activation of C5 and thereby blocks downstream complement system function. It thus 1) blocks complement hemolytic activity, 2) blocks the assembly of the C5b-9 membrane attack complex of complement, and 3) blocks the generation of the anaphylatoxic complement C5 cleavage product, C5a. 5G1.1 consists of a heavy chain that is 650 amino acids long and a light chain that is 214 amino acids long. The amino acid sequence of the light chain is:

There is one error in the information provided in the above paragraph. The heavy chain is in fact 448 (not 650) amino acids long. The correct sequence is shown on the attached sheet. The light chain is 214 amino acids long and that information in the above paragraph is correct. However, there was a single error in the sequence of the light chain that was submitted in 1999 and the correct sequence is shown on the attached sheet. Both sequences on the attached sheet (labeled as Figure 3.2.S.1.2.2) are presented using the standard one-letter amino acid code. If you need more information than that, please let me know. We would like the heavy- and light-chain sequences shown on the attached sheet to be inserted into the CAS database in place of the two sequences that were erroneously sent to you in 1999.

Additionally, the disulfide bonds of the whole antibody are known. These bonds are as follow:



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Disulfide Bonds Solely within a Light Chain
Cys23Light - Cys88Light
Cys134 Light - Cys194Light

Disulfide Bonds Solely within a Heavy Chain
Cys22Heavy - Cys96Heavy
Cys149Heavy - Cys205Heavy
Cys262Heavy - Cys322Heavy
Cys368Heavy - Cys426Heavy

Disulfide Bonds Connecting the Light and Heavy Chains
Cys136Heavy - Cys214Light

Disulfide Bonds Connecting Two Heavy Chains
Cys228Heavy - Cys228Heavy
Cys231Heavy - Cys231Heavy

From the above you see that each light chain has two intrachain disulfide bonds, each heavy chain has four intrachain disulfide bonds, there is a single disulfide bond connecting a light chain to a heavy chain, and there are two disulfide bonds connecting the two heavy chains to each other.

Additionally, there is one N-linked glycosylation site at Asn298 of the heavy chain.

We would like the same CAS Registry Number to be maintained for this molecule and to simply have the correct amino acid sequences for the light and heavy chains replace the incorrect sequences that were inadvertently submitted in 1999. Please let me know when the correction has been made. Please contact me if you need additional information.

Very truly yours,

Stephen A. Saxe

Stephen A. Saxe



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**Figure 3.2.S.1.2.2: Expected Amino Acid Sequence for h5G1.1-mAb**

| Heavy Chain |
| --- |
| QVQLVQSGAEVKKPGASVKVSCKASGYIFSNYWIQWVRQAPGQGLEWMGEILPGSGSTEYTENFKDRVTMTRDTSTSTVYMELSSLR<br>SEDTAVYYCARYFFGSSPNWYFDVWGQGTLVTVSSASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTF<br>PAVLQSSGLYSLSSVVTVPSSNFGTQTYTCNVDHKPSNTKVDKTVERKCCVECPPCPAPPVAGPSVFLFPPKPKDTLMISRTPEVTCVV<br>VDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVY<br>TLPPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHY<br>TQKSLSLSLGK<br>N-Terminal = Pyroglutamate<br>C-Terminal = OH<br>Average Mass = 49,502 Da |

| Light Chain |
| --- |
| DIQMTQSPSSLSASVGDRVTITCGASENIYGALNWYQQKPGKAPKLLIYGATNLADGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQ<br>NVLNTPLTFGQGTKVEIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSST<br>LTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC<br>N-Terminal = H<br>C-Terminal = OH<br>Average Mass = 23,135 Da |



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**Saxe, Stephen**

**From:** Bishop, Lois [lbishop@cas.org]
**Sent:** Friday, May 01, 2009 8:18 AM
**To:** Saxe, Stephen
**Subject:** RE: CAS Registry Number 219685-50-4

Dear Dr. Saxe,

The changes to your sequence for CAS Registry Number 219685-50-4 have been made. It may take a couple of days before they appear on STN. Let us know if we can be of further assistance.

Best regards,
Lois Bishop
CAS Client Services
614-447-3600 x2863

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**From:** Saxe, Stephen [mailto:SaxeS@alxn.com]
**Sent:** Tuesday, April 28, 2009 3:03 PM
**To:** answers
**Subject:** CAS Registry Number 219685-50-4

Dear Sir or Madam:

Please see the attached letter regarding correcting information for CAS Registry Number 219685-50-4. Please contact me if you need additional information. Thank you.

Stephen A. Saxe, Ph.D.
Associate General Counsel, Intellectual Property
Alexion Pharmaceuticals, Inc.
352 Knotter Drive
Cheshire, CT 06410
U.S.A.
Tel. 203-271-8289
Fax 203-271-8195

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## FDA Approves Alexion's Soliris(TM) for All Patients With PNH

### - First Therapy Approved for This Rare and Life-Threatening Blood Disease -

CHESHIRE, Conn., March 16, 2007 /PRNewswire-FirstCall via COMTEX News Network/ -- Alexion Pharmaceuticals, Inc., (Nasdaq: ALXN) announced today that it has received marketing approval from the U.S. Food and Drug Administration (FDA) for Soliris(TM) (eculizumab). Soliris is the first therapy approved for paroxysmal nocturnal hemoglobinuria (PNH), a rare, disabling and life-threatening blood disorder defined by chronic red blood cell destruction, or hemolysis. Soliris is indicated for the treatment of patients with PNH to reduce hemolysis.

Hemolysis can cause one or more of the following symptoms in patients with PNH: severe anemia, disabling fatigue, recurrent pain, shortness of breath, pulmonary hypertension, intermittent episodes of dark colored urine (hemoglobinuria), kidney disease, impaired quality of life and blood clots (thromboses).(1,2) PNH often strikes people in the prime of their lives, with an average age of onset in the early 30's.(3) The estimated median survival for PNH patients is between 10 and 15 years from the time of diagnosis.(3,4)

Patients with PNH are missing a specific protein that normally protects red blood cells from destruction by a component of the immune system called terminal complement. Soliris, the first complement inhibitor approved in the United States for the treatment of any disease, prevents hemolysis by selectively blocking terminal complement.

"Soliris brings real hope to people who live daily with the devastating effects of PNH. With the approval of Soliris, we now have a therapy that dramatically improves the lives of patients suffering from this disease. Importantly, all patients with this life-threatening disease will be eligible for treatment," said Leonard Bell, MD, chief executive officer of Alexion Pharmaceuticals.

"Soliris directly targets the underlying disease process responsible for debilitating symptoms that may contribute to shortened life spans of PNH patients," said Wendell F. Rosse, MD, Florence McAlister Professor of Medicine Emeritus, Duke University. "Having cared for more than 300 patients with PNH over my career, I believe this is the most important advance that has been made in the treatment of this disease. Treatment with Soliris markedly decreases the hemolysis responsible for anemia, fatigue, poor patient functioning and blood clots in PNH patients."

Clinical Data

Soliris has proven to be a safe and effective therapy for PNH in three multi-national clinical studies: TRIUMPH, a placebo-controlled 26 week Phase 3 study involving 87 PNH patients,(5) SHEPHERD, an open-label 52 week Phase 3 trial involving 97 PNH patients,(6) and E05-001, a long term extension study.(7)

These studies showed that Soliris reduced hemolysis in every treated patient. Hemolysis was dramatically reduced from a baseline LDH of 2,032 U/L to 239 U/L at week 26 ($p<0.001$). The reductions in hemolysis occurred within one week of initiating treatment and were sustained for periods of up to 54 months with continued dosing of Soliris. The reduction in hemolysis expands the number of circulating PNH cells and, thereby, increases the hemoglobin level. Hemoglobin stabilization and the number of transfused packed red blood cell units, the pivotal study's co-primary endpoints, were both achieved; half of the Soliris-treated patients achieved hemoglobin stabilization compared with none of the patients in the placebo group, the median number of transfusions was reduced from 10 units/patient to 0 units/patient, respectively ($p < 0.001$ in both cases). Soliris patients reported less fatigue and improved health-related quality of life. There were fewer thrombotic events with Soliris treatment than during the same period of time prior to treatment.

"The Aplastic Anemia & MDS International Foundation (AA&MDSIF) is extremely pleased that PNH patients now have a treatment specifically for their disease. This is a tremendous step forward for all who suffer from PNH -- and for anyone with bone marrow failure," said Sherrie VanVliet, vice-chairperson, AA&MDSIF, and the mother of a child with aplastic anemia. "We also appreciate that Alexion, in cooperation with the National Organization of Rare Diseases, has established a program to ensure that all patients who need eculizumab have access to it."

"Patients with rare diseases face huge challenges -- first getting a proper diagnosis, then finding effective treatments and access to them," said Abbey Meyers, president, National Organization for Rare Disorders (NORD). "Now that Soliris has been approved, people with PNH will have an effective treatment, and through NORD's PNH Foundation, the uninsured and underinsured will receive help to assure they will have access. This is a sign of hope for others with orphan illnesses, that their needs will one day be met," she added.



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Introducing Soliris OneSource(TM)

Alexion also today introduced Soliris OneSource(TM), a treatment support service for all PNH patients and their healthcare providers. Each patient enrolled in the program receives support from an Alexion Case Manager at OneSource. Alexion Case Managers are Registered Nurses and provide education about PNH and Soliris and facilitate solutions to help patients obtain Soliris. Alexion's goal is that all PNH patients who can benefit from Soliris will have access to it. Patients and their health care providers can learn more about OneSource by calling 1-888-SOLIRIS (1-888-765-4747) or visiting www.soliris.net.

Important Safety Information

Soliris is generally well tolerated. The most frequent adverse events observed in clinical studies were headache, nasopharyngitis (a runny nose), back pain and nausea.(8) Treatment with Soliris should not alter anticoagulant management because the effect of withdrawal of anticoagulant therapy during Soliris treatment has not been established.

The product label for Soliris also includes a boxed warning: "Soliris increases the risk of meningococcal infections. Vaccinate patients with a meningococcal vaccine at least 2 weeks prior to receiving the first dose of Soliris; revaccinate according to current medical guidelines for vaccine use. Monitor patients for early signs of meningococcal infections, evaluate immediately if infection is suspected, and treat with antibiotics if necessary. "Two out of 196 vaccinated PNH patients treated with Soliris experienced a serious meningococcal infection.

Prior to beginning Soliris therapy, all patients and their prescribing physicians will be enrolled in the Soliris Safety Registry which is part of a special risk management program that involves initial and continuing education and long-term monitoring for detection of new safety findings.

Please see full prescribing information at www.soliris.net.

Conference Call Information

Alexion will host a conference call/webcast to discuss FDA approval of Soliris. The call is scheduled for Monday, March 19th at 9:00 a.m., Eastern Time. To participate in this call, dial 913-981-4900, confirmation code 4700435, shortly before 9:00 a.m., Eastern Time. A replay of the call will be available for a limited period following the call, beginning at 12:00 p.m., Eastern Time. The replay number is 719-457-0820, confirmation code 4700435. The audio webcast can be accessed at: www.alexionpharm.com.

About PNH

PNH is an acquired genetic blood disorder defined by hemolysis, in which patients' red blood cells are destroyed by complement, a component of the body's immune system. PNH is a rare disease that affects an estimated 8,000 to 10,000 people in North America and Europe. Ten percent of all patients first develop symptoms at 21 years of age or younger.(2) PNH develops without warning and can occur in men and women of all races, backgrounds and ages. PNH often goes unrecognized, with delays in diagnosis often ranging from one to more than 10 years. PNH has been identified more commonly among patients with diseases of the bone marrow, including aplastic anemia (AA) and myelodysplastic syndrome (MDS). In patients with thrombosis of unknown origin, PNH may be an underlying cause.

Prior to approval of Soliris, there were no therapies specifically available for the treatment of PNH. PNH treatment was limited to symptom management through periodic blood transfusions, non-specific immunosuppressive therapy and, infrequently, bone marrow transplantations -- a high-risk and painful procedure used as a last resort.(2)

About Alexion

Alexion Pharmaceuticals is a biotechnology company working to develop and deliver life-changing drug therapies for patients with serious and life- threatening medical conditions. Alexion's lead product, Soliris(TM) (eculizumab), is indicated for the treatment of paroxysmal nocturnal hemoglobinuria (PNH). Alexion is engaged in the discovery and development of therapeutic products aimed at treating patients with severe disease states, including hematologic diseases, cancer and autoimmune disorders. In September 2006, Alexion applied for marketing authorization with the European Medicines Evaluation Agency for the use of Soliris(TM) (eculizumab) in PNH patients. This press release and further information about Alexion Pharmaceuticals, Inc. can be found at: http://www.alexionpharm.com.

This news release contains forward-looking statements, including statements related to medical benefits and commercial potential of Soliris(TM)(eculizumab), initiation and conduct of the PNH OneSource(TM) treatment support service, and estimates of the number of people living with PNH. Forward-looking statements are subject to factors that may cause Alexion's results and plans to differ from those expected, including requests by regulatory authorities for additional information following marketing approval, delays in arranging satisfactory manufacturing capability, inability to acquire funding on timely and



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satisfactory terms, delays in or failure to establish internal sales and marketing capabilities, delays in developing or adverse changes in commercial relationships, the possibility that results of clinical trials are not predictive of the safety and efficacy of Soliris(TM)(eculizumab) when made available to larger number of people, the risk that third parties won't agree to license any necessary intellectual property to us on reasonable terms, the risk that third party payors will not reimburse for the use of Soliris(TM) at acceptable rates or at all, the risk that estimates regarding the number of people living with PNH are inaccurate, and a variety of other risks set forth from time to time in Alexion's filings with the Securities and Exchange Commission, including but not limited to Alexion's Annual Report on Form 10-K. Alexion does not intend to update any of these forward-looking statements to reflect events or circumstances after the date hereof, except when a duty arises under law.


(1) Rother R, Bell L, Hillmen P, Gladwin M. The clinical sequelae of intravascular hemolysis and extracellular plasma hemoglobin. JAMA 2005; 293:1653-1662.

(2) Parker C, Omine M, Richards S, et al. Diagnosis and management of paroxysmal nocturnal hemoglobinuria. Blood 2005; 106:3699-3709.

(3) Socie G, Mary J Yves, de Gramont A, et al. Paroxysmal nocturnal haemoglobinuria: long-term follow-up and prognostic factors. Lancet 1996; 348:573-577.

(4) Hillmen P. Lewis SM, Bessler M, Luzzatto L, Dacie JV. Natural history of paroxysmal nocturnal hemoglobinuria. N Engl J Med 1995; 333:1253-1258.

(5) Hillmen P, Young N, et al. The Complement Inhibitor Eculizumab in Paroxsysmal Nocturnal Hemoglobinuria. N Engl J Med 2006; 355:1233-1243.

(6) Young N, Antonioli E, Rotoli B, et al. Safety and efficacy of the terminal complement inhibitor eculizumab in patients with paroxysmal nocturnal hemoglobinuria: SHEPHERD phase III clinical study results. Blood 2006; 108:971.

(7) Hillmen P, Muus P, Duhrsen U, et al. The terminal complement inhibitor eculizumab reduces thrombosis in patients with paroxysmal nocturnal hemoglobinuria. Blood 2006; 108:123.

(8) Soliris(TM) (eculizumab) prescribing information. Alexion Pharmaceuticals, Inc., 2006.


SOURCE Alexion Pharmaceuticals, Inc.


Leonard Bell, M.D., Chief Executive Officer, of Alexion Pharmaceuticals, Inc., +1-203-272-2596; or Media, David Patti, of Makovsky + Company, +1-212-508-9623, dpatti@makovsky.com; or Investors, Rhonda Chiger, of Rx Communications Group, LLC, +1-917-322-2569, rchiger@rxir.com, both for Alexion Pharmaceuticals, Inc.


http://www.alexionpharm.com


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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Food and Drug Administration
Rockville, MD 20857

MAR 16 2007

Our STN: BL 125166/0

Alexion Pharmaceuticals
Attention: Nancy Motola, Ph.D., RAC
Senior Vice President, Regulatory and Quality
352 Knotter Drive
Cheshire, CT 06410

Dear Dr. Motola:

We are issuing Department of Health and Human Services U.S. License No. 1743 to Alexion Pharmaceuticals, Inc., Cheshire, Connecticut, under the provisions of section 351(a) of the Public Health Service Act controlling the manufacture and sale of biological products. The license authorizes you to introduce or deliver for introduction into interstate commerce, those products for which your company has demonstrated compliance with establishment and product standards.

Under this license, you are approved to manufacture the product eculizumab, which is indicated for the treatment of paroxysmal nocturnal hemoglobinuria to reduce hemolysis.

You are approved to manufacture eculizumab drug substance at Lonza Biologics, PLC in Portsmouth, NH. The final formulated product will be manufactured, filled, labeled, and packaged at [redacted]. You may label your product with the proprietary name Soliris™ and will market it in 300 mg vials.

The final printed labeling (FPL) must be identical to the enclosed labeling. Marketing product with FPL that is not identical to the approved labeling text may render the product misbranded and an unapproved new drug.

The dating period for eculizumab drug product shall be 24 months from the date of manufacture when stored at 2-8°C. The date of manufacture shall be defined as the date of final sterile filtration of the formulated drug product. The dating period for your drug substance shall be 18 months when stored at 2-8°C.

You currently are not required to submit samples of future lots of eculizumab to the Center for Drug Evaluation and Research (CDER) for release by the Director, CDER, under 21 CFR 610.2. We will continue to monitor compliance with 21 CFR 610.1 requiring completion of tests for conformity with standards applicable to each product prior to release of each lot.



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You must submit information to your biologics license application for our review and written approval under 21 CFR 601 12 for any changes in the manufacturing, testing, packaging or labeling of eculizumab, or in the manufacturing facilities.

We acknowledge your written commitments as described in your letter of February 22, 2007, March 12, 2007 and March 12, 2007 as outlined below:

**Postmarketing Studies subject to reporting requirements of 21 CFR 601.70.**

1. To evaluate long-term safety of eculizumab by analyzing outcomes in the Soliris Safety Registry for a time period of no less than five years. At the end of the five year period, a study report will be submitted to the Biological License Application (BLA) that describes the major safety findings from the registry program, including the specific items listed below and proposing labeling changes as appropriate. Additionally, annual interim reports will be submitted to the BLA, along with expedited reports as specified below. The protocol for addressing this PMC will be submitted to the IND by May 31, 2007, and the five year study report will be submitted by June 30, 2012. All patients within the registry will be followed for the occurrence of:

    a. Serious infections, defined as infections necessitating or prolonging hospitalization or resulting in death. Alexion commits to collecting follow-up information from these patients to assess the nature of the serious infection, the duration of hospitalization, the major features of the clinical course and the survival status. Expedited reporting (15 day telephone or facsimile Medwatch communication) will be provided for the occurrence of these serious infections.

    b. Malignancy, including the nature of the malignancy and the survival status of patients who develop a malignancy;

    c. Use of eculizumab among pediatric patients under 16 years of age, to include collection of eculizumab dosage information, as well as the same information being required for adult patients in the registry;

    d. Pregnancy, including the clinical course of each pregnancy and the detection of congenital abnormalities among babies born to the women exposed to eculizumab during the pregnancy.

    e. Thrombotic events, including the nature of the event, the clinical outcome as well as the anticoagulant management prior to and after the event.



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2. To submit a comprehensive description of the Soliris Guardian Program Risk Minimization Action Plan (RiskMAP), including all items listed below. Fulfillment of this post-marketing commitment will be contingent upon FDA concurrence upon the expectations of the Soliris Guardian Program. Submission of all items listed below will occur no later than May 18, 2007. The submitted information will include:

   a. A final version of the Soliris Guardian Program document that, in addition to any other items, provides information fully consistent with the approved prescribing information.

   b. A copy of all educational materials to be provided as part of the program, including but not limited to all components of the Soliris Starter Kit, the Drug Fact Sheet and patient-health care provider documents relating to the Soliris Safety Registry.

   c. A commitment to develop and submit a protocol (with the understanding that this protocol may need modification based upon FDA review findings) that uses surveys of health care providers and patients to assess compliance with the vaccination requirements as well as their knowledge of the risks of eculizumab and the need for vaccination.

   d. A copy of the Soliris Safety Registry protocol and any supportive documents to be provided to health care providers and patients. These documents may need modification based upon FDA review findings. The submitted protocol will indicate that the Registry will continue until Alexion receives written concurrence from FDA to terminate the registry. The protocol will include collection of the occurrence of the following events:

      i. Death;

      ii. Meningococcal vaccination (type and dates of all vaccinations);

      iii. eculizumab administration dates, at designated time points to establish initiation and termination of therapy as well as to correlate eculizumab administration with the fatalities and the events listed below:

         - All meningococcal infections causing sepsis or meningitis
         - Other serious infections
         - Malignancy, including the nature of the malignancy and the survival status of patients who develop a malignancy;
         - Use of eculizumab among pediatric patients under 16 years of age, to include collection of eculizumab dosage information, as well as the required information for adult patients in the registry;
         - Use of eculizumab by indication;



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- Pregnancy, including the clinical course of each pregnancy and the detection of congenital abnormalities among off-spring of the women exposed to eculizumab during a pregnancy and;
- Serious hemolysis, as defined by specific criteria.

e. A commitment to submit quarterly RiskMAP reports for the first year and annual reports thereafter (unless FDA provides written request for more frequent submissions) summarizing all information relating to the Soliris Guardian Program. The reports should include the following:

i. An analysis of all cases of the following, including a root cause analysis and factors that might have contributed to serious outcomes:
- Meningococcal sepsis or meningitis, including the timing of all vaccinations relative to administration of Soliris
- Other infections (with serious outcomes)
- All deaths
- Cases of serious hemolysis and all cases of hemolysis with serious outcomes

ii. Soliris use patterns including indication for use;

iii. Extent of compliance with RiskMAP requirements such as the percentage of patients that were vaccinated prior to receiving eculizumab and the percentage of patients that were re-vaccinated at 3-year or 10-year intervals (as applicable);

iv. Analysis of all cumulative data collected in the Soliris Safety Registry;

v. Results from all health care provider and patient surveys, including:

- Any known data about patients or physicians who refused to participate in the surveys
- Any known data about survey participants who are considered "lost" (drop-outs).

3. To conduct a randomized, controlled clinical study to assess the effects of anticoagulant withdrawal among PNH patients receiving eculizumab. This study will randomize at least 100 anticoagulated patients to either continue or discontinue anticoagulation therapy. The major outcomes will assess the safety of discontinuation of anticoagulant therapy while continuing eculizumab, especially with respect to providing important evidence regarding major bleeding and that this discontinuation does not increase the risk for occurrence of thrombotic events in these patients. A full study report and data from this study will be submitted to the BLA and may include a label revision, contingent upon the importance of the study results. The study protocol will be submitted to the investigational new drug application (IND) by June 30, 2007 and patient accrual completed no later than June 1, 2009. A final study report will be submitted no later than March 31, 2014.



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4. To develop a validated and quantitative assay for the measurement of human anti-human antibodies (HAHA) for the detection of antibody formation to eculizumab. This assay will assess potential immune responses to the whole eculizumab molecule. Description of the validated assay will be submitted to the BLA as a CBE 30 by July 9, 2008.

5. To develop a validated and sensitive assay for the measurement of neutralizing HAHA to eculizumab. Alternatively, Alexion commits to submit documentation to FDA demonstrating with due diligence that a suitable assay could not be feasibly developed and that the assessment of serum lactate dehydrogenase (LDH) is a sufficiently sensitive indicator of the presence of neutralizing antibodies. This information will be submitted to the BLA by July 9, 2008.

6. To utilize samples from the ongoing E05-001 Phase III extension study (approximately 170 patients for at least 2 years) as test samples for the new validated HAHA assays. Alexion will continue to obtain serum samples from those patients who transition from E05-001 to the Soliris Safety Registry, at intervals of no less than one year, and continue this collection process for an additional three years. Sample collection will cease during this additional three year period for patients who terminate eculizumab administration. Additionally, serum samples will be obtained based upon physician reports of suspected loss of eculizumab bioactivity, based upon unanticipated alterations in serum LDH concentrations. All serum samples will be assayed at least annually and the results provided within an annual report to the BLA. Clinical data, to include the results of serum LDH concentrations, will also be obtained from any patients who show evidence of antibody formation. The protocol describing Alexion's plan for responding to this commitment will be submitted by May 1, 2007 and the final study report submitted by January 31, 2011.

**Postmarketing Studies not subject to reporting requirements of 21 CFR 601.70.**

7. To revalidate the linearity and accuracy of the Osmolality method across the full specification range using a combination of product samples diluted to lower osmolality and product samples spiked with osmolality standards. The revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

8. To revalidate the linearity of the IEF method across a load range of [ — ] The revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 supplement by August 31, 2007.

9. To revise the IEF method SOP to specify that the method is validated only for a [ — ] This information will be submitted to the BLA as a CBE 30 by August 31, 2007.



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10. To improve and revalidate the existing hemolytic assay. Improvements include increasing the number of sample replicates and qualifying the chicken erythrocytes reagent. The revised method SOP and revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

11. To develop a new quantitative biological activity assay to replace the existing hemolytic assay, or submit documentation to FDA demonstrating with due diligence that a suitable assay could not be feasibly developed. This information will be submitted to the BLA by February 29, 2008. Validation of the quantitative biological activity assay will be submitted by July 9, 2008.

12. To provide FDA with a completed drug substance and drug product container closure system leachables evaluation using end-of-shelf-life, long-term 2-8°C stability samples. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

13. To develop a suitable [redacted] assay and subsequently confirm [redacted] on three drug substance batches. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

We request that you submit clinical protocols to your IND, with a cross-reference letter to this biologics license application (BLA), STN BL 125166. Submit nonclinical and chemistry, manufacturing, and controls protocols and all study final reports to your BLA, STN BL 125166. Please use the following designators to label prominently all submissions, including supplements, relating to these postmarketing study commitments as appropriate:

- **Postmarketing Study Commitment Protocol**
- **Postmarketing Study Commitment Final Study Report**
- **Postmarketing Study Commitment Correspondence**
- **Annual Status Report of Postmarketing Commitment Studies**

For each postmarketing study subject to the reporting requirements of 21 CFR 601.70, you must describe the status in an annual report on postmarketing studies for this product. The status report for each study should include:

- information to identify and describe the postmarketing commitment,
- the original schedule for the commitment,
- the status of the commitment (i.e. pending, ongoing, delayed, terminated, or submitted),
- an explanation of the status including, for clinical studies, the patient accrual rate (i.e. number enrolled to date and the total planned enrollment), and
- a revised schedule if the study schedule has changed and an explanation of the basis for the revision.



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As described in 21 CFR 601.70(e), we may publicly disclose information regarding these postmarketing studies on our Web site (http://www.fda.gov/cder/pmc/default.htm). Please refer to the February 2006 Guidance for Industry: Reports on the Status of Postmarketing Study Commitments - Implementation of Section 130 of the Food and Drug Administration Modernization Act of 1997 (see http://www.fda.gov/cder/guidance/5569fnl.htm) for further information.

Under 21 CFR Part 208, we have determined that this product poses a serious and significant public health concern requiring the distribution of a Medication Guide. Eculizumab is a product for which patient labeling could help prevent serious adverse effects and inform the patient of serious risks relative to benefit that could affect their decisions to use, or continue to use, the product. Therefore, a Medication Guide is necessary for safe and effective use of this product and FDA hereby approves the draft Medication Guide you submitted March 15, 2007. Please note that:

- this Medication Guide must be reprinted at the end of the package insert or accompany it [21 CFR 201.57(c)(18)];
- you are responsible for ensuring that this Medication Guide is available for distribution to every patient who is dispensed a prescription for this product [21 CFR 208];
- the final printed Medication Guide distributed to patients must conform to all conditions described in 21 CFR 208.24, including a minimum of 10 point text; and
- you are responsible for ensuring that the label of each container or package includes a prominent and conspicuous instruction to authorized dispensers to provide a Medication Guide to each patient to whom the drug is dispensed, and states how the Medication Guide is provided.

Please submit within 30 days content of labeling [21 CFR 601.14(b)] in structured product labeling (SPL) format, as described at http://www.fda.gov/oc/datacouncil/spl.html, that is identical in content to the enclosed labeling text dated March 16, 2007. Upon receipt and verification, we will transmit that version to the National Library of Medicine for public dissemination.

You must submit adverse experience reports under the adverse experience reporting requirements for licensed biological products (21 CFR 600.80). You should submit postmarketing adverse experience reports to the Central Document Room, Center for Drug Evaluation and Research, Food and Drug Administration, 5901-B Ammendale Road, Beltsville, MD 20705-1266. Prominently identify all adverse experience reports as described in 21 CFR 600.80.

The MedWatch-to-Manufacturer Program provides manufacturers with copies of serious adverse event reports that are received directly by the FDA. New molecular entities and important new biologics qualify for inclusion for three years after approval. Your firm is eligible to receive copies of reports for this product. To participate in the program, please see the enrollment instructions and program description details at www.fda.gov/medwatch/report/mmp.htm.



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You must submit distribution reports under the distribution reporting requirements for licensed biological products (21 CFR 600.81).

You must submit reports of biological product deviations under 21 CFR 600.14. You should promptly identify and investigate all manufacturing deviations, including those associated with processing, testing, packing, labeling, storage, holding and distribution. If the deviation involves a distributed product, may affect the safety, purity, or potency of the product, and meets the other criteria in the regulation, you must submit a report on Form FDA-3486 to the Division of Compliance Risk Management and Surveillance (HFD-330), Center for Drug Evaluation and Research, Food and Drug Administration, 5600 Fishers Lane, Rockville, MD 20857. Biological product deviations sent by courier or overnight mail should be addressed to Food and Drug Administration, CDER, Office of Compliance, Division of Compliance Risk Management and Surveillance, HFD-330, Montrose Metro 2, 11919 Rockville Pike, Rockville, MD 20852.

Please submit all final printed labeling at the time of use and include implementation information on FDA Form 356h. Please provide a PDF-format electronic copy as well as original paper copies (ten for circulars and five for other labels). In addition, you may wish to submit draft copies of the proposed introductory advertising and promotional labeling with a cover letter requesting advisory comments to the Food and Drug Administration, Center for Drug Evaluation and Research, Division of Drug Marketing, Advertising and Communication, 5901-B Ammendale Road, Beltsville, MD 20705-1266. Final printed advertising and promotional labeling should be submitted at the time of initial dissemination, accompanied by a FDA Form 2253.

All promotional claims must be consistent with and not contrary to approved labeling. You should not make a comparative promotional claim or claim of superiority over other products unless you have substantial evidence to support that claim.

Please refer to http://www.fda.gov/cder/biologics/default.htm for information regarding therapeutic biological products, including the addresses for submissions.

Sincerely,

Richard Pazdur, M.D.
Director
Office of Oncology Drug Products
Center for Drug Evaluation and Research

Enclosure: Package Insert
Carton and Vial Labeling
Medication Guide
Patient Safety Card



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Page 4026

months. In certain embodiments, said patient has aplastic anemia or myelodysplastic syndrome.

In certain embodiments, said antibody that binds C5 or an active antibody fragment thereof is administered in a single unit dosage form. In certain embodiments, the single unit dosage form is a 300 mg unit dosage form. In certain embodiments, the single unit dosage form is lyophilized. In certain embodiments, the single unit dosage form is a sterile solution. In certain embodiments, the single unit dosage form is a preservative free formulation. In certain embodiments, the 300 mg single-use dosage form comprises 30 ml of a 10 mg/ml sterile, preservative free solution.

In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises an altered constant region, wherein said antibody or antigen-binding fragment exhibits decreased effector function relative to an anti-CDCPl antibody with a native constant region. In certain embodiments, decreased effector function comprises one or more properties of the following group: a) decreased antibody-dependent cell-mediated cytotoxicity (ADCC), and b) decreased complement dependent cytotoxicity (CDC), compared to an anti-CDCPl antibody with a native constant region. in certain embodiments, the altered constant region comprises a G2/G4 construct in place of the G1 domain.

In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region comprises one or more CDR regions having an amino acid sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:6, or SEQ ID NO:?, and wherein the light chain variable region comprises one or more CDR regions having an amino acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10. In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region consists of SEQ ID NO: 1 and the light chain variable region consists of residues 23 to 109 of SEQ ID NO: 3. In certain embodiments, the pharmaceutical composition comprises eculizumab. In certain embodiments, the pharmaceutical composition comprises pexelizumab. In certain embodiments, the antibody that binds C5 or an active antibody fragment thereof comprises a heavy chain and a light chain, wherein the heavy chain consists of SEQ ID NO: 2 and the light chain consists of residues 23 to 214 of SEQ ID NO: 4.

5



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Page 4027

~~New EP divisional application~~
~~based on EP 11 00 1632.6~~
~~Alexion Pharmaceuticals, Inc.~~
~~Our Ref.: P2913 EP/3~~

## CLAIMS

1. An antibody that binds C5 comprising a heavy chain consisting of SEQ ID NO: ~~2~~ and a light chain ~~comprising SEQ ID NOS: 8, 9 and 10.~~

~~2. The antibody of claim 1 comprising a light chain~~ consisting of residues 23 to 214 of SEQ ID NO: 4.

~~3~~2. A pharmaceutical composition comprising the antibody of claim 1 ~~or 2~~.



Samsung Bioepis Exhibit No. 1002
Page 4028

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# Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

| | |
|---|---|
| Submission number | 5964149 |
| Application number | EP16195355.9 |
| Date of receipt | 16 January 2018 |
| Receiving Office | European Patent Office, The Hague |
| Your reference | N411599EP-B |
| Applicant | All applicants as on file |

| Documents submitted | |
|---|---|
| package-data.xml | ep-sfd-request.xml |
| epf1038.pdf (2 p.) | DESC-1.pdf\Amended pg 5 (clean) N411599EP-B PXT.pdf (1 p.) |
| CLMS-1.pdf\Amended claims (clean) N411599EP-B PXT.pdf (1 p.) | DESC-HWA-1.pdf\Amended pg5 (tracked) N411599EP-B PXT.pdf (1 p.) |
| CLMS-HWA-1.pdf\Amended claims (tracked) N411599EP-B PXT.pdf (1 p.) | EXRE3-1.pdf\Response to OA N411599EP-B PXT.pdf (8 p.) |
| EXRE3-2.pdf\Dept of Health & Human Services letter N411599EP-B PXT.pdf (8 p.) | EXRE3-3.pdf\Alexion Pharmaceuticals press release N411599EP-B PXT.pdf (3 p.) |
| EXRE3-4.pdf\Saxe Declaration re CAS Eculizumab Sequence N411599EP-B PXT.pdf (8 p.) | EXRE3-5.pdf\Experimental Report N411599EP-B PXT.pdf (2 p.) |

| | |
|---|---|
| Submitted by | CN=Elizabeth Davenport 55598 |
| Method of submission | Online |
| Date and time receipt generated | 16 January 2018, 16:06 (CET) |

| | |
|---|---|
| Message Digest | AA:35:BB:A0:3B:E1:BE:8E:6C:14:45:E9:64:B3:F7:98:86:FF:D7:C4 |

**Correction by the EPO of errors in debit instructions filed by eOLF**
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

/European Patent Office/

J A • K E M P

BY ONLINE FILING

The European Patent Office
Bayerstrasse 34
(entrance via Zollstrasse 3)
80335 Munich
Germany

6 March 2018

Dear Sirs

**European Patent Application No. 16195355.9**
**ALEXION PHARMACEUTICALS, INC.**
*Our Ref: N411599EP-B PXT*

Further to our letter of 16 January 2018 responding to the Examination Report dated 17 November 2018, it has come to our attention that there is an error in one of the dates in our letter.

The second sentence in the third paragraph at page 5 of our letter of 16 January 2018 should be read as follows:

> "*the correct sequence information for eculizumab was not entered on the registry database until May 2009~~2018~~, which is after the filing date of the present application*".

The correct date of May 2009 is used in the fourth paragraph at page 5 of our letter of 16 January 2018.

Yours faithfully

*Electronically Signed*
**DR PAMELA M TUXWORTH**
**ASSOCIATION NO. 811**

**PATENT ATTORNEYS • TRADE MARK ATTORNEYS**
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A list of our partners is available at our principal place of business at the address above. Regulated by IPREG



Samsung Bioepis Exhibit No. 1002
Page 4031

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# Letter accompanying subsequently filed items


Representative:

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10958 Berlin
Germany
Tel. +49(0)30 25901-0 | Fax -840


The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

| | |
|---|---|
| Application number | 16195355.9 |
| Applicant's or representative's reference | N411599EP-B |

| | Description of document | Original file name | Assigned file name |
|---|---|---|---|
| 1 | Reply to examination report | Correction of error in response N411599EP-B PXT.PDF | EXRE3-1.PDF |

| | Payment | |
|---|---|---|
| 1 | Method of payment | Not specified |

**Signatures**

| | |
|---|---|
| Place: | **Oxford, GB** |
| Date: | **06 March 2018** |
| Signed by: | **Pamela Tuxworth 23470** |
| Association: | **J A Kemp** |
| Representative name: | **TUXWORTH, Pamela Mary** |
| Capacity: | **(Representative)** |

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European Patent Office
Office européen des brevets

# Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

| | | |
|---|---|---|
| Submission number | 6114273 | |
| Application number | EP16195355.9 | |
| Date of receipt | 06 March 2018 | |
| Receiving Office | European Patent Office, The Hague | |
| Your reference | N411599EP-B | |
| Applicant | All applicants as on file | |
| Documents submitted | package-data.xml<br><br>epf1038.pdf (1 p.) | ep-sfd-request.xml<br><br>EXRE3-1.PDF\Correction of error in response N411599EP-B PXT.PDF (1 p.) |
| Submitted by | CN=Pamela Tuxworth 23470 | |
| Method of submission | Online | |
| Date and time receipt generated | 06 March 2018, 17:37 (CET) | |
| Message Digest | C7:A7:D3:FC:46:24:13:7C:F3:43:CD:54:0F:56:2E:E8:21:88:44:5A | |

**Correction by the EPO of errors in debit instructions filed by eOLF**
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

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# Letter accompanying subsequently filed items


Representative:

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10958 Berlin
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Tel. +49(0)30 25901-0 | Fax -840


The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

| | |
|---|---|
| Application number | 16195355.9 |
| Applicant's or representative's reference | N411599EP-B |

Request:

• Enquiry as to the processing of the file

| | Description of document | Original file name | Assigned file name |
|---|---|---|---|
| 1 | Enquiry as to the processing of the file – electronically generated | | EPF1012.PDF |

| | Payment | |
|---|---|---|
| 1 | Method of payment | Not specified |

**Signatures**

| | |
|---|---|
| Place: | **Oxford, GB** |
| Date: | **19 April 2018** |
| Signed by: | **Pamela Tuxworth 23470** |
| Association: | **J A Kemp** |
| Representative name: | **TUXWORTH, Pamela Mary** |
| Capacity: | **(Representative)** |

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# Enquiry as to the processing of the file

I/we hereby enquire when the EPO will deliver the (supplementary) European search report / next communication[1]

for application/patent 16195355.9

[1] OJ EPO 2016, A66

**Signatures**

| | |
|---|---|
| Place: | **Oxford, GB** |
| Date: | **19 April 2018** |
| Signed by: | **Pamela Tuxworth 23470** |
| Association: | **J A Kemp** |
| Representative name: | **TUXWORTH, Pamela Mary** |
| Capacity: | **(Representative)** |

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# Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

| | | |
|---|---|---|
| Submission number | 6248515 | |
| Application number | EP16195355.9 | |
| Date of receipt | 19 April 2018 | |
| Receiving Office | European Patent Office, The Hague | |
| Your reference | N411599EP-B | |
| Applicant | All applicants as on file | |
| Documents submitted | package-data.xml<br>epf1038.pdf (1 p.) | ep-sfd-request.xml<br>epf1012.pdf (1 p.) |
| Submitted by | CN=Pamela Tuxworth 23470 | |
| Method of submission | Online | |
| Date and time receipt generated | 19 April 2018, 11:59 (CEST) | |
| Message Digest | 03:DA:9E:AA:7C:99:C1:0D:29:D8:9B:51:50:D0:BD:A3:A5:CB:25:A8 | |

**Correction by the EPO of errors in debit instructions filed by eOLF**
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

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European Patent Office
80298 MUNICH
GERMANY

**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

J A Kemp
14 South Square
Gray's Inn
London WC1R 5JJ
ROYAUME UNI

| Date |
|---|
| 07.05.2018 |

| Reference | Application No./Patent No. |
|---|---|
| | 16195355.9 - 1112 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

**Summons to attend oral proceedings pursuant to Rule 115(1) EPC**

You are hereby summoned to attend oral proceedings arranged in connection with the above-mentioned European patent application.

The matters to be discussed are set out in the communication accompanying this summons (EPO Form 2906).

The oral proceedings, which will not be public, will take place before the Examining Division

on 05.02.19 at 09.00 hrs at the EPO,
PschorrHöfe, Bayerstr. 34, 80335 Munich

No changes to the date of the oral proceedings can be made, except on serious grounds (see OJ EPO 2009, 68). If you do not appear as summoned, the oral proceedings may continue without you (R. 115(2) EPC, see also OJ EPO 2008, 471).

Your attention is drawn to Rule 4 EPC, regarding the language of the oral proceedings, and to Special edition No. 3 OJ EPO 2007, L.1, concerning the filing of authorisations for company employees and lawyers acting as representatives before the EPO.

**The final date for making written submissions and/or amendments (R. 116 EPC) is 04.01.19.**

The actual room number as well as the waiting room numbers will be given to you by the porter in the foyer at the above EPO address.

Parking is available in the underground car park, accessible only via the entrance "Grasserstrasse 2/6". On presentation of the summons to oral proceedings at one of the porters' lodges in the PschorrHöfe, the parking ticket will be revoked.

Please note that the oral proceedings will always take place as scheduled unless you are otherwise informed. The EPO will generally not send a reminder or a further communication prior to the date of oral proceedings.

| 1st Examiner: | 2nd Examiner: | Chairman: |
|---|---|---|
| Collura A | Terenzi C | Orlando M |

**Registered letter with advice of delivery**
EPO Form 2008 01.18 [ORAL03=9999] (02/05/18)

to EPO postal service: 02.05.18



Samsung Bioepis Exhibit No. 1002
Page 4037

**For the Examining Division**

Annexes:
Confirmation of receipt (Form 2936)
Communication (EPO Form 2906)



Samsung Bioepis Exhibit No. 1002
Page 4038

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European Patent Office
80298 MUNICH
GERMANY
Tel: +49 89 2399 0
Fax: +49 89 2399 4465

Application No.: 16 195 355.9

## Preparation for oral proceedings - Instructions to Support Service

Oral proceedings are to be held in connection with the above patent application

**1.** The matters to be discussed are set out in the annex (Form 2906)

**2.** Dispatch the summons using Form 2008/2310 and Form 2906 for the parties to attend on:

Day 05.02.2019 Time 09:00

**Archibus**

Conference Room 9999 booked

ORAL 01, 02, 03 and 05 coded

02.05.18 m
Date Initials

2.1 Parties' submissions in preparation for the oral proceedings, if any, should be made no later than

**1 month(s)**

before the date of the oral proceedings
(transfer to Form 2008.1 /2310.1)

2.2 Encode ORAL(04) coded

02.05.18 m
Date Initials

2.3 Dispatch Form 2008.7 /2310.7 to division

02.05.18 m
Date Initials

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European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY
Tel: +49 89 2399 0
Fax: +49 89 2399 4465

**3.** ☐ Arrange for the following special equipment to be provided in the conference room:

..... .....
Date Initials

**4.** Return the dossier to primary examiner after dispatching the summons

..... .....
Date Initials

26.04.18
Date

| Orlando, Michele | Terenzi, Carla | Collura, Alessandra | |
|---|---|---|---|
| Chairman | 2nd examiner | 1st examiner | Legal member |

Enclosure(s):

The examination is being carried out on the **following application documents**

**Description, Pages**

| | | | | |
|---|---|---|---|---|
| 1-4, 6-43, 45-55 | as originally filed | | | |
| 44 | received on | 10-07-2017 | with letter of | 10-07-2017 |
| 5 | filed in electronic form on | | | 16-01-2018 |

**Sequence listings, SEQ ID NO**

| | | | | |
|---|---|---|---|---|
| 1-10 | received on | 10-07-2017 | with letter of | 10-07-2017 |

**Claims, Numbers**

| | | | | |
|---|---|---|---|---|
| 1, 2 | filed in electronic form on | | | 16-01-2018 |

**Drawings, Sheets**

| | |
|---|---|
| 1/4-4/4 | as originally filed |

Reference is made to the documents already cited in the course of the procedure.

Moreover, the applicant should be aware of documents D8 and D9 filed by Third Parties on 12.12.17 which may be discussed in the course of the procedure and of WO2005/074607 (D10) which is the publication pamphlet of EP1720571, referred to in D9.

## 1. Articles 76(1) and 123(2) EPC

The present application does not meet the requirements of Article 76(1) EPC for the following reasons.

The applicant amended page 5 of the description of application as filed (which is the same as the description of th e parent application), and introduced a limitation to the length of the sequence of the indicated SEQ ID NO:3 and SEQ ID NO:4.

The applicant also amended the claims and introduced the same limitation to the length of the SEQ ID NO:4 in present claim 1.

In particular, instead of the full length of the sequences 3 and 4 provided in the application, the specific embodiments disclosed on page 5 and claimed in claim 1 are presently directed to:

(i) an antibody having a heavy chain variable region consisting of SEQ ID NO:1 and a light chain variable region consisting of residues 23-109 of SEQ ID NO: 3; and

(ii) an antibody (as claimed) comprising a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO:4.

In his letter dated 16.01.2018, the applicant explained that the amendments that he had carried out were to be considered the correction of an obvious mistake which met the requirements of Rule 139 EPC.

As already stated in the official communication from the examining division dated 17.11.17, it cannot be excluded by the skilled reader that the SEQ ID NO: 3 and 4 as filed in the parent application and in the application as originally filed were actually those for which protection was sought.

Moreover, in the original and parent application no disclosure was present of the fact that sequences 3 and 4 did not have to include the leader peptide.

For the reasons given above, the examining division concludes that the subject-matter of the present application does not meet the requirements of Articles 76(1) and 123(2) EPC.

## 2. Article 54 EPC

### 2.1 Eculizumab is considered to have been available to the public before the filing date of the present application

a) In the official communication dated 17.11.17, the examining division expressed its opinion on the fact that, since D1-D5 are all publications referring to eculizumab and since in none of these documents it was stated that the product had not been available for public use or that the working groups using it had been bound to a confidentiality agreement with Alexion Pharmaceuticals, it had to be concluded that the structure of the antibody was available to the public at the time of filing of the present application.

Moreover, the examining division pointed out that any of the scientists working with eculizumab could have performed a sequence listing on the antibody with the general knowledge available in the art. Reference was also made to D7, which disclosed most of the sequence of the light and heavy chains of 5G1.1 (which is eculizumab, see D4) and explained how the sequence was found.

b) On 12.12.17, Third Party observations concerning the present application were received by the EPO.

In the letter it was pointed out that the patentee himself, in opposition proceedings for a granted patent relating to eculizumab (i.e. EP1720571 filing date 03.02.2005; priority date 03.02.2004, in which the applicant was the patentee) had stated that the sequence for eculizumab had been submitted to Chemical Abstracts Services (CAS) and entered STN database on 14.02.1999 (see also the document D6 cited in the European Search Report).

In particular the applicant, at the time of the opposition proceedings against EP1720571, had argued against the objection of lack of sufficiency of disclosure raised by the opponent and based on the allegation that the complete structure of eculizumab was neither disclosed in the application as filed nor in any of the prior art documents cited by the opponent.

c) With a letter dated 16.01.2018, the applicant provided his arguments in response to the objections raised both by the examining division and by Third Parties.

The applicant acknowledged that on 14.02.1999 the sequence of eculizumab was entered in CAS Registry, but that the sequence was not correct.

In support of his arguments, the applicant provided the correspondence between Mr Saxe, who was the primary intellectual property counsel at Alexion Pharmaceuticals, and Mr Bishop, from the CAS Registry database. From this correspondence, it can be seen that Alexion had filed a sequence of eculizumab which contained some mistakes and that the corrected sequence was substituted to the wrong one in May 2009.

The applicant also:

(i) provided evidence of the fact that the marketing approval from the FDA for eculizumab was received by Alexion on 16.05.2007, i.e. after the filing date of the present application;

(ii) stated that when eculizumab was made available for clinical trials, all physicians and participants were required to maintain Alexion's confidential and/or proprietary information in strict confidence. For that reason the skilled person couldn't have obtained and analysed eculizumab to determine its structure; and

(iii) affirmed that the third party observation filed on 12.12.2017 were merely circumstantial and did not provide evidence that eculizumab was publically available at the date of filing of the application.

The examining division considered all the arguments provided in respect to the disputed question of whether eculizumab was publically available or not at the filing date of the present application.

The opinion of the examining division is the following:

1. The fact that Alexion has received the marketing authorisation for eculizumab from the FDA on 16.03.2007 does not necessarily mean that the antibody was not available to the public or that is structure was not known before the filing/priority of the present application.

2. It is clear from Mr. Saxe's declaration that Alexion Pharmaceuticals had intended to submit the correct sequence of eculizumab to CAS and that the incorrect sequence was submitted only inadvertently.

This means that (i) there was no interest in keeping the substance secret after the date of submission to CAS and (ii) anybody to whom the correction of the mistake in the sequence would not have been obvious could have contacted Alexion Pharmaceuticals Inc. to obtain the correct sequence.

Even if it were now purported that Alexion Pharmaceuticals would have never disclosed the correct sequence to anybody who had asked them for it, that would not amount to a valid defence since under the legal principle of "*nemo potest venire contra factum proprium*" Alexion Pharmaceuticals would be bound to its declared intention to lay the compound open under the CAS rules in order to have other patents be regarded as sufficiently disclosed.

The statement from the applicant acting as patentee in EP1720571 (see D9, page 14, item 5.1.2) confirms the fact that he considered the structure of eculizumab to have been disclosed at the filing date of the present application. To be noted is also the fact that the date of the applicant's statement in D9, namely the 30.12.2013, is later than the date in which the correction to the eculizumab structure was requested to CAS.

3. The many patent and non-patent literature documents published before the priority date and relating to the use of eculizumab can be regarded as evidence that the compound was well-known and available to the public before the priority date of the patent application. Among these documents, different published patent applications belonging to the applicant can be seen (see for example D8 filed by Third Party on 12.12.2017 and in particular WO2005/074607 published on 18.08.2005, which is the international publication pamphlet of EP1720571).

4. In respect to the statement of the applicant that the physicians and participants to the studies referred to in the prior art were bound to an agreement of secrecy and confidentiality, a proof of the confidentiality agreement between the company and each participant/physician involved in the studies should be provided.

For the reasons given above, the examining division concludes that the structure of eculizumab was available to the public at the filing/priority date of the present application.

### 2.2 The present application lacks novelty in view of the disclosure of D1-D5

As already pointed out in the European Searching Opinion and in the official communication from the examining division dated 17.11.17, the disclosures of D1-D5 teaching eculizumab and its use in the treatment of paroxysmal nocturnal hemoglobinuria are considered novelty destroying for the subject-matter of the claimed invention.

### 2.3 The present application also lacks novelty over the disclosure of D10

The examining division considers that the present application also lacks novelty over the disclosure of D10, which is a prior art document by Alexion Pharmaceuticals relating to eculizumab, for which the applicant explicitly stated that the structure of the antibody had been made available to the public on 14.02.1999.

## 3. Article 56 EPC

The present application does not meet the requirements of Article 56 EPC, because the subject-matter of the claims 1-2 is not inventive.

As a matter of fact, claims which are not novel cannot be considered to involve any exercise of an inventive step.

## 4. Article 83 EPC

The attention of the applicant is drawn to the fact that in case a negative conclusion on Articles 123(2) and 76(1) EPC and a positive conclusion on Article 54 EPC will be taken by the examining division in the further prosecution of the case (in particular at the oral proceedings), an objection under Article 83 EPC would be likely to arise.

In the description of the invention (see page 5 last paragraph), the applicant stated that eculizumab is a specific embodiment of the described invention.

In the application as originally filed, as well as in the parent application, sequences 3 and 4 were disclosed for identifying respectively the light chain variable region and the light chain of eculizumab.

On 16.01.2018, the applicant amended the description of the invention and the subject-matter of the claims and stated that the original application referred to the wrong sequences 3 and 4, which erroneously included the leader peptide.

The application has therefore been amended in order to assign a different meaning than one originally meant to the SEQ ID NO:3 and the SEQ ID NO:4.

Therefore, in the situation identified above, following the statements of the applicant in his letter dated 16.01.18, i.e. that (i) the sequences filed with the original application were not those identifying the structure of eculizumab, and (ii) that the structure of eculizumab was not available to the public at the date of filing of the present application, it would follow that the present application was not sufficiently disclosed at the relevant date.

Indeed the skilled person, at the filing date, wouldn't have known which structure was to be assigned to eculizumab.

## 5. Procedure

It is not at present apparent to the examining division which part of the application could serve as basis for a new and allowable set of claims.

Refusal of the application under Art. 97(2) EPC should therefore be expected.

However, since the applicant has requested oral proceedings, a summons is dispatched with the present communication.

Any item with respect to novelty and inventive step as well the fulfilment of any requirements of the EPC which will become relevant in the course of the procedure will be discussed during oral proceedings.

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**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

J A Kemp
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| Date |
|---|
| 07.05.2018 |

| Reference | Application No./Patent No. |
|---|---|
| | 16195355.9 - 1112 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

EPA/EPO/OEB Formblatt/Form/Formulaire : 2008

**Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks**
**Acknowledgement of receipt of the document specified above**
**Récépissé du document spécifié ci-dessus**

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J A Kemp
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ROYAUME UNI

Date: 07.05.2018

| Reference | Application No./Patent No. |
|---|---|
| N L11599EP-B | 16195355.9 - 1112 / 3167888 |
| Applicant/Proprietor: Alexion Pharmaceuticals, Inc. | |

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J A • K E M P

BY ONLINE FILING

The European Patent Office
Bayerstrasse 34
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80335 Munich
Germany

15 August 2018

Dear Sirs

**European Patent Application No. 16195355.9**
**ALEXION PHARMACEUTICALS, INC.**
*Our Ref: N411599EP-B PXT/cxe*

Thank you for the Summons to Oral Proceedings dated 7 May 2018. Our further submissions on the points raised by the Examining Division in the Summons are set out below. We attach the following documents:

- a second Declaration of Dr Bruce Andrien dated 15 August 2018;
- an extract from Alberts et al (1994);
- a copy of the Opposition statement filed against EP1720571 (D11);
- a redacted version of the representative clinical trial protocol C04-001; and
- a redacted version of the representative clinical trial protocol C02-002.

The comments below address each and every issue identified by the Examining Division in the Summons to Oral Proceedings. Given the early filing of this response in advance of the 5 February 2019 date set for Oral Proceedings, the Applicant would appreciate it if the Examining Division would consider the response as soon as possible and provide feedback, so that the Applicant has time to address any outstanding issues before the date set for filing final written submissions.

**Articles 76(1) and 123(2) EPC**

*The amendment complies with Rule 139 EPC because a skilled person would have immediately recognised that the applicant intended to claim only the mature antibody.*

The amendment of the description and claims to refer to an antibody having a light chain variable region consisting of residues 23-109 of SEQ ID NO: 3 and to an antibody having a light chain variable region consisting of residues 23-214 of SEQ ID NO: 4 meets the requirements of Articles 76(1) and 123(2) EPC.

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The Examining Division considers that this amendment is not a correction that complies with Rule 139 EPC because

> *"it cannot be excluded by the skilled reader that the SEQ ID NO: 3 and 4 as filed in the parent application as originally filed were actually those for which protection was sought."*

However, the skilled person would have immediately recognised that the applicant could not have intended to seek protection for an antibody comprising all of SEQ ID NO: 3 or all of SEQ ID NO: 4 because he would immediately have seen that these sequences contain a signal peptide (leader sequence) and would know that it is not possible to make a mature antibody that contains a signal peptide.

As established by the Enlarged Board of Appeal in G3/89 and G11/91:

> *"The part of a European patent application or of a European patent relating to the disclosure (the description, claims and drawings) may be corrected under Rule 88, second sentence, EPC [now Rule 139, second sentence, EPC] only within the limit of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of these documents as filed. Such a correction is of a strictly declaratory nature and thus does not infringe the prohibition of extension under Article 123(2) EPC." (Head note 1; emphasis added)*

It was common knowledge that immature heavy and light chains included a signal peptide at the N-terminus, and a skilled person could have readily identified the signal peptide in SEQ ID NOs: 3 and 4.

As addressed in the Andrien Declaration filed on 10 July 2017, it was common general knowledge in the art at the filing date of the application that a signal peptide is present at the N-terminus of immature heavy and light chain polypeptides. Kabat *et al.*, Sequences of Proteins of Immunological Interest, US Dept, Health and Human Services (1991) (Exhibits B to E filed with the Andrien Declaration on 10 July 2017), which is a database of biological sequences containing sequence alignments, is evidence of the skilled person's common general knowledge and shows the signal peptides of various human light chains.

Page 1 from Kabat *et al.* shows the 22-residue signal peptides of human kappa light chains. The first three residues are predominantly Met Asp Met and the last two residues are predominantly Arg Cys. In each of SEQ ID NO: 3 and SEQ ID NO: 4 of the patent, the first three residues are Met Asp Met and residues 21 and 22 are Arg Cys. Therefore, the skilled person would recognise that SEQ ID NO: 3 and SEQ ID NO: 4 are the amino acid sequences of the immature light chain variable region and the light chain, respectively, that contain a signal peptide that is not present in the mature antibody.

Furthermore, the skilled person would know from his common general knowledge that the framework of human kappa light chains commonly starts with the residues Asp Ile Gln Met as shown in the Table at pages 103 to 108 of Kabat *et al.* Residues 23



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to 26 of SEQ ID NO: 4 are Asp Ile Gln Met, which the skilled person would recognise as being the start of the mature light chain of the disclosed antibody.

It is also part of the common general knowledge of the skilled person that antibodies are produced using cell-based recombinant methods, and not by artificially synthesising the polypeptide chains. The attached second Declaration of Dr Bruce Andrien dated 15 August 2018 refers to the textbook Alberts et al (1994) Molecular Biology of the Cell and explains that antibodies are processed by the producing-cell in the same way as other secreted proteins, and that this processing always results in the N-terminal signal peptide being cleaved off such that it is not present in the mature antibody.

Thus, during antibody production, the light chain polypeptide sequence of SEQ ID NO: 4, or of SEQ ID NO: 3, is processed to remove the signal peptide. Therefore, the skilled person would know based on his common general knowledge that it would not have been the intention of the Applicant to seek protection for an antibody that contains a signal peptide.

Accordingly, the correction to refer to an antibody comprising only the portion of SEQ ID NO: 3 or SEQ ID NO: 4 that reflects the mature antibody is an obvious correction in the sense that it is immediately evident that nothing else would have been intended than what is offered as the correction within the limit of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the application as filed.

The corrections being made to page 5 of the description to refer to the portion of the light chain variable region or the light chain that would be found in the antibody would therefore immediately be recognised by the skilled person as representing the intention of the Applicant. Accordingly, the correction of the light chain variable region and light chain sequences at page 5 of the description meets with the requirements of Rule 139 EPC, Article 76(1) EPC and Article 123(2) EPC.

It follows that claim 1, which refers only to the portion of the light chain sequence shown in SEQ ID NO: 4 that is actually found in the mature antibody, also complies with the requirements of Article 76(1) EPC and Article 123(2) EPC.

*The EPO has routinely accepted corrections of this exact type.*

The European Patent Office has on other cases accepted that correction of applications defining an antibody as comprising heavy and light chain sequences including signal peptides to redefine the antibody as comprising only the mature proteins of the heavy and light chain sequences meets with the requirements of Rule 139 EPC. Two such examples include EP1558648, in which the correction allowed by the Examining Division was unsuccessfully challenged by the Opponent in an Opposition, and EP2581113.

**Article 54 EPC**

*Eculizumab was not available to the public before the filing date of the present application.*



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The Examining Division has, after considering the arguments provided in relation to the question of whether eculizumab was publicly available at the filing date of the present application, expressed its opinion in paragraphs 1 to 4 of the Summons. Our comments on each of these points are set out below.

1. The fact that Alexion Pharmaceuticals received marketing authorisation for eculizumab from the FDA on 16 March 2007 means that eculizumab was not available on the market at the 15 March 2007 filing date of the present application. This appears to be accepted by the Examining Division. The Examining Division considers, however, that the antibody could still have been available to the public or that its structure could have been known before the priority/filing date of the present application. As discussed below, eculizumab was not publicly available and its structure was not publicly known at the filing date.

2. It is clear from Mr Saxe's Declaration that Alexion Pharmaceuticals inadvertently submitted the incorrect sequence of eculizumab to the Chemical Abstract Services (CAS) such that the sequence entered into the CAS STN database on 14 February 1999 did not contain the heavy and light chain sequences set out in claim 1 of the present application. It is irrelevant whether or not Alexion had any intention of keeping the substance secret after the date of submission to CAS. It is similarly also irrelevant whether anybody to whom the erroneous sequence in CAS would have been obvious could have contacted Alexion Pharmaceuticals to inquire about the correct sequence. Although Mr Saxe corrected the sequence submitted to CAS as soon as he became aware of the error, the fact remains that as of the filing date of the present application, the correct sequence of eculizumab was not available via CAS.

   It is completely alien to the concept of novelty at the EPO that a mistake in a document, the correction of which is not immediately obvious, can be treated as if the document disclosed the correct information. The fact is that the correct sequence was not disclosed in the CAS registry on 14 February 1999. What was *presumably intended to be disclosed* in the CAS registry on 14 February 1999 does not matter for purposes of assessing novelty.

   Not only was an incorrect sequence disclosed on 14 February 1999, but the corrections that would need to be made to the sequences entered on the CAS STN database on 14 February 1999 to arrive at the correct sequence of eculizumab as disclosed in SEQ ID NOs: 2 and 4 of the present application would not have been immediately obvious to the skilled person.

   Firstly, with regard to the light chain sequence, there was a single error in the sequence of the light chain that was submitted in 1999 as explained in the letter of 28 April 2009 from Dr Stephen Saxe to CAS, which letter was enclosed with the Saxe Declaration filed with our response of 16 January 2018. This error was the inclusion of an arginine (R) residue at position 38 of the light chain sequence instead of a glutamine (Q) residue at this position. It would not have been obvious to the skilled person that the inclusion of an arginine residue instead of a glutamine residue was an error. Indeed, as



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shown in Figure 1B at page 1392 of D7, the 5G1.1 and h5G1.1 antibodies referred to therein contain an arginine (R) at position 38.

With regard to the heavy chain amino acid sequence, the sequence originally submitted and included in the STN database on 14 February 1999 was a 650 amino acid sequence, whereas the correct sequence has a length of only 448 amino acids. As shown in the annotated version of the incorrect heavy chain sequence originally submitted to CAS, which is included with the Saxe Declaration, the initially submitted sequence contains three blocks of amino acid residues that are not present in the eculizumab sequence. The first two blocks of amino acid sequences are inserted and the third block of amino acids substitutes a shorter stretch of amino acids present in eculizumab but missing in the incorrect sequence originally submitted to CAS. In addition, there are two single amino acids in the constant region of the heavy chain sequence that differ between the originally submitted sequence and the correct sequence. All of the errors in the originally submitted sequence would not have been obvious to the skilled person.

Even if the skilled person had recognised that the heavy chain sequence in the CAS STN database was unusually long for a heavy chain sequence and had turned to Thomas *et al*, 1996 (D7 in the present proceedings), which is the literature paper describing an antibody referred to as h5G1.1, he would have seen that the human IgG4 isotype was chosen to prepare a full length humanised 5G1.1 antibody in D7 (see D7, page 1396, sentence spanning left and right columns and page 1399, right column, lines 24 to 31). The skilled person would not have known that the heavy chain constant region intended to be submitted to CAS is not the IgG4 constant region used in D7.

The amino acid sequence of the IgG4 heavy chain in D7 differs from the heavy chain shown in SEQ ID NO: 2 of the present application and as correctly submitted to CAS in April 2009. The differences are illustrated at pages 2 to 3 of the Declaration of Dr Leonard Bell filed on 10 July 2017. There are 14 amino acid residues that differ between the IgG4 heavy chain constant region sequence and the heavy chain constant region sequence of eculizumab shown in SEQ ID NO: 2 of the present application. As shown in the Bell Declaration, there are four differences in the CH1 domain, six differences in the hinge region and four differences in the CH2 domain. Therefore, even if the skilled person would have turned to D7 to try and determine the correct sequence of eculizumab, D7 would have provided him with a very different sequence than that described in SEQ ID NO: 2.

In the third party observations filed 12 December 2017, attention was drawn to a statement made by the Patentee in the Opposition proceedings against EP1720571 in response to an allegation by the Opponent that the claims of that patent were insufficiently disclosed. A copy of the Opposition statement filed by Pfizer Inc against EP1720571 is attached as D11. It can be seen from Section 7.1 at pages 12 to 13 of this Opposition statement that the Opponent alleged that the complete sequence of eculizumab is not disclosed in U.S. Patent No. 6,355,245 or in Thomas *et al*, *Molecular Immunology*, Vol.33, No.17/18, pages 1389-1401, 1996 (D7 in the present proceedings).



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In response to this objection, in paragraph 5.1.2 of the response filed on 30 December 2013, the Patentee stated that:

> *"The Patentee asserts that the sequence for eculizumab was publically available prior to the priority and filing date. A sequence for eculizumab was submitted to Chemical Abstract Services (CAS) and entered into their STN database on 14 February 1999; please see the attached copy of the CAS entry No. 219685-560-4"* [emphasis added].

The copy of the CAS entry No. 219685-50-4 that was attached with the response of 30 December 2013 did not include any sequence information. Only a one page fax dated 04/08/2008 (8 April 2008) from CAS was filed with the response (a copy of which was provided with the third party observations filed on 12 December 2017). As the sequence of eculizumab on file at CAS had not been corrected as of 8 April 2008, and certainly not as of the priority date of the opposed patent, this statement by the Patentee referenced an incorrect sequence of eculizumab and was clearly made in error. It is clear that this erroneous statement was made inadvertently and in good faith. Neither the third party observer nor the Examining Division has pointed to any evidence of bad faith in conjunction with the incorrect statement, and indeed none exists. Further, despite this unfortunate mistaken statement in the Opposition response, the fact remains that the full correct sequence of eculizumab was not publicly disclosed or publicly available before 16 March 2007.

It is also noted that Alexion's statement in the aforementioned opposition response was never challenged because the Opponent had withdrawn the Opposition on 7 October 2013. Nor was Alexion called on by the Opposition Division to provide evidence of the eculizumab sequences published by CAS in 1999. Indeed, sufficiency of disclosure was not further discussed in the Opposition proceedings on EP1720571. The assertion made by Alexion was not relied on in any way in those proceedings, and the statement had no influence on the outcome of the proceedings, in which EP1720571 was revoked for lack of inventive step. Thus, Alexion's mistaken statement amounted to nothing more than a mere assertion that turned out to be erroneous but that had no bearing on the outcome of that case. Alexion obtained no benefit as a result of the inadvertent misstatement.

The third party argued in paragraph I.3 of his observations of 12 December 2017 that:

> *"in light of Alexion's past actions, Alexion's declarations in the present case have to be considered to contravene against the generally accepted legal principle of good faith. In particular, in this case, the principle of venire contra factum proprium makes these declarations inadmissible".*

However, the legal principle of *nemo potest venire contra factum proprium* does not apply in this situation.



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The principle of *nemo potest venire contra factum proprium* has been applied by the EPO's legal Boards of Appeal where the EPO has exhibited contradictory behaviour, i.e. where the actions of the EPO have given rise to legitimate expectations which precluded the EPO from later going back on its own previous conduct (see for example, J27/94 and J14/94 summarised in Case law of the Boards of Appeal of the European Patent Office, 8th Edition, page 519, paragraph 2.3).

In the present case, the assertion made in the Opposition response was not relied on or considered any further in the Opposition proceedings. It did not affect the outcome of the Opposition proceedings in which the patent was revoked for lack of inventive step. Accordingly, the assertion made in the response to the opposition of EP1720571 does not take precedence over the signed declarations made in connection with the present application, and it does not bind Alexion Pharmaceuticals in any way.

The Examining Division considers that:

> *"Even if it were now purported that Alexion Pharmaceuticals would have never disclosed the correct sequence to anybody who had asked them for it, that would not amount to a valid defence since under the legal principle of "nemo potest venire contra factum proprium" Alexion Pharmaceuticals would be bound to its declared intention to lay the compound open under CAS rules in order to have other patents be regarded as sufficiently disclosed".*

It appears that the Examining Division is attempting to apply the legal principle of *nemo potest venire contra factum proprium* in a different way than that suggested by the third party. Whilst the third party cited this legal principle in order to suggest that all of the declarations filed in the present application should be ignored, the Examining Division appears to consider that this principle would have bound Alexion Pharmaceuticals to disclose the correct sequence of eculizumab to anybody who requested it in order to have "*other patents be regarded as sufficiently disclosed*". It is presumed that the Examining Division is using the term "*other patents*" to refer to the patents and applications listed in D8 filed by the third party.

There are a number of points to be made here. Firstly, the legal principle of *nemo potest venire contra factum proprium* does not oblige a party who has submitted incorrect data to provide the correct data to any third party who requests it. Alexion is also unaware of what "CAS rules" the Examining Division refers to.

Secondly, the Examining Division seems to suggest that even though, in fact, the correct sequence of eculizumab was not disclosed before 16 March 2007, it must be considered to have been effectively disclosed so that the antibody defined using the term "eculizumab" used in previously-filed patents and patent applications listed in D8 is sufficiently disclosed. Clearly, this reasoning is legally flawed. Lack of novelty cannot be established based on an unsupported presumption of sufficiency of an earlier patent. Rather, the issue of novelty solely rests on the factual inquiry of whether or not the



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claimed invention was in the public domain prior to the effective filing date. In the present case, it was not. Therefore, the claims are novel.

Moreover, all of the patents and patent applications listed in D8, with the exception of EP1720571 which was revoked for lack of inventive step, refer to eculizumab by name only in dependent claims (see the right column in the Table in D8). The independent claims of these patents and applications refer to anti-C5 antibodies more generally.

There is no doubt that anti-C5 antibodies were sufficiently disclosed in 2004, which is the year of the earliest priority date of any of the patents and patent applications listed in D8. For example, all of the patents and patent applications refer to US Patent 6,355,245 and many refer also to Thomas *et al*, 1996 (D7 in the present proceedings). These documents both disclose heavy and light chain variable region sequences of anti-C5 antibodies, and D7 also discloses a full length humanised IgG4 anti-C5 antibody.

In any event, as stated above, it is of no import whether disclosure of the full correct sequence of eculizumab would have been necessary in order for all of the claims of the earlier patents and patent applications to meet the sufficiency requirements of Article 83 EPC - the *fact* remains that the full correct sequence of eculizumab was *not* disclosed prior to 16 March 2007.

The Examining Division considers that:

> "*The statement from the Applicant acting as Patentee on EP1720571 (see D9, page 14 Item 5.1.2) confirms the fact that he considered the structure of eculizumab to have been disclosed at the filing date of the present application*".

Again, this statement from the Patentee was an inadvertent error made in good faith. The issue of sufficiency was not further discussed in the course of the opposition and the assertion made by the Patentee was not challenged, the Opponent having withdrawn his Opposition on 7 October 2013. In the statement made in connection with the Opposition against EP1720571, Alexion Pharmaceuticals made no reference to SEQ ID NO: 2 or SEQ ID NO: 4, and did not make any admission that these particular sequences were publically available.

Also, the fact noted by the Examining Division that the date of the assertion in D9 (30 December 2013) is later than the date in which the correction of the eculizumab structure was requested to CAS is irrelevant to the discussion of novelty of the present application. The assertion cannot alter what was, or was not, disclosed at an earlier date.

The fact remains that the sequences submitted by Alexion Pharmaceuticals to CAS and entered into the CAS STN database on 14 February 1999 are not the sequences of SEQ ID NOs: 2 and 4 set out in claim 1 of the present application.



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3. The Examining Division considers that the

> *"many patent and non-patent literature documents published before the priority date and relating to the use of eculizumab can be regarded as evidence that the compound was well-known and available to the public before the priority date of the patent application".*

However, this position is not in line with the case law. The Boards of Appeal have established that the mention of a compound in a published document does not mean that the compound is available to the public.

In T576/91, the Board of Appeal stated that if contractual obligations between parties resulted in access to biological material being deliberately restricted to a group of persons bound either by a research contract or a licence, it could not be concluded that this material had been made "*available to the public*" within the meaning of Article 54(2) EPC.

Further, in T128/92 the Board of Appeal stated that for a complex biochemical to be made available to the public, the minimum that would seem to be required for publication was a notice to those in the field that samples of the biochemical could be obtained upon request, and clear evidence of exactly what the biochemical was. (See Case law of the Boards of Appeal of the European Patent Office, 8th Edition, page 89, paragraph 3.2.5).

At page 2 paragraph 2.1(a) of the Summons, the Examining Division expresses the opinion that

> *"since D1-D5 are all publications referring to eculizumab and since in none of these documents it was stated that the products had not be available for public use or that the working group using it had been bound to a confidentiality agreement with Alexion Pharmaceuticals, it had to be concluded that the structure of the antibody was available to the public at the time of filing of the present application".*

This conclusion is, however, clearly contrary to the case law discussed above. It cannot be concluded from a publication that an antibody was publicly available based merely on the absence of a statement that the antibody was *not* available. To the contrary, a positive statement to this effect would be required. No such statement is included in any of the cited documents.

The Examining Division has noted that different published patent applications belonging to the Applicant that mention "eculizumab" were available at the priority date of the present application. Such patents and applications are listed in D8 filed by the third party on 12 December 2017. None of these earlier applications, or the references they cite, disclose the full sequences of SEQ ID NO: 2 and SEQ ID NO: 4.

The mere existence of earlier patents and applications that mention "eculizumab" without precisely defining it does not destroy the novelty of



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claim 1 of the present application. The present Examining Division is tasked with assessing the novelty of the claims of the present application in light of all of the *factual* information that was available in the prior art, and the fact is that none of the patents and applications listed in D8 disclose an antibody comprising the full heavy and light chain sequences of SEQ ID NO: 2 and SEQ ID NO: 4.

4. The Examining Division has requested proof of the confidentiality agreement between the company and each participant/physician involved in the studies described in D1 to D5. Dr Laural Boone, a Senior Director and Patent Counsel at Alexion, stated that she has reviewed the protocols of all of the clinical trials that were carried out with eculizumab prior to 16 March 2007 and found strict confidentiality and drug accountability provisions in each of the protocols. (See the Declaration of Dr Boone filed on 10 July 2017).

The Table at page 3 of Dr Boone's declaration lists all of the trials for which she reviewed the protocols, and paragraphs 7 and 8 of her Declaration provide examples of the confidentiality provisions she found in the protocols. The representative protocols from the studies Dr Boone refers to, C04-001 and C02-002, are now attached in redacted form. The confidentiality provision referred to in paragraph 7 of the Boone Declaration is found in paragraph 11.1 of protocol number C04-001, and the provision referred to in paragraph 8 of the Boone Declaration is found in the final paragraph at page 46 of study number C02-002.

In addition, as paragraph 10 of Dr Boone's declaration makes clear, the protocols also contained strict drug accountability provisions. The provisions referred to in paragraph 10 of Dr Boone's declaration are set out in paragraph 4.6 spanning pages 19 and 20 of protocol number C04-001, and in paragraph 6.6 at page 24 of study number C02-002. These provisions ensured that no study drug (eculizumab) was released to the public, and, as stated in the Boone Declaration, were included in all clinical trial protocols identified in the Declaration. This evidence demonstrates that all physicians and participants in the clinical trials were bound by strict confidentiality and drug accountability provisions so that there was no public disclosure or public availability of eculizumab via the trials.

Moreover, it should be noted that even if the participants and physicians involved in the studies had not had these strict conditions imposed on them by their agreements with Alexion Pharmaceuticals, the structure of eculizumab still would not have been publicly available, because, in accordance with G1/92, the skilled person would not have been able to analyse the structure of eculizumab and reproduce it without an undue burden.

In T2045/09 the Board considered whether the public sale of an antibody made that antibody publicly available in the sense that the skilled person would be able to determine its internal structure and reproduce it without unburden in accordance with G1/92.



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In T2045/09, the Board noted that in a document published in 2006, the Authors emphasised that the sequencing of the variable regions of antibodies comprising the CDRs constituted a major scientific challenge and that:

> *"In particular, the unique character of the CDRs renders an alignment and the comparison of the data to already existing antibody sequences in databases impossible. A complete and sufficiently correct amino acid sequence could only be achieved by complementing the data of the Edman sequencing with sequence obtained independently from mass spectrometry".*

In view of the challenge the skilled person would have faced in trying to sequence an antibody in 2006, the Board was not persuaded that the skilled person could have correctly determined the amino acid sequence of the relevant antibody with the knowledge and the technologies available (see Reasons 35 and 36 of the Decision).

In the Summons at page 2, last paragraph, the Examining Division points to the official Communication dated 17 November 2017 in which it

> *"pointed out that any of the scientists working with eculizumab could have performed a sequence listing on the antibody with the general knowledge available in the art. Reference was also made to D7, which disclosed most of the sequence of the light and heavy chains of 5G1.1 (which is eculizumab, see D4) and explained how the sequence was found".*

However, at least the uniquely-engineered, non-naturally-occurring portions of eculizumab were not disclosed in D7 and, as explained above as found in T0245/09, obtaining the full sequence of eculizumab from the eculizumab molecule alone would not have been routine in the art at the 15 March 2006 priority date of the present application.

2.2 The Examining Division maintains that the disclosure of D1-D5 teaching eculizumab and its use in the treatment of PNH are considered novelty destroying for the subject matter of the claimed invention. The claims of the present application are, however, novel in view of the disclosure of D1-D5.

Each of D1-D5 refers to eculizumab by name only. None of these documents disclose the heavy and light chain sequences of eculizumab. As discussed in paragraphs 2.1(3) above, the mere mention of a complex biochemical by name in a publication does not enable that complex biochemical to be made or make that complex biochemical available to the public. Therefore, the claims of the patent application are novel over D1-D5.

2.3 The present application is novel over the disclosure of D10. D10 is an earlier patent application of Alexion Pharmaceuticals (WO 2005/074607). This document does not provide an enabling disclosure for an antibody having the heavy and light chain sequences of SEQ ID NOs: 2 and 4.



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WO 2005/074607 relates to methods of treating a hemolytic disease by administrating an anti-C5 antibody to a subject having a hemolytic disease (see claim 1 of D10). D10 discloses that:

> *"Particularly useful anti-C5 antibodies are h5G1.1-mAb, h5G1.1-scFv and other functional fragments of h5G1.1. Methods for the preparation of h5G1.1-mAb, h5G1.1-scFv and other functional fragments of h5G1.1 are described in U.S. Patent No. 6,355,245 and "Inhibition of Complement Activity by Humanised Anti-C5 Antibody and Single Chain Fv", Thomas et al., Molecular Immunology, Vol.33, No.17/18, pages 1389-1401, 1996, the disclosures of which are incorporated herein in their entirety by this reference. The antibody h5G1.1-mAb is currently undergoing clinical trials under the tradename eculizumab"* (page 18, lines 12 to 20).

Thus, D10 defines eculizumab by reference to U.S. Patent No. 6,355,245 and Thomas *et al*, 1996 (D7 in the present proceedings). Neither of these documents discloses the sequences of SEQ ID NOs: 2 and 4. Therefore an antibody having the heavy and light chain sequences of SEQ ID NO: 2 and SEQ ID NO: 4 is novel over D10.

The assertion made by the Applicant as Patentee in the response to the Opposition against EP1720571 derived from D10 cannot change what is disclosed in D10, and, as discussed above, is not an admission that SEQ ID NO:2 and SEQ ID NO: 4 were publically known at the filing date of EP1720571. The fact is that D10 does not disclose an antibody having the mature heavy and light chain sequences of SEQ ID NOs: 2 and 4, and nothing said later can change this. Therefore, the claims of the present application are novel over D10.

In conclusion, none of the prior art documents disclose an antibody having the sequences recited in claim 1, and such an antibody was not publically available in the sense of Article 54(2) EPC. Therefore, claim 1 is novel.

**Article 56 EPC**

The claims of the present application are novel for the reasons set out above. The claims also involve an inventive step in accordance with Article 56 EPC.

The claimed antibody that binds C5 and comprises a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO: 4 is inventive.

SEQ ID NO: 2 is the full amino acid sequence of an engineered heavy chain that has a unique, non-naturally occurring protein engineered CH1-hinge-CH2-CH3 sequence. This unique sequence confers unexpected advantageous effects on the antibody eculizumab and to patients receiving eculizumab.

D7 may be taken to represent the closest prior art. D7 describes an antibody that has the same heavy chain variable region as the antibody of claim 1 and a light chain variable region sequence that differs from the variable region sequence of the antibody of claim 1 by just one amino acid position. The antibody of D7 is a human



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IgG4 isotype (see D7, page 1399, right column, line 27). The antibody of claim 1, however, is not an IgG4 isotype antibody, but has a unique, non-naturally occurring protein-engineered heavy chain.

The amino acid differences between a human IgG4 constant and hinge region and the constant and hinge regions of SEQ ID NO: 2 are shown in paragraph 5 of the Bell Declaration filed with the letter of 10 July 2017. As shown in paragraph 5 of the Bell Declaration, there are 14 amino acid differences between the IgG4 constant region and the engineered constant region of SEQ ID NO: 2.

The technical effect of these differences is that eculizumab does not bind as strongly to Fc gamma receptors as the IgG4 isotype antibody disclosed in D7 as demonstrated in the attached Experimental Report, which compares binding of eculizumab with that of the IgG4 antibody of D7 to the FCγ receptor IIB using an ELISA assay. Weakened binding to Fc gamma receptors reduces the generation of undesirable immune responses and thus improves the ability of the antibody to selectively shut down the terminal complement pathway (see paragraph 6 of the Bell Declaration) and increases plasma half-life of the antibody (see paragraph 7 of the Bell Declaration).

Accordingly, the objective technical problem in view of D7 may be defined as the provision of an improved anti-C5 antibody for therapeutic use in humans.

The solution to this problem provided by claim 1 would not have been obvious to the skilled person from D7. D7 teaches that the human IgG4 isotype was chosen because it does not activate human complement as there is only one known allotype of IgG4 and it would likely preclude the development of auto-antibodies in patients (see D7 page 1399, right column, lines 27 to 31). There is no teaching or suggestion in D7 that the CH1-hinge-CH2-CH3 region of the heavy chain should be modified to further improve the properties of the antibody, let alone by engineering the exact fourteen amino acid substitutions present in SEQ ID NO: 2 into the IgG4 constant region.

None of the other documents on file provide any further information about the structure of eculizumab. It would therefore not have been obvious to the skilled person from any of these documents to engineer the heavy chain CH1-hinge-CH2-CH3 region to produce SEQ ID NO: 2.

Accordingly, claim 1 involves an inventive step.

**Article 83 EPC**

Regardless of the conclusions reached with respect to Articles 76(1) EPC, Article 123(2) EPC and Article 54 EPC, the claimed subject matter is sufficiently disclosed in the present application.

Claim 1 is directed to:

> *"An antibody that binds C5 comprising a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO: 4."*



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It would be within the routine skill of a person skilled in the art to make an antibody having the specified heavy and light chain amino acid sequences.

There is also no doubt that the sequences disclosed in the present application identify the structure of eculizumab. SEQ ID NO: 2 is the amino acid sequence of the full mature heavy chain of eculizumab and the sequence of SEQ ID NO: 4 is the amino acid sequence of the full immature light chain of eculizumab. Therefore, the sequences filed with the original application are those identifying the structure of eculizumab.

For the reasons explained above, the skilled person would know based on his common general knowledge which residues of SEQ ID NO: 4, or of SEQ ID NO: 3, correspond to the signal peptide and which residues correspond to the mature portion of the therapeutic antibody known as eculizumab, i.e. residues 23 to 214 of SEQ ID NO: 4.

Furthermore, in terms of actually producing the eculizumab antibody, a polynucleotide encoding the whole of SEQ ID NO: 4 could be expressed in a cell along with a polynucleotide encoding the heavy chain of eculizumab, i.e. SEQ ID NO: 2. The signal peptide of SEQ ID NO: 4 would be cleaved off during antibody production in the cell, resulting in an antibody whose light chain contains only the mature portion of SEQ ID NO: 4.

Thus, the skilled person would have known from the disclosure of the present application which structure was to be assigned to the therapeutic antibody eculizumab.

**Conclusion**

The Examining Division is requested to reconsider this application favourably. The Applicant has addressed each and every issue identified by the Examining Division in the Summons to Oral Proceedings. Given the early filing of this response in advance of the 5 February 2019 date set for Oral Proceedings, the Applicant would appreciate it if the Examining Division would consider the response as soon as possible and provide feedback. It is hoped that the application can be allowed without the need for Oral Proceedings. Accordingly, the Examiner is requested to telephone the undersigned once the Examining Division has considered our submissions.

I look forward to hearing from the Examiner.

Yours faithfully

*Electronically Signed*
**DR PAMELA M TUXWORTH**
**ASSOCIATION NO. 811**



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# MOLECULAR BIOLOGY OF
# THE CELL
## THIRD EDITION

Bruce Alberts • Dennis Bray
Julian Lewis • Martin Raff • Keith Roberts
James D. Watson



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**Front cover:** The photograph shows a rat nerve cell in culture. It is labeled ( *yellow* ) with a fluorescent antibody that stains its cell body and dendritic processes. Nerve terminals ( *green* ) from other neurons (not visible), which have made synapses on the cell, are labeled with a different antibody. (Courtesy of Olaf Mundigl and Pietro de Camilli.)

**Dedication page:** Gavin Borden, late president of Garland Publishing, weathered in during his mid-1980s climb near Mount McKinley with MBoC author Bruce Alberts and famous mountaineer guide Mugs Stump (1940–1992).

**Back cover:** The authors, in alphabetical order, crossing Abbey Road in London on their way to lunch. Much of this third edition was written in a house just around the corner. (Photograph by Richard Olivier.)

tein translocator. There is now strong evidence for a protein translocator. Normally, the pore in the translocator is plugged with the growing polypeptide chain that is in transit across the membrane; when the nascent chains are experimentally released from the ribosomes with the drug puromycin, however, the pores can be detected by the ion currents that flow through them. Although the pore is large enough to allow the passage of an unfolded polypeptide chain, it closes when the ribosome is removed from the membrane (Figure 12–42). Thus the pore seems to be a dynamic structure, opening when a ribosome with a growing polypeptide chain attaches to the membrane and closing when the ribosome detaches after the synthesis of the protein is completed.

## The ER Signal Peptide Is Removed from Most Soluble Proteins After Translocation [31]

We have seen that in chloroplasts and mitochondria the signal peptides are cleaved from the precursor proteins once they have crossed the membrane. Similarly, amino-terminal ER signal peptides are removed by a signal peptidase on the luminal side of the ER membrane. The peptide by itself, however, is not sufficient to signal cleavage by the peptidase; this requires an adjacent cleavage site that is specifically recognized by the peptidase. We shall see below that ER signal peptides that are contained within the polypeptide chain rather than at the amino terminus do not have these recognition sites and are never cleaved; instead, they can serve to retain transmembrane proteins in the lipid bilayer after the translocation process has been completed.

The amino-terminal ER signal peptide of a soluble protein itself has two signaling functions: in addition to directing the protein to the ER membrane, it is thought to serve as a **start-transfer signal,** which remains bound to the translocation apparatus while the rest of the protein is threaded continuously through the membrane as a large loop. Once the carboxyl terminus of the protein has passed through the membrane, the signal peptide is released from the translocator pore, cleaved off by the signal peptidase, and rapidly degraded to amino acids by other proteases in the ER while the protein is released into the ER lumen (Figure 12–43).

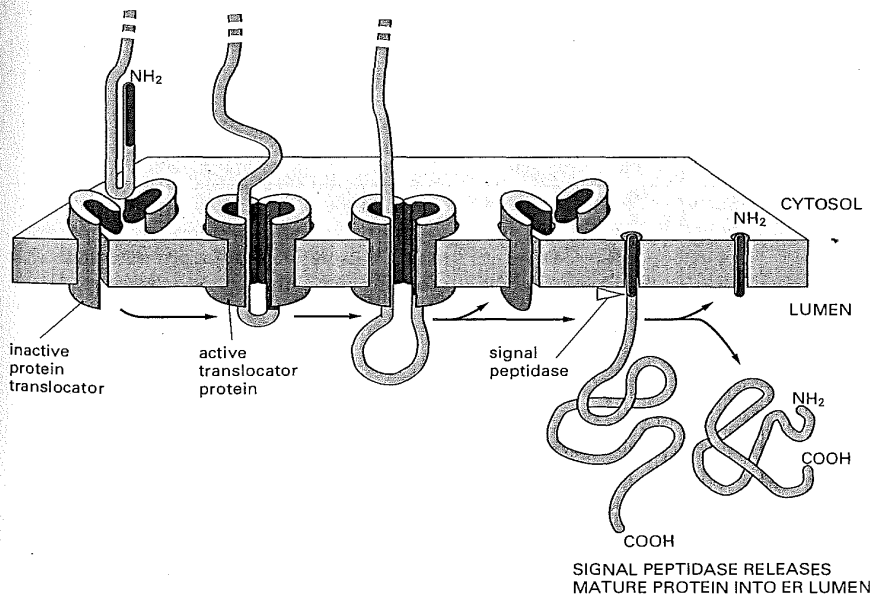



Figure 12–43 **The translocation of a soluble protein across the ER membrane.** In this hypothetical model the protein translocator in the membrane is postulated to exist in two alternative states—active or inactive. On binding an ER signal peptide (which acts as a start-transfer signal), the translocator adopts an active state and begins to transfer the polypeptide chain across the lipid bilayer as a loop. In this state it forms an aqueous pore across the membrane that can be detected electrophysiologically if the polypeptide chain is released (see Figure 12–42). After the protein has been completely translocated, the translocator reverts to an inactive conformation, which can no longer conduct ions across the membrane but is open to the lipid bilayer, allowing the hydrophobic signal peptide to diffuse out into the bilayer, where it is rapidly degraded. In this and the following two figures the ribosomes have been omitted for clarity.



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# Letter accompanying subsequently filed items


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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

| | |
|---|---|
| Application number | 16195355.9 |
| Applicant's or representative's reference | N411599EP-B |

| | Description of document | Original file name | Assigned file name |
|---|---|---|---|
| 1 | Reply to examination report | Letter to EPO Response to Summons N411599EP-B PXT.pdf | EXRE3-1.pdf |
| 2 | Reply to examination report | Second Andrien Declaration signed 15 Aug 18 N411599EP-B.PDF | EXRE3-2.PDF |
| 3 | Reply to examination report | Alberts et al (1994) signal peptide extract.PDF | EXRE3-3.PDF |
| 4 | Reply to examination report | Opposition Statement against EP1720571 (D11) N411599EP-B.PDF | EXRE3-4.PDF |
| 5 | Reply to examination report | C04-001 REDACTED N411599EP-B PXT.PDF | EXRE3-5.PDF |
| 6 | Reply to examination report | C02-002 REDACTED2 N411599EP-B PXT.PDF | EXRE3-6.PDF |

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**Signatures**

| | |
|---|---|
| Place: | **Oxford, GB** |
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| Capacity: | **(Representative)** |




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## SECOND DECLARATION BY DR BRUCE ANDRIEN

I, Bruce Andrien, Director, Early Assay Development and Pharmaceutical Development, of Alexion Pharmaceuticals, Inc., of 100 College Street, New Haven, CT 06510, United States of America, make the following factual declaration concerning the light chain sequence of eculizumab:

1. I am Director, Early Assay Development and Pharmaceutical Development, of Alexion Pharmaceuticals, Inc. ("Alexion"), as shown in my curriculum vitae, a copy of which was attached with my declaration of 23 May 2017.

2. Through my work at Alexion over the past 17 years, I have become very familiar with the protein sequences and structures of antibodies.

3. I understand that EP 16195355.9 is a European patent application whose parent international application was filed on March 16, 2007.

4. I understand the pending claim 1 of EP 16195355.9 reads as follows:

> *"An antibody that binds C5 comprising a heavy chain consisting of SEQ ID NO: 2 and a light chain consisting of residues 23 to 214 of SEQ ID NO: 4."*

5. I understand that SEQ ID NO: 4 in EP 16195355.9 reads as follows:

> SEQ ID NO: 4 - Eculizumab Light chain
>
> MDMRVPAQLLGLLLLWLRGARCDIQMTQSPSSLSASVGDRVTITCGASENIYGAL
> NWYQQKPGKAPKLLIYGATNLADGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQ
> NVLNTPLTFGQGTKVEIKRTVAAPSVFIFPPSDEQLKSGTASWCLLNNFYPREAKV
> QWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLTLSKADYEKHKVYACEVTHQG
> LSSPVTKSFNRGEC

6. I understand that EP 16195355.9 also refers to an antibody comprising a light chain variable region that consists of SEQ ID NO: 3.

> SEQ ID NO: 3 - Eculizumab $V_L$
>
> MDMRVPAQLLGLLLLWLRGARCDIQMTQSPSSLSASVGDRVTITCGASENIYGAL
> NWYQQKPGKAPKLLIYGATNLADGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQ
> NVLNTPLTFGQGTKVEIKRT

7. I have been asked to comment on whether one skilled in the art of antibody structure would have immediately recognized that the Applicant of EP 16195355.9 did not intend to seek protection for an antibody comprising the whole of SEQ ID NO: 4, or the whole of SEQ ID NO: 3.

8. In my Declaration of 23 May 2017, I explained why one skilled in the art in 2007 would have immediately recognized that the signal peptide is included in SEQ ID NO: 4 and would have found it straightforward and simple to delineate the signal peptide from the active N-terminus of the light chain in SEQ ID NO: 4. The same applies to the signal peptide and active N-terminus of the light chain variable region in SEQ ID NO: 3.

9. One skilled in the art would have also known in 2007 that the signal peptide portion of SEQ ID NO: 4, or SEQ ID NO: 3, would not be present in the mature antibody.

10. As described, for example, in Alberts et al. (1994) (attached as Exhibit A), secretory proteins are initially produced as precursor polypeptides. Each precursor polypeptide contains a signal peptide that directs the polypeptide into the endoplasmic reticulum for further transport and secretion. Where the signal peptide is present at the N-terminus of the polypeptide, it is cleaved off after being transported into the endoplasmic reticulum.

11. It was known in 2007 that an antibody heavy or light chain protein is initially produced as a precursor polypeptide containing a signal peptide, as explained in my Declaration of 23 May 2017. It was also well known that, as for other secretory proteins, the signal peptide of the antibody heavy or light chain directs the polypeptide into the endoplasmic reticulum and is cleaved off during transport of the antibody heavy or light chain into the endoplasmic reticulum. As a result of this cleavage, the mature antibody comprising a heavy chain and a light chain never comprises a signal peptide in either chain.

12. Thus, one skilled in the art would immediately have recognized that the Applicant of EP 16195355.9 intended to obtain protection for an antibody that contains only the mature portion of the light chain shown in SEQ ID NO: 4 (i.e., residues 23 to 214 of SEQ ID NO: 4), or SEQ ID NO: 3 (i.e., residues 23 to 109 of SEQ ID NO: 3), and not for an antibody that contains the whole of SEQ ID NO: 4, or SEQ ID NO: 3.

DECLARED at New Haven, CT
United States of America

This 15th Day of August 2018

Bruce A. Andrien Jr.
Bruce A. Andrien Jr., Ph.D.

**CLINICAL STUDY PROTOCOL**
**CONFIDENTIAL**

| | |
|---|---|
| IND NUMBER: | BB-IND 8853 |
| STUDY NUMBER: | C02-002 |
| VERSION: | VERSION 1.0 |
| USAN: | ANTI-C5 ANTIBODY |
| DOSAGE FORM: | PARENTERAL |
| STUDY TITLE: | A RANDOMIZED, THIRD-PARTY BLIND, PLACEBO-CONTROLLED, MULTI-CENTER, PHASE II STUDY ASSESSING THE SAFETY AND EFFICACY OF ECULIZUMAB [redacted] FOR THE TREATMENT OF SUBJECTS WITH DERMATOMYOSITIS |
| MEDICAL MONITOR: | ELLEN McCROSKERY, M.D. |
| AUTHOR: | JING JING WANG, M.S. |
| ADDRESS: | ALEXION PHARMACEUTICALS, INC.<br>352 KNOTTER DRIVE<br>CHESHIRE, CT 06410 |
| TELEPHONE NUMBER: | GENERAL INQUIRES-J.Wang 203-271-8348<br>EMERGENCIES- E.McCroskery, MD<br>OFFICE: 203-271-8298<br>CELL: 203-858-2230 |
| PROJECT SPONSOR: | ALEXION PHARMACEUTICALS, INC. |
| DATE: | SEPTEMBER 30, 2002 |

I have read the protocol and agree to conduct the study accordingly.

_____ _____
Principal Investigator Date

_____
Principal Investigator (Print)

Eileen M McCroskery M.D October 4, 2002
Alexion Clinical Director Date



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[redacted]

[redacted]

[redacted]

When study medication arrives, it should be promptly removed from the shipping cooler and stored in the refrigerator at $2^{\circ} - 8^{\circ}C$. The site should notify the sponsor immediately if vials are damaged and cannot be used or an error has been made in the randomization process (for procedures, please refer to Pharmacy Binder)

As with all investigational drugs, eculizumab must be stored in a secure, limited access storage area.

[redacted]

[redacted]



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[redacted]

### 6.6 Drug Accountability

When a drug shipment is received at the site, the pharmacist at each site should verify the contents and sign the Drug Order Form provided with the shipment and maintain the original copy for collection by the Study Monitor/Research Associate. The duplicate copy should be kept in the Pharmacy Binder.

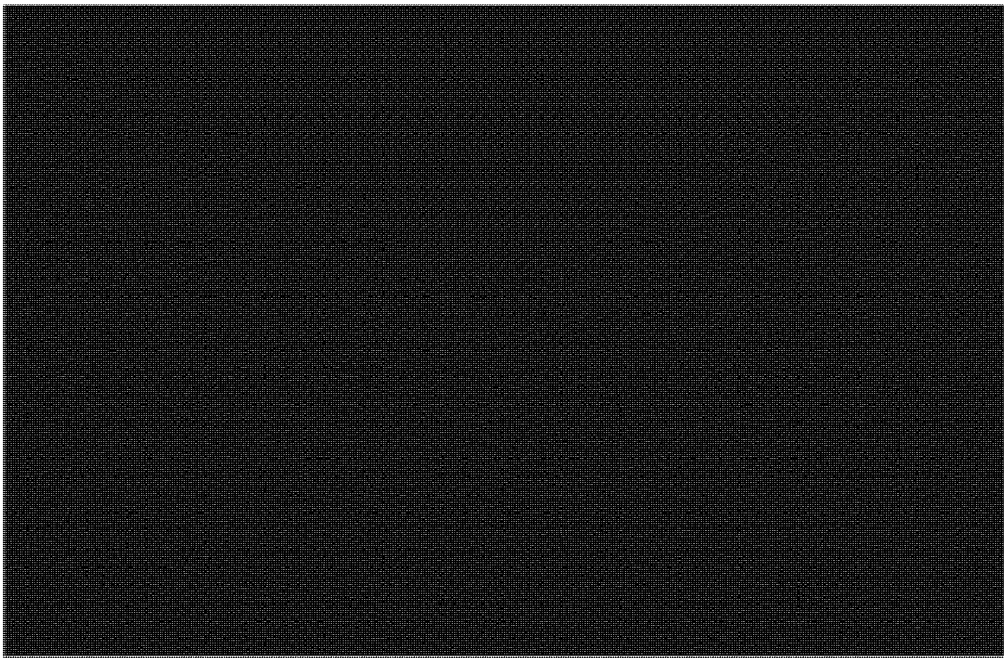
Each shipment of investigational drug supplies will contain a Drug Inventory / Disposition Form to assist the pharmacist in maintaining current and accurate inventory records covering receipt, dispensing, and disposition of the study drug. During the study, the following information must be noted in the Drug Inventory / Disposition Form: the identification number(s) and initials of subject(s) to whom drug is dispensed, the date(s) that the study drug is prepared and dispensed, and the initials of the pharmacist or his /her designee who prepared the study drug. Empty vials and vials with residual materials should be kept for inspection by the Study Monitor/Research Associate.

Because this study is third-party blinded, the inventory records may not be examined by the Study Monitor until the clinical database has been cleaned and locked. However, the inventory records must be readily available and may be subject to FDA, the local regulatory agency, or independent auditor's inspection at any time.

[redacted]



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# STUDY PROTOCOL

BB-IND 11075

***TRIUMPH*: A Hemoglobin Stabilization and Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multi-Center, Double-Blind, Placebo-Controlled, Using Eculizumab in Paroxysmal Nocturnal Hemoglobinuria Patients**

PROTOCOL NUMBER: C04-001

| | |
|---|---|
| Sponsor: | ALEXION PHARMACEUTICALS, INC.<br>352 Knotter Drive<br>Cheshire, CT 06410<br>USA |
| Sponsor Contact: | Michael Bombara<br>Clinical Project Manager<br>Alexion Pharmaceuticals, Inc.<br>352 Knotter Drive<br>Cheshire, CT 06410<br>Telephone: (203) 271-8213<br>Facsimile: (203) 271-8196 |
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| Version: | 2.1 |
| Date of Protocol: | 02-June-2004 |
| Amended: | not applicable |
| Proprietary Notice: | The concepts and information contained in this document or generated during the study are considered proprietary and may not be disclosed in whole or in part without the expressed, written consent of Alexion Pharmaceuticals, Inc. |
| Ethics Statement: | The study will be completed according to the guidelines of Good Clinical Practice. Compliance with this standard provides public assurance that the rights, safety, and well-being of trial patients are protected, consistent with the principles that have their origin in the Declaration of Helsinki. |

## SPONSOR SIGNATURE PAGE

**PROTOCOL TITLE:** *TRIUMPH:* A Hemoglobin Stabilization and Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multi-Center, Double-Blind, Placebo-Controlled, Using Eculizumab in Paroxysmal Nocturnal Hemoglobinuria Patients

**PROTOCOL NUMBER:** C04-001

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3-June-04
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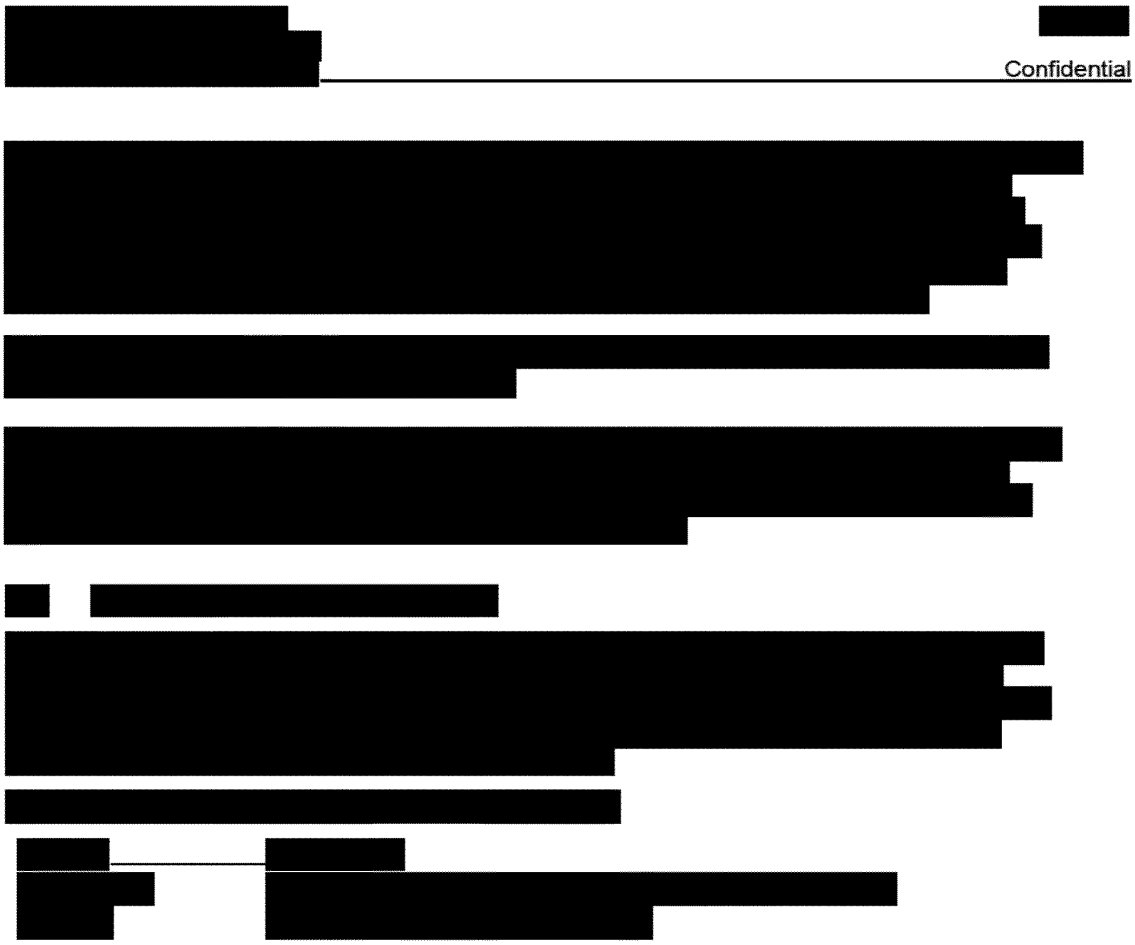
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[redacted]



4.5. Investigational Product Packaging and Storage

Investigational product will be released to the site upon receipt of all required essential documents based upon federal, state, and local regulations. Each kit will have a 2-panel label describing the contents and a place for the pharmacist to record the patient number and initials. The tear-off portion of the label will be affixed to the label sheet provided in the pharmacy binder.

When the investigational product arrives, it should be promptly removed from the shipping cooler and stored in refrigerated conditions at 2°C to 8°C. The pharmacy should immediately notify the distributor if vials are damaged and cannot be used or an error has been made in the randomization process (refer to pharmacy binder).

Eculizumab must be stored in a secure, limited-access storage area.

4.6. Test Article Accountability

When a drug shipment is received at the site, the pharmacist at each site shall verify the contents, sign the packing invoice provided with the shipment, and maintain the original

copy for review by the study monitor. The duplicate copy should be kept in the pharmacy binder.

Each shipment of investigational drug supplies will contain an accountability log to assist the pharmacist in maintaining current and accurate inventory records covering receipt, dispensing, and disposition of the investigational product. During the study, the following information must be noted in the accountability log: the identification number(s), initials of patient(s) who is dispensed investigational product, the date(s) that the investigational product is prepared and dispensed, and the initials of the pharmacist or designee who prepared the investigational product. Empty vials and vials with residual materials should be kept for inspection by the study monitor.

The study monitor will examine the inventory records during study conduct. Additionally, the inventory records must be readily available and may be subject to regulatory authorities or an independent auditor's inspection at any time. At the completion of the study, to satisfy regulatory requirements regarding drug accountability, all remaining investigational product inventory will be reconciled and retained or destroyed according to applicable local, state, and federal regulations.

[redacted]

[redacted]

## 11. ADMINISTRATIVE CONSIDERATIONS

The following administrative items are meant to guide the Principal Investigator or Subinvestigator in the conduct of the trial but may be subject to change based on industry and government Standard Operating Procedures or Working Practice Documents or Guidelines. Changes will be reported to the IRB/IEC, but will not result in protocol amendments.

### 11.1. Confidentiality

All laboratory specimens, evaluation forms, reports, and other records will be identified in a manner designed to maintain patient confidentiality. All records will be kept in a secure storage area with limited access. Clinical information will not be released without the written permission of the patient or the patient's guardian, except as necessary for monitoring by the Sponsor, its designee, the FDA/regulatory authorities, or the IRB/IEC.

The Investigator and all employees and coworkers involved with this study shall not disclose or use for any purpose, other than performance of the study, any data, records or other unpublished, confidential information disclosed to those individuals for the purpose of the study. Prior written agreement from the Sponsor or its designee must be obtained for the disclosure of any said confidential information to other parties.

[redacted]

## 12. INVESTIGATOR'S STATEMENT OF AGREEMENT

I agree to conduct the study as outlined in the protocol entitled: *"TRIUMPH*: A Hemoglobin Stabilization and Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multi-Center, Double-Blind, Placebo-Controlled, Using Eculizumab in Paroxysmal Nocturnal Hemoglobinuria Patients" and in accordance with the guidelines and all applicable government regulations. I have read and understand all sections of the protocol including Section 11, Administrative Considerations.

_____

Principal Investigator
(print name)

_____ _____

Principal Investigator
(sign name)

Date

**Annex 1**

---

Pfizer Inc's opposition statement against EP 1 720 571 B1 (ALEXION PHARMACEUTICALS, INC.)
"Method of treating hemolytic disease"

---

# 1 Introduction

This constitutes opponent Pfizer Inc's statement under Rule 76 (c) EPC, namely the statement of the extent to which European Patent number EP 1 720 571 B1 ("the Patent") is opposed and the grounds on which the opposition is based as well as an indication of facts, evidence and arguments presented of these grounds.

The following documents are introduced into the proceedings:

| | **Document** | **Publication date** |
|---|---|---|
| D1 | Hillmen et al, The New England Journal of Medecine 2004;350:552-9 | Feb 5, 2004 |
| D2 | Medscape Medical News, Dec 13, 2002, Jane Salodof MacNeil | Dec 2002 |
| D3 | Hillmen et al, British Journal of Hematology 121 (Suppl. 1) 87-95, 2003, Abstract 257 | April 2003 |
| D4 | Hillmen et al, Blood. 100(11). November 16, 2002. Abstract No. 154 | Nov 2002 |
| D5 | Hillmen et al, Journal of The American Society of Hematology 102(11), 2003, Abstract 1858 | Nov 2003 |
| D6 | Rother et al, Molecular Immunology. 40(2003), p 197, Abstract 54 | Sept 2003 |
| D7 | Rosse et al, American Society of Hematology – Education program, January 2004 (2004-01), pages 48-62 | Jan 2004 |
| D8 | Biotechnology News, 17 DEC 2004, 24(30), p.10 | Dec 2004 |
| D9 | U.S. Patent No. 6,355,245 | 2002 |
| D10 | Thomas et al, Molecular Immunology, Vol. 33, No. 17/18, pages 1389-1401, 1996 | 1996 |
| D11 | Drugs of the Future 2004, 29(7): 673-676 | July 2004 |
| D12 | Hillmen et al, British Journal of Haematology, 125 (Suppl.1),1-72, Abstract 5 | April 2004 |
| | | |
| | **Decision** | |
| | T1979/09 | Sept 2011 |
| | | |

All the claims of the Patent are opposed.

The grounds on which the Patent is opposed are:
Article 100(c)/Article 123(2) EPC: Added subject-matter
Article 100(a)/Article 54 EPC: Lack of novelty
Article 100(a)/ Article 56 EPC: Lack of inventive step
Article 100(b)/Article 83 EPC: Insufficiency of disclosure

## 2- The patent

*2.1 Formalities*

The Patent was granted on European Patent Application No.05712607.0, which was derived from PCT Patent Application No. PCT/US2005/003225 ("the PCT Application" or "the Application as filed"), which was filed on Feb 03, 2005 ("the Filing Date") and published as WO2005/074607. Priority was claimed from US Patent Application No. 10/771,552 ("Priority Application") filed on Feb 03, 2004 ("Claimed Priority Date").

*2.2 The Claims*

There are eight claims in the Patent, two of which are independent claims, namely claims 1 and 5. The remaining claims are all dependent, directly or indirectly, on at least one of the independent claims.

## 3- Requests

It is requested that the Patent be revoked in its entirety.

Oral proceedings are requested if the Patent cannot be revoked on the basis of the written submissions alone. If oral proceedings take place and either the Patentee or any other party chooses to speak in French or German, simultaneous translation into English is requested.

## 4- Added subject matter (Art 100(c)/Art 123(2) EPC)

According to Art.123(2) EPC a European patent application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed. It is therefore, according to Art.100(c) EPC, a ground of opposition that a European patent contains subject-matter that extends beyond the content of the application as filed. According to the Guidelines for examination (H-IV, 2.2), this legal principle is to be interpreted to mean that "An amendment should be regarded as introducing subject-matter which extends beyond the content of the application as filed, and therefore unallowable, if the overall change in the content of the application (whether by way of addition, alteration or excision) results in the skilled person being presented with information which is not directly and unambiguously derivable from that previously presented by the application, even when account is taken of matter which is implicit to a person skilled in the art".

The combination of features in claims 1 and 5 of the opposed patent is not directly and unambiguously disclosed by the application as filed, thereby contravening Art.123(2) EPC.

Claims 1 and 5 of the opposed patent were introduced into the application by way of amendment and contain, in combination, the following features:

(1) the use of eculizumab
(2) the treatment of a patient afflicted with paroxysmal nocturnal hemoglobinuria
(3) intravenous administration
(4) administration of 600 mg each week for four weeks

(5) administration of 900 mg a week later
(6) administration of 900 mg biweekly thereafter
(7) a breakthrough in serum hemolytic activity when the patient is treated under a dosing schedule according to (4) to (6)
(8) administration of 900 mg every 12 days

There is no mention in the claims of the application as filed of any of features (2) to (8), these claims relating to the treatment of hemolytic disease in general terms and not mentioning any features relating to the route of administration or dosage regimen. Therefore, to be allowable according to Art.100(c) EPC, the combination of features (1)-(8) must be directly and unambiguously derivable from the description.

The description discloses feature (2) on page 11, lines 5-6: "The present disclosure relates to a method of treating paroxysmal nocturnal hemoglobinuria ("PNH") and other hemolytic diseases in mammals". Within this broad umbrella, the description contemplates the treatment of a variety of different diseases and symptoms such as abdominal pain, fatigue, dyspnea, insomnia, hemoglobinuria, anemia, erectile dysfunction, dysphagia, thrombosis (page 23, lines 7-17).

As for feature (1), it is disclosed that a large number of compounds of varying pharmacology can be used in this method. These compounds bind to or otherwise block the generation and/or activity of one or more complement components (page 11, lines 24-25). From this broad class, anti-C5 antibodies are described as particularly useful (page 12, lines 1-3) and h5G1.1-mAb (eculizumab) is described as a particularly useful anti-C5 antibody (page 18, lines 12-20).

Regarding feature (3), the selected compound can be administered via a number of routes, one of which is "intravenous infusion by injection" (page 20, lines 4-8). However, the term "intravenous administration" as used in the claim, covers both injection into a vein using a hypodermic needle and the use of a catheter and therefore has a broader meaning than "intravenous infusion by injection".

There is no disclosure in the general description of the invention of any specific dosage or dosage regimen. On the contrary, it is disclosed that the dose selected should vary considerably depending on the compound selected, the manner of administration, the particular symptoms of the patient, the overall health, condition, size and age of the patient, and the judgment of the prescribing physician (page 19, lines 17-23; page 20, lines 1-3). The general teaching of the application, therefore, is that the dose to be administered should be chosen by the physician on a patient-by-patient basis.

In fact, the only basis for features (4)-(8) comes from the specific Example of the application as filed presented on pages 32-39. In this specific, detailed example, eleven patients from a particular patient group (PNH patients that were transfusion-dependent and hemolytic) were treated weekly with a 600 mg intravenous infusion of eculizumab for four weeks, then with 900 mg eculizumab one week later (by an unspecified route) and then with 900 mg eculizumab on a bi-weekly basis (page 32, lines 5-16; also by an unspecified route). Two of the patients exhibited breakthrough in serum hemolytic activity during this biweekly phase of the treatment which was controlled by reducing the dosing interval from fourteen to twelve days (page 35, lines 8-17).



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There is therefore no unambiguous disclosure of the claimed invention in the description. Rather, the features of the claim are drawn separately and variously from different parts of the disclosure, some of which are contradictory, requiring the creation of intermediate generalisations and/or selections.

The subject-matter of claim 1 is not directly and unambiguously derivable from the general part of the description since:

(a) It is necessary to select a pharmacological class (anti-C5 antibody) from a list of such classes (compounds that bind to or otherwise block the generation and/or activity of one or more complement components); a specific compound (eculizumab) from a list of compounds within that class; the disease PNH as the hemolytic disease to be treated from a list of several diseases; and a route of administration (intravenous) from several possible routes.

(b) There is no disclosure of "intravenous administration" in general terms, only the disclosure of "intravenous infusion by injection".

(c) There is no disclosure of any specific dosage regimen, only the disclosure that dosage will vary depending on the exact clinical situation to be addressed.

The subject-matter of claim 1 is not directly and unambiguously derivable from the Example since:

(a) the example is a specific disclosure that contains several other essential features that are missing from claim 1. In particular, the patients in this study were transfusion-dependent and hemolytic – this is a specific patient sub-group and the invention has not been shown to work in other sub-groups. Claim 1 therefore represents a generalisation of the actual teaching of the Example. Moreover, the specific meaning ascribed to the term "transfusion-dependent" on page 32, lines 7-9 should be specified in the claim. Likewise, the infusion time of "approximately 30 minutes" (page 32, lines 12-14) is not specified in the claim, despite being an essential feature of the Example. Finally, the breakthrough occurred in the extension study between weeks 12 and 64 (page 32 lines 17-20; page 35, lines 8-9) whereas the claim is not so limited and covers treatment regimens where the shorter 12 day treatment cycle is initiated in the initial 12 week acute phase of treatment.

(b) In the Example the patients received "a weekly 600 mg intravenous infusion" of eculizumab which implies (i) the drug was administered at time points one week apart and (ii) a catheter-based intravenous infusion was used to administer the drug. The corresponding features of the claim are "intravenous administration" which covers the use of a catheter and a direct injection and administration of "600 mg each week for four weeks" which implies that the drug was administered once within each of four successive calendar weeks but not necessarily at weekly intervals.

(c) In the Example, the route by which the drug was administered following the initial four week dosing is not specified whereas in the claim the route is specified as the intravenous route.

It is furthermore not appropriate to combine features from the general part of the description and the Example since:

(a) This would create an intermediate generalisation – the features of the Example are detailed and specific and associated with each other and to take one or more out of this narrow context and combine it with features of the invention described in general terms would create embodiments of the invention which were not contemplated in the application as filed.

(b) The general part of the description and the Example are not compatible teachings in that the general part of the description clearly contemplates a treatment in which the dosage is selected on a patient-by-patient basis according to the exact clinical situation presented whereas the Example teaches that the same, specific dosage should be administered to each patient regardless of the particular symptoms, overall health, condition, size and age of the patient.

Therefore, claims 1 and 5 of the patent include subject matter which is not directly and unambiguously derivable from the description or claims of the application as filed and are not allowable according to Art.123(2) and Art.100(c) EPC. The dependent claims, which all contain the features of claims 1 and 5, also contravene these provisions.

## 5- Lack of novelty (Article 100(a)/Art 54 EPC)

**5.1 – The subject matter of claim 1 and 5 is not entitled to the priority**

According to Art.87(1) EPC, the priority of an earlier application may be claimed if it discloses "the same invention". According to the Guidelines for Examination (F-VI, 1.3) and G2/98, this is to be interpreted to mean that the subject matter of a claim in a European patent may enjoy the priority of a previous application only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole.

The combination of features in claims 1 and 5 of the opposed patent is not directly and unambiguously disclosed in the priority application (US patent application No. 10/771,552 filed on 03 February 2004), in contravention of Art.87(1). The claims are therefore not entitled to the priority date.

Claims 1 and 5 of the opposed patent contain, in combination, the following features:

(1) the use of eculizumab
(2) the treatment of a patient afflicted with paroxysmal nocturnal hemoglobinuria
(3) intravenous administration
(4) administration of 600 mg each week for four weeks
(5) administration of 900 mg a week later
(6) administration of 900 mg biweekly thereafter
(7) a breakthrough in serum hemolytic activity when the patient is treated under a dosing schedule according to (4) to (6)
(8) administration of 900 mg every 12 days

There is no mention in the claims of the priority application of any of features (2) to (8), these claims relating to the treatment of hemolytic disease in general terms and not mentioning any

features relating to the route of administration or dosage regimen. Therefore, for the priority claim to be valid, the combination of features (1)-(8) must be directly and unambiguously derivable from the description.

The description of the priority application discloses feature (2) on page 4, lines 13-14: "Paroxysmal nocturnal hemoglobinuria ("PNH") and other hemolytic diseases are treated in accordance with this disclosure". Within this broad umbrella, the description contemplates the treatment of a variety of different diseases and symptoms such as hemoglobinuria, anemia, fatigue, low red blood cell count, erectile dysfunction, dysphagia and thrombosis (page 22, lines 12-17).

As for feature (1), it is disclosed that a large number of compounds of varying pharmacology can be used in this method. These compounds bind to or otherwise block the generation and/or activity of one or more complement components (page 11, lines 7-9). From this broad class, anti-C5 antibodies are described as particularly useful (page 11, lines 9-11) and h5G1.1-mAb (eculizumab) is described as a particularly useful anti-C5 antibody (page 17, line 23 – page 18, line 8).

Regarding feature (3), the selected compound can be administered via a number of routes, one of which is "intravenous infusion by injection" (page 19, lines 15-18). However, the term "intravenous administration" as used in the claim, covers both injection into a vein using a hypodermic needle and the use of a catheter and therefore has a broader meaning than "intravenous infusion by injection".

There is no disclosure in the general description in the priority application of any specific dosage or dosage regimen. On the contrary, it is disclosed that the dose selected should vary considerably depending on the manner of administration, the particular symptoms of the patient, the overall health, condition, size and age of the patient, and the judgement of the prescribing physician (page 19, lines 12-14). The general teaching of the application, therefore, is that the dose to be administered should be chosen by the physician on a patient-by-patient basis.

In fact, the only basis for features (4)-(8) comes from the specific Example of the invention presented on pages 30-35. In this specific, detailed example, eleven patients from a particular patient group (PNH patients that were transfusion-dependent and hemolytic) were treated weekly with a 600 mg intravenous infusion of eculizumab for four weeks, then with 900 mg eculizumab one week later (no route of administration specified) and then with 900 mg eculizumab on a bi-weekly basis (page 30, lines 6-16; no route of administration specified). One of the patients exhibited breakthrough in serum hemolytic activity during this biweekly phase of the treatment which was controlled by reducing the dosing interval from fourteen to twelve days (page 32, lines 13-19).

There is therefore no unambiguous disclosure of the claimed invention in the description. Rather, the features of the claim are drawn separately and variously from different parts of the disclosure, some of which are contradictory, requiring the creation of intermediate generalisations and/or selections.

The subject-matter of claim 1 is not directly and unambiguously derivable from the general part of the description since:

(a) It is necessary to select a pharmacological class (anti-C5 antibody) from a list of such classes (compounds that bind to or otherwise block the generation and/or activity of one or more complement components); a specific compound (eculizumab) from a list of compounds within that class; the disease PNH as the hemolytic disease to be treated from a list of several diseases; and a route of administration (intravenous) from several possible routes.

(b) There is no disclosure of "intravenous administration" in general terms, only the disclosure of "intravenous infusion by injection".

(c) There is no disclosure of any specific dosage regimen, only the disclosure that dosage will vary depending on the exact clinical situation to be addressed.

The subject-matter of claim 1 is not directly and unambiguously derivable from the Example since:

(a) the example is a specific disclosure that contains several other essential features that are missing from claim 1. In particular, the patients in this study were transfusion-dependent and hemolytic – this is a specific patient sub-group and the invention has not been shown to work in other sub-groups. Claim 1 therefore represents a generalisation of the actual teaching of the Example. Moreover, the specific meaning ascribed to the term "transfusion-dependent" on page 30, lines 8-9 should be specified in the claim. Likewise, the infusion time of "approximately 30 minutes" (page 30, lines 13-14) is not specified in the claim, despite being an essential feature of the Example.

(b) In the Example the patients received "a weekly 600 mg intravenous infusion" of eculizumab which implies (i) the drug was administered at time points one week apart and (ii) a catheter-based intravenous infusion was used to administer the drug. The corresponding features of the claim are "intravenous administration" which covers the use of a catheter and a direct injection and administration of "600 mg each week for four weeks" which implies that the drug was administered once within each of four successive calendar weeks but not necessarily at weekly intervals.

(c) In the Example, the route by which the drug was administered following the initial four week dosing is not specified whereas in the claim the route is specified as the intravenous route.

It is furthermore not appropriate to combine features from the general part of the description and the Example since:

(a) This would create an intermediate generalisation – the features of the Example are detailed and specific and associated with each other and to take one or more out of this narrow context and combine it with features of the invention described in general terms would create embodiments of the invention which were not contemplated in the application as filed.

(b) The general part of the description and the Example are not compatible teachings in that the general part of the description clearly contemplates a treatment in which the dosage is selected on a patient-by-patient basis according to the exact clinical situation presented whereas the Example teaches that the same, specific dosage

should be administered to each patient regardless of the particular symptoms, overall health, condition, size and age of the patient.

Therefore, claims 1 and 5 of the patent include subject matter which is not directly and unambiguously derivable from the priority application and are not entitled to the priority date. The validity of these claims is consequently to be considered as of the filing date of 03 February 2005.

**5.2 – Features of claims 1 and 5 as granted**

Claim 1 as granted contains the following features:

(1) the use of eculizumab
(2) the treatment of a patient afflicted with paroxysmal nocturnal hemoglobinuria
(3) intravenous administration
(4) administration of 600 mg each week for four weeks
(5) administration of 900 mg a week later
(6) administration of 900 mg biweekly thereafter
(7) a breakthrough in serum hemolytic activity when the patient is treated under a dosing schedule according to (4) to (6)
(8) administration of 900 mg every 12 days

The same numbering can be applied to claim 5 which comprises the same features as claim 1. The above numbering of the features of claims 1 and 5 will be used in the following sections.

**5.3 – D1 (Hillmen et Al, 2004) anticipates the subject matter of claims 1 to 8**

D1 published on Feb 5, 2004 and is therefore part of the state of the art under Art 54(2) EPC against claims which are not entitled to the priority date.

- Claims 1 and 5

On page 552, paragraph entitled "Methods", D1 describes a trial where 11 patients with PNH **(2)** received infusions **(3)** of Eculizumab **(1)** (600mg) every week for 4 weeks **(4)**, followed one week later by a 900-mg dose **(5)** and then by 900 mg every other week **(6)** through week 12.

On page 555, last sentence to page 556, first sentence, D1 describes one patient from the trial in whom eculizumab level fell below 35µg per milliliter at week 12, hemolytic activity returned **(7)** and lactate deshydrogenase levels increased transiently. The dosing frequency was increased from 900 mg every 14 days to 900 mg every 12 days **(8)**, reestablishing complete complement blockade during the ongoing 12-month extension study (data not shown).

Therefore, D1 anticipates claims 1 and 5 which lack novelty.

- Claims 2, 3, 6 and 7

On page 554, third full sentence, D1 describes that patients from the trial disclosed above "who were taking stable doses of immunosuppressive drugs (e.g., cyclosporine), warfarin, and iron supplements were permitted to continue them".

Therefore, D1 anticipates claims 2, 3, 6 and 7 which lack novelty.

- Claims 4 and 8

On page 555, figure 3A, the percentage of type III erythrocytes in patients from the above mentioned study is greater than 10% for all patients.

Therefore, D1 anticipates claims 4 and 8 which lack novelty.

# 6- Lack of Inventive Step (Article 100(a)/ Art 56 EPC)

As argued above the opponent is of the opinion that the subject matter of all claims lacks novelty. Should the Opposition Division (OD) be of a different opinion, the opponent reserves the right to use D1 cited in the novelty section for assessment of inventive step.

D7 (see page 53, last 5 lines first column and first 4 lines of second column), D8 (see 1st paragraph), D11 (see page 675, sentence bridging columns and first whole sentence in second column) and D12 (second column, lines 20 to 29) also disclose reduction of dosing interval of Eculizumab to prevent breakthrough of serum hemolytic activity and could also be used for assessment of inventive step.

As detailed below, in the unlikely case that the OD would consider the subject matter of claims entitled to the priority, we submit that none of the granted claims is inventive over the prior art published before the priority date.

## 6.1 Use of Eculizumab for the treatment of PNH was known at the priority date.

D2 published on Dec 13, 2002 and is therefore part of the state of the art under Art 54(2) EPC against all claims.[1]

D2 is an article discussing results from clinical trials conducted with Eculizumab. As mentioned in the 2nd paragraph of D2, 11 patients were administered Eculizumab for 3 months. D2 (paragraph 12 – emphasis added) further discloses, that "the PNH trial was conducted with Alexion support at two sites in the U.K. Patients received 600 mg of eculizumab each week for four weeks, after which the dose was switched to 900 mg every two weeks."

D3 (Hillmen et al.) is an abstract published in the British Journal of Haematology on April 9, 2003 and is therefore part of the state of the art under Art 54(2) EPC against all claims. D3 discloses that (emphasis added) "Eleven transfusion-dependent PNH patients have

[1] The Examiner confirmed that D2 is prior art in Section 2 of the Communication dated 21 September 2010 in prosecution

completed a 3-month pilot study receiving 600 mg Eculizumab by intravenous infusion over 30 min weekly for four doses and then 900 mg every other week."

D4 (Hillmen et al) is an abstract published on Nov 16, 2002 and is therefore part of the state of the art under Art 54(2) EPC against all claims. D4 discloses that "Ten transfusion-dependent PNH patients have been entered into an ongoing open label Pilot study of eculizumab and all patients will have completed the study by November 2002. Patients receive 600 mg eculizumab by intravenous infusion over 30 minutes weekly for 4 doses and then 900 mg every other week".

D6 (Rother et Al) is an abstract published in Sept 2003 and is therefore part of the state of the art under Art 54(2) EPC against all claims. D6 discloses that "Eleven transfusion dependent PNH patients have completed an open-label pilot study of eculizumab. Patients received 600 mg eculizumab by intravenous infusion over 30 min weekly for four doses, followed by 900 mg 1 week later, and then 900 mg every other week for the remainder of the trial."

It was therefore very well established at the priority date that Eculizumab could be used for treating a patient afflicted with paroxysmal nocturnal hemoglobinuria (PNH), wherein eculizumab is to be administered intravenously to the patient under the following dosing schedule: 600 mg each week for four weeks; 900 mg 1 week later and 900 mg on a biweekly basis.

**6.2 Reducing the dosing interval to prevent potential breakthrough in patients treated with 900mg Eculizumab biweekly was known before the priority date.**

D5 (Hillmen et al) is an abstract published on Nov 16 2003 and is therefore part of the state of the art under Art 54(2) EPC against all claims.

D5 relates to the results of the extension of the study disclosed in D4. On lines 5 to 8, D5 discloses that,

> *"We previously reported that eculizumab was very effective at acutely controlling intravascular hemolysis in a 3-month Pilot study of transfusion-dependent PNH patients. We now report that all 11 patients from the initial study entered an extension trial of 900mg eculizumab by i.v. infusion over 30 minutes every other week for one year."*

The pilot study mentioned in the above paragraph is the pilot study discussed lines 8 to 10 of D4. This is consistent with the disclosure of D4, which also mentions that the patients who have completed the pilot study have all entered into an extension study which results are reported in D5.

Therefore the patients from the study discussed in D5 have received 600 mg eculizumab by intravenous infusion over 30 minutes weekly for 4 doses and then 900 mg every other week during the pilot study disclosed in detail in D4. Then they entered into the extension study and continued to receive 900 mg eculizumab by i.v. infusion over 30 minutes every other week (see D5, l.7-8).

On page 510a, 1st col., l.8-12, D5 discloses that

> *"Two patients experienced transient breakthroughs in complement activity associated with increased LDH, hemoglobinuria and mild symptoms, these resolved immediately upon next dose of eculizumab and further breakthroughs were prevented by a slight decrease in the dosing interval."*

It was therefore very well established at the priority date that breakthroughs in serum hemolytic activity observed in patients afflicted with PNH and treated with Eculizumab under a dosing schedule according to items (i) to (iii) of claim 1 as granted could be prevented by slightly decreasing the dosing interval.

The difference between the subject matter of claim 1 and the disclosure of D5 is that the reduced dosing interval is 12 days.

The effect of this difference is to prevent further breakthrough in serum hemolytic activity in patients which exhibit such breakthrough when treated under a dosing schedule according to items (i) to (iii) of claim 1 as granted.

The objective technical problem to be solved is to identify a reduced interval allowing prevention of further breakthrough in serum hemolytic activity in said patients.

The man skilled in the art, starting from D5 and aiming at reducing the interval between two 900mg doses would have tried different intervals shorter than 14 days and would have determined very easily that a 12 days interval is suitable for preventing further breakthrough in serum hemolytic activity in patients exhibiting breakthrough when treated under a dosing schedule according to items (i) to (iii) of claim 1 as granted. As shown in figure 5 of the patent, this is exactly what has been done during the trial described in the examples of the patent. Figure 5 shows the effect of the dosing interval on hemoglobinuria in one of the two patients exhibiting breakthrough of hemolysis activity. When Eculizumab is administered every 14 days, hemoglobinuria is observed before the next dose is administered (see Fig.5 urine grade at day 13). The dosing interval was reduced to 13 days and hemoglobinuria was still observed on the last day of the interval (see Fig.5 urine grade at day 41). Therefore, the dosing interval was reduced to 12 days and no further hemoglobinuria event is observed in Fig.5.

The skilled person, observing a breakthrough in hemolytic activity in a patient administered with 900mg every 14 days, would have applied the teaching of D5 and reduced the dosing interval until it reaches the 12 days dosing interval such that further breakthrough were prevented. Indeed such a reduction in dosing interval represents a routine modification.

We make reference to T1979/09. Section 7 of the reasons of the decision concern an auxiliary request which included a dosage regimen. Reasons 7.3.1 states that:

> *"It is well known that in designing dosage regimen the two major parameters that can be adjusted are the dose itself, i.e. the quantity of drug administered, and the dosing frequency, i.e. the time interval between doses."*

Further, in Reasons 7.3.2 the Board stated that:

> *"The board considers that it is within the competence of the skilled person to find out the optimal dosage regime. Consequently, the replacement of a dosage regime by another dosage regime for the same purpose is considered to be a matter of routine experimentation and cannot be seen as involving an inventive step."*

This decision is applicable to the present situation - the use of the defined dosage schedule would have been considered routine to the skilled person in view of the prior art and faced with the technical problem.

Therefore claim 1 lack inventive step over D5 alone or in combination with any one of D2, D3, D4 or D6, or over any of D2, D3, D4 or D6. Claim 5 which relates to the same features also lack inventive step for the same reasons.

The additional features of dependant claims 2 to 4 and 5 to 8 do not confer inventive step the claimed use.

## 7- Insufficiency of disclosure (Art 100(b)/Art 83 EPC)

**7.1 Claims 1 to 8 contravene Article 83 because they lack essential features for the alleged technical effect**

Eculizumab is an essential feature of claims 1 to 8. The structure of Eculizumab is not disclosed in the application as filed. On page 8, lines 8-9, the patent discloses that h5G1.1-mAb is currently undergoing clinical trials under the tradename Eculizumab. On the same page, lines 5 to 8, the patent further mentions that methods for the preparation of h5G1.1-mAb, h5G1.1-scFv and other functional fragments of h5G1.1 are described in U.S. Patent No. 6,355,245 (D9) and "Inhibition of Complement Activity by Humanized Anti-C5 Antibody and Single Chain Fv", Thomas et al., Molecular Immunology, Vol. 33, No. 17/18, pages 1389-1401, 1996 (D10).

However, as detailed below, the complete sequence of Eculizumab or h5G1.1 mAb is not disclosed in these two documents.

D9 is a patent assigned to Alexion Pharmaceutical, Inc which relates to C-5 specific antibodies for the treatment of inflammatory diseases.

In example 7, D9 discloses a mouse monoclonal antibody 5G1.1. In example 11 (columns 42 to 44), D9 lists a number of humanized, chimeric and non humanized scFv, Fd and light chains. D9 does not comprise any reference to Eculizumab or h5G1.1 mAb nor does it disclose the sequence of a full length humanized antibody.

D10 is a publication from Alexion Pharmaceuticals relating to humanized anti-C5 antibody and scFv. D10 discloses the cloning of the variable region genes of the mouse mAb 5G1.1 (see page 1390), the humanization of 5G1.1 variable regions and the construction and expression of various Fab and scFv (see page 1391). The sequences of humanized variable regions are provided in Figure 1. The construction of a humanized antibody h5G1.1 called

h5G1.1 HuG4 is also discussed on page 1396 (paragraph bridging col.1 and 2) and on page 1399, col.2. However, the exact sequence of the humanized antibody is not disclosed in D10.

In view of the above, none of the patent, D9 or D10 provides a detailed description of the structure of h5G1.1 mAb or Eculizumab.

Therefore, the man skilled in the art would not be able to carry out the invention as he would not be able to prepare the specific antibody Eculizumab, which is an essential feature of the claims 1 to 8.

Therefore claims 1 to 8 are not sufficiently disclosed in the sense of Article 83 EPC.

**7.2 Claims 1 to 8 contravene Article 83 because the invention is not disclosed in a manner sufficiently clear and complete.**

Claim 1 as granted comprises the feature that the "patient exhibits breakthrough in serum hemolytic activity when treated under a dosing schedule according to items (i) to (iii)".

The term "breakthrough in serum hemolytic activity" is neither defined in claim 1 nor in the general disclosure of the application as filed. This term is used in the example section (see page 35, lines 9-10) and in particular in connection with two patients who did not sustain levels of Eculizumab necessary to consistently block complement. Again, no definition of this term is provided in the example. On page 35, lines 11 to 15, the application as filed discloses that "breakthrough of complement blockade resulted in hemoglobuniria, dysphagia and increased LDH and AST which correlated with the return of the hemolytic activity". These events (hemoglobinuria, dysphagia and increased LDH and AST) seem to be associated to some extent with serum hemolytic activity. However, it is not clear if one, two, three or four of these events are necessary and/or sufficient to characterize a breakthrough according to claim 1.

Claim 1 does not provide any indication relative to the characterization of "breakthrough in serum hemolytic activity". In the absence of additional guidance from the description, the skilled person would not be able to determine when a patient exhibits breakthrough in serum hemolytic activity and as a consequence would not be able to determine if and when the dosing interval should be reduced to 12 days.

Therefore, the skilled person would not be able to carry out the subject matter of claims 1 to 8 which therefore contravene Art.83 EPC.

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# Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

| | |
|---|---|
| Submission number | 6620529 |
| Application number | EP16195355.9 |
| Date of receipt | 15 August 2018 |
| Receiving Office | European Patent Office, The Hague |
| Your reference | N411599EP-B |
| Applicant | All applicants as on file |

| Documents submitted | |
|---|---|
| package-data.xml | ep-sfd-request.xml |
| epf1038.pdf (1 p.) | EXRE3-1.pdf\Letter to EPO Response to Summons N411599EP-B PXT.pdf (14 p.) |
| EXRE3-2.PDF\Second Andrien Declaration signed 15 Aug 18 N411599EP-B.PDF (2 p.) | EXRE3-3.PDF\Alberts et al (1994) signal peptide extract.PDF (3 p.) |
| EXRE3-4.PDF\Opposition Statement against EP1720571 (D11) N411599EP-B.PDF (13 p.) | EXRE3-5.PDF\C04-001 REDACTED N411599EP-B PXT.PDF (9 p.) |
| EXRE3-6.PDF\C02-002 REDACTED2 N411599EP-B PXT.PDF (6 p.) | |

| | |
|---|---|
| Submitted by | CN=Pamela Tuxworth 23470 |
| Method of submission | Online |
| Date and time receipt generated | 15 August 2018, 17:44 (CEST) |
| Message Digest | EC:B9:D1:84:6F:BB:37:B7:F4:70:C1:64:AF:F2:72:0F:CC:F8:48:F0 |

**Correction by the EPO of errors in debit instructions filed by eOLF**

Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

/European Patent Office/



Samsung Bioepis Exhibit No. 1002
Page 4098

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Application No. : 16 195 355.9

**Consultation by telephone with the applicant / representative**

Despatch for information

**Participants**

Applicant: Alexion Pharmaceuticals, Inc.

Representative: J A Kemp - Pamela Tuxworth

Member(s) of the Examining Division: Collura, Alessandra

**Result of consultation**

See Separate Sheet

14.09.2018
. . . . . .
Date

Collura, Alessandra
. . . . . .
Examiner

Enclosure(s):

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| Application No. | Ref. | Date |
|---|---|---|
| 16 195 355.9 - 1112 | | 25.09.2018 |
| Applicant<br>Alexion Pharmaceuticals, Inc. | | |

**Result of consultation**

A copy of the result of consultation of 14.09.2018 is enclosed for your information.

Collura, Alessandra
**For the Examining Division**

Enclosure(s): Copy of result of consultation (Form 2036)

The representative of the applicant wanted to discuss the application with the first examiner.

The first examiner explained that, since the application related to some core legal issues, the examining division would probably have to be enlarged with a legal member. The first examiner will phone again the representative of the applicant once the situation of the application has been clarified (probably within next week).

The first examiner confirmed the maintenance of the oral proceedings.




Samsung Bioepis Exhibit No. 1002
Page 4101

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Application No. : 16 195 355.9

**Consultation by telephone with the applicant / representative**

Despatch for information

**Participants**

Applicant: Alexion Pharmaceuticals, Inc.

Representative: Pamela Tuxworth

Member(s) of the Examining Division: Collura, Alessandra

**Result of consultation**

See Separate Sheet

19.12.2018
. . . . . .
Date

Collura, Alessandra
. . . . . .
Examiner

Enclosure(s):

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**Questions about this communication ?**
Contact Customer Services at www.epo.org/contact

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| Date |
|---|
| 02.01.2019 |

| Reference | Application No./Patent No. |
|---|---|
| | 16195355.9 - 1112 / 3167888 |
| Applicant/Proprietor | |
| Alexion Pharmaceuticals, Inc. | |

**BRIEF COMMUNICATION**

**Oral Proceedings on 05.02.19 at 09:00 hours**

Subject:
- ☐ Your letter of .....
- ☒ Cancellation / postponement at the instigation of the division

Communication:

1. ☐ The date / time fixed for oral proceedings is maintained.
   - ☐ The reasons are indicated on enclosed EPO Form 2906.
2. ☐ The request for the oral proceedings to be held as a videoconference is rejected. The reasons are indicated on enclosed EPO Form 2906.
3. ☐ The above-mentioned oral proceedings will start at ..... hours.
4. ☒ The summons to attend oral proceedings on the above-mentioned date is cancelled.

4.1
- ☐ The reasons are indicated on enclosed EPO Form 2906.
- ☐ The procedure will be continued in writing.
- ☒ A new date will be set later.
- ☐ New summons will follow.

4.2 ☐ Due to administrative reasons the oral proceedings have to be postponed to a later date. New summons will follow.

4.3 ☐ The application is deemed to be withdrawn. The right to oral proceedings only persists as long as proceedings are pending.

Please take note.

Please confirm receipt of this communication by return with date stamp and signature to our central fax server (+49) 89 23 99 44 65.

**Registered letter**



Samsung Bioepis Exhibit No. 1002
Page 4103

**For the Examining Division**




☒ Enclosure : EPO Form 2906



Samsung Bioepis Exhibit No. 1002
Page 4104

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| Application No. | Ref. | Date |
|---|---|---|
| 16 195 355.9 - 1112 | | 02.01.2019 |
| Applicant<br>Alexion Pharmaceuticals, Inc. | | |

**Result of consultation**

A copy of the result of consultation of 19.12.2018 is enclosed for your information.

Collura, Alessandra
**For the Examining Division**

Enclosure(s): Copy of result of consultation (Form 2036)

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Application No. : 16 195 355.9

**Consultation by telephone with the applicant / representative**

Despatch for information

**Participants**

Applicant: Alexion Pharmaceuticals, Inc.

Representative: Pamela Tuxworth

Member(s) of the Examining Division: Collura, Alessandra

**Result of consultation**

See Separate Sheet

19.12.2018
. . . . . .
Date

Collura, Alessandra
. . . . . .
Examiner

Enclosure(s):

The first examiner informed the representative of the applicant of the fact that the summons to oral proceedings on 05.02.2019 should be cancelled because the legal member who was assigned to the file could not attend the oral proceedings.

A new date for the oral proceedings will be set at the beginning of January 2019.

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| Application No. | Ref. | Date |
|---|---|---|
| 16 195 355.9 - 1112 | | 02.01.2019 |
| Applicant<br>Alexion Pharmaceuticals, Inc. | | |

**Result of consultation**

A copy of the result of consultation of 19.12.2018 is enclosed for your information.

Collura, Alessandra
**For the Examining Division**

Enclosure(s): Copy of result of consultation (Form 2036)

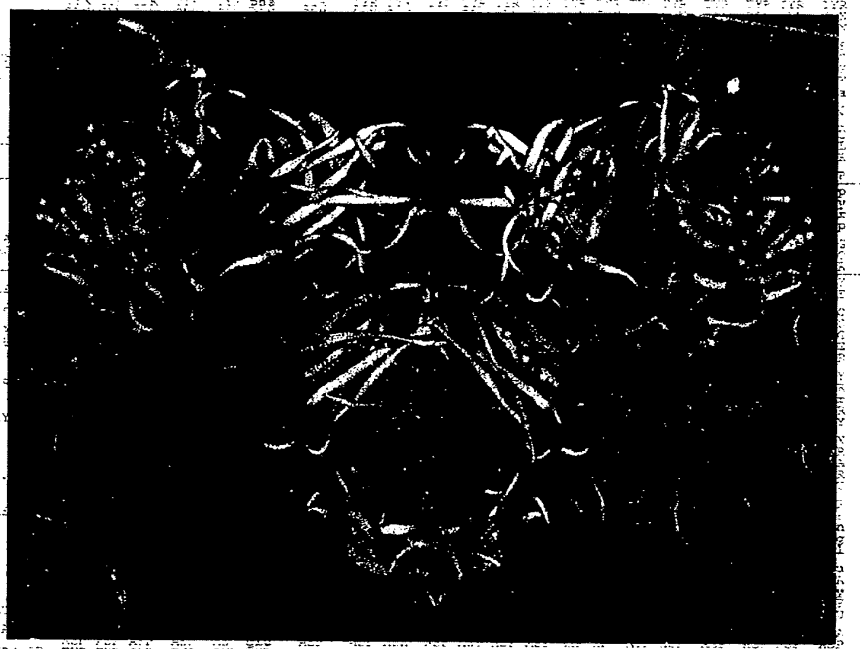
The first examiner informed the representative of the applicant of the fact that the summons to oral proceedings on 05.02.2019 should be cancelled because the legal member who was assigned to the file could not attend the oral proceedings.

A new date for the oral proceedings will be set at the beginning of January 2019.

# SEQUENCES OF PROTEINS OF IMMUNOLOGICAL INTEREST

## VOL. I

FIFTH EDITION



1991

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
National Institutes of Health

# SEQUENCES OF PROTEINS OF IMMUNOLOGICAL INTEREST

**FIFTH EDITION**

Tabulation and Analysis of
Amino Acid and Nucleic Acid Sequences of Precursors,
V-Regions, C-Regions, J-Chain, T-Cell Receptors for Antigen,
T-Cell Surface Antigens, $\beta_2$-Microglobulins,
Major Histocompatibility Antigens, Thy-1, Complement,
C-Reactive Protein, Thymopoietin, Integrins, Post-gamma Globulin,
$\alpha_2$-Macroglobulins, and Other Related Proteins

**1991**

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AND HUMAN SERVICES

Public Health Service
National Institutes of Health

NIH Publication No. 91-3242

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## SIGNAL PEPTIDES OF HUMAN KAPPA LIGHT CHAINS

| | INVARIANT RESIDUES | 1 HK101 'CL | 2 HK 137 'CL | 3 VKI- Chr1 'CL | 4 HuVH CAMP 'CL | 5 VKI-2I 'CL | 6 3D6 'CL | 7 V108 'CL | 8 VD 'CL | 9 Vb' 'CL | 10 HK102 'CL | 11 2A12 'CL | 12 1H1 'CL | 13 2C12 'CL | 14 1B11 'CL | 15 Vd 'CL | 16 Va' 'CL | 17 Ve 'CL | 18 V13 'CL | 19 GM 607 'CL | 20 A3 'CL | 21 HPMI 6410 'CL # | 22 A2 'CL | 23 A23 'CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -28 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -27 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -26 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -25 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -24 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -23 | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | | --- | --- | --- | --- | | --- | --- | --- | --- | |
| -22 | | MET | MET | --- | --- | THR | MET | MET | MET | MET | MET | MET | | | | MET | MET | --- | MET | | --- | --- | --- | |
| -21 | | ASP | ASP | --- | --- | ASP | ASP | GLU | ASP | ASP | ASP | ASP | | | | ASP | ASP | --- | ASP | | --- | --- | --- | |
| -20 | MET(.98) | MET | MET | MET | --- | VAL | MET | MET | MET | MET | MET | MET | | | | MET | MET | MET | MET | | MET | MET | MET | MET |
| -19 | | ARG | ARG | ARG | MET | ARG | ARG | ARG | ARG | MET | ARG | ARG | | | | ARG | ARG | ARG | ARG | | ARG | ARG | ARG | ARG |
| -18 | | VAL | VAL | ALA | GLY | ALA | VAL | VAL | VAL | VAL | VAL | VAL | | | | VAL | VAL | VAL | VAL | | LEU | LEU | LEU | LEU |
| -17 | | LEU | LEU | PRO | TRP | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | LEU |
| -16 | | ALA | ALA | THR | SER | THR | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA |
| -15 | | GLN | GLN | GLN | CYS | GLN | GLN | GLN | GLN | GLN | GLN | LEU | LEU | | | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN |
| -14 | | LEU | LEU | LEU | ILE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -13 | | LEU | LEU | LEU | ILE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -12 | | GLY | GLY | GLY | LEU | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | | GLY | GLY | GLY | GLY | | GLY | GLY | GLY | GLY |
| -11 | | LEU | LEU | LEU | PHE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -10 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -9 | | LEU | LEU | VAL | VAL | GLY | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | | MET | MET | MET | MET |
| -8 | LEU(.95) | LEU | LEU | LEU | ALA | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU |
| -7 | TRP(.95) | CYS | CYS | TRP | THR | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP | TRP | TRP | TRP |
| -6 | | PHE | PHE | LEU | ALA | LEU | LEU | LEU | PHE | PHE | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | VAL | VAL | ILE | VAL |
| -5 | | PRO | PRO | PRO | THR | PRO | ARG | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | SER | PRO | PRO | PRO |
| -4 | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| -3 | | ALA | ALA | ALA | VAL | ALA | ALA | SER | SER | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | SER | SER | SER | SER | SER |
| -2 | | ARG | ARG | ARG | HIS | ARG | LYS | ARG | ARG | ARG | LYS | LYS | LYS | LYS | LYS | ARG | ARG | ARG | ARG | SER | SER | SER | SER | SER |
| -1 | | CYS | CYS | CYS | SER | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | GLY | GLY | GLY | ALA | GLY |

| | 24 NG9 'CL | 25 HIC (R) 'CL # | 26 HAH 14.1 'CL # | 27 HAH 14.2 'CL # | 28 HAH 16.1 'CL # | 29 NOV BE10 'CL # | 30 TH3 'CL # | 31 TH3 'CL # | 32 Humkv 325 'CL | 33 EV1-15 'CL | 34 IARC/ BL41 'CL | 35 Humkv 305 'CL | 36 LS1 'CL | 37 LS2 'CL | 38 LS4 'CL | 39 LS5 'CL | 40 LS6 'CL | 41 LS7 'CL | 42 LS8 'CL | 43 Vg 'CL | 44 Vh 'CL | 45 CLL 'CL # | 46 Hum kv328 'CL # | 47 Hum ka31es 'CL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -28 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -27 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -26 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -25 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -24 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -23 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -22 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -21 | | --- | --- | --- | --- | | | | --- | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| -20 | MET | MET | MET | MET | MET | | | | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | | |
| -19 | GLU | GLU | GLU | GLU | GLU | | | | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | | |
| -18 | THR | THR | THR | THR | THR | | | | THR | THR | THR | THR | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | |
| -17 | PRO | PRO | PRO | PRO | PRO | | | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | |
| -16 | ALA | ALA | ALA | ALA | ALA | | | | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | |
| -15 | GLN | GLN | GLN | GLN | GLN | | | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | |
| -14 | LEU | LEU | LEU | LEU | LEU | | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -13 | LEU | LEU | LEU | LEU | LEU | | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -12 | PHE | PHE | PHE | PHE | PHE | | | | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | | |
| -11 | LEU | LEU | LEU | LEU | LEU | | | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -10 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -9 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -8 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -7 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | |
| -6 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | |
| -5 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | |
| -4 | VAL | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| -3 | PRO | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| -2 | SER | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| -1 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | ARG | GLY | GLY | GLY |

| | 48 GF4 /1.1 'CL | 49 K- EV15 'CL | 50 VKAPPA IV GERMLINE 'CL | 51 PB17IV 'CL | 52 FK-001 'CL # | 53 WALKER 'CL | 54 DAUDI 'CL | 55 VJ1 'CL | 56 HK100 'CL | 57 Va 'CL | 58 V2 'CL | 59 V14 'CL | 60 V52 'CL | 61 V55 'CL | 62 K- EVJK11 'CL | 63 PSEUDO VKAPPA 24'CL | # OF SEQUENCES | # OF AMINO ACIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | | |
| -22 | --- | --- | --- | --- | --- | MET | MET | --- | MET | MET | --- | --- | MET | | --- | --- | 17 | 2 |
| -21 | --- | --- | --- | --- | --- | ASP | ASP | --- | ASP | ASP | --- | --- | ASP | | --- | --- | 17 | 2 |
| -20 | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | | MET | MET | 52 | 2 |
| -19 | GLU | GLY | VAL | VAL | VAL | ARG | ARG | VAL | ARG | ARG | GLN | GLN | ARG | | GLU | ARG | 53 | 6 |
| -18 | ALA | SER | LEU | LEU | LEU | VAL | VAL | LEU | VAL | VAL | VAL | VAL | ALA | | THR | CYS | 53 | 7 |
| -17 | PRO | GLN | GLN | GLN | GLN | PRO | PRO | GLN | PRO | PRO | PRO | PRO | PRO | | PRO | SER | 54 | 5 |
| -16 | ALA | VAL | THR | THR | THR | ALA | ALA | THR | ALA | ALA | THR | THR | ALA | | ALA | PRO | 54 | 5 |
| -15 | HIS | HIS | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | HIS | 54 | 4 |
| -14 | VAL | LEU | VAL | VAL | VAL | LEU | LEU | VAL | LEU | LEU | LEU | LEU | LEU | | LEU | PHE | 54 | 4 |
| -13 | LEU | LEU | PHE | PHE | PHE | LEU | LEU | PHE | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | 54 | 3 |
| -12 | PHE | SER | ILE | ILE | ILE | GLY | GLY | ILE | GLY | GLY | GLY | GLY | GLY | GLY | PHE | GLU | 55 | 6 |
| -11 | LEU | PHE | SER | SER | SER | LEU | LEU | SER | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | 55 | 3 |
| -10 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | 58 | 1 |
| -9 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | VAL | VAL | LEU | PRO | LEU | VAL | 58 | 5 |
| -8 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | SER | LEU | PHE | 58 | 4 |
| -7 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | 59 | 3 |
| -6 | LEU | ILE | ILE | ILE | ILE | LEU | LEU | ILE | LEU | LEU | LEU | LEU | LEU | PHE | LEU | ILE | 59 | 5 |
| -5 | PRO | SER | SER | SER | SER | ARG | ARG | SER | SER | PRO | PRO | PRO | PRO | PRO | PRO | LEU | 59 | 5 |
| -4 | GLU | ASP | GLY | GLY | GLY | GLY | ARG | GLY | GLY | GLY | GLY | GLY | ASP | GLY | ASP | GLU | 63 | 5 |
| -3 | THR | THR | ALA | ALA | ALA | ALA | VAL | ALA | ALA | ALA | ALA | ALA | THR | THR | THR | VAL | 63 | 5 |
| -2 | SER | ARG | TYR | TYR | TYR | ARG | ARG | TYR | ARG | ARG | ARG | ARG | ARG | ARG | THR | SER | 63 | 6 |
| -1 | GLY | ALA | GLY | GLY | GLY | CYS | CYS | GLY | TYR | CYS | CYS | CYS | CYS | SER | GLY | GLY | 63 | 6 |

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**HUMAN KAPPA LIGHT CHAINS SUBGROUP I**

| | INVARIANT RESIDUES | 1 2C12 'CL # | 2 1B11 'CL # | 3 1H1 'CL # | 4 2A12 'CL # | 5 BR | 6 DEN | 7* 3D6 'CL | 8 HK102 'CL # | 9 EU | 10 CAR | 11 PA | 12 HK 137 'CL # | 13 RAU | 14 KUE | 15* HF2-1/17 | 16 VB 'CL | 17 VB' 'CL | 18 GAL (I) | 19 OU (IOC) | 20* NEA | 21 WIL (=) # | 22 WES | 23 DAUDI 'CL | 24 HK 134 'CL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | --- | --- | --- | --- | --- | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | # |
| 1 | | D ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| 2 | ILE(.98) | I ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| 3 | | Q GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| 4 | | M MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET |
| 5 | THR(.98) | T THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 6 | | G GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| 7 | SER(.99) | S SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 8 | PRO(.99) | P PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| 9 | SER(.97) | S SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 10 | | T THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ser | ser | THR | ser | ser | ser | ser | ser | ser | THR | ser | ser | ser |
| FR 1 11 | | L LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | gln | LEU | val | val | LEU | LEU | LEU | LEU | val | LEU | LEU |
| 12 | SER(.97) | S SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | pro | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 13 | | A ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| 14 | | S SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 15 | VAL(.96) | V VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| 16 | GLY(.99) | G GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| 17 | | D ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP |
| 18 | | S SER | SER | SER | SER | thr | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg |
| 19 | | I ILE | ILE | ILE | ILE | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val |
| 20 | THR(.96) | T THR | THR | THR | THR | THR | THR | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 21 | ILE(.95) | I ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| 22 | | T THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ile | THR | THR | THR | THR | THR | THR | THR |
| 23 | CYS | C CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| 24 | | R ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG |
| 25 | | A ALA | ALA | ALA | ALA | ALA | thr | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | pro | ALA | ALA |
| 26 | | S SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | gly | SER |
| 27 | | Q GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | his | GLN |
| 27A | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27B | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27C | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CDR 1 27D | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27E | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27F | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | | S SER | SER | SER | SER | SER | SER | SER | SER | SER | asn | SER | gly | SER | SER | gly | gly | gly | gly | thr | gly | ala | asp | asn | gly |
| 29 | | I ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | phe | ILE | ILE | ILE |
| 30 | | G GLY | GLY | GLY | GLY | ser | ser | ser | ser | asn | ser | ser | ser | ser | asn | arg | ser | ser | arg | ser | arg | GLY | ser | thr | ser |
| 31 | | N ASN | ASN | ASN | ASN | gly | arg | arg | ser | thr | ser | ser | ASN | ser | ile | ASN | ser | ser | ASN | ser | ASN | ser | his | ASN | ser |
| 32 | | W TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | ser | tyr | tyr | TRP | asp | TRP | asp | tyr | asp | TRP | TRP | phe | TRP |
| 33 | LEU(.95) | L LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 34 | | A ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ser | ALA | gly | ALA | ALA | thr | asx | thr | ALA | ALA | ser | ALA |
| 35 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP |
| 36 | | PHE | PHE | PHE | PHE | PHE | tyr | tyr | tyr | tyr | tyr | tyr | PHE | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr |
| 37 | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| 38 | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| 39 | | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS |
| 40 | PRO(.97) | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | ser | PRO | PRO |
| 41 | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | glu | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | glu |
| FR 2 42 | | LYS | LYS | LYS | LYS | LYS | glu | LYS | LYS | LYS | LYS | LYS | glu | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | thr | LYS | LYS | LYS | LYS |
| 43 | | ALA | ALA | ALA | ALA | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| 44 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| 45 | | ASN | ASN | ASN | ASN | ASN | lys | lys | lys | lys | lys | lys | gln | lys | lys | lys | lys | lys | lys | ASX | lys | glu | lys | thr | lys |
| 46 | | VAL | VAL | VAL | VAL | leu | VAL | leu | leu | leu | VAL | leu | ser | VAL | leu | arg | leu | leu | glu | leu | arg | leu | leu | leu | ser |
| 47 | LEU(.98) | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 48 | ILE(.98) | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | met | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| 49 | | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR |
| 50 | | LYS | LYS | LYS | LYS | LYS | gly | LYS | asp | LYS | LYS | glu | ala | ala | LYS | ala | ala | ala | ala | ala | gly | arg | ser | ala | ala |
| 51 | | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | asx | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | val | ALA | ALA | ALA |
| CDR 2 52 | | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | thr | SER | SER | SER | SER |
| 53 | | ASN | ASN | ASN | ASN | thr | ASN | ser | ser | ser | ser | ser | ser | ser | thr | ser | ser | ser | ASN | ASX | ser | ser | ser | ASN | ser |
| 54 | LEU(.97) | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 55 | | LYS | LYS | LYS | LYS | glu | glu | glu | glu | glu | glu | glu | gln | pro | glu | gln | gln | gln | his | gln | gln | glu | gln | gln |
| 56 | | ASN | ASN | ASN | lys | ser | ser | ser | ser | ser | ser | ser | ser | ser | thr | ser | ser | ser | ser | ser | ser | ser | ASN | val | ser |
| 57 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| 58 | | ILE | ILE | ILE | ILE | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val |
| 59 | PRO(.95) | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| 60 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 61 | ARG(.97) | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG |
| 62 | PHE(.96) | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| 63 | | SER | SER | SER | SER | SER | SER | SER | SER | SER | ile | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 64 | GLY(.96) | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| 65 | | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| 66 | GLY(.95) | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| 67 | | SER | SER | SER | SER | gha | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | ala | SER | SER | SER | SER | SER | SER |
| 68 | GLY(.95) | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| 69 | | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ala | THR | THR |
| 70 | | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | GLU | asp | GLU | asp | asp | gln | GLU | asp | asp | GLU | asx | GLU | GLU | GLU | GLU | asp |
| 71 | | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| FR 3 72 | | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 73 | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | phe | LEU | LEU | LEU | LEU | LEU |
| 74 | | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 75 | | VAL | VAL | VAL | VAL | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile |
| 76 | | ILE | ILE | ILE | ILE | asn | ser | ser | ser | ser | ser | ser | ser | ser | asn | ser | ser | ser | ser | ser | asn | ser | ser | ser | ser |
| 77 | | ASP | ASP | ASP | ASN | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | gly | ser | ser | ser | ser | ser | ser |
| 78 | LEU(.98) | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 79 | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| 80 | | SER | SER | SER | SER | pro | SER | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro |
| 81 | | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | glu | glu | ASP | glu | glu | glu | glu | glx | glu | ASP | glu | glu | glu |
| 82 | | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| 83 | | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | val | PHE | PHE | PHE |
| 84 | ALA(.98) | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| 85 | | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 86 | TYR(.98) | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR |
| 87 | TYR(.95) | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | gha | TYR | TYR |
| 88 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| 89 | | HIS | HIS | HIS | HIS | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | leu | gln | gln | leu | glx | leu | gln | gln | gln | gln |
| 90 | | HIS | HIS | HIS | HIS | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | glx | gln | gln | gln | gln | gln |
| 91 | | ASN | ASN | ASN | ASN | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | ASN | tyr | his | ala | ala | gln | ser | tyr | ala | ala | ASN | tyr |
| 92 | | ASP | ASP | ASP | GLY | ASP | ASP | asn | asn | asn | asn | asn | tyr | ser | asn | asn | asn | asn | asn | tyr | ser | asn | his | tyr | asn |
| 93 | | SER | SER | thr | SER | SER | SER | SER | SER | SER | thr | asn | SER | ile | arg | SER | SER | SER | SER | SER | SER | arg | SER | asn | SER |
| 94 | | PHE | PHE | PHE | ile | PHE | PHE | tyr | tyr | asp | PHE | leu | tyr | thr | tyr | tyr | PHE | PHE | tyr | ser | PHE | tyr | val | PHE | tyr |
| CDR 3 95 | | SER | SER | SER | SER | pro | pro | SER | SER | --- | --- | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | --- | pro | SER | pro |
| 95A | | --- | --- | --- | --- | --- | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | # |
| 95B | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 95C | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 95D | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 95E | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 95F | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 96 | | TRP | TRP | TRP | TRP | TRP | TRP | TYR | --- | --- | LYS | PHE | TRP | --- | THR | TYR | LEU | --- | --- | ARG | THR | TRP | --- | LEU | PHE |
| 97 | | THR | THR | THR | THR | THR | THR | THR | --- | --- | MET | THR | THR | --- | SER | THR | THR | --- | --- | SER | THR | THR | --- | THR | THR |
| 98 | PHE(.96) | PHE | PHE | PHE | PHE | PHE | PHE | PHE | --- | --- | PHE | PHE | PHE | --- | PHE | PHE | PHE | --- | --- | PHE | PHE | PHE | PHE | PHE | --- |
| 99 | GLX | GLY | GLY | GLY | GLY | GLY | GLY | GLY | --- | --- | GLY | GLY | GLY | --- | GLY | GLY | GLY | --- | --- | GLY | GLX | GLY | GLY | GLY | --- |
| 100 | | GLN | GLN | GLN | GLN | GLN | GLN | PRO | --- | --- | GLN | PRO | PRO | --- | GLN | GLN | GLY | --- | --- | GLN | GLX | GLN | GLN | GLY | --- |
| 101 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | --- | --- | GLY | GLY | GLY | --- | GLY | GLY | GLY | --- | --- | GLY | GLY | GLY | GLY | GLY | --- |
| 102 | THR(.98) | THR | THR | THR | THR | THR | THR | THR | --- | --- | THR | THR | THR | --- | THR | THR | THR | --- | --- | THR | THR | THR | THR | THR | --- |
| FR 4 103 | | LYS | LYS | LYS | LYS | LYS | LYS | LYS | --- | --- | LYS | LYS | LYS | --- | ARG | LYS | LYS | --- | --- | LYS | ARG | LYS | LYS | THR | LYS | --- |
| 104 | | VAL | VAL | VAL | VAL | VAL | LEU | VAL | --- | --- | VAL | VAL | VAL | --- | VAL | LEU | VAL | --- | --- | VAL | LEU | VAL | LEU | VAL | VAL | --- |
| 105 | | LEU | LEU | LEU | LEU | GLU | GLU | ASP | --- | --- | GLU | ASP | GLU | --- | GLU | ASP | GLU | --- | --- | GLU | GLX | GLU | GLU | ASP | ASP | --- |
| 106 | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | --- | --- | VAL | ILE | ILE | --- | ILE | ILE | ILE | --- | --- | ILE | ILE | VAL | ILE | ILE | ASN | --- |
| 106A | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 107 | | LYS | LYS | LYS | LYS | LYS | LYS | LYS | --- | --- | LYS | LYS | LYS | --- | LYS | LYS | LYS | --- | --- | LYS | LYS | LYS | LYS | LYS | LYS | --- |
| 108 | | ARG | ARG | ARG | ARG | | ARG | | --- | --- | GLY | ARG | | --- | ARG | ARG | ARG | --- | --- | ARG | ARG | ARG | ARG | ARG | --- | --- |
| 109 | THR | | | | | | THR | | --- | --- | THR | THR | | --- | THR | TER | | --- | --- | TER | THR | THR | THR | | --- | --- |

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HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)

| | | 25 Vd 'CL | 26 WALKER 'CL | 27 HK101 'CL # | 28 Vd' 'CL | 29 VKI- Chel 'CL | 30 AMYLOID BAN # | 31 Vd 'CL | 32 V13 'CL | 33 DEE | 34 WIL (-) # | 35 AND # | 36 V108 'CL # | 37 VKI-ZI 'CL | 38 REI | 39 AU | 40 ROY | 41 BI | 42* HuVH CAMP 'CL | 43 AG # | 44 SCH | 45 MEV | 46 KA | 47* LAY | 48 BEL | 49 NI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ala | ASP | ASP | ala | val | ASX | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | val | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | arg | trp | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 4 | leu | MET | MET | leu | MET | leu | MET | MET | MET | MET | MET | val | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | leu | MET |
| | 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| F | 10 | phe | ser | ser | ser | ser | ser | ser | leu | ser | THR | ser | ser | ser | ser | ser | ser | pro | ser | ser | ser | THR | ser | ser | ser |
| FR | 11 | LEU | LEU | LEU | LEU | LEU | LEU | ser | phe | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 1 | 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | val | val | ALA | ALA | thr |
| | 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | thr | thr | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | gly | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 18 | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | SER | arg | arg | arg | arg | arg | arg | arg | arg |
| | 19 | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val |
| | 20 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ile | THR | THR | THR | THR |
| | 21 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | phe | ILE | ILE | THR | ILE | ILE | ILE | ILE | THR | THR | THR | THR | THR | THR | ILE | leu |
| | 22 | THR | THR | THR | THR | THR | THR | THR | ser | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ILE | ILE | leu |
| | 23 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| | 24 | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | gln | gln | gln | gln | lys | gln | gln | ARG | glu | gln | glx | glu |
| | 25 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | met | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 26 | SER | SER | arg | SER | SER | SER | SER | SER | gly | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 27 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | his | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN |
| | 27A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ser |
| | 27B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | val |
| C | 27C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | leu |
| CDR | 27D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | glu |
| | 27E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 28 | gly | SER | gly | gly | gly | SER | gly | gly | SER | SER | SER | gly | gly | asp | asp | asp | asp | asn | asp | asp | SER | thr | asn | asx | SER |
| | 29 | ILE | ILE | ILE | ILE | ILE | val | ILE | ILE | val | val | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ser | val | val | ILE | gly |
| | 30 | ser | ser | ser | ser | ser | tyr | ser | ser | asn | ser | GLY | ser | ser | ile | ser | ser | arg | asp | asn | arg | val | leu | asn | ser | asn |
| | 31 | ser | ASN | ser | ser | ASN | ASN | ser | ser | lys | tyr | gly | ASN | ASN | lys | asp | ile | ASN | lys | his | lys | asp | ser | ala | lys | thr |
| | 32 | tyr | tyr | TRP | ala | asn | tyr | tyr | tyr | tyr | TRP | ser | gly | asn | tyr | tyr | phe | ser | tyr | tyr | his | tyr | tyr | tyr | | phe |
| | 33 | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU |
| | 34 | ALA | asn | ALA | ALA | asn | ALA | ALA | ALA | asn | ALA | asn | ser | asn | asn | asn | asn | ile | asn | asn | asn | asn | asn | asn | | ALA |
| | 35 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP |
| | 36 | tyr | tyr | tyr | tyr | tyr | PHE | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | LYS | tyr | tyr | tyr | tyr | tyr | tyr | | tyr |
| | 37 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | his | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | asp | GLN | GLN | GLN | | GLN |
| | 38 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN |
| | 39 | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | thr | LYS | LYS | LYS | LYS | $ | LYS | LYS | LYS | LYS | | LYS |
| | 40 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO |
| FR | 41 | GLY | GLY | glu | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | $ | GLY | GLY | GLY | GLY | lys | lys |
| 2 | 42 | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | gln | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | leu | LYS | LYS | LYS |
| | 43 | ALA | ALA | ALA | ALA | thr | ALA | ALA | ALA | ALA | ALA | ALA | ALA | thr | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | pro | ALA | ALA |
| | 44 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 45 | lys | lys | lys | lys | lys | lys | lys | glu | lys | ASN | ser | thr | lys | lys | lys | lys | lys | lys | arg | lys | lys | glu | lys | lys | lys |
| | 46 | leu | leu | ser | leu | leu | ser | leu | leu | VAL | leu | ser | ile | leu | leu | leu | phe | leu | leu | ile | leu | leu | leu | leu | leu | leu |
| | 47 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| | 48 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 49 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | | TYR | phe | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | phe | TYR | TYR | TYR | TYR |
| | 50 | ala | ala | ala | asp | ala | asp | ala | ala | ala | gln | gly | ala | ala | glu | asp | asp | asp | asn | asp | gly | asp | ala | gly | asp | asp |
| | 51 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ser | ALA | ALA | ALA | ALA | ALA | ALA |
| CDR | 52 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | glu | asn | SER | SER | SER | SER | SER | SER | SER |
| 2 | 53 | thr | ser | ser | ser | ser | thr | thr | thr | ser | ile | ser | ser | ser | asn | ser | lys | ASN | ASN | ASN | thr | ASN | ser | thr | thr | ASN |
| | 54 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | arg | LEU | LEU | |
| | 55 | gln | gln | gln | glu | gln | gln | gln | gln | LYS | asp | arg | gln | gln | gln | glu | glu | glu | gln | glu | glu | gln | glu | LYS | glu | |
| | 56 | ser | ser | ser | ser | ser | ser | ser | ser | ser | ala | ser | ser | ser | ala | ser | ala | ile | thr | thr | thr | ser | thr | ala | thr | thr |
| | 57 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 58 | val | val | val | val | ILE | val | val | val | val | val | val | val | ILE | val | val | val | val | val | val | val | val | val | val | val | val |
| | 59 | PRO | thr | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 60 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 61 | ARG | ARG | ARG | ARG | ARG | asn | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG | ARG |
| | 62 | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| | 63 | SER | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 64 | GLY | GLY | GLY | GLY | asp | GLY | GLY | GLY | GLY | GLY | GLY | GLY | asp | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 65 | SER | SER | SER | SER | SER | SER | SER | SER | SER | asn | SER | SER | SER | SER | gly | thr | SER | SER | GLY | SER | gly | gln | SER | SER | SER |
| | 66 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | ile | GLY | GLY | GLY | SER | GLY | GLY | SER | GLY | GLY | arg | GLY | GLY | GLY | GLY | GLY |
| | 67 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | phe | SER | SER | SER | SER | SER |
| | 68 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 69 | THR | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | THR | ala | THR | ala | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 70 | GLU | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | asp | his | asp | asp | asp | asp | asp | asx | asp | his | asp | asp |
| | 71 | PHE | PHE | PHE | PHE | tyr | PHE | PHE | PHE | PHE | PHE | PHE | PHE | tyr | tyr | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| FR | 72 | THR | THR | THR | THR | ile | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| 3 | 73 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | phe | phe | phe | LEU | LEU | LEU | LEU | LEU | LEU | phe | phe | LEU |
| | 74 | TER | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | ser | ile | THR | THR | THR | THR | THR | THR | THR |
| | 75 | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile | ile |
| | 76 | ser | ser | ser | ser | arg | ser | ser | ser | ser | ser | thr | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser | ser |
| | 77 | ser | ser | ser | ser | ser | ser | cys | cys | gly | ser | ser | ser | ser | ser | ser | gly | thr | ser | ser | ser | ser | ser | ser | ser | gly |
| | 78 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU | LEU | LEU |
| | 79 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | leu | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLY | GLN | GLN | GLX | |
| | 80 | pro | pro | pro | pro | pro | pro | SER | SER | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | |
| | 81 | glu | glu | glu | glu | glu | glu | glu | glu | glu | ASP | glu | glu | pro | gln | glu | glu | glu | glu | glu | ASP | glx | glu | ala | glx | |
| | 82 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | asn | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASX | |
| | 83 | PHE | ser | PHE | PHE | PHE | PHE | PHE | PHE | ser | PHE | val | PHE | ile | ile | ile | PHE | ile | ile | ile | PHE | PHE | ile | PHE | PHE | |
| | 84 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | gly | ALA | ALA | ALA | ALA | ALA |
| | 85 | THR | THR | THR | THR | THR | THR | THR | THR | THR | arg | ala | THR | ala | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | val | |
| | 86 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | |
| | 87 | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | phe | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | TYR | |
| | 88 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | |
| | 89 | gln | gln | gln | gln | gln | gln | gln | gln | glx | gln | gln | leu | gln | gln | gln | gln | gln | leu | gln | gln | gln | glx | gln | gln | gln |
| | 90 | gln | gln | gln | gln | gln | gln | gln | gln | glx | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | gln | glx | gln | gln | glx | |
| | 91 | leu | ser | tyr | phe | ser | tyr | tyr | tyr | ser | tyr | ser | dup | ser | tyr | tyr | tyr | tyr | his | tyr | tyr | ser | tyr | tyr | tyr | |
| | 92 | asn | tyr | asn | asn | ASP | asn | tyr | tyr | tyr | asn | tyr | tyr | ASP | asp | asp | tyr | tyr | gln | asp | asp | tyr | leu | asn | ASX | |
| | 93 | SER | SER | SER | SER | SER | SER | SER | SER | thr | arg | SER | thr | SER | SER | tyr | asn | asn | SER | thr | asn | thr | asp | asn | his | thr |
| | 94 | tyr | thr | tyr | tyr | thr | tyr | tyr | PHE | thr | tyr | ser | thr | thr | leu | leu | leu | leu | arg | leu | val | asn | leu | trp | PHE | leu |
| CDR | 95 | pro | leu | pro | pro | pro | pro | pro | pro | pro | --- | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro | pro |
| | 95A | --- | --- | # | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | GLU | --- | --- | --- | --- | --- |
| 3 | 95B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 95F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 96 | --- | ILE | --- | --- | | TYR | --- | --- | TYR | --- | TRP | | | TYR | TRP | LEU | TYR | ARG | ARG | ILE | VAL | ARG | PRO | LEU | SER |
| | 97 | --- | THR | --- | --- | | THR | --- | --- | THR | --- | THR | | | THR | THR | THR | THR | TRP | THR | THR | THR | THR | THR | THR | THR |
| | 98 | --- | PHE | --- | --- | | PHE | --- | --- | PHE | PHE | PHE | | | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE | PHE |
| | 99 | --- | GLY | --- | --- | | GLY | --- | --- | GLY | GLY | GLY | | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 100 | --- | GLN | --- | --- | | GLN | --- | --- | PRO | GLN | GLN | | | GLN | GLN | GLY | GLN | GLN | GLN | GLN | GLY | GLN | GLY | VAL | |
| | 101 | --- | GLY | --- | --- | | GLY | --- | --- | GLY | GLY | GLY | | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | |
| F | 102 | --- | THR | --- | --- | | THR | --- | --- | THR | THR | THR | | | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | SER |
| FR | 103 | --- | ARG | --- | --- | | LYS | --- | --- | LYS | LYS | LYS | | | LYS | LYS | LYS | LYS | LYS | LYS | ARG | THR | LYS | LYS | GLU | LYS |
| 4 | 104 | --- | LEU | --- | --- | | # | --- | --- | VAL | LEU | VAL | | | LEU | VAL | LEU | LEU | VAL | LEU | VAL | VAL | VAL | VAL | VAL | |
| | 105 | --- | GLU | --- | --- | | # | --- | --- | GLU | GLU | GLU | | | GLN | GLU | ASP | GLU | GLU | GLU | ASP | ASP | GLU | GLU | GLU | |
| | 106 | --- | ILE | --- | --- | | ILE | --- | --- | MET | ILE | ILE | | | ILE | ILE | PHE | ILE | ILE | ILE | ASN | ILE | LEU | VAL | VAL | |
| | 106A | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 107 | --- | LYS | --- | --- | | LYS | --- | --- | THR | LYS | ARG | | | THR | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS | LYS |
| | 108 | --- | --- | --- | --- | | ARG | --- | --- | ARG | ARG | | | | ARG | ARG | ARG | ARG | ARG | GLY | ARG | ARG | ARG | | | ARG |
| | 109 | --- | --- | --- | --- | | | --- | --- | THR | THR | | | | TRP | THR | THR | THR | | THR | THR | | THR | | | THR |

**HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)**

| | | 50 RZ | 51* Hu RSV19 VK # | 52 HBJ 4 | 53 BJ 26 # | 54 BJ 19 # | 55 RFZ | 56 HA | 57 PAU | 58 PSM | 59 JBL # | 60 NE | 61 FRA | 62 BJ 48 | 63 HF3- 16/6 | 64 HF2- 1/13B | 65 HF2J 18/2 | 66 GR' | 67 G1 'CL # | 68 HOM | 69 KER | 70 ESM IGG | 71 ESM IGM | 72* DAV | 73* FIN | 74 PW # | 75 SHE | 76 ADA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | his | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | GLN | his | GLN | GLN |
| | 4 | MET | leu | MET | MET | leu | MET | MET | MET | MET | MET | leu | MET | MET | MET | MET | MET | MET | | MET | MET | MET | MET | MET | leu | leu | val |
| | 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | SER | thr | SER | SER |
| F | 10 | ser | ser | THR | ser | ser | ser | ser | THR | ser | ser | ser | THR | ser | ser | ser | ser | THR | | ser | ser | ser | ser | ser | ser | ser | ser |
| R | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU |
| 1 | 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | SER | SER | SER | SER |
| | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA | thr | thr | ALA | val |
| | 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | tyr | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | val | val | SER | pha |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP |
| | 18 | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | arg | | arg | arg | arg | arg | arg | arg | arg | arg |
| | 19 | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | val | | val | ILE | val | val | val | val | val | val |
| | 20 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | THR | THR | THR | THR | THR | THR | THR | THR |
| | 21 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | val | phe | ILE |
| | 22 | THR | THR | THR | THR | THR | THR | THR | THR | THR | ala | THR | THR | THR | THR | THR | THR | THR | | THR | THR | THR | THR | THR | arg | THR | THR |
| | 23 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS |
| | 24 | gln | ARG | ARG | gln | gln | gln | gln | ARG | gln | ARG | glx | ARG | | ARG | ARG | ARG | ARG | | gln | gln | ARG | ARG | asp | asp | ARG | glx | glx |
| | 25 | ALA | ser | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA | | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| | 26 | asn | SER | SER | SER | SER | asn | SER | SER | SER | SER | SER | SER | | SER | SER | SER | SER | | asp | SER | SER | SER | SER | SER | SER | SER | SER |
| | 27 | GLN | GLN | GLN | GLN | GLN | GLN | --- | GLN | GLN | GLN | GLX | GLX | | GLN | GLN | GLN | arg | | his | GLN | GLX | GLX | GLN | GLN | GLX | GLX | GLX |
| | 27A | --- | thr | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 27B | --- | leu | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 27C | --- | val | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C | 27D | --- | his | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| D | 27E | --- | thr | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| R | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- | --- | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 28 | val | asp | SER | SER | asp | val | --- | SER | asp | SER | asx | asx | | gly | gly | gly | SER | | asp | asp | SER | SER | asx | asx | SER | asx | asx |
| | 29 | ILE | gly | val | ILE | ILE | ILE | --- | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 30 | ser | asn | asn | asn | asn | ser | arg | ser | arg | ser | ser | asx | | arg | arg | arg | ser | | ser | lys | ser | ser | asx | asx | GLY | ser | |
| | 31 | lys | thr | ASN | lys | thr | lys | ASN | ser | ser | thr | ASX | ASX | | ASN | ASN | ASN | ser | | ASN | | ser | ser | ser | ser | | ASX | ASX |
| | 32 | ser | tyr | TRP | tyr | pha | ser | tyr | ser | tyr | pha | tyr | tyr | | asp | asp | asp | TRP | | tyr | | tyr | tyr | TRP | TRP | tyr | tyr | tyr |
| | 33 | LEU | LEU | LEU | ala | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | | LEU | | LEU | LEU | LEU | LEU | ser | LEU | LEU |
| | 34 | asn | glu | ALA | asn | asn | asn | asn | ALA | asn | # | asx | ALA | | gly | gly | gly | ALA | | asn | | asx | asx | ile | ile | asx | asx | asx |
| | 35 | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | TRP | | TRP | TRP | TRP | TRP | | TRP | | TRP | TRP | TRP | TRP | TRP | TRP | TRP |
| | 36 | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | tyr | | tyr | tyr | tyr | tyr | | PHE | | tyr | tyr | tyr | tyr | tyr | tyr | tyr |
| | 37 | GLN | GLN | GLN | glu | GLN | GLN | GLN | GLX | GLN | GLN | GLX | GLX | | GLN | GLN | GLN | GLN | | GLN | | GLX | GLX | GLN | GLN | GLN | his | GLX |
| | 38 | GLN | GLN | glu | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLX | GLX | | GLN | GLN | GLN | gly | | GLN | | | | GLN | GLN | GLN | GLX | tyr |
| | 39 | arg | LYS | LYS | # | # | arg | LYS | LYS | LYS | LYS | LYS | LYS | | LYS | LYS | LYS | arg | | LYS | | | | tyr | tyr | LYS | LYS | LYS |
| | 40 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | gln | PRO | PRO | PRO | | PRO | PRO | PRO | PRO | | PRO | | | | PRO | PRO | | PRO | PRO |
| | 41 | GLY | GLY | GLY | # | # | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | | | GLY | | | | | | | | |
| F | 42 | gln | LYS | glx | LYS | LYS | gln | arg | glx | LYS | LYS | glx | | | | | | | | | | | | | | | | |
| R | 43 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | | ALA | | | | | | | | | | | | | | |
| 2 | 44 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | | | | | | | | | | | | | | |
| | 45 | lys | lys | lys | lys | lys | lys | lys | lys | lys | lys | lys | | lys | | | | | | | | | | | | | | |
| | 46 | leu | leu | leu | leu | leu | leu | leu | leu | leu | leu | VAL | | | | | | | | | | | | | | | | |
| | 47 | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU | LEU | met | | | | | | | | | | | | | | | | |
| | 48 | ILE | ILE | ILE | | ILE | ILE | ILE | ILE | ILE | | ILE | | | | | | | | | | | | | | | | |
| | 49 | TYR | TYR | ser | | TYR | TYR | TYR | TYR | TYR | TYR | TYR | | gly | | | | | | | | | | | | | | |
| | 50 | asp | arg | LYS | | asp | asp | asp | glx | asp | | | | asp | | | | | | | | | | | | | | |
| | 51 | ALA | val | thr | asp | ALA | ALA | ALA | | ALA | | | | ALA | | | | | | | | | | | | | | |
| C | 52 | SER | SER | SER | SER | SER | ala | phe | | SER | | | | SER | | | | | | | | | | | | | | |
| D | 53 | ASN | ser | arg | ser | ASX | ASN | | | | | | | ser | | | | | | | | | | | | | | |
| R | 54 | LEU | arg | LEU | LEU | LEU | LEU | LEU | | LEU | | | | LEU | | | | | | | | | | | | | | |
| 2 | 55 | glu | pha | glu | glu | glu | glu | glu | | glu | | | | asx | | | | | | | | | | | | | | |
| | 56 | ser | ser | arg | thr | thr | | ala | | | | | | ser | | | | | | | | | | | | | | |
| | 57 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | GLY | | | | | | | | | | | | | | |
| | 58 | val | val | val | asx | val | val | val | | | | | | val | | | | | ILE | | | | | | | | |
| | 59 | PRO | PRO | PRO | PRO | glx | PRO | PRO | | | | | | val | | | | | PRO | | | | | | | | |
| | 60 | SER | SER | SER | SER | SER | | SER | | | | | | SER | | | | | SER | | | | | | | | |
| | 61 | ARG | ARG | ARG | lys | ARG | ARG | ARG | | | | | | ARG | | | | | ARG | | | | | | | | |
| | 62 | PHE | PHE | PHE | val | PHE | PHE | | | | | | | gln | | | | | PHE | | | | | | | | |
| | 63 | thr | SER | ala | SER | leu | thr | | | | | | | SER | | | | | SER | | | | | | | | |
| | 64 | GLY | GLY | GLY | GLY | GLY | GLY | | | | | | | GLY | | | | | GLY | | | | | | | | |
| | 65 | SER | SER | SER | SER | SER | | | | | | | | SER | | | | | SER | | | | | | | | |
| | 66 | GLY | GLY | GLY | GLY | asx | GLY | | | | | | | GLY | | | | | GLY | | | | | | | | |
| | 67 | SER | SER | | SER | phe | | | | | | | | SER | | | | | SER | | | | | | | | |
| | 68 | GLY | GLY | | glu | asx | | | | | | | | GLY | | | | | GLY | | | | | | | | |
| | 69 | THR | THR | | THR | THR | | | | | | | | THR | | | | | THR | | | | | | | | |
| | 70 | asp | asp | | asp | lys | | | | | | | | asp | | | | | GLU | | | | | | | | |
| | 71 | PHE | PHE | | val | | | | | | | | | pro | | | | | PHE | | | | | | | | |
| F | 72 | pha | THR | | THR | | | | | | | | | ser | | | | | THR | | | | | | | | |
| R | 73 | LEU | pha | | val | | | | | | | | | LEU | | | | | LEU | | | | | | | | |
| 3 | 74 | THR | THR | | asx | | | | | | | | | ala | | | | | THR | | | | | | | | |
| | 75 | ile | ile | | glx | | | | | | | | | VAL | | | | | VAL | | | | | | | | |
| | 76 | ser | ser | | ser | | | | | | | | | ser | | | | | ILE | | | | | | | | |
| | 77 | ser | ser | | ser | | | | | | | | | arg | | | | | ASN | | | | | | | | |
| | 78 | LEU | LEU | | LEU | | | | | | | | | | | | | | LEU | | | | | | | | |
| | 79 | arg | GLN | | GLN | | | | | | | | | | | | | | GLN | | | | | | | | |
| | 80 | pro | pro | | pro | | | | | | | | | | | | | | SER | | | | | | | | |
| | 81 | glu | glu | | glu | | | | | | | | | | | | | | ASP | | | | | | | | |
| | 82 | ASP | ASP | | ASP | | | | | | | | | | | | | | ASP | | | | | | | | |
| | 83 | val | ile | | ile | | | | | | | | | | | | | | PHE | | | | | | | | |
| | 84 | ALA | ALA | | ALA | | | | | | | | | | | | | | ALA | | | | | | | | |
| | 85 | THR | THR | | pro | | | | | | | | | | | | | | THR | | | | | | | | |
| | 86 | TTR | TTR | | lys | | | | | | | | | | | | | | TTR | TYR | | | | | | | |
| | 87 | phe | TYR | | | | | | | | | | | | | | | | TYR | TYR | | | | | | | |
| | 88 | CYS | CYS | | | | | | | | | | | | | | | | CYS | CYS | | | | | | | |
| | 89 | gln | phe | | gln | | | | | | | | | | | | | | HIS | gln | | | | | | | |
| | 90 | gln | gln | | gln | | | | | | | | | | | | | | HIS | gln | | | | | | | |
| | 91 | tyr | gly | | arg | phe | | | | | | | | gly | | | | | ASN | tyr | | | | | | | |
| | 92 | his | ser | | ASP | ASP | | | | | | | | glu | | | | | ASP | ASP | | | | | | | |
| | 93 | asn | his | | asp | asp | | | | | | | | SER | | | | | thr | asp | | | | | | | |
| C | 94 | leu | leu | | leu | leu | | | | | | | | asp | | | | | PHE | leu | | | | | | | |
| D | 95 | pro | pro | | pro | pro | | | | | | | | SER | | | | | SER | pro | | | | | | | |
| R | 95A | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| 3 | 95B | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 95C | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 95D | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 95E | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 95F | --- | --- | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 96 | LEU | ARG | | TYR | TYR | | | | | | | | ARG | | | | | TRP | PRO | | | | | | | |
| | 97 | THR | THR | | THR | THR | | | | | | | | THR | | | | | THR | THR | | | | | | | |
| | 98 | PHE | PHE | | LEU | PHE | | | | | | | | PHE | | | | | PHE | PHE | | | | | | | |
| | 99 | GLY | GLY | | GLY | GLY | | | | | | | | GLY | | | | | GLY | GLY | | | | | | | |
| | 100 | GLY | GLY | | GLY | PRO | | | | | | | | GLN | | | | | GLN | PRO | | | | | | | |
| | 101 | GLY | GLY | | GLY | GLY | | | | | | | | GLY | | | | | GLY | GLY | | | | | | | |
| | 102 | THR | THR | | THR | THR | | | | | | | | THR | | | | | TBR | TBR | | | | | | | |
| F | 103 | LYS | LYS | | LYS | LYS | | | | | | | | LYS | | | | | LYS | LYS | | | | | | | |
| R | 104 | VAL | VAL | | VAL | VAL | | | | | | | | VAL | | | | | VAL | VAL | | | | | | | |
| 4 | 105 | GLU | GLU | | GLU | GLU | | | | | | | | GLU | | | | | LEU | ASP | | | | | | | |
| | 106 | ILE | ILE | | MET | LEU | | | | | | | | VAL | | | | | ILE | LEU | | | | | | | |
| | 106A | --- | | | --- | --- | | | | | | | | --- | | | | | --- | --- | | | | | | | |
| | 107 | LYS | | | LYS | LYS | | | | | | | | LYS | | | | | LYS | LYS | | | | | | | |
| | 108 | | | | | | | | | | | | | | | | | | ARG | | | | | | | | |
| | 109 | | | | | | | | | | | | | | | | | | | | | | | | | | |

**HUMAN KAPPA LIGHT CHAINS SUBGROUP I** (cont'd)

| | | 77 AMYLOID VIII-B | 78 PAUL | 79 RI # | 80 MAT | 81* LOW | 82 AMYLOID ES305 # | 83 OCO | 84 BOL | 85 AMYLOID X | 86 SAC | 87 BJ | 88 GO | 89 F-GUI # | 90 S-GUI # | 91 HF6-21/28 | 92 DIE | 93 CAR A | 94 TEI | 95 MON | 96 ALE | 97 JOH | 98 POT | 99 CON | 100 TRA | 101* H-G2b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | pca | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASP | ASP | ASP | ASP | ASP |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | val | ILE | ILE | val | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE |
| | 3 | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | | GLN | GLN | GLN | val | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| | 4 | MET | MET | MET | MET | MET | leu | MET | ile | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET |
| | 5 | THR | THR | THR | THR | THR | THR | THR | met | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| | 6 | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLX | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLX | GLN | GLN | GLN | GLN | GLN |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | ala | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | ala | PRO | | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | SER | leu | SER | SER | SER | SER | SER | ala | SER | SER | SER |
| FR1 | 10 | ser | THR | THR | ser | ser | ser | ser | ser | ser | ser | | phe | ser | ser | ser | ser | ser | THR | | ser | ser | ser | ser | ser |
| FR1 | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | LEU | | val | LEU | LEU | LEU | LEU | LEU | LEU | | LEU | LEU | LEU | LEU | LEU |
| FR1 | 12 | SER | SER | SER | SER | SER | SER | val | SER | SER | SER | | SER | SER | SER | pro | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| FR1 | 13 | ALA | ALA | ALA | ALA | ALA | ALA | ser | ALA | ALA | ALA | | ALA | ALA | ALA | val | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA |
| FR1 | 14 | SER | SER | SER | SER | SER | SER | pro | SER | SER | SER | | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | SER |
| FR1 | 15 | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | | VAL | VAL | VAL | leu | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL | VAL |
| FR1 | 16 | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY | GLY |
| FR1 | 17 | ASP | ASP | ASP | ASP | ASP | ASP | ASX | ASX | ASP | ASP | | ASX | ASX | ASX | gly | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP |
| FR1 | 18 | arg | arg | gly | arg | arg | | leu | arg | arg | --- | arg | arg | arg | arg | pro | arg | arg | arg | arg | arg | arg | arg | arg | arg |
| FR1 | 19 | val | val | val | val | val | val | val | val | val | --- | val | val | val | val | ala | val | val | val | val | val | val | val | val | val |
| FR1 | 20 | THR | THR | THR | THR | THR | THR | THR | THR | ile | --- | THR | THR | THR | THR | ser | THR | THR | THR | THR | THR | THR | THR | THR | THR |
| FR1 | 21 | ILE | ILE | ILE | ILE | ILE | # | ILE | ILE | ILE | --- | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | leu | ILE | ILE | ILE | ILE | ILE |
| FR1 | 22 | THR | THR | ser | THR | THR | THR | THR | THR | | --- | THR | THR | THR | THR | ser | THR | THR | THR | THR | ser | THR | THR | THR | THR |
| FR1 | 23 | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | --- | CYS | CYS | CYS | CYS | CYS | CYS | CYS | CYS | | CYS | CYS | CYS | | |
| CDR1 | 24 | gln | ARG | ARG | glx | ala | gln | glx | ARG | glx | --- | gln | ARG | | ARG | ARG | | | | | ARG | | | | |
| CDR1 | 25 | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | ALA | --- | ALA | ALA | ALA | ALA | ser | | | | | | | | | |
| CDR1 | 26 | SER | SER | SER | SER | SER | SER | SER | SER | | --- | SER | SER | | | SER | | | | | | | | | |
| CDR1 | 27 | GLN | GLN | GLX | GLN | GLN | glu | GLX | GLX | GLX | --- | GLN | | | | GLN | | | | | | | | | |
| CDR1 | 27A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | ser | | | | | | | | | |
| CDR1 | 27B | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | leu | | | | | | | | | |
| CDR1 | 27C | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | val | | | | | | | | | |
| CDR1 | 27D | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | trp | | | | | | | | | |
| CDR1 | 27E | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | ser | | | | | | | | | |
| CDR1 | 27F | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | --- | | | | | | | | | |
| CDR1 | 28 | asx | SER | SER | asp | asx | ala | asx | gly | asx | --- | asp | | | | asp | | | | | | | | | |
| CDR1 | 29 | ILE | ILE | ILE | ILE | ILE | # | ILE | ILE | ILE | --- | ILE | | | | gly | | | | | | | | | |
| CDR1 | 30 | GLY | | ser | ser | ser | | ser | | | --- | asn | | | | arg | | | | | | | | | |
| CDR1 | 31 | | ser | | asp | | ASN | ASX | | pro | --- | lys | | | | ser | | | | | | | | | |
| CDR1 | 32 | tyr | ser | | tyr | | tyr | tyr | | tyr | --- | | | | | tyr | | | | | | | | | |
| CDR1 | 33 | LEU | | | val | | LEU | | | LEU | --- | | | | | LEU | | | | | | | | | |
| CDR1 | 34 | | | | asn | | | | | | --- | | | | | glu | | | | | | | | | |
| FR2 | 35 | TRP | | | TRP | | TRP | | | | --- | | | | | TRP | | | | | | | | | |
| FR2 | 36 | | | | | | tyr | | | tyr | --- | | | | | tyr | | | | | | | | | |
| FR2 | 37 | | | | | | | | | | --- | | | | | GLN | | | | | | | | | |
| FR2 | 38 | | | | | | | | | | --- | | | | | GLN | | | | | | | | | |
| FR2 | 39 | | | | | | | | | | --- | | | | | LYS | | | | | | | | | |
| FR2 | 40 | | | | | | | | | | --- | | | | | PRO | | | | | | | | | |
| FR2 | 41 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 42 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 43 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 44 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 45 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 46 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 47 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 48 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR2 | 49 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| CDR2 | 50 | | | | | | | | | | LYS | | | | | | | | | | | | | | |
| CDR2 | 51 | | | | | | | | | | ser | | | | | | | | | | | | | | |
| CDR2 | 52 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| CDR2 | 53 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| CDR2 | 54 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| CDR2 | 55 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| CDR2 | 56 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 57 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 58 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 59 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 60 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 61 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 62 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 63 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 64 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 65 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 66 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 67 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 68 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 69 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 70 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 71 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 72 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 73 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 74 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 75 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 76 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 77 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 78 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 79 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 80 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 81 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 82 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 83 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 84 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 85 | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR3 | 86 | | | | | | | | | | --- | TYR | | | | | | | | | | | | | |
| FR3 | 87 | | | | | | | | | | --- | TYR | | | | | | | | | | | | | |
| FR3 | 88 | | | | | | | | | | CYS | CYS | | | | | | | | | | | | | |
| CDR3 | 89 | | | | | | | | | | glx | gln | | | | | | | | | | | | | |
| CDR3 | 90 | | | | | | | | | | glx | gln | | | | | | | | | | | | | |
| CDR3 | 91 | | | | | | | | | | glx | tyr | | | | | | | | | | | | | |
| CDR3 | 92 | | | | | | | | | | ASX | glu | | | | | | | | | | | | | |
| CDR3 | 93 | | | | | | | | | | ala | asn | | | | | | | | | | | | | |
| CDR3 | 94 | | | | | | | | | | ala | leu | | | | | | | | | | | | | |
| CDR3 | 95 | | | | | | | | | | thr | pro | | | | | | | | | | | | | |
| CDR3 | 95A | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 95B | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 95C | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 95D | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 95E | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 95F | | | | | | | | | | --- | --- | | | | | | | | | | | | | |
| CDR3 | 96 | | | | | | | | | | ILE | TYR | | | | | | | | | | | | | |
| CDR3 | 97 | | | | | | | | | | PRO | | | | | | | | | | | | | | |
| FR4 | 98 | | | | | | | | | | ILE | | | | | | | | | | | | | | |
| FR4 | 99 | | | | | | | | | | GLY | | | | | | | | | | | | | | |
| FR4 | 100 | | | | | | | | | | GLY | | | | | | | | | | | | | | |
| FR4 | 101 | | | | | | | | | | GLY | | | | | | | | | | | | | | |
| FR4 | 102 | | | | | | | | | | THR | | | | | | | | | | | | | | |
| FR4 | 103 | | | | | | | | | | LYS | | | | | | | | | | | | | | |
| FR4 | 104 | | | | | | | | | | VAL | | | | | | | | | | | | | | |
| FR4 | 105 | | | | | | | | | | ASX | | | | | | | | | | | | | | |
| FR4 | 106 | | | | | | | | | | VAL | | | | | | | | | | | | | | |
| FR4 | 106A | | | | | | | | | | --- | | | | | | | | | | | | | | |
| FR4 | 107 | | | | | | | | | | LYS | | | | | | | | | | | | | | |
| | 108 | | | | | | | | | | ARG | | | | | | | | | | | | | | |
| | 109 | | | | | | | | | | THR | | | | | | | | | | | | | | |

**HUMAN KAPPA LIGHT CHAINS SUBGROUP I (cont'd)**

| | | 102* K-G2 | 103 BRA | 104 LUX | 105* HEI | 106 PAP | 107* H-G2a | 108 CRA | 109 AMYLOID LEP | 110* WAC | 111 KOE | 112 HBJ 1 | 113 AMYLOID 547 | 114 WEB | 115 HBJ 10 | 116 LOD | 117 BEN | 118 MAA | 119 GR | 120 MUK | 121 GM131 'CL # | 122 AMYLOID 594 | 123* MAR | 124 CL* |
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| | 0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | --- | --- | --- |
| | 1 | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | ASP | --- |
| | 2 | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | ILE | | ILE | ILE | --- |
| | 3 | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | GLN | GLN | leu | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | --- |
| | 4 | MET | MET | leu | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | MET | | MET | leu | MET | MET | | MET | leu | --- |
| | 5 | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | THR | | THR | THR | --- |
| | 6 | GLN | GLX | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | GLN | | GLN | GLN | --- |
| | 7 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | --- |
| | 8 | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | PRO | | PRO | PRO | --- |
| | 9 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | thr | SER | SER | SER | SER | SER | SER | SER | SER | | SER | SER | --- |
| FR1 | 10 | ser | ser | phe | THR | ser | ser | ser | ser | ser | THR | ser | ser | ser | ser | THR | ser | THR | ser | ser | | ser | ser | --- |
| | 11 | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | LEU | val | LEU | | LEU | LEU | LEU | LEU | | LEU | LEU | --- |
| | 12 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | | | --- |
| | 13 | ALA | val | ALA | ALA | val | ALA | ALA | ALA | ALA | SER | ALA | ALA | ALA | ALA | ALA | ALA | ALA | val | | | | | --- |
| | 14 | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | SER | | | | | | | | | --- |
| | 15 | VAL | VAL | VAL | VAL | VAL | VAL | leu | VAL | VAL | VAL | VAL | VAL | VAL | | VAL | | | | | | | | --- |
| | 16 | GLY | GLY | GLY | GLY | GLY | GLY | arg | GLY | GLY | | GLY | | | | | | | | | | | | --- |
| | 17 | ASP | glx | ASP | ASP | ASP | ASP | ASP | ASP | ASP | | ASP | | | | | | | | | | | | --- |
| | 18 | arg | asp | arg | arg | arg | arg | arg | arg | | | | | | | | | | | | | | | --- |
| | 19 | val | val | val | val | val | val | val | val | | | | | | | | | | | | | | | --- |
| | 20 | THR | THR | THR | THR | THR | | THR | THR | | | | | | | | | | | | | | | --- |
| | 21 | ILE | ILE | ILE | | ILE | ILE | ILE | | | | | | | | | | | | | | | | --- |
| | 22 | THR | THR | THR | | ala | THR | THR | | | | | | | | | | | | | | | | --- |
| | | | CYS | | | | | | | | | | | | | | | | | | | | | |
| | 23 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 24 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 25 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 26 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27A | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27B | | | | | | | | | | | | | | | | | | | | | | | --- |
| CDR1 | 27C | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27D | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27E | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 27F | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 28 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 29 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 34 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 37 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 38 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 39 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 40 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 41 | | | | | | | | | | | | | | | | | | | | | | | --- |
| FR2 | 42 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 43 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 44 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 51 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 52 | | | | | | | | | | | | | | | | | | | | | | | --- |
| CDR2 | 53 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 54 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 55 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 57 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 71 | | | | | | | | | | | | | | | | | | | | | | | --- |
| FR3 | 72 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 73 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 74 | | | | | | | | | | | | | | | | | | | | | | | --- |
| | 75 | | | | | | | | | | | | | | | | | | | | | | | --- |
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| | 78 | | | | | | | | | | | | | | | | | | | LEU | | | | --- |
| | 79 | | | | | | | | | | | | | | | | | | | GLN | | | | --- |
| | 80 | | | | | | | | | | | | | | | | | | | pro | | | | --- |
| | 81 | | | | | | | | | | | | | | | | | | | glu | | | | --- |
| | 82 | | | | | | | | | | | | | | | | | | | ASP | | | | --- |
| | 83 | | | | | | | | | | | | | | | | | | | PHE | | | | --- |
| | 84 | | | | | | | | | | | | | | | | | | | ALA | | | | --- |
| | 85 | | | | | | | | | | | | | | | | | | | THR | | | | --- |
| | 86 | | | | | | | | | | | | | | | | | | | TYR | | | | --- |
| | 87 | | | | | | | | | | | | | | | | | | | TYR | | | | --- |
| | 88 | | | | | | | | | | | | | | | | | | | CYS | | | | --- |
| | 89 | | | | | | | | | | | | | | | | | | | gln | | | | --- |
| | 90 | | | | | | | | | | | | | | | | | | | gln | | | | --- |
| | 91 | | | | | | | | | | | | | | | | | | | his | | | | --- |
| | 92 | | | | | | | | | | | | | | | | | | | ASP | | | | ASP |
| | 93 | | | | | | | | | | | | | | | | | | | his | | | | ile |
| | 94 | | | | | | | | | | | | | | | | | | | leu | | | | PHE |
| CDR3 | 95 | | | | | | | | | | | | | | | | | | | pro | | | | pro |
| | 95A | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 95B | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 95C | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 95D | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 95E | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 95F | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 96 | | | | | | | | | | | | | | | | | | | LEU | | | | GLY |
| | 97 | | | | | | | | | | | | | | | | | | | THR | | | | THR |
| | 98 | | | | | | | | | | | | | | | | | | | PHE | | | | PHE |
| | 99 | | | | | | | | | | | | | | | | | | | GLY | | | | GLX |
| | 100 | | | | | | | | | | | | | | | | | | | GLY | | | | GLN |
| | 101 | | | | | | | | | | | | | | | | | | | GLY | | | | GLY |
| | 102 | | | | | | | | | | | | | | | | | | | THR | | | | THR |
| FR4 | 103 | | | | | | | | | | | | | | | | | | | THR | | | | LYS |
| | 104 | | | | | | | | | | | | | | | | | | | VAL | | | | VAL |
| | 105 | | | | | | | | | | | | | | | | | | | GLU | | | | GLU |
| | 106 | | | | | | | | | | | | | | | | | | | MET | | | | ILE |
| | 106A | | | | | | | | | | | | | | | | | | | --- | | | | --- |
| | 107 | | | | | | | | | | | | | | | | | | | LYS | | | | LYS |
| | 108 | | | | | | | | | | | | | | | | | | | ARG | | | | ARG |
| | 109 | | | | | | | | | | | | | | | | | | | THR | | | | THR |

**HUMAN KAPPA LIGHT CHAINS SUBGROUP I** (cont'd)

| | | 125 AMYLOID | 126 HBJ 6 | 127 AMYLOID MS # | 128 PEN | # OF SEQUENCES | # OF AMINO ACIDS | OCCURRENCES OF MOST COMMON AMINO ACID | VARIABILITY |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | --- | --- | --- | --- | 1 | 1 | 1(PCA) | |
| | 1 | ASP | ASP | ASP | ASP | 125 | 3,4 | 122(ASP),118(ASP) | 3.1,4.2 |
| | 2 | ILE | ILE | # | ILE | 123 | 2 | 120(ILE) | 2. |
| | 3 | glu | GLN | GLN | GLN | 123 | 7 | 116(GLN),112(GLN) | 7.4,7.7 |
| | 4 | MET | MET | MET | MET | 124 | 4 | 109(MET) | 4.6 |
| | 5 | pro | THR | THR | | 124 | 3 | 122(THR) | 3. |
| | 6 | GLN | GLN | | | 123 | 1,2 | 123(GLN),116(GLN) | 1.,2.1 |
| | 7 | SER | | | | 121 | 2 | 120(SER) | 2. |
| | 8 | PRO | | | | 121 | 2 | 120(PRO) | 2. |
| | 9 | SER | | | | 121 | 4 | 117(SER) | 4.1 |
| FR1 | 10 | sar | | | | 120 | 5 | 89(SER) | 6.7 |
| FR1 | 11 | LEU | | | | 119 | 4 | 111(LEU) | 4.3 |
| FR1 | 12 | | | | | 118 | 3 | 115(SER) | 3.1 |
| FR1 | 13 | | | | | 117 | 4 | 107(ALA) | 4.4 |
| FR1 | 14 | | | | | 113 | 6 | 106(SER) | 6.4 |
| FR1 | 15 | | | | | 113 | 3 | 109(VAL) | 3.1 |
| FR1 | 16 | | | | | 109 | 2 | 108(GLY) | 2. |
| FR1 | 17 | | | | | 109 | 3,4 | 106(ASP),98(ASP) | 3.1,4.4 |
| FR1 | 18 | | | | | 106 | 6 | 97(ARG) | 6.6 |
| FR1 | 19 | | | | | 107 | 3 | 101(VAL) | 3.2 |
| FR1 | 20 | | | | | 106 | 4 | 102(THR) | 4.2 |
| FR1 | 21 | | | | | 104 | 4 | 99(ILE) | 4.2 |
| FR1 | 22 | | | | | 104 | 6 | 95(THR) | 6.6 |
| FR1 | 23 | | | | | 96 | 1 | 96(CYS) | 1. |
| | 24 | | | | | 88 | 6 | 57(ARG) | 9.3 |
| FR1 | 25 | | | | | 88 | 6 | 82(ALA) | 6.4 |
| FR1 | 26 | | | | | 85 | 4 | 79(SER) | 4.3 |
| FR1 | 27 | | | | | 84 | 4 | 79(GLN),66(GLN) | 4.3,5.1 |
| FR1 | 27A | | | | | 3 | 2 | 2(SER) | |
| FR1 | 27B | | | | | 3 | 2 | 2(LEU) | |
| CDR1 | 27C | | | | | 3 | 2 | 2(VAL) | |
| CDR1 | 27D | | | | | 3 | 3 | 1( + ) | |
| CDR1 | 27E | | | | | 2 | 2 | 1( + ) | |
| CDR1 | 27F | | | | | | | | |
| CDR1 | 28 | | | | | 84 | 7 | 29(SER) | 20. |
| FR2 | 29 | | | | | 83 | 5 | 72(ILE) | 5.8 |
| FR2 | 30 | | | | | 81 | 11 | 41(SER) | 22. |
| FR2 | 31 | | | | | 79 | 12 | 27(ASN),24(SER) | 35.,39. |
| FR2 | 32 | | | | | 79 | 9 | 34(TYR) | 21. |
| FR2 | 33 | | | | | 77 | 4 | 73(LEU) | 4.2 |
| FR2 | 34 | | | | | 73 | 7,8 | 30(ALA) | 17.,19. |
| FR2 | 35 | | | | | 76 | 1 | 76(TRP) | 1. |
| FR2 | 36 | | | | | 74 | 2 | 66(TYR) | 2.2 |
| FR2 | 37 | | | | | 73 | 4 | 68(GLN),61(GLN) | 4.3,4.8 |
| FR2 | 38 | | | | | 71 | 4 | 68(GLN),63(GLN) | 4.2,4.5 |
| FR2 | 39 | | | | | 68 | 4 | 62(LYS) | 4.4 |
| FR2 | 40 | | | | | 70 | 3 | 68(PRO) | 3.1 |
| FR2 | 41 | | | | | 58 | 3 | 54(GLY) | 3.2 |
| FR2 | 42 | | | | | 60 | 6 | 49(LYS) | 7.3 |
| FR2 | 43 | | | | | 61 | 4 | 57(ALA) | 4.3 |
| FR2 | 44 | | | | | 61 | 1 | 61(PRO) | 1. |
| FR2 | 45 | | | | | 61 | 7,8 | 46(LYS) | 9.3,11. |
| FR2 | 46 | | | | | 60 | 7 | 42(LEU) | 10. |
| FR2 | 47 | | | | | 59 | 2 | 58(LEU) | 2. |
| FR2 | 48 | | | | | 57 | 2 | 56(ILE) | 2. |
| FR2 | 49 | | | | | 59 | 4 | 55(TYR) | 4.3 |
| CDR2 | 50 | | | | | 59 | 9 | 19(ALA) | 28. |
| CDR2 | 51 | | | | | 59 | 5 | 60(ALA) | 5.9 |
| CDR2 | 52 | | | | | 58 | 6 | 53(SER) | 6.6 |
| CDR2 | 53 | | | | | 57 | 6,7 | 26(SER) | 13.,15. |
| CDR2 | 54 | | | | | 58 | 2 | 56(LEU) | 2.1 |
| CDR2 | 55 | | | | | 58 | 8,9 | 25(GLU) | 19.,21. |
| CDR2 | 56 | | | | | 56 | 8 | 34(SER) | 13. |
| | 57 | | | | | 57 | 1 | 57(GLY) | 1. |
| | 58 | | | | | 58 | 3 | 50(VAL) | 3.5 |
| FR3 | 59 | | | | | 57 | 4 | 54(PRO) | 4.2 |
| FR3 | 60 | | | | | 57 | 1 | 57(SER) | 1. |
| FR3 | 61 | | | | | 58 | 3 | 56(ARG) | 3.1 |
| FR3 | 62 | | | | | 57 | 3 | 55(PHE) | 3.1 |
| FR3 | 63 | | | | | 57 | 6 | 50(SER) | 6.8 |
| FR3 | 64 | | | | | 57 | 2 | 55(GLY) | 2.1 |
| FR3 | 65 | | | | | 56 | 5 | 51(SER) | 5.5 |
| FR3 | 66 | | | | | 57 | 4 | 54(GLY) | 4.2 |
| FR3 | 67 | | | | | 55 | 3 | 51(SER) | 3.2 |
| FR3 | 68 | | | | | 55 | 3 | 52(GLY) | 3.2 |
| FR3 | 69 | | | | | 55 | 2 | 51(THR) | 2.2 |
| FR3 | 70 | | | | | 55 | 5,6 | 33(ASP),31(ASP) | 8.3,11. |
| FR3 | 71 | | | | | 54 | 4 | 49(PHE) | 4.4 |
| FR3 | 72 | | | | | 54 | 5 | 50(THR) | 5.4 |
| FR3 | 73 | | | | | 54 | 3 | 43(LEU) | 3.8 |
| FR3 | 74 | | | | | 54 | 4 | 51(THR) | 4.2 |
| FR3 | 75 | | | | | 54 | 3 | 47(ILE) | 3.4 |
| FR3 | 76 | | | | | 53 | 5 | 43(SER) | 6.2 |
| FR3 | 77 | | | | | 54 | 6 | 40(SER) | 8.1 |
| FR3 | 78 | | | | | 54 | 2 | 53(LEU) | 2. |
| FR3 | 79 | | | | | 54 | 3,4 | 52(GLN),48(GLN) | 3.1,4.5 |
| FR3 | 80 | | | | | 54 | 2 | 46(PRO) | 2.3 |
| FR3 | 81 | | | | | 54 | 3,5 | 37(GLU),34(GLU) | 4.4,7.9 |
| FR3 | 82 | | | | | 54 | 2 | 53(ASP),50(ASP) | 2.,2.2 |
| FR3 | 83 | | | | | 54 | 4 | 40(PHE) | 5.4 |
| FR3 | 84 | | | | | 54 | 2 | 53(ALA) | 2. |
| FR3 | 85 | | | | | 54 | 6 | 48(THR) | 6.7 |
| FR3 | 86 | | | | | 56 | 2 | 55(TYR) | 2. |
| FR3 | 87 | | | | | 55 | 2 | 52(TYR) | 2.1 |
| FR3 | 88 | | | | | 56 | 1 | 56(CYS) | 1. |
| FR3 | 89 | | | | | 57 | 4,5 | 46(GLN),43(GLN) | 5.,6.6 |
| FR3 | 90 | | | | | 57 | 2,3 | 51(GLN),46(GLN) | 2.2,3.7 |
| FR3 | 91 | | | | | 59 | 11,12 | 28(TYR) | 23.,25. |
| FR3 | 92 | | | | | 60 | 9 | 20(ASN),19( + ) | 27.,28. |
| FR3 | 93 | | | | | 60 | 9 | 29(SER) | 19. |
| CDR3 | 94 | | | | | 60 | 12 | 15(LEU) | 48. |
| CDR3 | 95 | | | | | 56 | 4 | 44(PRO) | 5.1 |
| CDR3 | 95A | | | | | 1 | 1 | 1(GLU) | |
| CDR3 | 95B | | | | | | | | |
| CDR3 | 95C | | | | | | | | |
| CDR3 | 95D | | | | | | | | |
| CDR3 | 95E | | | | | | | | |
| CDR3 | 95F | | | | | | | | |
| CDR3 | 96 | | | | | 44 | 12 | 10(TRP) | 53. |
| CDR3 | 97 | | | | | 43 | 4 | 39(THR) | 4.4 |
| FR4 | 98 | | | | | 46 | 3 | 44(PHE) | 3.1 |
| FR4 | 99 | | | | | 46 | 1 | 46(GLY) | 1. |
| FR4 | 100 | | | | | 46 | 4,5 | 28(GLN),27(GLN) | 6.6,8.5 |
| FR4 | 101 | | | | | 46 | 1 | 46(GLY) | 1. |
| FR4 | 102 | | | | | 46 | 2 | 45(THR) | 2. |
| FR4 | 103 | | | | | 46 | 4 | 38(LYS) | 4.8 |
| FR4 | 104 | | | | | 45 | 2 | 36(VAL) | 2.5 |
| FR4 | 105 | | | | | 45 | 4,5 | 29(GLU),28(GLU) | 6.2,8. |
| FR4 | 106 | | | | | 46 | 7 | 30(ILE) | 11. |
| FR4 | 106A | | | | | | | | |
| | 107 | | | | | 45 | 3 | 42(LYS) | 3.2 |
| | 108 | | | | | 33 | 2 | 31(ARG) | 2.1 |
| | 109 | | | | | 22 | 1 | 22(THR) | 1. |

# CENTER FOR DRUG EVALUATION AND RESEARCH

*APPLICATION NUMBER:*

**125166**

# MEDICAL REVIEW



AMG1024

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Date: March 15, 2007
From: Karen D. Weiss, M.D. KW
Subject: Office level memorandum: BLA STN 125166/0 Eculizumab (Soliris™ ), Alexion
To: File

The Division of Medical Imaging and Hematology Products and members of the review team for the above referenced BLA recommend an approval action. I concur with this recommendation. Below is a brief summary of the application with attention to major points of discussion surrounding the product labeling.

Alexion Pharmaceuticals, Inc. submitted the above referenced Biological License Application (BLA) on September 15, 2006. The product, Eculizumab (Soliris™), is a monoclonal antibody directed against complement C5. The product was studied for its efficacy and safety in patients with Paroxysmal Nocturnal Hemoglobinuria (PNH), a rare disease characterized by a deficiency in terminal complement inhibitor. The hallmark of this disease is chronic intravascular hemolysis secondary to complement-mediated lysis. Manifestations of the disease are related to the hemolysis and include anemia, fatigue, transfusion requirements, and thromboses. The disease manifestations and their severity vary from patient to patient.

Soliris™ inhibits the actions of terminal complement by blocking C5 activation. This mechanism provides the rationale for its use in PNH as well as the major safety concern of serious meningococcal disease, discussed below. In this BLA, the major evidence for efficacy and safety derive from TRIUMPH, a randomized, placebo controlled trial in patients with transfusion-dependent PNH ($\geq$ 4 transfusions/month). A total of 87 patients were randomized 1:1 to Soliris™ or placebo for 26 weeks. Treatment was administered intravenously as follows: 600 mg q 7 days X 4 weeks, then 900 mg for dose 5, then 900 mg q 14 days thereafter. This dose/regimen chosen was based on pK and pD modeling data to identify the concentrations of eculizumab needed to block terminal C5 activation. These data were derived from pk/pd studies in several different patient populations. The specific regimen for PNH was derived from a study in 40 PNH patients in which serum LDH, a marker of hemolysis, was markedly reduced by week 1 and sustained at week 26.

The major efficacy outcomes were measures of hemolysis. The co-primary endpoints were hemoglobin stabilization rates and avoidance of RBC transfusions. Secondary outcomes included other measures of hemolysis and fatigue. Patients randomized to Soliris™ had significant improvements in all primary and secondary outcomes compared to placebo treated patients. The most frequent adverse reactions relative to placebo treated patients were constitutional symptoms – headache, nausea, back pain, and naso-pharyngitis. There were no differences between groups in rates of serious adverse reactions and no severe infusion reactions.

Additional data were derived from a single arm trial (SHEPHERD) in which 97 patients who required at least one RBC transfusion in the past 12 months received Soliris™ at the



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same dose and schedule as in TRIUMPH, but for 52 weeks. The hemolysis-related parameters at the end of the study were similar to the results in TRIUMPH.

Patients who had enrolled in and completed initial Soliris™ studies were eligible for an extension study. In the extension study, 187 patients continued with Soliris™ at the same dose and schedule as above. The exposure ranged from 10 months to 54 months. Patients maintained improvements in signs and symptoms of hemolysis.

The major safety concern, closely related to the mechanism of action of the drug, is serious infection from encapsulated bacteria, primarily meningococcal infections. All PNH patients were required to be vaccinated with meningococcal vaccine prior to receiving Soliris™. Despite this, 2 of 196 PNH patients still developed a serious meningococcal infection; fortunately, no one died as a result of their infection. The high degree of concern about this serious safety issue and ability to minimize risk through vaccination are described in various sections of the product labeling, including the boxed warning, contra-indication, Medication Guide, and specific risk minimization program that will involve initial and ongoing patient and provider education.

A theoretical safety concern is the risk of excessive thrombosis from abrupt Soliris™ discontinuation. This situation could arise because Soliris™ treatment reduces the hemolysis and therefore results in expansion of PNH cells. These expanded cells would still be susceptible to complement-mediated hemolysis. In the clinical trial experience, no patient had evidence of enhanced or exaggerated hemolysis. The package insert includes a warning/precaution about the potential for this type of event.

A major point of contention with the sponsor was whether and if so, what data to include in the PI about the effect of Soliris™ on thromboses. In all the clinical studies, approximately 50-60% of the patients were on anticoagulants during the study; some because of known thromboses, others as prophylaxis. In TRIUMPH, there was 1 thrombotic event in the placebo arm and 0 in Soliris™ arm. The sponsor argued that the event rate was so low, and study duration and small sample size prohibited that study from being able to show an effect. They proposed to draw evidence of the effectiveness of Soliris™ on thromboses from the extension trial by comparing rates/per patient years prior to and while on treatment. However, FDA concluded that these types of observational data were not sufficient [redacted] decreased thromboses and moreover, the PI needed to include a warning/precaution not to alter anticoagulant management as a result of Soliris™. The PI does include a statement that in the extension trial, there were fewer thrombotic events on Soliris™ than during the same period of time prior to Soliris™ along with caveats about inability to conclude the effects of anticoagulant withdrawal. The sponsor has agreed to conduct as part of a PMC a study to evaluate the withdrawal of anticoagulation while on Soliris™.

In addition, the sponsor will evaluate patients in a registry, and periodically submit results periodically, and assess the impact of their risk minimization plan on occurrence of serious meningococcal infection.



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**DIVISION DIRECTOR'S REVIEW MEMORANDUM**

| | |
|---|---|
| **BLA:** | 125166 |
| **DRUG:** | Eculizumab injection, solution for intravenous use |
| **TRADENAME:** | Soliris® |
| **FORMULATION:** | 300 mg single-use vials, containing 30 mL of 10 mg/mL sterile, preservative-free soluation |
| **ROUTE:** | Intravenous administration as an infusion over 35 minutes |
| **DOSE:** | 600 mg every seven days for the first four weeks, followed by 900 mg for the fifth dose seven days later, then 900 mg every 14 days thereafter |
| **SPONSOR:** | Alexion Pharmaceuticals, Inc. |
| **SUBMITTED:** | September 15, 2006 |
| **PDUFA DUE DATE:** | March 17, 2007 |
| **DD MEMO COMPLETED:** | March 10, 2007 |
| **DD MEMO PREPARERS:** | Dwaine Rieves, MD, Acting Division Director<br>Division of Medical Imaging and Hematology Products |

**SPONSOR'S PROPOSED INDICATION:**

"Soliris is indicated for the treatment of patients with paroxysmal nocturnal hemoglobinuria (PNH) to reduce hemolysis."

**RELATED DRUGS:**

Soliris is the first FDA-approved product specifically indicated for treatment of PNH.

**RELATED REVIEWS:**

| | |
|---|---|
| Clinical: | Andrew Dmytrijuk, M.D.; Kathy Robie Suh, M.D., Ph.D. |
| Statistics: | Yuan Richard Chen, Ph.D, Jyoti Zalkikar, Ph.D. |
| Chemistry: | Michelle Jessen, Ph.D., Joseph Kutza, Ph.D., Kurt Brorson, Ph.D. |
| Microbiology: | Benda Uratani, Ph.D., Patricia Hughes, Ph.D. |
| Pharm-toxicology: | Siham Biade, Ph.D., Adebayo Laniyonu, Ph.D. |
| Clin Pharmacology: | Ike Lee, Ph.D, Hong Zhao, Ph.D. |
| Project Manager: | Florence Moore, RN, MSN, RAC |
| SEALD Reviewers: | Melissa Furness and Laurie Burke (Study endpoint and label development) |
| Advisory Committee: | None |

**RECOMMENDED REGULATORY ACTIONS:**

***1) Licensure of Soliris for the treatment of PNH to reduce hemolysis:***

PNH is a very rare (estimated prevalence of no more than 500 patients in the United States) condition that manifests with:

- intravascular hemolysis
- thrombosis
- bone marrow hypoplasia or aplasia

Patients with PNH may manifest none or all three of these major clinical problems although red blood cell (RBC) hemolysis is the most common presentation of the condition. RBC hemolysis is the only condition that was shown, in clinical studies, to be altered by Soliris therapy.

RBC hemolysis in PNH patients occurs through the development of a clonal population of RBC that are exceptionally susceptible to lysis by complement. These cells are referred to as "PNH cells." The development of this clone is due to a somatic mutation in marrow cells. Hence, the clonal population affects not only RBC but also white blood cells and other cells derived from the marrow. The complement-mediated hemolysis results in anemia that may require RBC transfusions.

The other major clinical manifestations of PNH, thrombosis and marrow aplasia/hypoplasia, account for most of the mortality in the condition and the extent, if any, to which these problems mechanistically relate to hemolysis is unknown. Only about one-half of all PNH patients will ever experience a thrombotic event and even fewer will experience marrow aplasia. The rarity of these events, combined with the overall rarity of PNH, may have contributed to the sponsor's inability to establish Soliris treatment effects upon thrombotic complications and marrow hypoplasia/aplasia.

Soliris is a humanized monoclonal antibody that inhibits C5, a key complement component protein. Administration of Soliris results in a form of drug-induced complement deficiency which, in PNH patients, allows PNH cells to survive such that this clonal population expands in the blood and increases the blood's total content of RBC.

The sponsor submitted data from one adequate and well controlled clinical study that provided substantial evidence of Soliris safety and efficacy in the treatment of hemolysis among adult PNH patients. Overall, safety data were obtained from 196 PNH patients exposed to Soliris. The most important safety finding was the occurrence of *Nesseria meningitidis* septicemia among two PNH patients. Meningococcal sepsis or meningitis is the major risk for use of Soliris. These safety concerns are addressed in product labeling and the sponsor's use of a risk minimization plan that focuses on education and voluntary compliance with meningococcal vaccination.

All review teams concur with the decision for licensure of Soliris. The submitted safety and efficacy data did not present unique challenges in data review or interpretation and the findings were regarded as sufficiently persuasive to preclude the need for a discussion at an Advisory Committee.

***2) Requirement of the sponsor to conduct post-marketing studies and to submit additional information:***

The sponsor has agreed to provide no less than five years of follow-up clinical data regarding Soliris usage, including any Soliris usage among pediatric patients and pregnant patients. This information will be obtained from a special registry to be maintained by the sponsor. Additionally, follow-up safety data obtained in this registry will include the detection of malignancies, serious infections and antibody formation. No controlled clinical studies are required as post-marketing commitments.

An additional post-marketing commitment pertains to the submission of a final risk minimization document that describes the "Soliris Guardian Program," the sponsor's risk

management program that was submitted in draft form during the review (it was contingent, in part, upon finalization of labeling).

Multiple chemistry, manufacturing and controls (CMC) items were also components of post-marketing commitments (PMC).

***3) Approval of the trade name, Soliris®***

This recommendation is consistent with that of the FDA Office of Drug Safety/Division of Medication Errors and Technical Support.

***4) No Pediatric Research Equity Act (PREA) of 2003 expectations:***

Soliris has an Orphan Product designation. Hence, PREA does not directly apply to the licensure. Nevertheless, the sponsor's post-marketing registry is designed to obtain outcome data from any usage of Soliris among pediatric patients. PNH is predominantly a condition among adults and very rare among pediatric patients.

**REVIEW COMPONENTS:**

**Background**

Soliris (eculizumab) was proposed by the sponsor for "treatment of PNH." The sponsor agreed to modify the indication statement to describe hemolysis as the major treatment effect of Soliris. Indeed, the entire Soliris clinical development program was engineered to establish Soliris treatment effects upon hemolysis and this effect was established with robust clinical evidence.

During the review cycle, the sponsor initially proposed a complex risk management program that was referred to as the [redacted] Consequently, the sponsor revised the risk minimization plan to still require participation of all patients within a safety registry and educational program but this modified program (Soliris Guardian Program) eliminated verification mandates. Instead, compliance with vaccination expectations and other usage requirements will be on a voluntary basis. This proposal is reasonable in light of the consideration that Soliris prescription/administration is expected to be under the aegis of hematologists and other well-trained health care personnel. Additionally, the requirement for intravenous administrations of Soliris every 14 days, provides a strong likelihood that patients will frequently and regularly interact with health care personnel.

**Brief Regulatory Timeline**

- September 15, 2006 - submission of BLA
- October 30, 2006 Filing meeting, BLA was assigned a priority review
- November 14, 2006 Filing action date
- January 4, 2007 Mid-cycle meeting
- March 16, 2007 PDUFA due date



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**Clinical Review**

The clinical review was performed by Dr. Andrew Dmytrijuk. Dr. Kathy Robie Suh provided Team Leader expertise to the review and a secondary review. I have examined the clinical review and I concur with the findings, comments and recommendations. The review was finalized prior to labeling discussions. Hence, some of the recommendations are not specifically consistent with the final labeling, in terms of textual wording. However, the substance of the recommendations is consistent with the final labeling.

Substantial evidence of safety and effectiveness for Soliris was obtained from the clinical study referred to as the TRIUMPH study (A hemoglobin stabilization and transfusion reduction efficacy and safety clinical investigation, randomized, multi-center, double-blind, placebo-controlled, using eculizumab in paroxysmal nocturnal hemoglobinuria).

**Triumph study:**

a. Major study features:

Triumph was a randomized, double-blind clinical study that compared Soliris to placebo among 87 transfusion-dependent adults PNH patients. The study's co-primary endpoints were a (superiority) comparison of "hemoglobin stabilization" rates and a comparison of the number of RBC units between the two study groups. Prior to initiation of the active treatment periods, patients were observed over a period of time (up to three months) to establish a hemoglobin "set point" that identified the hemoglobin criterion applicable to establishing "hemoglobin stabilization." The set point identified the lowest hemoglobin value that would necessitate RBC transfusion.

Soliris was administered at the dose recommended within the product label; 600 mg once weekly for four weeks followed by 900 mg on the fifth week and then 900 mg on alternate weeks, thereafter.

The major study evaluations consisted of frequent hematologic evaluations (serum lactic dehydrogenase (LDH), free hemoglobin, blood counts and flow cytometry) as well as clinical, clinical chemistry and certain patient reported outcome (FACIT-fatigue and EORTC QLQ-30) evaluations--all obtained at baseline and throughout a 26 week treatment period.

The study's primary endpoint analytical methodology consisted of a Fisher's comparison of the hemoglobin stabilization rates and the comparison of the total number of RBC units used by each patient within each group used a Wilcoxin rank sum comparison. Secondary endpoints (transfusion avoidance, area-under-the-curve lactate dehydrogenase (LDH), FACIT-fatigue outcomes) were also analyzed using prespecified methods.

b. Major study findings:

Both co-primary endpoints were directly related to evidence of Soliris reduction in hemolysis and both demonstrated statistical persuasiveness ($P < 0.001$). This reduction

Antibody formation to Soliris was detected in three patients (out of 196) and resulted in no apparent clinical consequences.

**Statistical Review:**

The statistical review was performed by Dr. Richard Chen, lead statistician for the BLA. The findings from her review were secondarily reviewed by Dr. Jyoti Zalkikar, Biometric Team Leader.

I have read Dr. Chen's statistical review report and I concur with his statistical analyses, findings and comments that the sponsor has provided persuasive evidence of Soliris safety and efficacy.

**Clinical Pharmacology and Biopharmaceuticals (OCPB) Review**

The clinical pharmacology and biopharmaceutical review was performed by Dr. Jang-Ik Lee. The findings from the review were secondarily reviewed by Dr. Hong Zhao, Team Leader. Dr. Rajanikanth Madabushi provided a phaarmacometrics review.

I have read the clinical pharmacology and biopharmaceuticals review report and I concur with the observations and comments.

The OCPB review noted that pharmacodynamics of Soliris are mainly indicated by reductions in serum LDH, a measure that is readily available to clinicians and that may be clinically useful for monitoring Soliris effects. This monitoring is briefing described within the Soliris label. The OCPB reviewers requested no phase 4/PMC studies.

**Chemistry and Microbiology**

The Chemistry review was performed mainly by Dr. Michelle Jessen. However, other CMC reviewers included Drs. Joseph Kutza, Gurpreet Gill-Sangha and Kurt Brorson. Her report was secondarily reviewed by Dr. Patrick Swann as supervisory chemist.

I have read the summary of the chemistry review findings and concur with the results. Dr. Jessen observed that the supplied chemistry and manufacturing information was sufficient to support the product's approval. She also noted that inspection of all manufacturing facilities revealed satisfactory findings. Multiple CMC PMC were agreed to by the sponsor.

Notably, the sponsor had not supplied an acceptable neutralization assay for the detection of antibody formation. One of the PMC relates to the need for this assay although the Soliris bioactivity appears so intimately related to the reduction of serum LDH, the in-use, patient data may provide the most meaningful measure of neutralizing antibody formation.

Dr. Brenda Uratani provided a microbiology review that recommended approval. I have examined Dr. Uratani's summary findings, including inspectional findings.

**Pharamcology/Toxicology**

The pharmacology/toxicology review was performed by Dr. Siham Biade and was secondarily reviewed by Dr. Adebayo Laniyonu.

I have read the pharmacology/toxicology recommendations and I concur with the observations. The reviewers noted that the submitted pharmacology/toxicology data support the approval of Soliris and with no need for PMC nonclinical studies.

In general, animal testing used a monoclonal antibody that was bioactive within animals (a surrogate antibody). Soliris was not used since it appeared specific for human proteins and was inactive in the tested animals.

**Pediatric Safety and Efficacy**

As previously noted, no pediatric data were supplied and the sponsor is to collect any pediatric usage information in the post-marketing period.

**Proposed Labeling**

During the review cycle, FDA and the sponsor developed multiple revisions of the Soliris product label. These revisions largely related to the description of the clinical studies and the safety information. I have reviewed the final product label and concur with the text.

**Office of Drug Safety/Division of Medication Errors and Technical Support (ODS/DMETS/)**

Linda Wisniewski, RN (Safety Evaluator) provided a DMETS review of the proposed product label, container label and proprietary name. The secondary review of her findings was performed by Nora Roselle, PharmD. (Team Leader). The team found the proposed labeling of cartons/containers acceptable as was the proprietary name, Soliris.

**Division of Scientific Investigation (DSI)**

Dr. Tejashri Purohit-Sheth provided a report of the FDA inspectional findings at selected clinical sites involved in the TRIUMPH study. The secondary reviewer on his report was Dr. Leslie Ball. The inspectors found the clinical data reliable. Only minor protocol violations were detected. I have read the report and concur with the findings.

**Financial Disclosure**

As noted in Dr. Dmytrijuk's review, the sponsor has submitted required financial disclosure information and the information is acceptable.

**Consultations**

The SEALD (study endpoint and label development) team provided a consult regarding the quality of life measures used in the Soliris clinical development program. The team noted that Soliris studies demonstrated persuasive treatment effects as evidenced by changes in the FACIT-fatigue and EORTC QLQ-C30 scores. The team regarded use of the words, "health-related quality of life" in the label but discouraged the word, "fatigue." During labeling discussions, the sponsor insisted upon the use of "fatigue" and the

SEALD team, at one point, acknowledged the size of the treatment effects in FACIT-fatigue and did not object to the use of the word, "fatigue." The team did object to the

Office of Surveillance and Epidemiology (OSE) consultation (Joyce Weaver, Betsy Scruggs, Jeanine Best and Claudia Karwolski) participated in the review of the risk minimization plan and were instrumental in working with the sponsor to draft an acceptable program. The OSE consultants also participated in final labeling discussions and provided detailed feedback on development of a Medication Guide.

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✓ Trade Secret / Confidential

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M E M O R A N D U M

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION
CENTER FOR DRUG EVALUATION AND RESEARCH

Date: March 5, 2007

From: Kathy M. Robie-Suh, M.D., Ph.D. K. Robie-Suh M 3/5/07
Medical Team Leader, Hematology
Division of Medical Imaging and Hematology Drug Products (HFD-160)

Subject: Medical Team Leader Secondary Review
BLA 125166, submitted 9/15/06
Soliris (eculizumab; h5G1.1 G2/G4 mAb) for treatment of patients with paroxysmal nocturnal hemoglobinuria (PNH)

To: BLA 125166

**Background:**
Paroxysmal nocturnal hemoglobinuria (PNH) is a rare acquired intravascular hemolytic disorder having an incidence of 1 to 2 per million and prevalence of 12 per million. The disorder is due to a somatic mutation in the PIG-A gene which is necessary for the synthesis of GPI-anchors. The mutation leads to a deficiency of the GPI-anchored terminal complement inhibitor CD59 on the surface of clonal populations of hematopoietic stem cells. Normally CD59 blocks formation of the terminal complement complex on the red blood cell (RBC) surface and thereby prevents hemolysis. Though PNH cells are present in all blood cell types, PNH RBCs are more sensitive to complement mediated lysis and characteristics of the disease reflect RBC hemolysis. The clinical manifestation of this disorder is a highly variable anemia that may be accompanied by fatigue, pain and intermittent frank hemoglobinuria. Patients may also have mild thrombocytopenia and granulocytopenia. Patients have an increased frequency of thromboses (predominantly venous) and may develop aplastic anemia or evolve into acute myeloblastic leukemia. Patients have a shortened lifespan. Intravascular hemolysis is monitored most commonly by measuring the release of the enzyme lactate dehydrogenase (LDH) into the plasma. There are no labeled treatments for PNH. Patients usually require RBC transfusions, which increase hemoglobin concentration and may help decrease hemolysis by suppressing hematopoiesis of abnormal RBCs. Corticosteroids have been used to suppress inflammation which may stimulate complement activation. Patients often receive anticoagulants to prevent and treat thrombosis.



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Eculizumab is a humanized version of a murine monoclonal antibody that binds to human complement 5 (C5) component protein and results in inhibition of complement-mediated hemolysis. The drug has been developed for use in treating PNH to reduce hemolysis of PNH cells thereby preventing anemia and consequent need for red blood cell transfusions. Eculizumab is not currently approved in the U.S. or anywhere in the world for any use. In this application the sponsor is seeking marketing approval of eculizumab for treatment of PNH in adult patients. The application has been granted priority review.

**Findings of the Clinical Review:**

*Efficacy:*

The primary Clinical Review of eculizumab was done by Dr. A. Dmytrijuk (dated 2/1/07, signed 02/28/07). To support the indication the sponsor has conducted a single adequate and well-controlled study evaluating the efficacy and safety of eculizumab in transfusion-dependent PNH patients. This study (C04-001, TRIUMPH) was a randomized, multicenter, double-blind, placebo-controlled investigation of eculizumab involving 109 enrolled patients (88 randomized, 87 randomized and treated) patients with transfusion-dependent PNH. Qualified patients were adult males or females (age ≥18 yrs) having a GPI deficient RBC clone (Type III cells) ≥10% and stable dose of other therapies [e.g., immunosuppressive therapy, corticosteroids, erythrocyte stimulating agent (ESA), iron supplementation). Notable exclusion criteria were mean hemoglobin prior to transfusion of >12.5 g/dL over the prior 12 months, neutrophil count ≤500/mcL, history of meningococcal disease, history of bone marrow transplantation. Following enrollment patients underwent a 13 week observation period. Patients having LDH level ≥1.5 times upper limit of normal, who received at least 1 RBC transfusion during the observation period within 48 hours of experiencing either a hemoglobin of ≤9 g/dL with symptoms or a hemoglobin ≤7 g/dL without symptoms [hemoglobin "set point"][hemoglobin value also must be within 1.5 g/dL of the previously calculated mean hemoglobin pre-transfusion for the previous 12 months], and who had platelet counts ≥100,000/mcl were randomized at the conclusion of the observation period. Important criteria for exclusion were evidence for or suspicion of bacterial infection, history of meningococcal disease or bone marrow transplant, neutrophil count ≤500/mcl, mean hemoglobin prior to transfusion of >10.5 g/dL during preceding year, pregnant or breast-feeding. All patients were vaccinated against *Neisseria meningitidis* at least 14 days prior to beginning treatment. Patients were randomized to eculizumab 600 mg IV (via 25-45 minute infusion) weekly for 4 weeks followed by 900 mg in week 5 and then every 14 days thereafter to a total of 26 weeks of treatment or placebo for 26 weeks. Patients were followed for 12 weeks after their last dose of study drug. Randomization was stratified on packed RBC transfusions (low, mid and high) during the year prior to screening. Efficacy was assessed using the co-primary endpoints of hemoglobin stabilization and RBC transfusion requirement (number of units). For the hemoglobin stabilization endpoint, those patients who dropped out of the study or were transfused above their set points during the treatment phase were categorized as failures. For the number of units of packed red blood cells (PRBCs) transfused, each patient's units of PRBCs transfused after randomization to 26 weeks was calculated. Additional endpoints included lactate



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dehydrogenase area-under-the-curve (AUC) during the study, changes in the functional assessment of chronic illness therapy fatigue (FACIT-F) assessment score, quality of life (QOL) assessment using the EORTC-C30 instrument, and thrombosis. Important safety outcomes were occurrence of infections

In Study C04-001, of 88 patients randomized, 87 were treated (43 eculizumab, 44 placebo). Baseline characteristics were reasonably well-balanced between treatment groups in this somewhat small study. Mean age of patients was similar in the two treatment groups (42.1 yrs in eculizumab; 38.4 yrs in placebo group). There were relatively more females in the placebo group than in the eculizumab group (65.9% and 53.5%, respectively) and patients with blood type A+ predominated in the placebo group (25.6% in the eculizumab group; 45.5% in the placebo group) while patients with blood type O+ predominated in the eculizumab group (37.2% in the eculizumab group; 22.7% in the placebo group). About 90% of patients were Caucasian. Mean hemoglobin prior to transfusion was approximately 8.0 g/dL and mean number of RBC units transfused was about 19.5 in both groups. About 63% of patients had symptomatology of severe or worsening fatigue associated with transfusion. Nine patients in the eculizumab group and 8 patients in the placebo group had history of major vascular event. There was concomitant use of antithrombotic agents in 55.8% of patients randomized to placebo and 45.5% of patients randomized to placebo. Ten patients in the placebo group discontinued study treatment prematurely, all due to lack of efficacy; all 10 continued followup to complete study assessments. Two patients in the eculizumab group discontinued prematurely, 1 due to an adverse event (pregnancy) and one due to patient request. Results for the primary efficacy analyses are summarized in the following table.

**Primary Efficacy Results for Study C04-001 after 26 Weeks of Treatment**

| Randomization Strata | N | Eculizumab N=43 | Placebo N=44 | p-value |
|---|---|---|---|---|
| Overall: | 87 | | | |
| Hb stabilized | | 21/43 (48.8) | 0/44 (0.0) | <0.00001[a] |
| Mean units PRBC transfused (SE) | | 3.0 (0.67) | 11.0 (0.83) | <0.00001[b] |
| 4 to 14 units: | 30 | | | |
| Hb stabilized | | 12/15 (80.0) | 0/15 (0.0) | <0.00001[a] |
| Mean units PRBC transfused | | 0.4 (0.29) | 6.7 (0.72) | <0.00001[b] |
| 15 to 25 units | 35 | | | |
| Hb stabilized | | 5/17 (29.4) | 0/18 (0.0) | <0.00001[a] |
| Mean units PRBC transfused | | 4.2 (1.14) | 10.8 (1.17) | <0.00066[b] |
| >25 units | 22 | | | |
| Hb stabilized | | 4/11 (36.4) | 0/11 (0.0) | 0.090[a] |
| Mean units PRBC transfused | | 4.5 (1.59) | 17.0 (1.04) | 0.00030[b] |

[a] Fisher's exact test; [b] Wilcoxon's rank sum test

No placebo-treated patients achieved hemoglobin stabilization. Overall and within each of the strata, more eculizumab-treated patients than placebo-treated patients achieved hemoglobin stabilization, and the difference between treatment groups was statistically



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significant and robust overall. Results within the low and medium transfusion strata (≤25 units PRBC) strongly supported the overall efficacy result. Units of PRBC transfused similarly were significantly less in the eculizumab group than in the placebo group. Efficacy results were similar for males and females.

In addition, overall and within each stratum AUC for LDH was significantly less over the course of the study in the eculizumab group as compared to the placebo group (mean AUC: eculizumab group, 81140; placebo group, 429874). At completion of study treatment (Week 26) for assessed patients a modest between groups difference was seen in FACIT-Fatigue score improvement (53.7% of eculizumab patients as compared to 20.5% of placebo patients improved by at least 4 points). Two eculizumab patients and 5 placebo patients were missing data for this analysis.

Study C04-001 was supported by an additional study, Study C04-002 (SHEPHERD Study), which was an open-label, multicenter study designed primarily as a safety study. The inclusion and exclusion criteria for this study were similar to those for Study C04-001 except that Study C04-002 allowed lower platelet counts (≥30,000/mcl) and required only 1 RBC transfusion in prior 24 months. The study included a 12 week enrollment phase followed by a 2-week screening phase, followed by 52-weeks of treatment and 8 weeks of additional followup. In this single arm study, efficacy was assessed by change in LDH AUC over time. Treatment duration was planned for 52 weeks. The BLA submission contains an interim report of 26 weeks treatment. A total of 97 patients were enrolled and treated. One patient died after 5 doses of study drug due to cerebral herniation and 96 patients completed all visits. Baseline characteristics, including pre-treatment LDH levels were similar to those for patients in Study C04-001. In this study 42/97 patients had a history of thrombosis and and 63.9% of patients were on concomitant antithrombotics during the study. Mean change in LDH from baseline to 26 weeks was a decrease of 325376 U/L×day. Mean LDH level at 26 weeks was 270 (mean at baseline was not calculated). Of the enrolled patients, 55.7% of patients had no transfusions. Percentages of PNH Type III RBC increased from a median of 33.5% at baseline to 50.6% at 26 week visit.

The sponsor attempted to evaluate efficacy of eculizumab for reducing likelihood of thrombosis in patients with PNH. In Study C04-001, 9 patients in the eculizumab group had a history of a total of 12 thrombosis events and 8 patients in the placebo group had a history of 8 thrombosis events. During that study only one patient in the placebo group experienced a thrombotic event (hepatic vein thrombosis) and none in the eculizumab group. The small number of patients in this study and the low thrombotic event rate preclude meaningful comparison of rates between groups in this controlled study. The sponsor seeks to augment the data by performing an analysis across all studies of eculizumab in PMH patients comparing frequency of thrombosis during treatment with eculizumab with their historical rate of thrombosis during the total time before and during the year prior to study entry as documented in the case report form. Events included in this analysis included those classified as major adverse vascular events (MAVE). MAVE



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included thrombophlebitis/deep vein thrombosis, pulmonary embolus, cerebrovascular accident amputation, myocardial infarction, transient ischemic attack, unstable angina, renal vein thrombosis, mesenteric vein thrombosis, portal vein thrombosis (Budd-Chiari), gangrene, acute peripheral vascular occlusion, and sudden death. Event rates were calculated by dividing the total events reported (historical) or observed (during study treatment) by the calculated total amount of time all patients in the study had been on eculizumab (patient years). In all the PNH studies in the eculizumab treated patients, the calculated MAVE rates per 100 patient years were less during study treatment than during the time prior to the study. These results using the 12 months prior to eculizumab treatment are shown in the sponsor's table below.

**Table 5.4.2-1: Thromboembolic Events in Patients During the 12 Months Prior to Start of Eculizumab Treatment and During Eculizumab Treatment in C04-001, C04-002, C02-001/E02-001/X03-001 and E05-001**

| | C04-001 | C04-002 | C02-001/ E02-001/ X03-001 | E05-001 (All studies combined) |
|---|---|---|---|---|
| Pre-Treatment | | | | |
| Patients (n) | 43 | 97 | 11 | 195 |
| MAVE Events (n) | 6 | 23 | 3 | 33 |
| Patient Years (n) | 42.9 | 93.8 | 11.0 | 191.8 |
| MAVE Event Rate (n per 100 patient years) | 13.98 | 24.51 | 27.27 | 17.21 |
| SOLIRIS™ Treatment | | | | |
| Patients (n) | 43 | 97 | 11 | 195 |
| MAVE Events (n) | 0 | 2 | 0 | 2 |
| Patient Years (n) | 21.8 | 48.2 | 35.8 | 164.1 |
| MAVE Event Rate (n per 100 patient years) | 0.00 | 4.15 | 0.00 | 1.22[1] |

[1]P=0.013 Eculizumab vs. Pre-Treatment

In the controlled clinical study (Study C04-001), MAVE rate prior to study treatment were lower in the patients randomized to placebo (2.34 per 100 patient years) than in those randomized to eculizumab (5.18 per 100 patient years). The MAVE rate in placebo-treated patients during the study was 4.38 per 100 patient years. Average years per patient prior to treatment were 10.7 and 7.2 in the placebo and eculizumab treatment groups, respectively.

During these studies approximately 54% of patients had received antithrombotic agents prior to start of eculizumab. These medications were allowed as concomitant treatment in the studies and about half of patients were on anticoagulation during the study. The apparent diminution in MAVE rate with eculizumab was confined to patients who had been on anticoagulants prior to study. (Actually, MAVE rates rose in the STUDY C04-002 study during eculizumab treatment in patients who had not been on anticoagulants prior to the study). Because anticoagulant use was common and was not controlled or carefully documented in terms of dose, dose adjustment, starting and stopping, monitoring and so forth, and because there was not a concurrent control for this analysis it is not possible to distinguish between an effect of anticoagulation management and a



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possible effect of eculizumab. Also, there was no prospective plan for verifying or validating the quality of the data collection on event rates prior to study enrollment. Thus, the sponsor's analysis must be considered exploratory. In addition to there being a lack of evidence to support efficacy on the thrombosis endpoint, there is concern that highlighting the low thrombosis rates generally seen in these PNH studies may mislead patients or health care providers into thinking anticoagulation can be discontinued in high risk patients who are receiving eculizumab.

*Safety:*
The safety information is the application is reviewed, summarized and discussed in detail in the Medical Officer's review by Dr. A. Dmytrijuk (dated 2/1/07, signed 2/28/07). The major findings will be summarized here.

In the controlled study in PNH patients (Study C04-001), 43 patients were exposed to eculizumab. Two patients in the eculizumab group discontinued prematurely, 1 due to an adverse event (pregnancy) and one due to patient choice. In the placebo group, 10 patients discontinued, all due to lack of efficacy. One patient in the placebo group experienced a portal vein thrombosis during the study; no patients in the eculizumab group experienced thrombosis in this study. Adverse events that were notably more common in the eculizumab treated patients than in the placebo treated patients were: headache (44.2% and 27.3%, respectively), back pain (18.6% and 9.1%, respectively), fatigue (11.6% and 2.3%, respectively), and respiratory tract infection (7.0% and 2.3%, respectively). Viral infection (2.3% and 11.4%, respectively), urinary tract infection (2.3% and 9.1%, respectively) and paroxysmal nocturnal hemoglobinuria (2.3% and 6.8%, respectively) were more frequent in the placebo group than in the eculizumab group. There were no deaths in this study.

Among 193 PNH patients who received eculizumab in uncontrolled studies serious adverse events occurring in 2 or more patients were: viral infection (2.6%), anemia (1.6%), pyrexia (1.6%), hemolysis (1.0%), and headache 2.1%). Serious adverse events occurring in more that 1 patient among the 140 patients who received eculizumab in Studies C04-001 and C04-002 included: anemia (2.1%), hemolysis (1.4%), intervertebral disc protrusion (1.4%) and pyrexia (1.4%) and headache (1.4%).

Across all PNH studies overall infections did not seem to be more frequent in patients who received eculizumab than in those who received placebo. The incidence of herpes simplex infection appeared to be increased in PNH patients treated with eculizumab (8/140; 5.7%) as compared to none in placebo patients.

Because eculizumab inhibits complement activation, it may impair neutrophil and monocyte function and impair the ability of the patient to clear infections with encapsulated orgainisms. For this reason all patients were required to be vaccinated against *Neisseria meningitides* at least 2 weeks prior to starting study treatment. There have been 3 cases of Neisseria meningitis in patients receiving eculizumab. These were:



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a 22 year old unvaccinated woman with idiopathic membranous glomerulonephritis who had received eculizumab for about 7 months; a 54 year old vaccinated female PNH who had been on eculizumab for approximately 14 months; and a 24 year old male vaccinated PNH patient who had received exulizumab for approximately 12 months. No patients died but the unvaccinated patient had a complicated course with amputation of parts of some digits due to gangrene, pulmonary embolus, and pneumonia and she was discharged to a rehabilitation facility after prolonged antibiotic treatment.

In the PNH studies patients were tested for human antihuman antibodies (HAHA) after eculizumab treatment and 2 patients were found to have IgG titers of 1:20 and one patient had an IgM titer of 1:20 and 1:100. No patients developed a rebound in hemolysis with these antibodies. Also, because of concern of rebound hemolysis after discontinuing eculizumab it was planned to follow patients after discontinuation of eculizumab, but few patients in the controlled study discontinued eculizumab prematurely and most patients continued into extension studies of eculizumab after completing study treatment.

In the eculizumab database of PNH patients, a total of 4 patients have died. These were: a 31 year old man with PNH and hemosiderosis in C04-002 who experienced low back pain was hospitalized and suffered a pulmonary embolus 31 days after last eculizumab, had a hemorrhagic cerebral infarction and cerebral herniation and died; a woman [redacted] patient in a physician-sponsored study who experienced exacerbations of cholecystitis and fever about 2 months after last eculizumab dose, abdominal pain and presumed sepsis died due to a CVA; a man in E05-001 who had PNH and myelodysplastic syndrome (MDS) developed cellulitis, sepsis and acute renal failure after [redacted] was hospitalized, developed a viral infection and died due to worsening of his MDS; a woman who died after 13 months on eculizumab of metastatic adenocarcinoma. There is also some experience with eculizumab in other indications, including rheumatoid arthritis, bullous pemphigoid, systemic lupus erythromatosis, idiopathic membranous glomerulonephropathy, psoriasis and dermatomyositis (984 total patients; about 666 exposed to eculizumab). Duration of exposure in these studies generally was longer than in the PNH studies. There have been 3 deaths of patients in these studies: a woman who received placebo in C01-004, a study in rheumatoid arthritis, who experienced acute respiratory distress post-surgery for an incarcerated hernia and died presumably of a pulmonary embolus; a 60 year old woman with rheumatoid arthritis who received eculizumab in Study E99-01, who developed bacterial sepsis followed by Candida sepsis after cholecystectomy and died after 8 months of eculizumab therapy; a man in CC99-004 with idiopathic membranous glomerulonephropathy who died [redacted]

*Special Populations:*
Pediatrics: No pediatric patients have received eculizumab. PNH is an uncommon disease occurring in only about 1-2 per million persons. The sponsor was granted Orphan Drug status for the drug for the PNH indication on 8/20/03; consequently



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pediatric studies are not required under PREA. The sponsor has requested an exemption from any requirement to assess eculizumab in the pediatric PNH subpopulation. Clinical review recommends that this request be granted. Any pediatric patients treated may be followed in a post-marketing registry.

Pregnancy and Lactation: The Pediatric and Maternal Health Staff (PMHS) has provided comment on the proposed labeling for eculizumab. (See Memorandum from Dr. K. Feibus, dated 2/22/07, signed 2/28/07). The PMHS team comments and recommendations for the package insert included that: the Labor and Delivery section of the label be deleted, since there is no information; human IgG crosses the placenta and, therefore, eculizumab also is expected to cross the placenta; eculizumab will likely be Pregnancy Category C and sclass should be used during pregnancy or in women not using adequate contraception unless the potential benefit justifies the potential risk to the fetus; IgG is excreted in human milk, therefore eculizumab is expected to appear in the breast milk.

The PMHS review recommended that in the registry the sponsor plans to establish for patients with PNH who use eculizumab, the registry should be used to prospectively follow pregnancies with eculizumab exposure and their maternal and neonatal outcomes.

**Other Information:**
Chemistry: The eculizumab antibody (h5G1.1-mAb) is a humanized $IgG_{2/4}$ kappa antibody consisting of two 448 amino acid heavy chains and two 214 amino acid light chains. The heavy chains are comprised of human $IgG_2$ sequences in constant region 1, the hinge, and the adjacent protion of constant region 2, and human $IgG_4$ sequences in the remaining part of constant region 2 and constant region 3. The light chains are comprised of human kappa sequences. The variable chains consist of human framework regions with grafted murine complementarity-determining regions, which form the antigen binding site. The protein molecule has an expected molecular mass of 148,523 Daltons.

The chemistry, manufacturing, and controls (CMC) (Product) information for eculizumab drug substance has been reviewed by B. Urtani, Ph.D. (review signed 2/23/07). The review found the drug substance section of the application acceptable fro a microbiology product quality perspective. Lonza Biologics, NH, the drug substance manufacturer, and Alexion Pharmaceuticals, CT, for release testing, were found to be in acceptable GMP compliance.

The review of the drug substance control of source and Starting Materials of Biological Origin, Generation of Cell Substrate, Cell banking system, characterization, batch analyses, justification of specifications, reference standards, and stability sections of the application were reviewed by Office of Biotechnology Products, Division of Monoclonal Antibodies (OBP/DMA) (review by M. Frazier-Jessen, Ph.D. et al., final signature 2/27/07). Manufacturing information was found acceptable to support product approval. A number of PMCs were recommended to provide additional information to assure the



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continued safety of the product. The review states that these have been agreed to by the sponsor and are as follows:

1. Alexion commits to developing a validated and quantitative assay for the measurement of human anti-human antibodies (HAHA) for the detection of antibody formation to Eculizumab. This assay will assess potential immune responses to the whole Eculizumab molecule. Description of the validated assay will be submitted to the BLA as a CBE 30 by July 9, 2008.

2. Alexion commits to developing a validated and sensitive assay for the measurement of neutralizing HAHA to Eculizumab. Alternatively, Alexion commits to submit documentation to FDA demonstrating with due diligence that a suitable assay could not be feasibly developed and that the assessment of serum lactate dehydrogenase (LDH) is a sufficiently sensitive indicator of the presence of neutralizing antibodies. This information will be submitted to the BLA by July 9, 2008.

3. Alexion commits to revalidating the linearity and accuracy of the Osmolality method across the full specification range using a combination of product samples diluted to lower osmolality and product samples spiked with osmolality standards. The revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

4. Alexion commits to revalidating the linearity of the IEF method across a load range of [redacted] The revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

5. Alexion commits to revising the IEF method SOP to specify that the method is validated only for a [redacted]. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

6. Alexion commits to improving and revalidating the existing hemolytic assay. Improvements include increasing the number of sample replicates and qualifying the chicken erythrocytes reagent. The revised method SOP and revalidation plan will be submitted in advance to FDA for review and endorsement. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.



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7. Alexion commits to developing a new quantitative biological activity assay to replace the existing hemolytic assay, or submit documentation to FDA demonstrating with due diligence that a suitable assay could not be feasibly developed. This information will be submitted to the BLA as a CBE 30 by February 29, 2008. Validation of the quantitative biological activity assay will be submitted by July 9, 2008.

8. Alexion commits to providing FDA with a completed drug substance and drug product container closure system leachables evaluation using end-of-shelf-life, long-term 2 – 8°C stability samples. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

9. Alexion commits to develop a suitable [redacted] assay and subsequently confirm [redacted] on three drug substance batches. This information will be submitted to the BLA as a CBE 30 by August 31, 2007.

Pharmacology: The pharmacology and toxicology data have been reviewed in detail by S. Biade, Ph.D. (review signed 2/23/07). Notable review findings are summarized briefly here.

Early non-clinical investigations showed that eculizumab did not cross-react with C5 complement of non-primate and non-human primate species. Activity against human C5 was established by measuring the ability of eculizumab to block C5b-9 dependent lysis of pre-sensitized chicken erythrocytes by human serum *in vitro*. Because the molecule shows species specificity with regard to complement inhibition (inhibits only human C5 complement), all non-clinical studies safety studies (safety pharmacology, general toxicity, and reproduction toxicology studies) were done with a murine anti-mouse C5 whole antibody (BB5.1) ("surrogate mAb"). Also, there are no murine models of PNH, so the sponsor studied the murine anti-mouse C5 antibody in mouse models of arthritis, lupus-like autoimmune disease, and asthma which potentially involve C5 and evidence of complement inhibition activity was seen in these models.

No genotoxicity studies have been done (in accordance with ICH S6 Guidance) and no carcinogenicity studies have been done, because of lack of cross-reactivity with C5 in the species usually used for these tests. No placental transfer studies have been done with eculizumab or the similar mouse antibody. However, IgG antibodies are known to cross the placental/fetal barrier through an FcRn receptor mediated mechanism, so eculizumab is felt to have the potential for transfer across the placenta.

The Pharmacology/Toxicology Review describes that, "In a 4 week, repeat dose toxicity study, no toxic signs, based on mortality, clinical observations and body weights, were observed in mice treated for 4 weeks with 30, 60, or 90 mg/kg/week (2-4, 4-8, and 6-12 times the human dose) by bolus injection. Similar hemolytic inhibition was obtained at 60 and 90 mg/kg/week. Therefore, 60 mg/kg/week was selected as the maximum dose



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for subsequent studies." In a 26 week study in mice where 60 mg/kg/week was the high dose, there were some clinical signs and microscopic findings and some unexpected deaths in control and high-dose, but not low dose, animals. The Pharmacology/Toxicology Review comments that, "Because of the higher incidence in clinical signs and histopathological findings (lungs, ears, eyes) in the low and high dose treatment groups compared to the control animals, an NOAEL could not be established in this study." Toxicokinetics and antibody measurement were not conducted in any of the toxicology studies. Hemolytic activity was measured as an indicator of systemic exposure.

Reproductive and developmental toxicity studies done in mice established a NOEL for female toxicity, for male and female fertility, reproductive performance and fetal effects of $\geq$60 mg/kg/week when BB5.1 was administered prior to mating and through early gestation. For male toxicity the NOAEL was 30 mg/kg/week. When BB5.1 was administered to pregnant mice through organogenesis, the NOAEL for maternal toxicity and reproductive performance was 60 mg/kg/week and the NOAEL for embryo-fetal development toxicity was 30 mg/kg/week. In the mouse reproduction studies there were three malformations (2 unilateral retinal dysplasias and 1 umbilical hernia) among 230 offspring of high-dose (60 mg/kg/week) animals. In studies where BB5.1 was administered from implantation through weaning in mice, a NOAEL of $\geq$60 mg/kg/week was established for $F_1$ pup development and reproductive performance.

The Pharmacology/Toxicology Review found no unresolved toxicology issues and recommended that from the perspective of nonclinical pharmacology and toxicology, Soliris may be approved. There were no recommendations for postmarketing studies. Recommendations for labeling included Pregnancy Category C classification for eculizumab, comment that it is expected that Soliris will be excreted in human milk, and mention of lack of long-term animal studies for carcinogenic and genotoxic potential of the drug. The exact wording of these recommendations from the Pharmacology/Toxicology Review is as follows:

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**Pregnancy (Category C)**

8.1 Pregnancy

Pregnancy Category C:

Soliris is a recombinant IgG molecule (humanized murine anti-C5 antibody), and IgG molecules are known to cross the placenta. Developmental abnormalities and an increased rate of dead and moribund offspring were observed in animal studies (mice) that used a surrogate murine anti-C5 antibody at 2 – 8 times the human dose of Soliris. There are no adequate and well-controlled studies in pregnant women. Soliris should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Animal reproduction studies were conducted in mice using doses of a murine anti-C 5 antibody that approximated 2-4 times (low dose) and 4-8 times (high dose) the recommended human Soliris dose. When animal exposure to the antibody occurred in the time period from before mating until early gestation, no decrease in fertility or reproductive performance was observed. When maternal exposure to the antibody occurred during organogenesis, two cases of retinal dysplasia and one case of umbilical hernia were observed among 230 offspring born to mothers exposed to the higher antibody dose; however, the exposure did not increase fetal loss or neonatal death. When maternal exposure to the antibody occurred in the time period from implantation through weaning, [redacted] antibody-treated mothers also had a higher number of male offspring that became moribund or died (1/25 controls, 2/25 low dose group, 5/25 high dose group) [redacted] Surviving offspring had normal development and reproductive performance.

[redacted]

8.3 Nursing Mothers

It is not known whether Soliris is secreted into human milk. IgG is excreted in human milk, so it is expected that Soliris will be present in human milk.

However, published data suggest that breast milk antibodies do not enter the neonatal and infant circulation in substantial amounts. Caution should be exercised when Soliris is administered to a nursing woman. The unknown risks to the infant from gastrointestinal or limited systemic exposure to Soliris should be weighed against the known benefits of breastfeeding.



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13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility
Long-term animal studies have not been conducted to evaluate the carcinogenic and genotoxic potential of Soliris. Effects of Soliris upon fertility have not been studied in animals. Intravenous injections of male and female mice with a murine anti-C5 antibody at up to 4-8 times the equivalent of the clinical dose of Soliris had no adverse effects on mating or fertility.

Clinical Pharmacology: Clinical Pharmacology and Biopharmaceutics review was conducted by J.-I. Lee, Pharm.D., Ph.D. (signed 2/28/07). The review found the application acceptable for approval and did not recommend any post-marketing commitments from clinical pharmacology perspective.

Dr. Lee's summary of the clinical pharmacology findings are shown below:
Exposure-Response Relationships

- When determined using a hemolytic assay following a single dose of eculizumab 8.0 mg/kg to patients with rheumatoid arthritis (RA), the onset of complete hemolytic inhibition occurred before the first sampling time (15 min). The duration of the inhibition ranged from 7 to 14 days. The recovery time ranged from 11 to 21 days.
- Based on the pharmacokinetic (PK) / pharmacodynamic (PD) modeling using data collected from patients with idiopathic membraneous glomerulopathy (IMG), RA, and PNH, the total serum (free and bound) concentrations of eculizumab required to block terminal C5 complement activation was roughly 43 mcg/mL.
- Treatment with eculizumab at the proposed dose and dosing regimen resulted in an immediate (from 2109 U/L to 65 U/L by Week 1) and sustained (325 U/L by Week 26) decrease in serum lactate dehydrogenase (LDH) levels as determined in 40 PNH patients (Study C04-001).

Basic Pharmacokinetics

- When studied in patients with RA and systemic lupus erythematosus (SLE) following a single dose, a striking feature of eculizumab concentration-time curve is the presence of second peak at approximately 2 days post dose.
- Eculizumab PK have not been assessed following a single dose to PNH patients.
- Based on a population PK modeling with sparse sampling in a multiple dose study, the clearance of eculizumab for a typical PNH patient weighing 70 kg was 22 mL/hr and the volume of distribution was 7.7 L. The estimated half-life was 272 ± 82 hrs (mean ± SD).



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- The mean observed peak and trough serum concentrations of eculizumab by week 26 following the administration of the proposed dose and dosing regimen were 194 ± 76 mcg/mL and 97 ± 60 mcg/mL, respectively.

Immunogenicity

- Using a partially validated enzyme-liked immunosorbent assay (ELISA) method, 1 out of 43 (2.3%) PNH patients treated with eculizumab and 1 out of 44 PNH patients treated with placebo demonstrated a detectable level of human anti-human antibodies (HAHA) at the last study visit (Week 26).
- There appears to be no apparent impact of HAHA induction on the efficacy, safety, and PK of eculizumab. However, a definitive conclusion cannot be made based on the small number of PNH patients with positive HAHA response.

Pharmacometrics review (R. Madabushi, Ph.D. (signed 2/28/07) evaluated the sponsor's pharmacokinetic data. The data were based on population PK modeling using sparse sampling. The review found the following:

1) Based on the population pharmacokinetic modeling, the clearance of eculizumab for a typical PNH patient weighing 70 kg was 0.022 L/hr and the volume of distribution was 7.7 L. The half-life was 272 ± 82 hrs (mean ± SD).
2) The mean observed peak and trough serum concentrations of eculizumab by week 26 were 194 ± 76 µg/mL and 97 ± 60 mcg/mL respectively.
3) Based on the PK/PD modeling, the total serum (free and bound) concentration of eculizumab required to block 50% of terminal complement activation is roughly 43 µg/mL ($EC_{60}$).
4) Treatment with Eculizumab with the proposed dosing regimen results in immediate (from 2109 ± 965 U/L to 652 ± 278 U/L by week 1) and sustained (326 ± 438 U/L by week 26) lowering of LDH levels.

The review concluded, "Treatment with Eculizumab with the proposed dosing regimen result in immediate and sustained decrease in intravascular hemolysis as evidence by lowering of LDH levels."

Office of Safety and Epidemiology/ Division of Surveillance, Research, and Communication Support (OSE/DSRCS) Review of Patient Labeling: The sponsor proposed a Patient Package Insert (PPI) and a Patient Safety Card for distribution with Soliris (eculizumab). This material was reviewed by OSE/DSRCS (J. Best, review dated and signed 2/28/07). DSRCS recommended that the PPI be modified and issued as a Medication Guide, since a Medication Guide is required to be distributed with the product while distributionof a PPI is voluntary. This should enhance the education of patients who receive eculizumab about the drug. DSRCS also recommended that these two pieces (the Medication Guide and the Patient Safety Card) be the only materials used for patient education, so as not to overwhelm the patient. Finally, the Medication Guide should also be included as part of the text of the package insert following the Patient Counseling Information.



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Trade Name Review: Review of the proposed trade name, Soliris, by the Division of Medication Errors and Technical Support (DMETS) (L. Wisniewski, 12/20/06) found that while the name was acceptable for existing approved products, there was potential "for strong orthographic and pnonetic similarities" with two other products that are currently under review, [redacted] and only the first of these three to be approved should receive the requested name. As of 2/28/07 neither [redacted] has been approved.

**Discussion:**
The sponsor has provided convincing evidence from a single adequate and well controlled clinical trial (C04-001) of eculizumab versus placebo in PNH patients of efficacy in stabilizing hemoglobin levels and reducing the need for transfusions at the eculizumab dose tested. Hemolysis in these PNH patients is lessened as demonstrated by a rapid and sustained decrease in plasma LDH levels in patients receiving eculizumab. Event rates for thrombosis were too small to allow meaningful statistical comparison between treatment groups. Based on the efficacy analyses in C04-001 the clinical review (Dr. A. Dmytrijuk, dated 2/1/07, signed 2/28/07) concluded,

> Therefore it appears that Eculizumab is effective in stabilizing hemoglobin and decreasing the number of packed red blood cell transfusions required in transfusion dependent PNH patients. Secondary endpoint analyses for transfusion avoidance and LDH AUC provide additional support that Eculizumab is effective in the treatment of PNH. However, QOL measures using the FACIT- F tool and EORTC QLQ-C30 tool are confounded by the fact that no assessment of effect of transfusion on QOL was performed. Furthermore, with regard to the FACIT-F tool it is not clear if the tool measures all of the components of fatigue because fatigue is a multidimensional concept that encompasses both mental and physical attributes. With regard to the EORTC QLQ-C30 tool there is no evidence available to support the validity of the instrument to measure the individual domain or individual symptom constructs. Analyses of the effect of Eculizumab on the incidence of thrombosis are confounded by the fact that approximately 50% of patients in the Eculizumab treatment arm were on concomitant anticoagulant therapy.

The review concluded that conclusions regarding effect of eculizumab on thrombosis were confounded because a majority of patients in Study C04-002 were on concomitant anticoagulant therapy in the study. The application also was consulted to the Study Endpoints and Label Development (SEALD) team for comment on the quality of life assessments and data. The medical review reports that the SEALD team identified concerns, including that it is unclear if the FACIT-F tool measures all components of fatigue and no evidence is available to support the validity of the EORTC QLQ-C30 QOL instrument to measure the individual domain or individual symptom constructs.

Based on the safety database provided, with regard to safety the Clinical Review concluded:



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Therefore, Eculizumab appears to be generally safe for the treatment of patients with PNH. However, because of the mechanism of action of Eculizumab on the immune system patients with PNH who are treated with Eculizumab are at increased risk for infections with encapsulated organisms. The sponsor proposes an early alert program and a registry program in order to minimize the risk of infections in patients with PNH were treated with Eculizumab. In addition patients who are to be treated with Eculizumab must be vaccinated with *Neisseria meningitidis* vaccine at least two weeks prior to treatment with Eculizumab as was described in the protocols in the PNH studies.

The Clinical Review recommended that eculizumab be approved for treatment of PNH [redacted] dosing as used in the C04-001 Study.

**Conclusions and Recommendations:**
Soliris (eculizumab) is being recommended for approval for the treatment of paroxysmal nocturnal hemoglobinuria (PNH) to [redacted] hemolysis [redacted] Soliris is administered intravenously over [redacted] minutes at a dose of 600 mg every 7 days for the first 4 weeks, followed by 900 mg for the fifth dose 7 days later, then 900 mg every 14 days thereafter.

To support the BLA application the sponsor has provided a single adequate and well-controlled clinical trial of eculizumab compared to placebo for 24 week treatment in transfusion-dependent PNH patients and a single-arm, uncontrolled study following PNH patients on eculizumab treatment over 26 weeks. Results of the controlled study clearly demonstrated greater improvement in the co-primary endpoints of number of transfused RBC units required and hemoglobin stabilization and in proportions of patients requiring blood transfusions, and decreases in serum lactate dehydrogenase levels in the eculizumab treated patients as compared to the placebo-treated patients. The Statistical Review (Y. W. Chen, Ph.D., 1/31/07) concluded, "Efficacy results for both two co-primary efficacy endpoints demonstrated the statistical significance favoring eculizumab, overall and by subgroup of historical transfusion stratification." Measures of some quality of life parameters, such as fatigue, also appeared to improve in the eculizumab treated patients as compared to in the placebo patients. However, the quality of life assessments were carried out only prior to transfusion in the control group, so it is not clear whether improvement in fatigue was due to a direct eculizumab effect or, more likely, due to improvement in the hemolysis.

Important aspects for the labeling include:

- There should be prominent inclusion of the necessity of well-documented, up to date immunization of patients against *Neisseria meningitidis* prior to treatment with eculizumab. Patients must be maintained with current vaccinations throughout treatment with eculizumab. Information about Neisseria meningitis risk should be contained in a black box warning, as the sponsor has proposed.



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- The label should indicate that active meningococcal infection and/or lack of up to date meningococcal immunization are contraindications for eculizumab use.

- The indications statement should reflect that eculizumab decreased hemolysis in PNH patients. Clinical studies in PNH patients were done in transfusion dependent patients and eculizumab stabilized hemoglobin and reduced the need for red blood cell transfusions in these patients.

- The recommended dosing should be that used in the controlled clinical trial.

- An effect of eculizumab in reducing thromboses in PNH patients has not been shown in the submitted studies. Over half of the patients enrolled in the PNH studies had concomitant use of antithrombotics during eculizumab treatment.

- The patient education materials should be revised to include a Medication Guide and a Patient Safety Card, as recommended by DSRCS.

Though a restricted distribution risk minimization plan is not being recommended for this product, the labeling should prominently reflect the particular risk of meningococcal infections and a patient Medication Guide and Patient Safety Card should be developed for the product as planned by the sponsor and distributed to all patients who receive the drug, as recommended by the DSRCS.

Exact wording of the labeling is being negotiated with the sponsor.

Though the information provided is adequate from a clinical viewpoint to support approval of eculizumab for marketing, additional information is needed to provide more complete information in the labeling to enhance the safe use of the product. Accordingly, the clinical review (Dr. A. Dmytrijuk, 2/28/07) recommends the following clinical post-marketing commitments (PMCs):

The sponsor should be required to do the following:



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- Commit to evaluating long-term safety of Eculizumab by analyzing outcomes in the paroxysmal nocturnal hemoglobinuria (PNH) registry program for a time period of no less than five years. At the end of the five year period, a study report will be submitted to the Biological License Application (BLA) that describes the major safety findings from the registry program, including the specific items listed below and proposing labeling changes as appropriate. Additionally, annual interim reports will be submitted to the BLA, along with expedited reports as specified below. All patients within the registry will be followed for the occurrence of:

    - Serious infections, defined as infections necessitating or prolonging hospitalization or resulting in death. The sponsor should commit to collecting follow-up information from these patients to assess the nature of the serious infection, the duration of hospitalization, the major features of the clinical course and the survival status. Expedited reporting (15 day telephone or facsimile Medwatch communication) will be provided for the occurrence of these serious infections.

    - Malignancy, including the nature of the malignancy and the survival status of patients who develop a malignancy;

    - Use of Eculizumab among pediatric patients under 16 years of age, to include collection of Eculizumab dosage information, as well as the same information being required for adult patients in the registry.

    - Pregnancy, including the clinical course of each pregnancy and the detection of congenital abnormalities among babies born to the women exposed to Eculizumab during the pregnancy.

For all the patients being followed in the registry, eculizumab exposure (dose and treatment duration), as well as clinical outcomes and adverse events should be collected. Patients who discontinue eculizumab should be followed for evidence of rebound hemolysis.

Additional PMCs as recommended by the Division of Monoclonal Antibodies, Division of Monoclonal Antibodies, OBP, and detailed under "Other Information: Chemistry" above should also be required.



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# CLINICAL REVIEW

| | |
|---|---|
| Application Type | BLA |
| Submission Number | 125166 |
| Submission Code | 000 |
| Letter Date | September 15, 2006 |
| Stamp Date | September 15, 2006 |
| PDUFA Goal Date | March 16, 2007 |
| Reviewer Name | Andrew Dmytrijuk, MD |
| Review Completion Date | February 1, 2007 |
| Established Name | Eculizumab (h5G1.1-mAb) |
| (Proposed) Trade Name | Soliris |
| Therapeutic Class | Monoclonal Antibody |
| Applicant | Alexion Pharmaceuticals, Inc.<br>352 Knotter Dr.<br>Cheshire, CT 06410 |
| Priority Designation | S |
| Formulation | Humanized Monoclonal Antibody |
| Dosing Regimen | 600mg via 25-45 minute intravenous infusion every 7+/- 2 days for the first 4 weeks followed by 900mg via 25-45 minute intravenous infusion for the fifth dose 7 +/- 2 days later then 900mg via 25-45 minute intravenous infusion every 14 +/- 2 days thereafter. |
| Indication | Treatment of Patients with Paroxysmal Nocturnal Hemoglobinuria |
| Intended Population | Patients with Paroxysmal Nocturnal Hemoglobinuria |

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# LIST OF ABBREVIATIONS:

| | |
|---|---|
| AE | adverse event |
| ALT | alanine aminotransferase |
| AST | aspartate aminotransferase |
| AUC | area under the curve |
| CFR | Code of Federal Regulations |
| CRF | case report form |
| DSMB | data safety monitoring board |
| ECG | electrocardiogram |
| EORTC QLQ-C30 | European Organisation for Research and Treatment of Cancer Quality-of-Life Questionnaire Core 30, Version 3.0 |
| FACIT-Fatigue scale | Functional Assessment of Chronic Illness Therapy-Fatigue scale, version 4 |
| GPI | glycosylphosphatidylinositol |
| HAHA | human antihuman antibody (anti-h5G1.1-mAb) |
| ICF | informed consent form |
| ICH | International Conference on Harmonisation |
| IEC | independent ethics committee |
| IgG | immunoglobulin G |
| IgM | immunoglobulin M |
| INR | international normalized ratio |
| IRB | institutional review board |
| ITT | intent-to-treat |
| IV | intravenous |
| IVRS | interactive voice response system |
| LDH | lactate dehydrogenase |
| MAVE | major adverse vascular event |
| MID | minimally important difference |
| NO | nitric oxide |
| PD | pharmacodynamics |
| PK | pharmacokinetics |
| PNH | paroxysmal nocturnal hemoglobinuria |
| PRBC | packed red blood cell |
| QoL | quality of life |
| RBC | red blood cell |



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| | |
|---|---|
| SAE | serious adverse event |
| SD | standard deviation |
| TEAE(s) | treatment-emergent adverse event(s) |
| WBC | white blood cell |

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# EXECUTIVE SUMMARY

## 1.1 Recommendation on Regulatory Action

Eculizumab should be approved for the following indication:

- Treatment of paroxysmal nocturnal hemoglobinuria (PNH) [redacted] The dose proposed is as follows:
    - In the induction phase, 600 mg of Eculizumab is administered every week for the first four weeks and 900 mg of Eculizumab is administered in week five. The maintenance phase consists of a 900 mg dose of Eculizumab every 14 +/- 2 days thereafter. The drug is administered as a [redacted] minute intravenous (IV) infusion.

The rationale for this approval recommendation is based on the following information:

- The efficacy of the proposed therapy is supported by the TRIUMPH (C 04-001) study. This study was a randomized, double-blind, placebo-controlled, multicenter, multinational trial conducted in transfusion dependent patients with PNH. The study showed a benefit of Eculizumab in stabilizing hemoglobin levels and reducing requirement for red blood cell transfusions.
- In addition, the efficacy of Eculizumab for the treatment of patients with transfusion dependent PNH was supported by the SHEPHERD (C 04-002) study. This was an open label, multicenter, multinational trial in which Eculizumab decreased intravascular hemolysis as measured by serum lactate dehydrogenase (LDH) levels in patients with PNH.
- The safety of this regimen was supported by comparative information from the placebo-controlled TRIUMPH study and an analysis of the safety in all PNH patients exposed to Eculizumab.

## 1.2 Recommendation on Postmarketing Actions

### 1.2.1 Risk Management Activity

The sponsor should undertake the usual postmarketing monitoring and reporting. In addition the sponsor proposes a risk minimization program which involves a registry of all PNH patients who are exposed to Eculizumab. In addition to the registry the sponsor proposes to incorporate an early alert program to minimize the risk of infectious adverse events in patients with PNH who are treated with Eculizumab.



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### 1.2.2 Required Phase 4 Commitments

The sponsor should address all of the postmarketing commitments (PMCs) which include both clinical and chemistry/manufacturing postmarketing commitments and are listed as follows:

- Commit to evaluating long-term safety of Eculizumab by analyzing outcomes in the paroxysmal nocturnal hemoglobinuria (PNH) registry program for a time period of no less than five years. At the end of the five year period, a study report will be submitted to the Biological License Application (BLA) that describes the major safety findings from the registry program, including the specific items listed below and proposing labeling changes as appropriate. Additionally, annual interim reports will be submitted to the BLA, along with expedited reports as specified below. All patients within the registry will be followed for the occurrence of:

    - Serious infections, defined as infections necessitating or prolonging hospitalization or resulting in death. The sponsor should commit to collecting follow-up information from these patients to assess the nature of the serious infection, the duration of hospitalization, the major features of the clinical course and the survival status. Expedited reporting (15 day telephone or facsimile Medwatch communication) will be provided for the occurrence of these serious infections.

    - Malignancy, including the nature of the malignancy and the survival status of patients who develop a malignancy;

    - Use of Eculizumab among pediatric patients under 16 years of age, to include collection of Eculizumab dosage information, as well as the same information being required for adult patients in the registry.

    - Pregnancy, including the clinical course of each pregnancy and the detection of congenital abnormalities among babies born to the women exposed to Eculizumab during the pregnancy.

- In addition there are a number of chemistry, manufacturing and controls (CMC) postmarketing commitments which require that the sponsor evaluate human antihuman antibody formation (HAHA) as well as other manufacturing issues. (See CMC review for a list of these PMCs).

### 1.2.3 Other Phase 4 Requests

None requested.



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## 1.3 Summary of Clinical Findings

### 1.3.1 Brief Overview of Clinical Program

Eculizumab is a humanized monoclonal antibody that binds to the human C5 complement protein. This results in the inhibition of the terminal complement cascade. CD 59 blocks the terminal complement cascade on normal red blood cells. Red blood cells lacking CD59 are type III red blood cell clones. Patients with paroxysmal nocturnal hemoglobinuria (PNH) lack CD59. The lack of CD59 on the red blood cells of patients with PNH allows the terminal complement cascade to hemolyze these red blood cells. Currently there are no pharmacologically related products other than other monoclonal antibodies used in various other diseases. These monoclonal antibodies share the common adverse event of infusion reaction usually displayed as a hypersensitivity reaction either systemically or locally at the point of infusion. Also because this is a monoclonal antibody with human constant regions HAHA to Eculizumab may develop.

PNH is an uncommon, life-threatening hemolytic anemia. The reported incidence is 1-2 per million. The disease is characterized by chronic intravascular hemolysis. There is release of hemoglobin into the plasma from hemolyzed red blood cells. The hemolysis leads to anemia, thrombosis and fatigue - which are the most common morbidities for this disease. Clinically, the degree of the hemolysis is monitored by levels of serum lactate dehydrogenase (LDH). Currently there are no approved treatments for PNH.

Eculizumab administered in a 30 minute IV infusion at doses > 4 mg/kg or at fixed doses > 600 mg reaches peak serum concentrations in excess of 100 mcg/ml within one hour of infusion. At these doses of Eculizumab terminal complement inhibition is evidenced by the essentially complete inhibition of complement mediated hemolysis. The sponsor notes that the hemolysis in pharmacodynamic assays is inhibited by Eculizumab concentrations in excess of 35 mcg/ml. Concentrations below this threshold result in inadequate inhibition of C5. Hemolysis takes place at concentrations < 20 mcg/ml as measured by the pharmacodynamic hemolytic assay. The sponsor states that the proposed dosing regimen effectively maintains the concentration of Eculizumab at approximately 35 mcg/ml.

The study C04-001, also known as the TRIUMPH study (A Hemoglobin Stabilization in Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multicenter, Double-Blind, Placebo-Controlled, Using Eculizumab and Paroxysmal Nocturnal Hemoglobinuria Patients), is the pivotal study supporting Eculizumab's safety and efficacy for the treatment of PNH. In addition, information from the open label study C04-002, also known as the SHEPHERD study (Safety in Hemolytic Paroxysmal Nocturnal Hemoglobinuria Patients Treated with Eculizumab: the Multicenter, Open Label, Research Design Study), was submitted by the sponsor to support the safety and also the efficacy of Eculizumab therapy in PNH patients. An additional analysis of the safety of Eculizumab in PNH patients was undertaken using the combined safety database consisting of all of the PNH patients exposed to Eculizumab thus far in the clinical development program. The sponsor, in the submission, lists 196 PNH patients as having been exposed to Eculizumab. The sponsor reported in a teleconference with the division in January of 2007 that one additional patient in a physician sponsored IND was exposed to



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Eculizumab that was not reported as part of the safety database for Eculizumab in the BLA submission. The non-PNH studies were reviewed to further analyze the safety database of Eculizumab.

In the 87 patient, double blind, placebo controlled, TRIUMPH study conducted in patients with PNH, the efficacy co-primary endpoints for this study were hemoglobin stabilization and the number of packed red blood cell units transfused during the treatment phase of the study through 26 weeks. The secondary objectives of this study were transfusion avoidance, hemolysis as measured by lactate dehydrogenase (LDH) area under the curve (AUC) during the treatment phase from baseline through 26 weeks. This study also had the exploratory endpoints of LDH change from baseline through 26 weeks, EORTC QLQ-C30 quality-of-life (QOL) changes from baseline through 26 weeks, thrombosis, platelet activity, nitric oxide and free hemoglobin measures from randomization and through 26 weeks.

The 97 patient SHEPHERD study was an open label, multicenter study of Eculizumab administered IV to patients with PNH for 52 weeks. The primary objective of this study was to evaluate the safety of Eculizumab in patients with transfusion dependent PNH. The secondary objectives of this study were to analyze hemolysis reduction as measured by LDH AUC and changes in the functional assessment of chronic illness therapy fatigue (FACIT-F QOL) scale. Exploratory endpoints for this study included health-related QOL as measured by the EORTC QLQ-C30 and measures of thrombosis, platelet activity, nitric oxide and free hemoglobin.

The safety of Eculizumab was supported by information from the TRIUMPH study and an analysis of the safety in all PNH patients exposed to Eculizumab.

### 1.3.2 Efficacy

In the TRIUMPH study, in the Eculizumab treated group there were 21/43 patients who had hemoglobin stabilization compared to 0/44 patients with hemoglobin stabilization in the placebo group in the TRIUMPH study ($P<<0.0001$). The hemoglobin set point for each patient was defined as $\leq 9$ g/dl in patients with symptoms and was $\leq 7$ g/dl in patients without symptoms. To achieve a designation of hemoglobin stabilization, a patient had to maintain a hemoglobin concentration above the hemoglobin set point and avoid any red blood cell transfusion for the entire 26 week treatment period. In the Eculizumab group 22/43 patients did not achieve hemoglobin stabilization. When patients were stratified according to transfusion requirements prior to study entry, (low, intermediate and high strata) there was a statistically significant number of patients who achieve hemoglobin stabilization treated with Eculizumab compared to placebo treated patients. The table below shows the results of the primary endpoint of hemoglobin stabilization in the intention to treat population.



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**Table 10. Hemoglobin Stabilization (ITT)**

| Randomization strata | Hemoglobin stabilization? | Eculizumab N = 43 n/N (%) | Placebo N = 44 n/N (%) | *P* Value[a] |
|---|---|---|---|---|
| Overall (N=87) | Yes | 21/43 (48.8) | 0/44 (0.0) | 0.000000014 |
| | No | 22/43 (51.2) | 44/44 (100) | |
| 4 to 14 units (n=30) | Yes | 12/15 (80.0) | 0/15 (0.0) | 0.000010521 |
| | No | 3/15 (20.0) | 15/15 (100) | |
| 15 to 25 units (n=35) | Yes | 5/17 (29.4) | 0/18 (0.0) | 0.019061584 |
| | No | 12/17 (70.6) | 18/18 (100) | |
| >25 units (n=22) | Yes | 4/11 (36.4) | 0/11 (0.0) | 0.090225564 |
| | No | 7/11 (63.6) | 11/11 (100) | |

Note: Stabilization was calculated between Baseline and 26 weeks after first dose.

[a] *P* values were calculated using Fisher's exact test.

Reference: Table 14.2.1.1

The table below shows the hemoglobin stabilization in the intention to treat population. In the Eculizumab treated group there were 21/43 patients who had hemoglobin stabilization compared to 0/44 patients with hemoglobin stabilization in the placebo group in the TRIUMPH study (P<<0.0001). In the Eculizumab group 22/43 patients did not achieve hemoglobin stabilization. When patients were stratified according to transfusion requirements prior to study entry, (low, intermediate and high strata) there was a statistically significantly greater number of patients who achieved hemoglobin stabilization treated with Eculizumab compared to placebo treated patients. The table below shows the results of the primary endpoint of hemoglobin stabilization in the intention to treat population.

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**Table 11. Summary of Units Transfused from Baseline to 26 Weeks (ITT)**

| Randomization strata | Eculizumab | Placebo | *P* value[a] |
|---|---|---|---|
| **Overall (N)** | 43 | 44 | <0.000000001 |
| Mean (standard error) | 3.0 (0.67) | 11.0 (0.83) | |
| Median | 0.0 | 10.0 | |
| Range | (0.0, 16.0) | (2.0, 21.0) | |
| **4 - 14 units (n)** | 15 | 15 | 0.000002311 |
| Mean (standard error) | 0.4 (0.29) | 6.7 (0.72) | |
| Median | 0.0 | 6.0 | |
| Range | (0.0, 4.0) | (2.0, 12.0) | |
| **15 - 25 units (n)** | 17 | 18 | 0.000665129 |
| Mean (standard error) | 4.2 (1.14) | 10.8 (1.17) | |
| Median | 2.0 | 10.0 | |
| Range | (0.0, 15.0) | (2.0, 21.0) | |
| **> 25 units (n)** | 11 | 11 | 0.000301977 |
| Mean (standard error) | 4.5 (1.59) | 17.0 (1.04) | |
| Median | 3.0 | 18.0 | |
| Range | (0.0, 16.0) | (10.0, 20.0) | |

[a] *P* values were calculated using Wilcoxon's rank sum test.

Reference: Table 14.2.1.2.1

In the SHEPHERD study the primary endpoint was the LDH AUC. The results of the analysis of the primary endpoint are shown in the table below. There was a significant decrease in the LDH AUC over time in these patients.

**Table 9. Area Under the Curve for Lactate Dehydrogenase in U/L over time (PP)**

| Statistic | Eculizumab N=97 | *P* Value[a] |
|---|---|---|
| **Overall** | | <0.001 |
| Mean (standard error) | -325375.7 (18296.43) | |
| Median | -301837.0 | |
| Range | (-881796.5, -39392.5) | |

Note: Area under the curve was calculated from Baseline to 26 weeks after first dose.

[a] Based on Wilcoxon signed rank test.

Reference: Table 14.2.1.1

Therefore, the TRIUMPH study was a randomized, double-blind, placebo-controlled, multicenter study of Eculizumab or placebo administered by IV infusion to 87 patients with hemolytic transfusion dependent PNH patients. The treatment arms were similar in terms of patient demographics, thrombosis and transfusion history. In this study hemoglobin stabilization (a co primary endpoint) was achieved in 48.8% of Eculizumab treated patients indicating that these patients did not require any transfusions during the 26 week study duration. Hemoglobin stabilization did not occur among any of the placebo patients and the difference between the treatment groups was a statistically significant. A sensitivity analysis performed on the



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hemoglobin stabilization endpoints confirmed this efficacy outcome. After treatment with Eculizumab, statistically significant differences in hemoglobin stabilization were observed in the low and middle transfusion strata but not the high strata. In addition a statistically significant reduction in the number of packed red blood cell units transfused (a co-primary endpoint) was achieved in the Eculizumab group compared with placebo. During the 26 week study the median units transfused per patient was 0.0 in the Eculizumab group and 10.0 in the placebo group regardless of transfusion strata.

Secondary endpoint analyses for efficacy showed transfusion of avoidance was achieved in 22/43 Eculizumab patients and in no placebo patients which was statistically significant. The LDH AUC secondary endpoint analysis showed a statistically significant overall improvement in LDH AUC. Also, in each transfusion strata the LDH AUC improved after treatment with Eculizumab compared to the placebo group which was statistically significant. The sponsor analyzed the QOL in this study using the FACIT-Fatigue QOL tool. Eculizumab treated patients demonstrated statistically significant improvements in fatigue levels compared to placebo treated patients by visit six and at subsequent visits. However, because the QOL tool was administered to patients prior to transfusion without a follow-up QOL tool administration immediately after transfusion, is difficult to ascertain Eculizumab's effect on QOL independent of transfusion. The sponsor was asked to demonstrate that improvement in fatigue with Eculizumab did not require improvements in both hemolysis and anemia but was related to either the improvement in hemolysis without requirement for an improvement in anemia or a drug activity unrelated to the observed drug related improvements in hemolysis or anemia. The sponsor was able to demonstrate that Eculizumab is able to improve hemolysis which may positively impact on patient QOL.

The sponsor performed a series of exploratory endpoint analyses including the change of lactate dehydrogenase from baseline, an analysis of QOL using the EORTC QLQ-C30 tool, platelet activity, nitric oxide measure, free hemoglobin measurements and thrombosis. As is noted above, the change in lactate dehydrogenase from baseline, the analysis of QOL from the EORTC QLQ-C30 tool. In the TRIUMPH study, Eculizumab treated patients did show improvement in both the functional and symptom/item measures when assessed using the EORTC QLQ-C30 tool. In addition, nitric oxide measures and free hemoglobin measures favored the Eculizumab treated patients. The exploratory analysis for platelet activity by visit showed that there is no statistically significant change from baseline between the treatment groups.

Therefore it appears that Eculizumab is effective in stabilizing hemoglobin and decreasing the number of packed red blood cell transfusions required in transfusion dependent PNH patients. Secondary endpoint analyses for transfusion avoidance, LDH AUC and QOL measures using the FACIT- Fatigue tool support the fact that Eculizumab is effective in the treatment of PNH. Analyses of the effect of Eculizumab on the incidence of thrombosis are confounded by the fact that approximately 50% of patients in the Eculizumab treatment arm were on concomitant anticoagulant therapy.

In the open label SHEPHERD study, Eculizumab decreased the LDH AUC compared to baseline, appeared to improve quality of life as measured by the FACIT-F QOL instrument. Eculizumab treatment resulted in significant improvements in fatigue and hemolysis without



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meaningful changes in transfusion requirements in the SHEPHERD study population. The sponsor stated that statistically significant improvements in fatigue were observed in the < four units per year pretreatment transfusion stratum. The sponsor indicated that this improvement in fatigue was obtained in patients with minimal pretreatment transfusion requirements and without demonstrable reductions in their transfusion requirements with Eculizumab treatment. The sponsor indicated that the baseline fatigue score for these patients (n=21) was 27.6. The mean change from baseline fatigue score at week 26 for these patients was 13.1 (P<0.001). In this group of 21 patients a median of 0.0 units of red blood cells were transfused during the 26 weeks pretreatment and a median of 0.0 units of packed red blood cells were transfused during the 26 weeks of treatment. Using the EORTC QLQ-C30 QOL tool, in an exploratory analysis, the sponsor was able to show that in patients treated with Eculizumab there were improvements in 13/15 measures including: global health status, role, social, cognitive, physical, emotional, fatigue, pain, dyspnea, appetite loss, insomnia, nausea/vomiting and diarrhea symptom domains. Conclusions regarding the effect of Eculizumab on thrombosis are confounded because of the fact that a majority of patients (59/97) were on concomitant anticoagulant therapy. The SHEPHERD study was designed primarily to assess the safety of Eculizumab in patients with PNH.

Therefore, it appears that Eculizumab is effective in the treatment of patients with transfusion dependent PNH by decreasing hemolysis which results in a stabilization of hemoglobin levels and avoidance of transfusion. It also appears that Eculizumab may improve QOL in patients with PNH in terms of decreasing fatigue and by improving other QOL parameters. Due to the fact that a large number of patients were on concomitant anticoagulant therapy a conclusion regarding Eculizumab's effect on thrombosis incidence rates cannot be made.

### 1.3.3 Safety

There were a total of 7 deaths in all of the Eculizumab studies combined. No deaths occurred in the TRIUMPH study. There were three deaths in non-PNH studies and four deaths in PNH studies other than the TRIUMPH study.

In the TRIUMPH study 4/43 patients in the Eculizumab group compared to 9/44 patients in the placebo group had serious adverse events. The most prevalent serious adverse event was exacerbation of PNH which occurred in one Eculizumab treated patient and three placebo treated patients.

In addition, overall one Eculizumab treated patient reported one serious adverse event associated with infection compared to four placebo patients who reported six infections related adverse events. Overall, there were three patients that developed meningococcal infection while enrolled in the Eculizumab trials. In the PNH trials there were two patients who discontinued treatment prematurely. Neither of these discontinuations appeared to be related to Eculizumab treatment (one patient with pregnancy, one patient with myelodysplastic syndrome).

The serious adverse events reported with Eculizumab treatment which had a frequency of more than 2% were headache (5.2%) and pyrexia (2.1%) in PNH studies. The sponsor reports that in uncontrolled studies the frequency of mild-moderate adverse events reported with Eculizumab



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treatment was 99.0%. The overall frequency of severe treatment emergent adverse events in uncontrolled PNH studies was 22.8%. The sponsor states that adverse events reported as mild to moderate with Eculizumab treatment in more than 10% of patients in uncontrolled studies were: headache (47.7%), nasopharyngitis (39.9%), upper respiratory tract infection (28.5%), nausea (22.3%), arthralgia (17.6%), back pain (17.1%), diarrhea (17.1%), pyrexia (16.1%), vomiting (15.5%), dizziness (15.0%), cough (14.5%), pharyngeal pain (13%), influenza like illness (12.4%), extremity pain (12.4%), insomnia (11.9%), viral infection (11.4%), abdominal pain (11.4%), constipation (10.9%), urinary tract infection (10.9%) and constipation (10.9%).

In the PNH studies three patients developed human antihuman antibodies (HAHA) after treatment with Eculizumab. Two patients had IgG titers of 1:20 and one patient had IgM titers of 1:20 and 1:100. None of these patients developed a rebound in hemolysis despite the presence of these neutralizing antibodies.

Therefore, Eculizumab appears to be generally safe for the treatment of patients with PNH. However, because of the mechanism of action of Eculizumab on the immune system patients with PNH who are treated with Eculizumab are at increased risk for infections with encapsulated organisms. The sponsor proposes an early alert program and a registry program in order to minimize the risk of infections in patients with PNH were treated with Eculizumab. In addition patients who are to be treated with Eculizumab must be vaccinated with *Neisseria meningitidis* vaccine at least two weeks prior to treatment with Eculizumab as was described in the protocols in the PNH studies.

### 1.3.4 Dosing Regimen and Administration

The sponsor proposes an induction and maintenance phase for the administration of Eculizumab. In the induction phase, 600 mg of Eculizumab is administered every week for the first four weeks and 900 mg of Eculizumab is administered in week five. The maintenance phase consists of a 900 mg dose of Eculizumab every 14 +/- 2 days thereafter. The drug is administered as a [redacted] minute intravenous (IV) infusion.

### 1.3.5 Drug-Drug Interactions

No specific drug-drug interaction studies were performed in the Eculizumab clinical development program for PNH treatment.

### 1.3.6 Special Populations

No studies were performed to analyze the safety and efficacy of Eculizumab in patient subgroups based on age, race or gender.



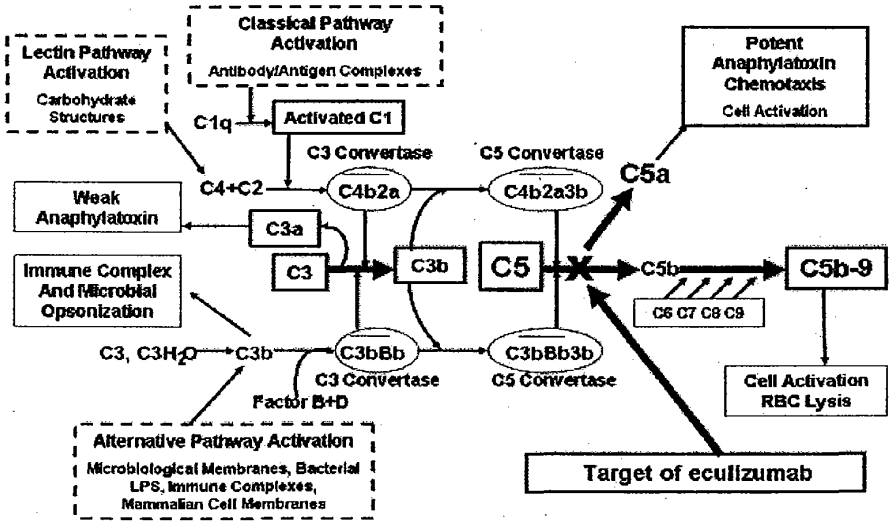
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# 2 INTRODUCTION AND BACKGROUND

## 2.1 Product Information

- Eculizumab is a humanized monoclonal antibody that binds to the human C5 complement protein. This results in the inhibition of the terminal complement cascade. CD 59 blocks the terminal complement cascade on normal red blood cells. Red blood cells lacking CD59 are type III red blood cell clones. Patients with paroxysmal nocturnal hemoglobinuria (PNH) lack CD59. The lack of CD59, on the red blood cells of patients with PNH allows the terminal complement cascade to hemolyze these red blood cells. The figure below shows the complement cascade and the target of Eculizumab.

**Figure 2.5.1.4.2-1: The Complement Cascade**

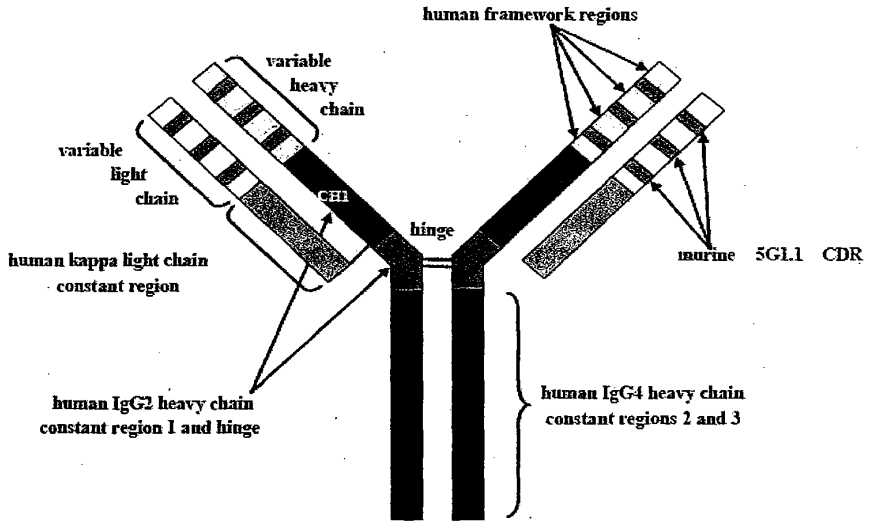



Eculizumab is an IgG kappa immunoglobulin comprised of human constant regions and murine complementarity determining regions (CDR) grafted onto human framework light and heavy chain variable regions. Eculizumab is composed of two 448 amino acid heavy chains and two 214 amino acid light chains and has a molecular weight of approximately 148 kDa. The figure below shows the schematic diagram for Eculizumab.



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**Figure 2.5.1.1-1: Schematic Diagram of Eculizumab (h5G1.1 G2/G4 mAb)**




- The established name is Eculizumab (h5G1.1 G2/G4 mAb). The proposed trade name is Soliris.
- Chemical class: New molecular entity biologic.
- Pharmacological class: Monoclonal antibody.
- Eculizumab was developed for the treatment of patients with paroxysmal nocturnal hemoglobinuria (PNH). The drug is administered as a [redacted] minute intravenous (IV) infusion. The dosage regimen consists of an induction and maintenance phase. In the induction phase, 600 mg of Eculizumab is administered every week for the first four weeks and 900 mg of Eculizumab is administered in week five. The maintenance phase consists of a 900 mg dose of Eculizumab every 14 +/- 2 days thereafter. Eculizumab therapy was not studied in patients with PNH whose age was <18 years. Therefore, patients with PNH whose age is ≥ 18 years is the proposed treatment population.

## 2.2 Currently Available Treatment for Indication

PNH is an uncommon, life-threatening hemolytic anemia. The term "nocturnal" refers to the belief that hemolysis is triggered by acidosis during sleep and activates complement to hemolyze red blood cell that lack CD59. However, it is possible that any condition that activates complement could lead to a hemolytic crisis.[1] The disease is rare. The reported incidence is 1-2 per million. PNH is an acquired genetic terminal complement inhibitor deficiency disorder. The disease is characterized by chronic intravascular hemolysis. There is release of hemoglobin into the plasma from hemolyzed red blood cells. The hemolysis leads to anemia, thrombosis and fatigue - which are the most common morbidities for this disease. Clinically, the degree of the hemolysis is monitored by levels of lactate dehydrogenase (LDH). Currently there are no approved treatments for PNH. The following list is some of the treatments that have been tried for the treatment of PNH[2]:



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- Transfusion for anemia with washed red blood cells in order to avoid transfusing complement in plasma.
- Oral iron therapy for iron deficiency.
- Steroid hormones:
  - Fluoxymesterone 20-30 mg orally daily.
  - Prednisone 20-60 mg orally every other day.
- Anticoagulants:
  - Prophylactic anticoagulation usually not indicated
  - Anticoagulant management of thrombotic complications with low molecular weight heparins, Coumadin has been used.
- Bone marrow transplantation.

## 2.3 Availability of Proposed Active Ingredient in the United States

Eculizumab is a new molecular entity (NME) and is not currently marketed in this country.

## 2.4 Important Issues with Pharmacologically Related Products

Currently there are no pharmacologically related products other than other monoclonal antibodies used in various other diseases. These monoclonal antibodies share the common adverse event of infusion reaction usually displayed as a hypersensitivity reaction either systemically or locally at the point of infusion. Also because this is a monoclonal antibody with human constant regions it is possible that anti-human neutralizing antibodies to Eculizumab may develop.

## 2.5 Presubmission Regulatory Activity

The regulatory history of Eculizumab is as follows:

- May 2003- BB IND 11075 for Eculizumab treatment of PNH submitted.
- August 2003 - Orphan drug designation granted.
- July 2004 - Special Protocol Assessment submitted and approved. The sponsor was told that the co primary endpoints would both need to show significant positive effects. In addition, the sponsor was told that a sensitivity analysis would need to be performed.
- July 2005 - Fast Track request submitted which identified hemolysis and decreased red blood cell transfusion as aspects that can benefit Eculizumab treated PNH patients. The request was denied due to the fact that the sponsor failed to show an unmet need and that no serious aspect of the serious disease PNH was identified.
- March 2006 - pre-BLA meeting held.
- September 15, 2006 - BLA submission.



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## 2.6 Other Relevant Background Information

In October of 2003 the European Community orphan drug designation was granted. In November of 2004 the sponsor was given European Medicines Agency (EMeA) protocol assistance. In February of 2006 the EMeA gave the sponsor follow-up scientific advice on the quality of life endpoints. In June of 2006 the EMeA granted an Accelerated Assessment Procedure.

For this application the sponsor submits one randomized, double blind, placebo controlled multicenter study (C04-001, TRIUMPH, see section 4.1 of this review for description of study) and one open label study (C04-002, SHEPHERD see section 4.1 of this review for description of study). The original protocol for the TRIUMPH study was dated June 2, 2004. On August 8, 2004 an amendment to the protocol was implemented specifically for sites in Germany. This was done to address inclusion/exclusion regarding hepatitis and HIV status required by the German regulatory authorities. On August 10, 2004 a clarification letter was distributed to the primary investigators. This letter clarified the language in the protocol regarding hemoglobin sample collection times at transfusion visits, the removal of assays for gamma globulin, total cholesterol and triglycerides from the laboratory measurements, the inclusion of calculations for red blood cell indices and the addition of phosphorus to the blood chemistry list. These changes according to the sponsor did not alter the overall analysis plan. Of note, in the TRIUMPH study there was difference of one patient in the intention to treat (ITT) population compared to the per protocol population of patients. This patient (number 027-001) is not included in the ITT population because she was randomly assigned to treatment in error. Only two patients discontinued from treatment with Eculizumab in the TRIUMPH study. The sponsor did not conduct an analysis to assess the safety of Eculizumab in those patients who withdrew from the study, because such an analysis was considered to be not clinically meaningful.

The original protocol for the SHEPHERD study was submitted June 2, 2004. On November 24, 2004 an amendment to the protocol was implemented specifically for sites in Germany. This was done to address the inclusion/exclusion criteria regarding hepatitis and HIV status that the German regulatory authorities required prior to giving the protocol approval in that country. On September 23, 2004 an administrative letter was sent to the investigators to clarify discrepancies in the laboratory testing sections of the protocol. The wording for the testing sections in the protocol clarified testing for hepatitis and HIV. On March 4, 2005 protocol changes were made that included elimination of the upper limit for the number of transfusions required in the inclusion criteria, changing the intravascular hemolysis as measured by LDH AUC from a secondary endpoint to a primary surrogate of efficacy endpoint, changing the LDH change from baseline from an exploratory endpoint to a secondary endpoint and changing the [redacted]

For the SHEPHERD study the sponsor noted that protocol deviations involved incomplete study procedures, procedures or study visits outside of the prescribed visit window, laboratory samples collected at incorrect visits, infusion times exceeding protocol limits, incorrect infusion volumes and transfusions administered above the set point. Some study sites in Germany reported the PQ interval from patient electrocardiograms instead of the protocol specified PR interval. This was due to the standard used in Germany. In addition, patient 018-002 was granted a protocol



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exemption from an inclusion criterion which stated that PNH patients had to have ≥ 10% type III red blood cell clones present by flow cytometry. Nevertheless, this patient was included because the primary investigator reasoned that the patient was hemolyzing extremely quickly and that the PNH clone could never build up to a 10% level. Patients 070-009, 070-012 and 070-013 were granted protocol exemptions from the inclusion criterion that required that patients have evidence of PNH for more than six months. Patient 015-001 received only 600 mg instead of the protocol specified 900 mg due to an error at the study site. Patients 022-002, 101-002, 102-003, 102-005, 092-002, 093-001 and 131-001 had visit number two outside the protocol prescribed 14 day window.

These protocol deviations and protocol amendments, in both the TRIUMPH and SHEPHERD studies, were good-faith changes and clarified the protocols. The patient errors listed appear to be minor and do not appear to affect the analysis of the safety and efficacy of Eculizumab in PNH patients reported by the sponsor.

# 3 SIGNIFICANT FINDINGS FROM OTHER REVIEW DISCIPLINES

## 3.1 CMC (and Product Microbiology, if Applicable)

A number of CMC related concerns have been raised. Of particular note is that the sponsor has not provided adequate validation of their method for assessing the immunogenicity of Eculizumab these concerns are reflected in the postmarketing commitments listed in section 1.2.2 of this review.

## 3.2 Animal Pharmacology/Toxicology

Eculizumab does not inhibit C5 activity in the sera from 4 primate and 4 non-primate species. Tissue cross-reactivity of Eculizumab was evaluated by assessing binding to a panel of 38 human tissues. It was shown that Eculizumab binds to smooth and striated muscle as well as renal proximal epithelium. A 26 week mouse toxicity study with a surrogate antibody directed against murine C5 showed the blockage of hemolytic activity during the course of the study in both male and female mice. A no adverse effect level (NOAEL) was established at 60 mg/kg/week for maternal toxicity and reproductive performance and a NOAEL for embryo/fetal development toxicity was established at 30 mg/kg/week. The pharmacology/toxicology review of this submission stated there are no unresolved toxicology issues and from the perspective of nonclinical pharmacology and toxicology, Eculizumab is recommended for approval (see Pharmacology/Toxicology review completed February 27, 2007).



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# 4 DATA SOURCES, REVIEW STRATEGY, AND DATA INTEGRITY

## 4.1 Sources of Clinical Data

The sponsor submitted information from six clinical studies which provide the basis for establishing the safety and efficacy of Eculizumab therapy in PNH patients. The studies are listed in the table below.

| Study Number | Phase/Design[1] | Duration/Status | Total Patients Enrolled |
|---|---|---|---|
| C02-001 | 2[3] / OL | 12 weeks/Complete | 11 |
| E02-001 | 2[3] / OL (C02-001 Extension) | 52 weeks/Complete | 11 |
| X03-001 | 2[3] / OL (E02-001 Extension) | 104 weeks/Complete | 11 |
| C04-001 | 3 / R,DB,PC | 26 weeks/Complete | 87 |
| C04-002 | 3 / OL | 52 weeks/Ongoing<br>26 week Interim Complete | 97 |
| E05-001 | 3b / OL (C04-001, C04-002, and X03-001 Extension) | 104 weeks/Ongoing | 112[2] (~190 anticipated) |

[1]R = Randomized; [2]As of July 18, 2006; [3]Also referred to as Phase I studies; DB = Double Blind; PC = Placebo Controlled; OL = Open Label.

The study C04-001, also known as the TRIUMPH study (A Hemoglobin Stabilization in Transfusion Reduction Efficacy and Safety Clinical Investigation, Randomized, Multicenter, Double-Blind, Placebo-Controlled, Using Eculizumab and Paroxysmal Nocturnal Hemoglobinuria Patients), is the pivotal study supporting Eculizumab's safety and efficacy for the treatment of PNH. For the TRIUMPH study the first patient's first visit was on August 27, 2004 and the last patient's last visit was on December 27, 2005. In addition, information from the open label study C04-002, also known as the SHEPHERD study (Safety in Hemolytic Paroxysmal Nocturnal Hemoglobinuria Patients Treated with Eculizumab: the Multicenter, Open Label, Research Design Study), was submitted by the sponsor to support the safety and also the efficacy of Eculizumab therapy in PNH patients. For the SHEPHERD study, the first visit of the first patient was on December 16, 2004 and the last patient's last visit was on March 21, 2006. An additional analysis of the safety of Eculizumab in PNH patients was undertaken using the combined safety database consisting of all of the PNH patients exposed to Eculizumab thus far in the clinical development program. The sponsor, in the submission, lists 196 PNH patients as having been exposed to Eculizumab. The sponsor reported in a teleconference on January 31, 2007 that one additional patient in a physician sponsored IND was exposed to Eculizumab that was not reported as part of the safety database for Eculizumab in the BLA submission. The non-PNH studies were reviewed to further analyze the safety database of Eculizumab.



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In addition, the sponsor provided summaries of studies performed in the non-PNH setting which provides additional information for the safety of Eculizumab. The studies are listed in the table below.

**Table 2.5.1.5-3: Listing of All Non-PNH Studies**

| Study Number | Indication | Phase/Design[1] | Duration/Status | Total Patients |
|---|---|---|---|---|
| C97-001-01 | Rheumatoid Arthritis (RA) | 1 / R, DB, PC | Single dose/Complete | 42 |
| C99-001 | RA | 2 / R, DB, PC | 12 wks/Complete | 209 |
| E99-001 | RA (C99-001 extension) | 2 / OL | 12 month/Complete | 132 |
| C00-003 | Bullous Pemphigoid | 2 / R, DB, PC | 8 wks/Terminated | 1 |
| C01-004 | RA | 2 / R, DB, PC | 12 month/Complete | 367 |
| E01-004 | RA (C01-004 extension) | 2 / OL | 12 month/Complete | 256 |
| C97-002-01 | Systemic Lupus Erythematosus | 1 / R, DB, PC | Single dose/Complete | 24 |
| C99-004 | Idiopathic Membranous Glomerulopathy (IMG) | 2 / R, DB, PC | 16 wks/Complete | 117 |
| E99-004 | IMG (C99-004 extension) | 2 / OL | 12 month/Complete | 72 |
| C99-007 | Psoriasis | 2 / R, DB, PC | 8 wks/Complete | 40 |
| C99-006 | Dermatomyositis | 2 / R, TP, PC | 8 wks/Complete | 13 |

[1]R = Randomized; DB = Double Blind; PC = Placebo Controlled; OL = Open Label.

## 4.2 Tables of Clinical Studies

See section 4.1.

## 4.3 Review Strategy

The medical review of the TRIUMPH and SHEPHERD studies is included in this document. The TRIUMPH and SHEPHERD studies were the primary studies used to understand the safety and efficacy of Eculizumab for the treatment of patients with PNH. Summaries of the other studies submitted by the sponsor to support Eculizumab's efficacy and safety in the treatment of patients with PNH were reviewed.

An additional analysis of the safety of Eculizumab in PNH patients was undertaken using the combined safety database consisting of all of the PNH patients exposed to Eculizumab thus far in the clinical development program. The sponsor in the submission lists 196 PNH patients as having been exposed to Eculizumab. The sponsor reported in a teleconference with the division in January of 2007 that one additional patient in a physician sponsored IND was exposed to Eculizumab that was not reported as part of the safety database for Eculizumab in the BLA submission. The non-PNH studies were reviewed to further analyze the safety database of Eculizumab.



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## 4.4 Data Quality and Integrity

On September 26, 2006 the Division of Scientific Investigations (DSI) was consulted to evaluate one study site in Leeds, England (study site number 070, primary investigator Dr. Peter Hillman) and one study site in Washington, DC (study site number 027, primary investigator Dr. Neil Young) based on number of patients enrolled at each one of the sites. In addition, DSI also inspected the sponsor (Alexion Pharmaceuticals). PNH is a rare disease which is treated by a very limited number of physicians around the world. There were small numbers of patients enrolled at any one particular study site however, study site number 027 enrolled five patients and the site number 070 enrolled 12 patients. The results of the DSI audit are as follows:

- For the site number 027:
  - The investigator was found to have executed this study adequately. At this site 3/3 female subjects did not have month a year and pregnancy tests during the screening, observation and treatment phase as required by the protocol for the TRIUMPH study.
  - 1/3 subjects was administered one incorrect dose investigational drug (180 mL instead of 120 mL) as required by the protocol for the TRIUMPH study.
  - 1/3 subjects was not given rescue medication on the date of first investigational drug infusion. This patient received rescue medication seven days after the first investigational drug infusion.
  - Overall it appeared that the data collected and generated was acceptable.

- For the site number 070:
  - There did not appear to be any significant deviations from regulations and the study was conducted according to the TRIUMPH study protocol.

- For the sponsor investigation:
  - The inspection evaluated the sponsor's documentation of selection of qualified investigators for the study, financial disclosures and trading of clinical investigators. The inspection verified that the sponsor followed up on all problems encountered.

Therefore, the violations noted above appear to be inconsequential to this review.

## 4.5 Compliance with Good Clinical Practices

All studies, both in the PNH setting and non-PNH setting, were conducted in compliance with the current revision of the Declaration of Helsinki, the International Conference on Harmonization Guidelines for Good Clinical Practices and local regulatory requirements. The protocols and any amendments were approved by an institutional review board prior to initiation and continuation of the studies. Written informed consent provided by the patient was required and the written informed consent form for the TRIUMPH study was reviewed. The informed consent, protocol violations and site-specific issues were reviewed and found to be within accepted standards.



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### 4.6 Financial Disclosures

The [redacted] study's primary investigator was [redacted] The sponsor reported that an unrestricted educational grant was awarded to the [redacted] in the amount of £50,000 annually. The grant was used to fund the salary of a research fellow. In addition, the sponsor reported that a two-year unrestricted educational grant was awarded to the [redacted] which is affiliated with [redacted] in the amount of £50,000 annually. The sponsor reports that the grant was used to fund the salary of a research fellow under the direction of Dr. [redacted] The financial disclosures appear to be appropriate.

## 5 CLINICAL PHARMACOLOGY

### 5.1 Pharmacokinetics

Eculizumab is administered IV and has an assumed 100% bioavailability. The distribution is expected to be typical of the endogenous human antibodies within the vascular and extracellular spaces. Population pharmacokinetic modeling with Eculizumab shows that the volume of distribution approximates that of plasma. The sponsor states that the amount of Eculizumab associated with non-C5 plasma proteins and the effects of plasma protein binding on Eculizumab distribution have not been determined. Eculizumab contains only naturally occurring amino acids and has no known active metabolites. Human antibodies are metabolized by lysosomal enzymes to small peptides and amino acids. The extent of catabolism is inversely proportional to the receptor binding affinity. No specific clinical studies have been conducted to evaluate specific pathways of Eculizumab excretion. Due to its molecular size (148 kD) Eculizumab like other immunoglobulins is expected to be excluded from filtration by normal kidneys. However, in animal studies, testing with the parent molecule for Eculizumab showed that this parent molecule can cross the placental barrier. The table below shows a summary of the single-dose and multiple-does pharmacokinetic parameters of serum Eculizumab estimated from a rheumatoid arthritis model. This model appears to adequately have described the pharmacokinetics of Eculizumab in patients with PNH. The sponsor reports that no clinically important covariates with respect to pharmacokinetic parameters were found. No accumulation of Eculizumab was observed.

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**Table 9.5 C04-001 Parameter Mean Estimates 1C-p Method (n=40)**

| | CL (mL/hr/kg) | $V_d$ (mL/kg) | $K_{el}$ (1/hr) | $t_{1/2}$ (hr) |
|---|---|---|---|---|
| Mean | 0.311183 | 110.3 | 0.002776 | 271.7 |
| SD | 0.125097 | 17.9 | 0.000817 | 81.6 |
| % SD | 40.20 | 16.2 | 29.45 | 30.0 |
| Min | 0.150944 | 79.1 | 0.001376 | 134.1 |
| Max | 0.745052 | 144.1 | 0.005169 | 503.8 |
| Median | 0.289969 | 108.3 | 0.002793 | 248.2 |

1C-p = 1CPNCLI; 1-compartment clearance parameterization IT2B method

Source: Appendix 15

## 5.2 Pharmacodynamics

The sponsor states that 35 mcg/ml of Eculizumab blocks the terminal complement mediated intravascular hemolysis in PNH patients. Pharmacodynamics of Eculizumab mediated complement inhibition was measured in human serum samples using an assay of antibody sensitized chicken erythrocyte lysis in the presence of human serum complement, in which even small amounts of unbound C5 resulted in > 90% hemolysis. The sponsor states that Eculizumab binds to human C5 and inhibits human C5 cleavage in a dose-dependent manner such that a 1:1 molar ratio of Eculizumab to C5 is sufficient for C5 inhibition. The sponsor states that there are no known secondary pharmacological effects of Eculizumab because of the highly specific interaction of Eculizumab with its target as indicated by the lack of Eculizumab binding to C5 from other species.

## 5.3 Exposure-Response Relationships

Eculizumab administered in a 30 minute IV infusion at doses > 4 mg/kg or at fixed doses > 600 mg reaches peak serum concentrations in excess of 100 mcg/ml within one hour of infusion. At these doses of Eculizumab terminal complement inhibition is evidenced by the essentially complete inhibition of complement mediated hemolysis. The sponsor notes that the hemolysis in pharmacodynamic assays is inhibited by Eculizumab concentrations in excess of 35 mcg/ml. Concentrations below this threshold result in inadequate inhibition of C5. This takes place at concentrations < 20 mcg/ml as measured by the pharmacodynamic hemolytic assay. The sponsor states that the proposed dosing regimen effectively maintains the concentration of Eculizumab at approximately 35 mcg/ml. The sponsor states that no clinically relevant pharmacodynamic interactions between Eculizumab and other medications or substances have been observed in any of the clinical subjects at this point. The sponsor also states that, with the exception of patients with a known C5 deficiency, no genetic factors have been identified that would be anticipated to affect the response to Eculizumab. The pharmacology group in the Division of Medical Imaging and Hematology stated that the pharmacology of Eculizumab is



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described by the sponsor is appropriate and reflects the pharmacologic parameters of Eculizumab.

# 6 INTEGRATED REVIEW OF EFFICACY

## 6.1 Indication

The proposed indication for Eculizumab in this submission is: "Eculizumab is indicated for the treatment of patients with paroxysmal nocturnal hemoglobinuria (PNH)."

### 6.1.1 Methods

The clinical data upon which this application is submitted is based on the TRIUMPH study with additional support from the SHEPHERD study.

### 6.1.2 General Discussion of Endpoints

The TRIUMPH study was a randomized, double-blind, placebo-controlled, multicenter study of Eculizumab or placebo administered IV to patients with PNH. The primary objective of this study was to evaluate the safety and efficacy of Eculizumab in transfusion dependent patients with hemolytic PNH. The efficacy co-primary endpoints for this study were hemoglobin stabilization and the number of packed red blood cell units transfused during the treatment phase of the study through 26 weeks. The secondary objectives of this study were transfusion avoidance, hemolysis as measured by lactate dehydrogenase (LDH) area under the curve (AUC) during the treatment phase from baseline through 26 weeks. This study also had the exploratory endpoints of LDH change from baseline through 26 weeks, EORTC QLQ-C30 quality-of-life (QOL) changes from baseline through 26 weeks, thrombosis, platelet activity, nitric oxide and free hemoglobin measures from randomization and through 26 weeks.

The SHEPHERD study was an open label, multicenter study of Eculizumab administered IV to patients with PNH for 52 weeks. The primary objective of this study was to evaluate the safety of Eculizumab in patients with transfusion dependent PNH. The secondary objectives of this study were to analyze hemolysis reduction as measured by LDH AUC and changes in the functional assessment of chronic illness therapy fatigue (FACIT-F QOL) scale. Exploratory endpoints for this study included health-related QOL as measured by the EORTC QLQ-C30 and measures of thrombosis, platelet activity, nitric oxide and free hemoglobin.

### 6.1.3 Study Design

The TRIUMPH study was a randomized, double-blind, placebo-controlled, multicenter study of Eculizumab or placebo administered IV to patients with PNH. Patients that were randomized to the placebo group received placebo IV once a week for five doses then once every two weeks for 21 weeks. Patients randomized to the Eculizumab group received Eculizumab as noted in section 2.1 of this review. Patients who completed the study received 16 IV infusions. The



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duration of the study was as follows, a 12 week enrollment phase followed by a 13 week observation phase followed by a 26 week treatment phase and an 8 week post-treatment phase. The sponsor supplied the study drug and placebo. Patients who were prematurely discontinued from the study had follow-up contact through 12 weeks after their last dose. 87 patients were enrolled in the study. Patient stratification was based on packed red blood cell transfusions within one year prior to screening. The strata were as follows:

- 4-14 units (low stratum).
- 15-25 units (mid stratum).
- > 25 units (high stratum).

The major inclusion criteria were as follows:

- Male or Female patients had to be at least 18 years of age.
- Required to have transfusions and 12 months prior to visit number one.
- CD 59 cell clone ≥ 10%.
- Stable dose of erythrocyte stimulating agent (ESA) for 26 weeks prior to screening visit number one with a dose remaining stable during the observation and treatment phases.
- Immunosuppressive therapy it was to be stable for at least 26 weeks prior to the first visit and was to remain stable during the observation and treatment phases.
- Corticosteroid dose was to be stable for at least four weeks prior to the first visit. The dose could remain stable or decrease over the course of the study.
- Anticoagulant therapy was to be stable for four weeks with international normalized ratio (INR) remaining stable during the observation and treatment phases.
- Iron supplementation or folic acid was to be stable for four weeks prior to visit number three.
- Vaccination against *Neisseria meningitidis* at least 14 days prior to visit number three.

In addition, during the observation period following inclusion criteria were applied:

- Documented LDH level ≥ 1.5 times the upper limit of normal either at visit one or during the observation phase.
- Patients that received red blood cell transfusion during the observation phase if the patients hemoglobin was≤ 9 g/dl with symptoms or if the hemoglobin was ≤ 7 g/dl without symptoms, and also within a 1.5 g/dl of the mean hemoglobin pretransfusion value for the previous 12 months. The transfusion was to be carried out in accordance with the patient's individual transfusion hemoglobin algorithm and was to occur within 48 hours a hemoglobin sample that predicted the transfusion.
- Platelet count ≥ 100,000/mcl either at visit one or during the observation phase.

The exclusion criteria for this study were as follows:

- Mean hemoglobin level prior to transfusion over the previous 12 months > 10.5 g/dl.
- Absolute neutrophil count ≤ 500/mcl.
- Presence or suspicion of bacterial infection.



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- Known or suspected hereditary complement deficiency.
- Pregnant, breast-feeding or intending to conceive during the course of the study including the post-treatment phase.
- History of meningococcal disease.
- History of bone marrow transplantation.

Patients were to be discontinued from treatment for the following reasons:

- If ≥ 25% absolute decrease in PNH red blood cell clone population in one week or less.
- The hemoglobin level was ≤ 5 gm/dl.
- There was a change in mental status.
- There was a 50% increase in serum creatinine.
- Thrombosis developed.
- If the patient was discontinued from treatment then blood transfusion, exchange transfusion, anticoagulant therapy or steroid treatment could be administered at the discretion of the treating physician.

The schedule of events for this study is listed in the tables below.

**Table 2. Schedule of Events**

| STUDY PHASE | Enrollment | | Treatment | | | | | | | | | | | | | | | | | Post-treatment | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Period | Observation Period | | Induction Period | | | | | Maintenance Period | | | | | | | | | | | Unscheduled | | |
| Study Month | Screen | Month -3 to 0 | Month 1 | | | | Month 2 | Month 3 | | Month 4 | | Month 5 | | Month 6 | | Month 7 | | | FINAL | |
| Study Visit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | D | Weeks | |
| Study Week | | | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | | 1-8 | ET |
| Informed consent | X | | | | | | | | | | | | | | | | | | | | |
| Demographics | X | | | | | | | | | | | | | | | | | | | | |
| Medical, transfusion, and thrombosis history | X | | | | | | | | | | | | | | | | | | | | |
| Physical examination | X | | | | | | | | | | | | | | | | | X | | | X |
| Weight | X | | X | | | | | | | | | | | | | | | X | | | X |
| Concomitant medications | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Review laboratory results | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Vital sign measurements | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 12-lead electrocardiogram | X | | X | | | | | | X | | | | | | | | | X | | | X |
| Blood and urine | X | X | X | X | X | X | X | X | X | | X | X | X | | X | | X | X | | X | X |
| Lactate dehydrogenase | x | x | x | x | x | x | x | | x | | x | | x | | x | | x | x | | | x |
| Hematology and chemistry | x | x | x | | x | | x | | x | | x | | x | | x | | x | x | | | x |
| Reticulocyte count | x | x | x | | x | | x | | x | | x | | x | | x | | x | x | | | x |
| Haptoglobin | x | x | x | | x | | x | | x | | x | | x | | x | | x | x | | | x |
| Urinalysis | x | x | x | | x | | x | | x | | x | | x | | x | | x | x | | | x |
| Hemoglobin and serum creatinine | | | | | | | | | | | | | | | | | | | | x | |
| Pharmacokinetics/pharmacodynamics | | | B | T/P | | | T/P | T/P | | | T/P | | | | | | | T/P | | | T |
| Coagulation profile | x | | x | | | | | | x | | | | | | | | | x | | | x |



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**Table 2. Schedule of Events**

| STUDY PHASE | Enrollment | | Treatment | | | | | | | | | | | | | | | | | Post-treatment | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Period | Observation Period | | Induction Period | | | | | Maintenance Period | | | | | | | | | | | Unscheduled | | |
| Study Month | Screen | Month -3 to 0 | Month 1 | | | | Month 2 | Month 3 | | Month 4 | | Month 5 | | Month 6 | | Month 7 | | | | FINAL | |
| Study Visit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | D | Weeks | |
| Study Week | | | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | | 1-8 | ET |
| Flow cytometry for PNH red blood cells, white blood cells, and platelet clone size | x | | x | | | | | | x | | | | | | | | | x | | x | x |
| Platelet activity assays | x | | | x | x | | x | | | | | x | | | | | | x | | | x |
| Free hemoglobin/NO measures | x | | | x | x | | x | | | | | x | | | | | | x | | | x |
| Pregnancy (β-human chorionic gonadotropin) | x | | | | | | | | | | | | | | | | | x | | | x |
| Anti-h5G1.1-mAB (HAHA) | | | x | | | | | | | | x | | | | | | | x | | | x |
| Ferritin, vitamin $B_{12}$, folate | | | x | | | | | | | | | | | | | | | x | | | x |
| Meningococcal vaccine titer given/assayed | x | x# | | | | | | | | | | | | | | | | x | | | x |
| Complete transfusion algorithm worksheet | X | | | | | | | | | | | | | | | | | | | | |
| Administer quality-of-life instruments | | X^ | X | X | X | X | X | | | | X | | | | X | | | X | | | X |
| Adverse events | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Thrombosis record (MAVE) | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Vaccination for Neisseria meningitidis | X* | | | | | | | | | | | | | | | | | | | | |
| Prescribe rescue antibiotic and provide identification card | | | X | | | | | | | | | | | | | | | | | | |
| Review entry criteria / fax attestation form for authorization to randomize | | X** | | | | | | | | | | | | | | | | | | | |
| Call IVRS for randomization | | X | | | | | | | | | | | | | | | | | | | |

**Table 2. Schedule of Events**

| STUDY PHASE | Enrollment | | Treatment | | | | | | | | | | | | | | | | | Post-treatment | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Period | Observation Period | | Induction Period | | | | | Maintenance Period | | | | | | | | | | | Unscheduled | | |
| Study Month | Screen | Month -3 to 0 | Month 1 | | | | Month 2 | Month 3 | | Month 4 | | Month 5 | | Month 6 | | Month 7 | | | | FINAL | |
| Study Visit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | D | Weeks | |
| Study Week | | | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | | 1-8 | ET |
| Dosing visits (all visits are ±2 days); Dose (mg) | | | 600 | 600 | 600 | 600 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | | | |
| Transfusion record update (date and # of PRBCs) | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |

ET =Early Termination; B=Baseline T/P=Trough and Peak T=Trough NO=nitric oxide HAHA =human antihuman antibody MAVE=major adverse vascular event
IVRS=interactive voice response system

*Patients must have been vaccinated for *N meningitidis* 14 days prior to randomization at Visit 1 or during the observation period as determined by the principal investigator's discretion

^The quality-of-life assessment was to be done before the patient was given a transfusion.

#The meningococcal vaccine titer assay sample was to be collected 4 to 8 weeks postvaccination.

**Prior to calling IVRS for randomization, written authorization to randomly assign a patient to treatment must have been received from [redacted] global project manager or Alexion's clinical project manager.

In addition safety assessments included treatment emergent adverse events, clinical laboratory and electrocardiogram data as well as vital signs were to be analyzed. Adverse events were assigned MedRA preferred terms and tabulated as incidence rates per treatment group. The safety review for this study can be found in section 7 of this review.

The statistical analysis was as follows:

- Patient characteristics at baseline were summarized for each treatment group. Summary statistics were used to present the demographics, transfusion history, thrombosis history and LDH. The number of study drug infusions and total amount of study drug infused

were summarized by treatment group. The frequency and listings of concomitant medications were also provided by the sponsor.

- The co primary endpoints and all secondary endpoints of the primary analysis were based on the intention to treat (ITT) population. The hemoglobin set point for each patient was defined as $\leq 9$ g/dl in patients with symptoms and was $\leq 7$ g/dl in patients without symptoms. To achieve a designation of hemoglobin stabilization, a patient had to maintain a hemoglobin concentration above the hemoglobin set point and avoid any red blood cell transfusion for the entire 26 week treatment period. Patients who reached or dropped below their predetermined hemoglobin set point did not achieve hemoglobin stabilization. Those patients who withdrew prematurely from the study or work transfused above their hemoglobin set point during the treatment phase also were treated as not achieving hemoglobin stabilization. A 2-sided Fisher exact test was used for analysis. Each patient's units of packed red blood cells transfused after randomization through visit 18 were calculated. For those patients who discontinued study drug but remained in the study for follow-up the actual transfusion records were used to calculate the units transfused. For patients who had at least one transfusion but withdrew prematurely from the study prior to 26 weeks, the number of units were prorated by a applying the formula (26/number of weeks on study drug) x (Number of units transfused while on the study drug). For patients who withdrew prematurely from the study prior to having a transfusion their transfusion data, 26 weeks previous to their last contact date, was used to calculate the number of units of packed red blood cells transfused. The primary analysis method was the Wilcoxon rank sum test. A sensitivity analysis was performed based on the following rules in order to test the robustness of the results for the co primary endpoints:

    - If a patient assigned to placebo violated the protocol by receiving a transfusion without meeting the hemoglobin transfusion criteria, that transfusion was ignored in determining the endpoints and the patient was considered to have achieved hemoglobin stabilization.
    - If a patient assigned to Eculizumab violated the protocol by receiving a transfusion without meeting the transfusion criteria, that transfusion was counted in determining the endpoints and the patient was not considered to have achieved hemoglobin stabilization.

For the sensitivity analysis the population in each treatment group for packed red blood cell transfusion units at visit 18 was examined. For each treatment group, available packed red blood cell transfusion unit values were used to impute missing data using multiple imputation, mean values and median values.

The secondary efficacy analyses were undertaken as follows:

- The endpoint of transfusion avoidance was classified for each patient during the 26 week treatment phase I utilizing patients' transfusion records from randomization through visit 18. Those patients who withdrew prematurely from the study during the treatment phase were treated as requiring transfusion. The analysis was carried out using the two sided Fisher exact test.



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- The AUC of LDH from baseline through visit 18 was calculated for each patient. For patients with missing LDH values, the last observation carried forward method was used to impute missing values. The AUC was analyzed using the Wilcoxon rank sum test.
- The scoring guideline for the FACIT-Fatigue scale was used to calculate the fatigue score. The main hypothesis of interest was that Eculizumab will provide a statistically significant increase in a patients' total FAC IT-Fatigue scale score compared to placebo. The change in the total FAC IT-Fatigue score from baseline was analyzed using a mixed effects model with baseline as covariate, treatment and time as fixed effects and patient as a random effect.

The SHEPHERD study was an open label, multicenter study of Eculizumab administered IV to 97 patients with transfusion dependent hemolytic PNH. Patients who received the same dosing regimen and schedule of Eculizumab as that of the TRIUMPH study. This study had a 12 week enrollment phase followed by a two-week screening phase followed by a 52-week treatment phase and an eight week post-treatment phase. Patients who prematurely discontinued study drug were required to have for follow-up visits at 1, 2, 4 and 8 weeks after their last dose of study drug and a follow-up contact 12 weeks after their last dose of study medication. The inclusion and exclusion criteria were similar to that of the TRIUMPH study with the exception of the following:

- TRIUMPH
  - $\geq$ 4 transfusions/12m
  - $\geq$ 100,000/mcl platelets
  - $\geq$ 1.5 ULN LDH
  - $\geq$ 10% RBC clone
- SHEPHERD
  - $\geq$ 1 transfusions/24m
  - $\geq$ 30,000/mcl platelets
  - $\geq$ 1.5 ULN LDH
  - $\geq$ 10% RBC clone

Therefore, the SHEPHERD study patient population had a broader range of transfusion requirements and degree of thrombocytopenia which is reflected in the demographics for the SHEPHERD study.

The SHEPHERD study had similar discontinuation from treatment criteria to that of the TRIUMPH study. The schedule of events for the SHEPHERD study is shown below.



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**Table 2. Schedule of Events**

| Study Period: Weeks: -2 to 26 | Screen | Induction Period | | | | | Maintenance Period | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Week | -2 | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |
| Study Visit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Informed consent | X | | | | | | | | | | | | | | | | |
| Demographics | X | | | | | | | | | | | | | | | | |
| Medical, transfusion, and thrombosis history | X | | | | | | | | | | | | | | | | |
| Concomitant medications | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Physical examination | X | | | | | | | | | | | | | | | | |
| Weight | X | X | | | | | | | | | | | | | | | |
| Review laboratory results | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Vital signs | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 12-lead ECG | X | | | | | | | X | | | | | | | | | X |
| Blood and urine collection | X | X | X | X | X | X | X | X | | X | X | X | | X | | X | X |
| Hematology and chemistry | x | x | | x | | x | | x | | x | | x | | x | | x | x |
| LDH | x | x | x | x | x | x | | x | | x | | x | | x | | x | x |
| Reticulocyte count | x | x | | x | | x | | x | | x | | x | | x | | x | x |
| Haptoglobin | x | x | | x | | x | | x | | x | | x | | x | | x | x |
| Urinalysis | x | x | | x | | x | | x | | x | | x | | x | | x | x |
| Hemoglobin and serum creatinine | | | | | | | | | | | | | | | | | |
| Blood and urine collection | | | | | | | | | | | | | | | | | |
| Flow cytometry for PNH RBC, WBC, and platelet clone size (refer to protocol, section 6 text) | x | | | | | | | x | | | | | | | | | x |
| Coagulation profile | x | | | | | | | x | | | | x | | | | | x |
| Pregnancy (β-HCG) | x | | | | | | | | | | | | | | | | |
| Ferritin, vitamin B12, folate | | x | | | | | | | | | | | | | | | x |

**Best Possible Copy**

**Table 2. Schedule of Events**

| Study Period: Weeks: -2 to 26 | Screen | Induction Period | | | | | Maintenance Period | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Week | -2 | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |
| Study Visit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Anti-h5G1.1-Mab (HAHA) | | x | | | | x | | | | | | | | | | | x |
| Blood and urine collection | | | | | | | | | | | | | | | | | |
| PK/PD | | B | D/P | | | D/P | D/P | | | D/P | | | | | | | D/P |
| Platelet activity assays | | x | x | x | | x | | | | | x | | | | | | x |
| Free hemoglobin/NO measures | | x | x | x | | x | | | | | x | | | | | | x |
| Meningococcal vaccine titer assays | x | | | | | | | x | | | | | | | | | x |
| Administer QoL | x | x | x | x | x | x | | | | x | | | | x | | | x |
| Thrombosis record (MAVE) | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Adverse events | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Vaccination: N meningitidis* | x | | | | | | | | | | | | | | | | |
| Prescribe rescue antibiotic and provide identification card | | x | | | | | | | | | | | | | | | |
| Review entry criteria and fax patient confirmation form | x | | | | | | | | | | | | | | | | |
| Register patient via IVRS | x | | | | | | | | | | | | | | | | |
| Dosing visit ±1 days | | | | | | | | | | | | | | | | | |
| Dose (mg) | | 600 | 600 | 600 | 600 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 |
| Transfusion record update | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |

B = baseline; ET = early termination; IVRS = interactive voice response system; D/P = trough and peak

* Patients must have been vaccinated for *Neisseria meningitidis* 14 days prior to receiving eculizumab; he/she may have been vaccinated at Visit 1 or as determined at the discretion of the principal investigator

^ The QoL assessment should have been done before the patient was transfused

*WEEK 28 TO END OF STUDY CONTINUED ON THE NEXT 2 PAGES*

**Table 2. Schedule of Events (continued)**

| Study Period: Weeks 28 to Posttreatment | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Week | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | | Post- Trt Phase | | |
| Study Visit | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | WK8 | | |
| Informed Consent | | | | | | | | | | | | | | | 1-8 | ET | |
| Demographics | | | | | | | | | | | | | | | | | |
| Medical, transfusion, and thrombosis history | | | | | | | | | | | | | | | | | |
| Concomitant medications | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X |
| Physical examination | | | | | | | | | | | | | X | | | | X |
| Weight | | | | | | | | | | | | | X | | | | X |
| Review laboratory results | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X |
| Vital signs | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X |
| 12-lead ECG | | | | | | | X | | | | | | X | | | | X |
| Blood and urine collection | X | | X | | X | | X | | X | | X | | X | | | X | X |
| Hematology and chemistry | x | | x | | x | | x | | x | | x | | x | | | | x |
| LDH | x | | x | | x | | x | | x | | x | | x | | | | x |
| Reticulocyte count | x | | x | | x | | x | | x | | x | | x | | | | x |
| Haptoglobin | x | | x | | x | | x | | x | | x | | x | | | | x |
| Blood and urine collection | | | | | | | | | | | | | | | | | |
| Urinalysis | x | | x | | x | | x | | x | | x | | x | | | | x |
| Hemoglobin and serum creatinine | | | | | | | | | | | | | | | | x | |
| Flow cytometry for PNH RBC, WBC, and platelet clone size (refer to protocol, section 6 text) | | | | | | | x | | | | | | x | | | x | x |
| Coagulation profile | | | | x | | | x | | | | x | | x | | | | x |
| Pregnancy (β-HCG) | | | | | | | | | | | | | x | | | | x |

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**Table 2. Schedule of Events (continued)**

| Study Period: Weeks 28 to Posttreatment | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study Week | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | | Post- Trt Phase | | |
| Study Visit | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | WK8 | | |
| Ferritin, Vitamin B12, folate | | | | | | | | | | | | | x | | 1-8 | ET | |
| Anti-h5G1.1-Mab (HAHA) | | | | | | | x | | | | | | x | | | | x |
| Blood and Urine Collection | | | | | | | | | | | | | | | | | x |
| PK/PD | | | | | | | | | | | | | T/P | | | | T |
| Platelet activity assays | | | | | | | | | | | | | x | | | | x |
| Fece hemoglobin/NO measures | | | | | | | | | | | | | x | | | | x |
| Meningococcal vaccine titer assays | | | | | | | | | | | | | x | | | | x |
| Administer QoL | | | | | x | | | | x | | | | x | | | | x |
| Thrombosis record (MAVE) | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X |
| Adverse events | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X |
| Dosing Visit ±2 days | | | | | | | | | | | | | | | | | |
| Dose (mg) | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | | | | |
| Transfusion record update | x | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x |

B = baseline; ET = early termination; ; IVRS = interactive voice response system; T/P = trough and peak

a Patients must have been vaccinated for *N meningitidis* 14 days prior to receiving eculizumab; he/she may have been vaccinated at Visit 1 or as determined at the discretion of the Principal Investigator

b The QoL assessment should have been done before the patient was transfused.

In addition safety assessments included treatment emergent adverse events and clinical laboratory and vital signs were to be analyzed. Adverse events were assigned MedRA preferred terms and tabulated as incidence rates per treatment group. The safety review for the TRIUMPH, SHEPHERD and combined studies can be found in section 7 of this review.

Two populations were analyzed for the TRIUMPH study - the per protocol population and the safety population. The criteria for patient analysis subsets were, in the per protocol population,



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all patients who received any amount of Eculizumab and had no major protocol violations and in the safety population, any patient who received any amount of Eculizumab was considered evaluable for safety analyses. The LDH AUC change from baseline to week 26 was calculated and sensitivity analyses performed. QOL measurements were calculated and analyzed at 26 weeks. The incidence of thrombosis was tabulated for each type of event. In addition platelet activity was analyzed that 26 weeks taking into account patient's transfusions and concomitant medications such as anticoagulants. Changes of platelet activity results from baseline were analyzed using a mixed- effects model. Changes in nitric oxide and free hemoglobin measures from baseline were also analyzed using a mixed - effects model. Safety was assessed by examination of treatment emergent adverse events and analyses were performed at 26 weeks. Adverse events were assigned MedRA preferred terms and tabulated by severity and analyzed using descriptive statistics. In addition adverse events related to the occurrence of infection were tabulated. Descriptive statistics were used in the analysis of laboratory safety data.

The design of the TRIUMPH study appears to be appropriate for the evaluation of safety and efficacy. However, the SHEPHERD study was an open label study and lacked a comparator. The sponsor used baseline patient data in terms of LDH AUC, QOL, transfusion history and other laboratories which were analyzed. Therefore the TRIUMPH study is the pivotal study supporting the safety and efficacy of Eculizumab for the treatment of patients with PNH. Efficacy data from the SHEPHERD study is supportive. The SHEPHERD study was designed to evaluate safety primarily.

### 6.1.4 Efficacy Findings

In the TRIUMPH study, 114 patients were screened and five patients did not meet entry criteria. One patient revoked consent. There were 109 patients who were enrolled in the study however, one patient did not meet enrollment criteria. There were 108 patients who entered the observation phase of which 20 were not eligible for treatment. Therefore, 88 patients were randomized of which, one patient was removed from the analysis because they were randomized in error. 87 patients entered the treatment phase and two patients terminated their participation early. 85 patients completed all visits. 10 patients discontinued treatment but completed all study visits. 75 patients completed the treatments as scheduled. The disposition of the patients by treatment group for the ITT population is shown below.

**Table 3. Patient Disposition by Treatment Group (ITT)**

| | Eculizumab N = 43 n (%) | Placebo N = 44 n (%) | Total N = 87 n (%) |
|---|---|---|---|
| Completed treatment | 41 (95.3) | 34 (77.3) | 75 (86.2) |
| Discontinued treatment because of: | | | |
| Lack of efficacy | 0 (0.0) | 10 (22.7) | 10 (11.5) |
| Treated and terminated early because of: | | | |
| Patient requested withdrawal | 1 (2.3) | 0 (0.0) | 1 (1.1) |
| Adverse event | 1 (2.3) | 0 (0.0) | 1 (1.1) |

Reference: Table 14.1.1.1



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In the TRIUMPH study, protocol deviations in individual patients do not appear to change the efficacy results. Patient 010-001 who was treated with Eculizumab did not have a serum pregnancy test at screening as required per protocol. This site performed a urine dipstick test. Patient 010-001 eventually had a serum beta hCG pregnancy test but not until the last visit on study. Patient 102-002 also treated with Eculizumab did not have a serum beta hCG pregnancy test performed on till visit number three. Both of these patients were randomized in violation of the protocol. Patient 028-003 reported her pregnancy to the primary investigator on the [redacted] She had been randomly assigned to Eculizumab treatment on [redacted] and received her first dose on [redacted]. When her pregnancy was reported the patient was discontinued from the study drug. This patient's pregnancy resulted in a normal pregnancy despite Eculizumab exposure. Patient 028-002 was randomly assigned to Eculizumab treatment however it was discovered that after randomization she had not been vaccinated. She did not receive her first dose on till she was vaccinated after 14 days and had another qualifying transfusion. Patient 027-001 did not meet entry criteria (the mean hemoglobin was below the specified protocol criterion) but was inappropriately entered for random assignment to treatment. The patient did not receive study drug. The sponsor made a decision to not include this patient in the intention to treat population because she was randomly assigned in error. Patient 015-002 was taking erythropoietin on February 17, 2005. The protocol required that patients on ESA had to have any stable dose for at least 26 weeks prior to visit number one. At visit number one the investigator indicated that the ESA did not appear to improve the patient's status and the ESA was subsequently discontinued. The sponsor reported that the patient had an increased need for transfusion in the first several weeks of the study. The patient was allowed to remain in the study and completed all study assessments. Seven patients (013-0 02, 0 to 7-004, 061-002, 070-005, 070-010, 101-002 and 102-003) showed a discrepancy between the stratification assignment as entered compared to the number of units transfused in the patient's transfusion history. All analyses for this study were performed on the intention to treat population as randomized and stratified according to the parameters listed above. Patient 015-001 who was treated with placebo was not on a stable dose of prednisone for weeks prior to randomization. The patient was allowed to stay in the study.

The demographic and baseline characteristics for the intention to treat population are summarized in the table below.

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**Table 4. Summary of Demographics and Baseline Characteristics (ITT)**

| | Eculizumab N = 43 | Placebo N = 44 | *P* Value[b] |
|---|---|---|---|
| **Gender n (%)** | | | |
| Male | 20 (46.5) | 15 (34.1) | 0.2783 |
| Female | 23 (53.5) | 29 (65.9) | |
| **Race n (%)** | | | |
| Not required[a] | 1 (2.3) | 1 (2.3) | 0.2629 |
| Caucasian | 37 (86.0) | 41 (93.2) | |
| Black | 4 (9.3) | 0 (0.0) | |
| Asian | 1 (2.3) | 1 (2.3) | |
| Other | 0 (0.0) | 1 (2.3) | |
| **Age (years)** | | | |
| Mean (standard deviation) | 42.1 (15.47) | 38.4 (13.38) | 0.2714 |
| Median (first, third quartile) | 41.0 (29.0, 51.0) | 35.0 (29.0, 45.0) | |
| Range | (20.0, 85.0) | (18.0, 78.0) | |
| **Age groups (years) n (%)** | | | |
| <65 | 37 (86.0) | 42 (95.5) | 0.2085 |
| 65 to 75 | 5 (11.6) | 1 (2.3) | |
| ≥75 | 1 (2.3) | 1 (2.3) | |
| **Weight (kg)** | | | |
| n | 41 | 43 | 0.2287 |
| Mean (standard deviation) | 74.9 (11.69) | 72.8 (14.04) | |
| Median (first, third quartile) | 76.1 (65.6, 83.7) | 70.0 (61.5, 79.6) | |
| Range | (53.1, 102.0) | (55.0, 124.1) | |
| **Height (cm)** | | | |
| n | 42 | 44 | 0.6750 |
| Mean (standard deviation) | 170.4 (9.37) | 169.7 (8.89) | |
| Median (first, third quartile) | 171.5 (164.0, 179.0) | 168.0 (162.3, 175.5) | |
| Range | (151.0, 187.0) | (156.0, 189.0) | |
| **Blood type n (%)** | | | |
| A- | 5 (11.6) | 1 (2.3) | 0.1357 |
| A+ | 11 (25.6) | 20 (45.5) | |
| B- | 2 (4.7) | 0 (0.0) | |
| B+ | 3 (7.0) | 5 (11.4) | |
| AB+ | 2 (4.7) | 2 (4.5) | |
| O- | 4 (9.3) | 6 (13.6) | |
| O+ | 16 (37.2) | 10 (22.7) | |

[a] Local law did not allow the collection of race data at sites in France.

[b] For categorical variables, exact Pearson's chi-square test was used, and for continuous variables, Wilcoxon's rank sum test was used.

Reference: Table 14.1.1.2

The two arms of the study were overall well-balanced in terms of the patient demographics listed in the table above. The transfusion history for the patients in the ITT population is presented in the table below. Overall, the two arms of the study were well-balanced in terms of the transfusion history.

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**Table 6. Transfusion History (ITT)**

| Parameter | Eculizumab N = 43 | Placebo N = 44 |
|---|---|---|
| **Mean hemoglobin prior to transfusion** | | |
| n | 43 | 44 |
| Mean - g/dL (standard deviation) | 8.0 (0.86) | 7.9 (1.02) |
| Median - g/dL (first, third quartile) | 8.1 (7.3, 8.5) | 7.8 (7.2, 8.6) |
| Range - g/dL | (5.9, 9.8) | (6.0, 10.5) |
| **Mean hemoglobin posttransfusion** | | |
| n | 10 | 8 |
| Mean - g/dL (standard deviation) | 10.5 (1.06) | 9.0 (1.22) |
| Median - g/dL (first, third quartile) | 10.8 (9.6, 11.1) | 9.3 (8.5, 9.8) |
| Range - g/dL | (9.0, 12.6) | (6.6, 10.6) |
| **Number of units transfused** | | |
| n | 43 | 44 |
| Mean - g/dL (standard deviation) | 19.2 (8.41) | 19.9 (9.28) |
| Median - g/dL (first, third quartile) | 18.0 (12.0, 24.0) | 17.0 (13.5, 25.0) |
| Range - g/dL | (7.0, 36.0) | (7.0, 44.0) |
| **Symptoms associated with transfusion n (%)** | | |
| All symptoms | 438 | 426 |
| Change in mental status | 14 (3.2) | 20 (4.7) |
| Severe or worsening shortness of breath | 69 (15.8) | 63 (14.8) |
| Severe or worsening fatigue | 279 (63.7) | 264 (62.0) |
| Other | 76 (17.4) | 79 (18.5) |

Reference: Table 14.1.2.1

In terms of the thrombosis history for patients in the TRIUMPH study, nine patients in the Eculizumab group compared to eight patients in the placebo group had 16 compared to 11 thrombotic events respectively. The history of previous thrombosis between the two treatment arms was similar and is shown in the table below. One patient in the placebo group developed a portal vein thrombosis among all treated patients in the TRIUMPH study.

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**Table 7. Thrombosis History by Major Adverse Vascular Event (ITT)**

| Parameter | Eculizumab N = 43 | | Placebo N = 44 | |
|---|---|---|---|---|
| | Patients n (%) | Events | Patients n (%) | Events |
| Any thrombosis event | 9 (20.9) | 16 | 8 (18.2) | 11 |
| Cerebrovascular accident | 1 (2.3) | 2 | 0 (0.0) | 0 |
| Mesenteric vein thrombosis | 0 (0.0) | 0 | 2 (4.5) | 2 |
| Other (as reported): | | | | |
| Ischemic stroke | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Suspected pulmonary embolus during pregnancy | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Thrombus | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Thrombus artery carotis interna left | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Thrombosis right arm after feeding infusion | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Pulmonary embolus | 1 (2.3) | 1 | 0 (0.0) | 0 |
| Thrombophlebitis/deep vein thrombosis | 4 (9.3) | 5 | 6 (13.6) | 9 |
| Transient ischemic attack | 1 (2.3) | 3 | 0 (0.0) | 0 |

Reference: Table 14.1.2.2

The number and type of concomitant medications taken by at least 5% of patients in either treatment group in the ITT population was similar. The sponsor did not formally study drug interactions with Eculizumab during this study or during the clinical development program for Eculizumab. The table below shows the concomitant medication list taken by at least 5% of the patients in either treatment group in the ITT population.

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**Table 8. Summary of Concomitant Medications Taken by at Least 5% of Patients in Either Treatment Group (ITT)**

| Anatomical therapeutic chemical classification level 2 term | Eculizumab N = 43 n (%) | Placebo N = 44 n (%) |
|---|---|---|
| Vaccines | 43 (100) | 44 (100) |
| Antianemic preparations | 31 (72.1) | 36 (81.8) |
| Analgesics | 30 (69.8) | 29 (65.9) |
| Antithrombotic agents | 24 (55.8) | 20 (45.5) |
| Antibacterials for systemic use | 23 (53.5) | 26 (59.1) |
| Corticosteroids for systemic use | 13 (30.2) | 15 (34.1) |
| Antacids, drugs for treatment of peptic ulcers and flatulence | 12 (27.9) | 11 (25.0) |
| Antihistamines for systemic use | 9 (20.9) | 15 (34.1) |
| Vitamins | 9 (20.9) | 8 (18.2) |
| Psycholeptics | 8 (18.6) | 9 (20.5) |
| All other therapeutic products | 6 (14.0) | 7 (15.9) |
| Blood substitutes and perfusion solutions | 6 (14.0) | 4 (9.1) |
| Psychoanaleptics | 6 (14.0) | 4 (9.1) |
| Laxatives | 6 (14.0) | 6 (13.6) |
| Mineral supplements | 6 (14.0) | 8 (18.2) |
| Antiinflammatory and antirheumatic products | 6 (14.0) | 10 (22.7) |
| Beta blocking agents | 5 (11.6) | 2 (4.5) |
| Antidiarrheal, intestinal antiinflammatory/antiinfective agents | 4 (9.3) | 4 (9.1) |
| Antispasmodics and anticholinergic agents and propulsives | 4 (9.3) | 4 (9.1) |
| Sex hormones and modulators of the genital system | 4 (9.3) | 8 (18.2) |
| Agents acting on the renin-angiotensin system | 4 (9.3) | 1 (2.3) |
| Cough and cold preparations | 4 (9.3) | 9 (20.5) |
| Antibiotics and chemotherapy for dermatological use | 3 (7.0) | 1 (2.3) |
| Antivirals for systemic use | 3 (7.0) | 1 (2.3) |
| Corticosteroids, dermatological preparations | 3 (7.0) | 1 (2.3) |
| Nasal preparations | 3 (7.0) | 2 (4.5) |
| Diuretics | 3 (7.0) | 3 (6.8) |
| Ophthalmologicals | 3 (7.0) | 3 (6.8) |
| Calcium channel blockers | 2 (4.7) | 3 (6.8) |
| Antiasthmatics | 1 (2.3) | 3 (6.8) |
| Drugs for treatment of bone diseases | 1 (2.3) | 3 (6.8) |
| Anesthetics | 0 (0.0) | 5 (11.4) |

Reference: Table 14.1.3.1

In the TRIUMPH study, the hemoglobin set point between the two treatment arms was similar and shown in the table below.



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**Table 9. Summary of Hemoglobin Set Points Established During the Observation Period (ITT)**

| | | Eculizumab N = 43 g/dL | Placebo N = 44 g/dL | *P* Value[a] |
|---|---|---|---|---|
| **Hemoglobin set value** | | | | |
| Mean | (standard deviation) | 7.8 (0.79) | 7.7 (0.75) | 0.7532 |
| Median | (first, third quartile) | 7.7 (7.1, 8.5) | 7.7 (7.2, 8.3) | |
| Range | | (6.1, 8.8) | (6.2, 9.0) | |

Note: The hemoglobin set points for patients were based on transfusion data 12 months prior to Screening.

[a] Wilcoxon's rank sum test was used to calculate the *P* value.

Reference: Table 14.1.1.2

The table below shows the hemoglobin stabilization in the intention to treat population. In the Eculizumab treated group there were 21/43 patients who had hemoglobin stabilization compared to 0/44 patients with hemoglobin stabilization in the placebo group in the TRIUMPH study (P<<0.0001). In the Eculizumab group 22/43 patients did not achieve hemoglobin stabilization. When patients were stratified according to transfusion requirements prior to study entry, (low, intermediate and high strata) there was a statistically significant number of patients who achieve hemoglobin stabilization treated with Eculizumab compared to placebo treated patients. The table below shows the results of the primary endpoint of hemoglobin stabilization in the intention to treat population.

**Table 10. Hemoglobin Stabilization (ITT)**

| Randomization strata | Hemoglobin stabilization? | Eculizumab N = 43 n/N (%) | Placebo N = 44 n/N (%) | *P* Value[a] |
|---|---|---|---|---|
| Overall (N=87) | Yes | 21/43 (48.8) | 0/44 (0.0) | 0.000000014 |
| | No | 22/43 (51.2) | 44/44 (100) | |
| 4 to 14 units (n=30) | Yes | 12/15 (80.0) | 0/15 (0.0) | 0.000010521 |
| | No | 3/15 (20.0) | 15/15 (100) | |
| 15 to 25 units (n=35) | Yes | 5/17 (29.4) | 0/18 (0.0) | 0.019061584 |
| | No | 12/17 (70.6) | 18/18 (100) | |
| >25 units (n=22) | Yes | 4/11 (36.4) | 0/11 (0.0) | 0.090225564 |
| | No | 7/11 (63.6) | 11/11 (100) | |

Note: Stabilization was calculated between Baseline and 26 weeks after first dose.

[a] *P* values were calculated using Fisher's exact test.

Reference: Table 14.2.1.1

To assess the robustness of these results a sensitivity analysis was performed based on the rules described previously. This analysis shows of that overall there is a statistically significant level of hemoglobin stabilization in the Eculizumab treated group relative to placebo (P<0.001). These results are shown in the table below.



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Table 14.2.1.1.1 Sensitivity Analysis for Hemoglobin Stabilization
Population: ITT

| Randomization Strata (a) | Hemoglobin Stabilization | Eculizumab | Placebo | Difference (95% CI) | P Value (b) |
|---|---|---|---|---|---|
| Overall (N = 87) | Yes | 21/43 ( 48.8%) | 5/44 ( 11.4%) | 0.37 (0.20,0.55) | 0.000153935 |
| | No | 22/43 ( 51.2%) | 39/44 ( 88.6%) | | |
| 4 - 14 Units (N = 30) | Yes | 12/15 ( 80.0%) | 2/15 ( 13.3%) | | 0.000678918 |
| | No | 3/15 ( 20.0%) | 13/15 ( 86.7%) | | |
| 15 - 25 Units (N = 35) | Yes | 5/17 ( 29.4%) | 3/18 ( 16.7%) | | 0.443017494 |
| | No | 12/17 ( 70.6%) | 15/18 ( 83.3%) | | |
| > 25 Units (N = 22) | Yes | 4/11 ( 36.4%) | 0/11 ( 0.0%) | | 0.090225564 |
| | No | 7/11 ( 63.6%) | 11/11 (100.0%) | | |

In the TRIUMPH study, Eculizumab patients required significantly fewer units of packed red blood cells (primary endpoint) during the treatment phase (median 0 units) compared with placebo treated patients (median 10 units) ($P << 0.001$). In addition, there was a statistically significant reduction in the median units of packed red blood cells transfused in each of the three strata subgroups. These results are shown in the table below:

**Table 11. Summary of Units Transfused from Baseline to 26 Weeks (ITT)**

| Randomization strata | Eculizumab | Placebo | *P* value[a] |
|---|---|---|---|
| **Overall (N)** | 43 | 44 | <0.000000001 |
| Mean (standard error) | 3.0 (0.67) | 11.0 (0.83) | |
| Median | 0.0 | 10.0 | |
| Range | (0.0, 16.0) | (2.0, 21.0) | |
| **4 - 14 units (n)** | 15 | 15 | 0.000002311 |
| Mean (standard error) | 0.4 (0.29) | 6.7 (0.72) | |
| Median | 0.0 | 6.0 | |
| Range | (0.0, 4.0) | (2.0, 12.0) | |
| **15 - 25 units (n)** | 17 | 18 | 0.000665129 |
| Mean (standard error) | 4.2 (1.14) | 10.8 (1.17) | |
| Median | 2.0 | 10.0 | |
| Range | (0.0, 15.0) | (2.0, 21.0) | |
| **> 25 units (n)** | 11 | 11 | 0.000301977 |
| Mean (standard error) | 4.5 (1.59) | 17.0 (1.04) | |
| Median | 3.0 | 18.0 | |
| Range | (0.0, 16.0) | (10.0, 20.0) | |

[a] *P* values were calculated using Wilcoxon's rank sum test.

Reference: Table 14.2.1.2.1

In the TRIUMPH study the secondary analysis of transfusion avoidance showed that overall 22/43 patients in the Eculizumab group compared to 0/44 patients in the placebo group avoided transfusion ($P<<0.001$). The results are shown in the table below.

**Table 12. Summary of Patients Who Avoided Transfusions (ITT)**

| Randomization strata | N | Eculizumab N=43 n/N (%) | Placebo N=44 n/N (%) | *P* value[a] |
|---|---|---|---|---|
| **Overall** | 87 | 22/43 (51.2%) | 0/44 (0.0%) | 0.000000005 |
| **4 – 14 units** | 30 | 12/15 (80.0%) | 0/15 (0.0%) | 0.000010521 |
| **15 – 25 units** | 35 | 6/17 (35.3%) | 0/18 (0.0%) | 0.007624633 |
| **>25 units** | 22 | 4/11 (36.4%) | 0/11 (0.0%) | 0.090225564 |

Note: Area under the curve was calculated from Baseline to 26 weeks after first dose.

[a] *P* values were calculated using Fisher's exact test.

Reference: Table 14.2.2.1

LDH reflects the degree of intravascular hemolysis. In the TRIUMPH study there was a statistically significant decrease in the LDH AUC for patients treated with Eculizumab compared to placebo both overall and with regard to the randomization strata (P<<0.001). These results are shown in the table below.

**Table 13. Area Under the Curve for Lactate Dehydrogenase (U/L × day) (ITT)**

| Randomization strata | Eculizumab N=43 | Placebo N=44 | *P* Value[a] |
|---|---|---|---|
| **Overall (N)** | 43 | 44 | <0.000000001 |
| Mean (standard error) | 81140.0 (17626.59) | 429874.1 (21704.31) | |
| Median | 58586.5 | 411821.8 | |
| Range | (32417.0, 792005.5) | (161413.5, 886544.0) | |
| **4 - 14 units (n)** | 15 | 15 | 0.000057371 |
| Mean (standard error) | 103760.6 (49309.63) | 391388.7 (32020.39) | |
| Median | 53609.5 | 398573.0 | |
| Range | (38340.5, 792005.5) | (230351.5, 697637.5) | |
| **15 - 25 units (n)** | 17 | 18 | 0.000000482 |
| Mean (standard error) | 58670.4 (3364.68) | 444075.6 (37304.47) | |
| Median | 56126.5 | 420338.3 | |
| Range | (32417.0, 90114.5) | (161413.5, 886544.0) | |
| **>25 units (n)** | 11 | 11 | 0.000106960 |
| Mean (standard error) | 85019.5 (16790.79) | 459115.5 (44197.34) | |
| Median | 67181.0 | 441879.5 | |
| Range | (33230.5, 242071.5) | (234604.5, 711934.0) | |

Note: Area under the curve was calculated from Baseline to 26 weeks after first dose.

*P* values were calculated using Wilcoxon's rank sum test.

Reference: Table 14.2.2.2



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In order to determine the degree to which Eculizumab impacts the QOL, the sponsor undertook an analysis using the FACIT-F QOL tool. The FACIT-F scale was created to measure the physical symptoms and functional impact of cancer-related fatigue over the past seven days. It was developed using patient and clinician semi-structured interviews to generate items. The FACIT-Fatigue scale summarizes a multidimensional construct in to a single score that combines a fatigue severity/intensity rating with impact assessment. This instrument consists of 13 items - each rated on a 5-point scale from 0="Not at all" to 4="Very much"). The total score has a possible range of 0 to 52. (See Study Endpoints and Label Development (SEALD) review completed January 29, 2007.) In the TRIUMPH study Eculizumab treated patients demonstrated statistically significant improvements in fatigue levels compared to placebo by visit six and at subsequent visits 11, 15 and 18 ($P<0.01$). The results of this analysis are shown in the table below. A sensitivity analysis was performed by the statistics reviewer for the data presented in the table below which showed the finding to be robust (see Statistics review). However, discussions within the Division of Medical Imaging and Hematology Drug Products have revealed that the FACIT-F QOL tool has not been validated for patients in the hematology and oncology setting. Therefore, the results shown in the table below should not be included in labeling for Eculizumab. In addition, the FACIT QOL tool was administered to patients prior to transfusion. No QOL assessment was made after transfusion. Therefore it is unknown how transfusion itself impacted the QOL assessment.

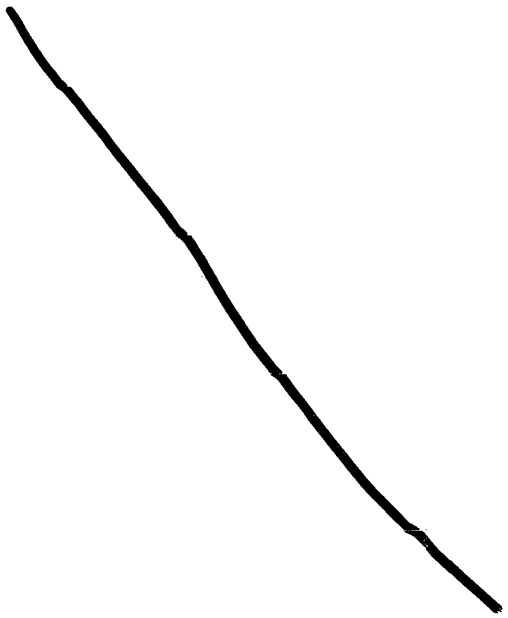


The sponsor undertook an exploratory analysis of QOL using the EORTC QLQ-C30 QOL tool. The EORTC QLQ-C30 was developed to be an "integrated, modular approach for evaluating the quality of life of patients participating in international [oncology] clinical trials." It is comprised of 5 functional scales (physical, role, cognitive, emotional, and social), three symptom scales (fatigue, pain, and nausea and vomiting), a global health status scale, a number of single items assessing additional symptoms commonly reported by cancer patients (dyspnea, loss of appetite, insomnia, constipation, and diarrhea) and perceived financial impact of the disease. (See SEALD review completed January 29, 2007.) A positive change in global health status and the functional (role, social, cognitive, physical and emotional) course and a negative change in symptom/item (fatigue, pain, dyspnea, appetite loss, insomnia, financial difficulties, constipation, nausea/vomiting and diarrhea) scores indicate improvement. In the TRIUMPH study, Eculizumab treated patients did show improvement in both the functional and symptom/item measures. The results of a QOL analysis using the EORTC QLQ-C30 tool are shown in the table



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below. This was an exploratory analysis and this data should not be included in the label for Eculizumab.



In addition, a consult to the Study Endpoints and Label Development (SEALD) was requested on November 1, 2006. This consult evaluated the adequacy of the FACIT-F QOL tool and the EORTC QLQ-C30 QOL tool for use in patients with PNH. The review of the EORTC QLQ-C30 and the FACIT-F tools identified concerns regarding the adequacy of these endpoints to support claims of clinical benefit. With regard to the FACIT-F QOL tool, the consult states that validation experience documents that the scales used by this QOL tool assess distinct components of the QOL construct. However, the review states that it is not clear if the tool measures all of the components of fatigue because fatigue is a multidimensional concept that encompasses both mental and physical attributes. (See SEALD review completed January 29, 2007.) Also, with regard to the EORTC QLQ-C30 QOL tool, the consult states that validation experience documents that the scales assess distinct components of the health-related quality of life construct. However, no evidence is available to support the validity of the instrument to measure the individual domain or individual symptom constructs. (See SEALD review completed January 29, 2007.)

During a teleconference with the sponsor on January 31, 2007 the sponsor was asked to show that the demonstrated improvement in fatigue with Eculizumab did not require improvements in both hemolysis and anemia but was related to either the improvement in hemolysis without



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requirement for an improvement in anemia or a drug activity unrelated to the observed drug related improvements in hemolysis or anemia. The sponsor responded to this request, on February 1, 2007, by performing univariate and multiple logistic regression analyses. The sponsor states that in the univariate analysis reductions in intravascular hemolysis and anemia were independently associated with an improvement in fatigue using univariate logistic regression analyses over time. For each reduction by a multiple of the upper limit of the normal range for LDH (223 U/L) the odds ratio was 1.11 (confidence interval of 1.05-1.17) that there would be a four-point or greater improvement in the FACIT-F score ($P<0.001$). For each increase in hemoglobin of 1.0 g/dl, the odds ratio was 1.29 (confidence interval of 1.08-1.53) that there would be a four-point or greater improvement in the FACIT-F score ($P= 0.005$). In the multiple logistic regression analysis reductions in both intravascular hemolysis (reduced LDH) and anemia (increased hemoglobin level) were associated with an improvement in fatigue using multiple logistic regression analysis over time. For each reduction by a multiple of the upper limit of the normal range for LDH (223 U/L), the odds ratio was 1.08 (confidence interval of 1.01-1.14) that there would be a four-point improvement or greater in the FACIT-F score ($P= 0.03$). For each increase in hemoglobin of 1.0 g/dl, the odds ratio was 1.21 (confidence interval of 0.99-1.46) that there would be a four-point or greater improvement in FACIT-F score ($P= 0.058$). The sponsor concludes that the univariate and multivariate logistic regression analyses support that fatigue in patients with PNH is related to intravascular hemolysis. These analyses suggest that Eculizumab may provide an improvement in the QOL of patients with PNH. This conclusion is supported by the statistics review (see Statistics review). However, because a decrease in the degree of hemolysis can impact the severity of anemia it remains that the sponsor has not completely shown that Eculizumab can impact the QOL of patients with PNH independent of its antihemolytic effect and/or its effect on anemia.

In addition, in the TRIUMPH study the sponsor undertook further exploratory analyses of the endpoints of nitric oxide, free hemoglobin measures thrombosis and platelet activity with the essential results as follows:

- Change of the LDH from baseline: reduced LDH from baseline by visit number four $p < 0.001$.
- Platelet activity: 14 North American sites contributed. Activity evaluated by P-selectin and leukocyte platelet aggregation via flow cytometry showed that neither treatment nor time had influence on platelet activity.
- Nitric oxide: consumption favored Eculizumab $p < 0.05$ at visit 12 and $p < 0.01$ at visit 18.
- Free hemoglobin favored Eculizumab by visit 18 the median free hemoglobin was reduced from 40.5mg/dl to 5.2mg/dl $p<0.001$.
- Thrombosis: one patient in the placebo group developed a portal vein thrombosis among all treated patients.

The SHEPHERD study was primarily designed to evaluate the safety of Eculizumab for the treatment of patients with PNH (see section 7 for the review of the safety of Eculizumab demonstrated in the SHEPHERD study). Changes in the conduct of the SHEPHERD study were mainly for clarification of the protocol in terms of laboratory schedule of events and clarification



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of site-specific inclusion and exclusion criteria namely, hepatitis and HIV status as required by a German regulatory authorities. Also changes in the protocol included elimination of the upper limit for the number of transfusions required in the inclusion criteria. This change in the protocol does not appear to have impacted the analysis and in fact allowed for patients with greater transfusion needs to be included.

In the SHEPHERD study there were 107 patients screened and nine patients did not meet entry criteria. 98 patients were enrolled into the screening phase. 96 patients completed all visits through visit 17. There was one patient who discontinued the study before visit 17. Patient 102-005 it received five doses of study drug (for induction doses and one maintenance dose) but died approximately 1 month into the study as a result of a cerebral herniation. This patient is described in detail in the Deaths section (7.1.1) of this review.

Protocol deviations included site-specific deviations similar to the TRIUMPH study. Patient protocol deviations were as follows and were minor:

- Patient 018-002 was granted exemption despite a PNH clone < 10%.
- Patient 070-009, 070-012, 070-013 did not have formal PNH diagnoses established at least six months prior to enrollment.
- Patient 015-001 received 600 mg of Eculizumab at visit six instead of 900 mg.
- Seven patients had study medication infused beyond the 14 day treatment phase.

There were six patients (013-001, 013-002, 014-002, 070-006, 091-002, 101-004) that had Eculizumab dosing at a shorter time interval than every 14 days in the SHEPHERD study as is required by the maintenance phase of the dosing regimen. All six of these patients received Eculizumab on day 12 of the maintenance dosing regimen. This was within the parameters of the dosing regimen.

The table below further describes the demographics of the patients included in the SHEPHERD study. The sponsor performed no subgroup analyses based on age, race or gender.

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**Table 3. Summary of Demographics and Baseline Characteristics (PP)**

| | Overall N = 97 |
|---|---|
| **Gender n (%)** | |
| Male | 48 (49.5) |
| Female | 49 (50.5) |
| **Race n (%)** | |
| Caucasian | 88 (90.7) |
| Black | 3 (3.1) |
| Asian | 3 (3.1) |
| Other | 3 (3.1) |
| **Age (years)** | |
| Mean (standard deviation) | 41.05 (14.41) |
| Median (first, third quartile) | 41.00 (29.00, 51.00) |
| Range | (18.00, 78.00) |
| **Age groups (years) n (%)** | |
| <65 | 90 (92.8) |
| 65 to 75 | 5 (5.2) |
| ≥75 | 2 (2.1) |
| **Weight (kg)** | |
| n | 97 |
| Mean (standard deviation) | 73.72 (14.29) |
| Median (first, third quartile) | 73.50 (62.80, 81.10) |
| Range | (47.63, 120.50) |
| **Height (cm)** | |
| n | 96 |
| Mean (standard deviation) | 171.70 (10.23) |
| Median (first, third quartile) | 173.00 (163.00, 180.00) |
| Range | (148.00, 203.00) |
| **Blood Type n (%)** | |
| A- | 10 (10.3) |
| A+ | 31 (32.0) |
| B- | 3 (3.1) |
| B+ | 5 (5.2) |
| AB- | 1 (1.0) |
| AB+ | 5 (5.2) |
| O- | 6 (6.2) |
| O+ | 36 (37.1) |

Reference: Table 14.1.2.1



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Generally, patients in the SHEPHERD were of the same median age and had a similar gender distribution to that of the TRIUMPH study. A list of the concomitant medications used by the patients enrolled in the SHEPHERD study is presented below. Of note, 62.9% of patients in this study were on concomitant anticoagulant therapy. Also 47.4% of patients in the SHEPHERD study were on concomitant steroids, and 29.9% had a history of aplastic anemia or myelodysplastic syndrome. The sponsor reported that patients in the SHEPHERD study had an 8.0 U median RBC transfusion requirement in the 12 months prior to enrollment into the study. Also, the mean baseline LDH levels was reported to be 2,051 U/L and the mean free hemoglobin concentration at baseline was reported to be 34.9 g/dl in patients enrolled in the SHEPHERD study.

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**Table 7. Summary of Concomitant Medications Taken by at Least 5% of Patients (PP)**

| Anatomical therapeutic chemical classification level 2 term | N = 97<br>n (%) |
|---|---|
| Vaccines | 97 (100) |
| Antianemic preparations | 84 (86.6) |
| Analgesics | 71 (73.2) |
| Antithrombotic agents | 61 (62.9) |
| Antibacterials for systemic use | 67 (69.1) |
| Corticosteroids for systemic use | 39 (40.2) |
| Antihistamines for systemic use | 32 (33.0) |
| Antacids, drugs for treatment of peptic ulcers and flatulence | 30 (30.9) |
| Vitamins | 24 (24.7) |
| Mineral supplements | 22 (22.7) |
| Antiinflammatory and antirheumatic products | 17 (17.5) |
| Psycholeptics | 19 (19.6%) |
| Diuretics | 16 (16.5) |
| Sex hormones and modulators of the genital system | 13 (13.4) |
| Psychoanaleptics | 13 (13.4) |
| All other therapeutic products | 13 (13.4) |
| Beta blocking agents | 12 (12.4) |
| Cough and cold preparations | 12 (12.4) |
| Immunosuppressive agents | 11 (11.3) |
| Laxatives | 11 (11.3) |
| Agents acting on the renin-angiotensin system | 10 (10.3) |
| Cardiac therapy | 9 (9.3) |
| Ophthalmologicals | 8 (8.2) |
| Blood substitutes and perfusion solutions | 8 (8.2) |
| Antiemetics and antinauseants | 7 (7.2) |
| Anesthetics | 7 (7.2) |
| Antispasmodics and anticholinergic agents and propulsives | 7 (7.2) |
| Antivirals for systemic use | 7 (7.2) |
| Muscle relaxants | 7 (7.2) |
| Drugs used in diabetes | 6 (6.2) |
| Antiasthmatics | 6 (6.2) |
| Antifungals for dermotological use | 6 (6.2) |
| Antimycotics for systemic use | 6 (6.2) |
| Stomatological preparations | 6 (6.2) |
| Urologicals | 6 (6.2) |
| Antidiarrheal, intestinal antiinflammatory/antiinfective agents | 5 (5.2) |
| Antiepileptics | 5 (5.2) |
| Antibiotics and Chemotherapy for dermotological use | 5 (5.2) |
| Immunostimulants | 5 (5.2) |
| Other nervous system drugs | 5 (5.2) |



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The baseline thrombosis history of patients in the SHEPHERD study is presented in the table below. In the SHEPHERD study 42/97 patients had a history of thrombosis. These 42 patients had a history of 93 thrombotic events.

14.1.2.4 Summary of Thrombosis History by Major Adverse Vascular Event (MAVE)
Population: Per Protocol

| | (N = 97) | |
|---|---|---|
| Major Adverse Vascular Event | Patient | Event |
| Any Thrombosis Event | 42 ( 43.3%) | 93 |
| Cerebrovascular Accident | 10 ( 10.3%) | 11 |
| Mesenteric Vein Thrombosis | 5 ( 5.2%) | 5 |
| Portal Vein Thrombosis (Budd-Chiari) | 13 ( 13.4%) | 13 |
| Pulmonary Embolus | 5 ( 5.2%) | 5 |
| Thrombophlebitis/Deep Vein Thrombosis | 17 ( 17.5%) | 26 |
| Transient Ischemic Attack | 1 ( 1.0%) | 1 |
| Unstable Angina | 1 ( 1.0%) | 1 |
| Other ((post-thrombosis?) portal vein cavernoma) | 1 ( 1.0%) | 1 |
| Other (Budd-Chiari syndrome) | 1 ( 1.0%) | 1 |
| Other (Deep Vein Thrombosis) | 2 ( 2.1%) | 2 |
| Other (Hepatic vein thrombosis) | 1 ( 1.0%) | 1 |
| Other (Jugularis interna thrombosis) | 1 ( 1.0%) | 1 |
| Other (Recurrent ischemic colitis) | 1 ( 1.0%) | 1 |
| Other (Splenic infarct.) | 1 ( 1.0%) | 1 |
| Other (Suspected abdominal veins microthrombosis) | 1 ( 1.0%) | 1 |
| Other (Thrombophlebitis) | 1 ( 1.0%) | 1 |

NOTE: Major Adverse Vascular Events (MAVEs) were defined in the protocol. Those designated as 'other' were required to have explanatory verbatim terms entered. Patients may have reported more than one MAVEs.

Source Data: 16.2.3.5
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In the SHEPHERD study the primary endpoint was the LDH AUC. The results of the analysis of the primary endpoint are shown in the table below. There was a significant decrease in the LDH AUC over time in these patients.

**Table 9. Area Under the Curve for Lactate Dehydrogenase in U/L over time (PP)**

| Statistic | Eculizumab N=97 | *P* Value[a] |
|---|---|---|
| **Overall** | | <0.001 |
| Mean (standard error) | -325375.7 (18296.43) | |
| Median | -301837.0 | |
| Range | (-881796.5, -39392.5) | |

Note: Area under the curve was calculated from Baseline to 26 weeks after first dose.

[a] Based on Wilcoxon signed rank test.

Reference: Table 14.2.1.1



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QOL measured by the FACIT-F QOL tool secondary endpoint analysis is shown in the table below. This table shows that fatigue was significantly improved as compared to baseline in these patients (P<0.001).

**Table 10. Change of FACIT-Fatigue Scores Between Baseline and All Visits (PP)**

| | Eculizumab | *P* Value[a] |
|---|---|---|
| **Baseline** | | |
| N | 96 | |
| Mean (standard error) | 30.8 (1.20) | |
| Median | 33.0 | |
| Range | (5.0,51.0) | |
| **Change from Baseline at:** | | |
| Visit 3 (Week 1) (n) | 93 | <0.001 |
| Mean (standard error) | 5.6 (1.00) | |
| Median | 3.0 | |
| Range | (-8.0,40.0) | |
| Visit 4 (Week 2) (n) | 94 | <0.001 |
| Mean (standard error) | 7.1 (0.98) | |
| Median | 5.0 | |
| Range | (-12.0,34.0) | |
| Visit 5 (Week 3) (n) | 95 | <0.001 |
| Mean (standard error) | 9.1 (1.10) | |
| Median | 7.0 | |
| Range | (-22.0,44.0) | |
| Visit 6 (Week 4) (n) | 93 | <0.001 |
| Mean (standard error) | 8.9 (1.12) | |
| Median | 8.0 | |
| Range | (-18.0,37.0) | |
| Visit 10 (Week 12) (n) | 90 | <0.001 |
| Mean (standard error) | 9.9 (1.20) | |
| Median | 7.5 | |
| Range | (-13.0,43.0) | |
| Visit 14 (Week 20) (n) | 90 | <0.001 |
| Mean (standard error) | 11.6 (1.25) | |
| Median | 9.5 | |
| Range | (-18.0,42.0) | |
| Visit 17 (Week 26) (n) | 94 | <0.001 |
| Mean (standard error) | 11.8 (1.20) | |
| Median | 8.5 | |
| Range | (-10.7,44.0) | |

[a] Based on Wilcoxon signed rank test.
Reference: Table 14.2.2.1.2

As in the TRIUMPH study analyses of QOL, on January 31, 2007, the sponsor was asked to show that improvement in fatigue with Eculizumab did not require improvements in both hemolysis and anemia but was related to either the improvement in hemolysis without requirement for an improvement in anemia or a drug activity unrelated to the observed drug-related improvements in hemolysis or anemia. The sponsor responded on February 1, 2007, stating that Eculizumab treatment resulted in significant improvements in fatigue and hemolysis without meaningful changes in transfusion requirements in the SHEPHERD study population. The sponsor stated that statistically significant improvements in fatigue were observed in the < 4 U/year pretreatment transfusion stratum. The sponsor indicated that this improvement in fatigue was obtained in patients with minimal pretreatment transfusion requirements and without demonstrable reductions in their transfusion requirements with Eculizumab treatment. The



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sponsor indicated that the baseline fatigue score for these patients (n=21) was 27.6. The mean change from baseline fatigue score at week 26 for these patients was 13.1 (P<0.001). In this group of 21 patients a median of 0.0 units of red blood cells were transfused during the 26 weeks pretreatment and a median of 0.0 units of packed red blood cells were transfused during the 26 weeks of treatment. The analysis performed by the sponsor appears to support the claim that Eculizumab may improve the QOL of patients with PNH regardless of Eculizumab's affect on hemolysis or anemia. However, the SHEPHERD study was an uncontrolled and open label study and it is not clear what the effect of placebo may have been or if there may have been biased patient reporting in favor of improved QOL.

In the SHEPHERD study two patients developed thrombotic events (one patient with deep vein thrombosis and one patient with pulmonary embolism). The event rate was low however, a majority of patients were on concomitant anticoagulant treatment and there was no comparator arm in this trial. These issues confound the conclusion regarding the effect of Eculizumab on the rate of thrombosis.

Table 14.2.3.3 Summary of Thrombosis Events
Population: Per Protocol

| Major Adverse Vascular Event | (N = 97) |
|---|---|
| Any Thrombosis Event | 2 (2.1%) |
| Other (Deep Vein Thrombosis) | 1 (1.0%) |
| Pulmonary Embolus | 1 (1.0%) |

The baseline transfusion history of the patients enrolled in the SHEPHERD study is shown in the table below. Patients had a median hemoglobin of 7.5 g/dl and a median transfusion requirement of eight units of red blood cells over two years. The sponsor reports that shortness of breath and fatigue was the two most common reported symptoms which triggered transfusion.

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**Table 5. Transfusion History (PP)**

| Parameter | Eculizumab N = 97 |
|---|---|
| **Hemoglobin prior to transfusion** | |
| n | 94 |
| Mean - g/dL (standard error) | 7.7 (0.13) |
| Median - g/dL (first, third quartile) | 7.5 (6.9, 8.3) |
| Range - g/dL | (4.5, 12.4) |
| **Hemoglobin after transfusion** | |
| n | 42 |
| Mean - g/dL (standard deviation) | 9.4 (0.22) |
| Median - g/dL (first, third quartile) | 9.4 (8.2, 10.1) |
| Range - g/dL | (6.3, 13.2) |
| **Number of units transfused** | |
| n | 97 |
| Total units transfused | 1546 |
| Mean (standard error) | 15.9 (1.67) |
| Median (first, third quartile) | 8.0 (4.0, 24.0) |
| Range | (0.0, 66.0) |
| **Symptoms associated with transfusion** | |
| All symptoms | 728 |
| Angina | 1 (<1%) |
| Change in mental status | 5 (1%) |
| Severe or worsening shortness of breath | 143 (20%) |
| Severe or worsening fatigue | 448 (62%) |
| Other | 131 (18%) |

Reference: Table 14.1.2.3

The sponsor undertook an analysis of the number of units of packed red blood cells transfused and transfusion avoidance and the analyses are shown in the table below. The results shown here for the SHEPHERD study for these analyses are compared to baseline. In addition, LDH levels (secondary endpoint) and free hemoglobin analyses (exploratory endpoint) are shown in the table below. This table shows that compared to baseline in the SHEPHERD study patients had improved transfusion avoidance has no packed red blood cell units were transfused. In addition, LDH levels decreased compared to baseline. Also, free hemoglobin levels decreased compared to baseline.



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| | TRIUMPH | | | SHEPHERD | |
|---|---|---|---|---|---|
| | Placebo N = 44 | Ecu N = 43 | P – Value1 | Ecu N = 97 | P – Value2 |
| Stabilization of hemoglobin levels (%) | **0.0** | **48.83** | **< 0.001** | N/A | N/A |
| Median PRBC Units Transfused/patient | **10.0** | **0.03** | **< 0.001** | 0.0 | < 0.001 |
| Transfusion Avoidance (%) | 0.0 | 51.2 | < 0.001 | 55.7 | < 0.001 |
| LDH levels at 26 wks | 2,166.5 | 239.0 | < 0.001 | 270.0 | < 0.001 |
| Free Hb at 26 weeks | 61.6 | 5.2 | < 0.001 | 6.0 | < 0.001 |

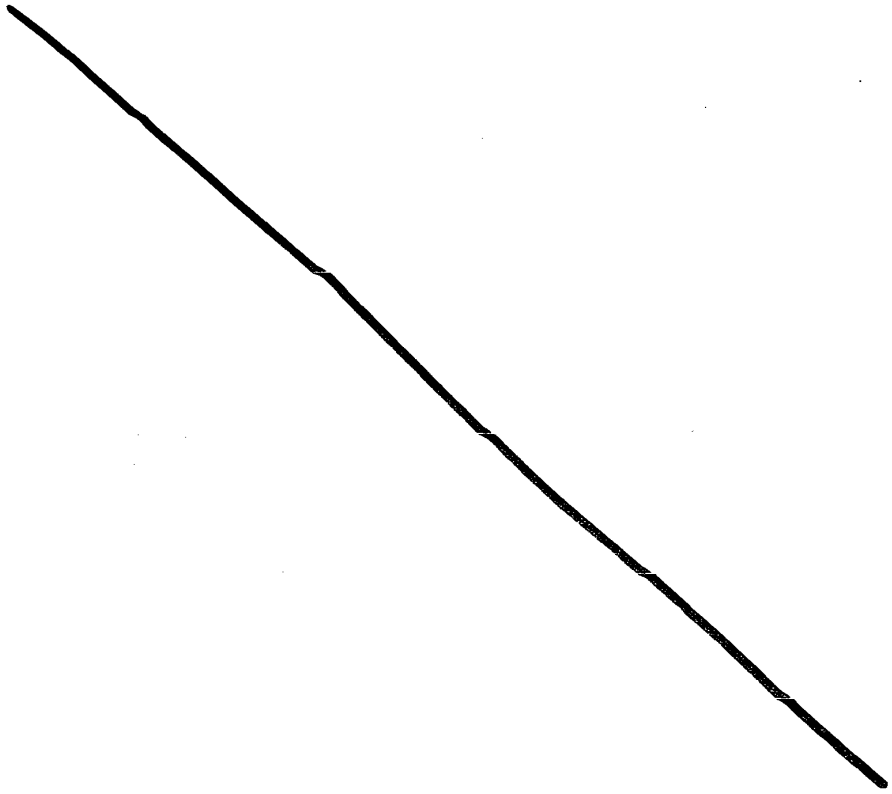
In the SHEPHERD study six patients had Eculizumab dosing during the maintenance phase given more frequently then every 14 days. These patients were still treated according to the protocol specified dosing regimen of 14 +/- 2 days. The mean number of doses of Eculizumab administered to these six patients was 29.5 (range 29-31 doses). The table below shows the number of doses at each of the intervals and the change from baseline in LDH and hemoglobin for these six patients. At the dosing interval of every 14 days these six patients had a mean decrease in hemoglobin of 0.44 mg/dl. Administration of Eculizumab more frequently caused an increase in hemoglobin and further decrease in LDH as is shown in the table below. In an e-mail communication on February 21, 2007 the sponsor reported that only these 6/196 PNH patients have been treated more frequently then the maintenance specified dosing interval of every 14 days.

| Parameter | Dosing Interval | | |
|---|---|---|---|
| | Every 12 days | Every 13 days | Every 14 Days |
| Number of doses | 71 | 45 | 25 |
| Mean change LDH (U/L) from baseline | -1998 | -2519 | -755 |
| Mean change hemoglobin (mg/dl) from baseline | 1.26 | 1.44 | -0.44 |

An additional exploratory analysis was conducted on QOL using the EORTC QLQ-C30 tool. A positive change in global health status and functional scores (role, social, cognitive, physical, emotional) and eight negative change in symptom/item scores (fatigue, pain, dyspnea, appetite loss, insomnia, financial difficulties, constipation, nausea/vomiting and diarrhea) would indicate an improvement. Changes in this QOL tool's scores from baseline were analyzed using a mixed-effects model with baseline as a covariate, time as fixed effect and patient as a random effect. The sponsor indicates that there was a statistically significant improvement seen for overall visits in 13/15 items including: global health status, role, social, cognitive, physical, emotional, fatigue, pain, dyspnea, appetite loss, insomnia, nausea/vomiting and diarrhea symptom domains. The table below shows these results.



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### 6.1.5 Clinical Microbiology

Not Applicable

### 6.1.6 Efficacy Conclusions

The TRIUMPH study was a randomized, double-blind, placebo-controlled, multicenter study of Eculizumab or placebo administered by IV infusion to 87 patients with hemolytic transfusion dependent PNH patients. The treatment arms were similar in terms of patient demographics, thrombosis and transfusion history. In this study hemoglobin stabilization (a co primary endpoint) was achieved in 48.8% of Eculizumab treated patients indicating that these patients did not require any transfusions during the 26 week study duration because their hemoglobin levels remained above their individual set points. Hemoglobin stabilization did not occur among any of the placebo patients and the difference between the treatment groups was statistically significant. A sensitivity analysis performed on the hemoglobin stabilization endpoints confirmed this efficacy outcome. After treatment with Eculizumab, statistically significant differences in hemoglobin stabilization were observed in the low and middle transfusion strata but not the high

strata. In addition a statistically significant reduction in the number of packed red blood cell units transfused (a co-primary endpoint) was achieved in the Eculizumab group compared with placebo. During the 26 week study the median units transfused per patient was 0.0 in the Eculizumab group and 10.0 in the placebo group regardless of transfusion strata.

Secondary endpoint analyses for efficacy showed transfusion avoidance was achieved in 22/43 Eculizumab patients and in no placebo patients which was statistically significant. Secondary endpoint analysis showed a statistically significant overall improvement in LDH AUC. Also, there was a statistically significant improvement in LDH AUC in each transfusion stratum after treatment with Eculizumab compared to the placebo. The sponsor analyzed the QOL in this study using the FACIT-Fatigue QOL tool. Eculizumab treated patients had a similar mean number of QOL assessments per patient compared to placebo treated patients in the TRIUMPH study (8.7 (range 5-9) assessments, n = 43 Eculizumab treated patients compared to 8.6 (range 3-9) assessments, n = 44 placebo treated patients). Eculizumab treated patients demonstrated statistically significant improvements in fatigue levels compared to placebo treated patients by visit six and at subsequent visits. A sensitivity analysis was performed by the statistics reviewer for the data presented in the table below which showed the finding to be robust (see Statistics review). However, because the QOL tool was administered to patients prior to transfusion without a follow-up QOL tool administration immediately after transfusion, is difficult to ascertain Eculizumab's effect on QOL independent of transfusion. The sponsor was asked to demonstrate that improvement in fatigue with Eculizumab did not require improvements in both hemolysis and anemia but was related to either the improvement in hemolysis without requirement for an improvement in anemia or a drug activity unrelated to the observed drug related improvements in hemolysis or anemia. However, the sponsor was not able to demonstrate that improvement in fatigue with Eculizumab did not require improvements in both hemolysis and anemia but was related to either the improvement in hemolysis without requirement for an improvement in anemia or a drug activity unrelated to the observed drug related improvements in hemolysis or anemia due to the fact that the sponsor did not assess the effect of red blood cell transfusion by itself on QOL.

The sponsor performed a series of exploratory endpoint analyses including comparison of change of lactate dehydrogenase from baseline, an analysis of QOL using the EORTC QLQ-C30 tool, platelet activity, nitric oxide measure, free hemoglobin measurements and thrombosis. In the TRIUMPH study, Eculizumab treated patients did show improvement in both the functional and symptom/item measures when assessed using the EORTC QLQ-C30 tool and fatigue using the FACIT-F tool. The QOL analyses suggest that Eculizumab may provide an improvement in the QOL of patients with PNH. This conclusion is supported by the statistics review (see Statistics review). However, because a decrease in the degree of hemolysis can impact the severity of anemia it remains that the sponsor has not completely shown that Eculizumab can impact the QOL of patients with PNH independent of its antihemolytic effect and/or its effect on anemia.

The review of the EORTC QLQ-C30 and the FACIT-F tools by the SEALD team identified concerns regarding the adequacy of these endpoints to support claims of clinical benefit. With regard to the FACIT-F QOL tool, the review states that validation experience documents that the scales used by this QOL tool assess distinct components of the QOL construct. However, the review further states that it is not clear if the tool measures all of the components of fatigue



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because fatigue is a multidimensional concept that encompasses both mental and physical attributes. (See SEALD review completed January 29, 2007.) Also, with regard to the EORTC QLQ-C30 QOL tool, the review states that validation experience documents that the scales assess distinct components of the health-related quality of life construct. However, the review further states that no evidence is available to support the validity of the instrument to measure the individual domain or individual symptom constructs. (See SEALD review completed January 29, 2007.)

Nitric oxide measures and free hemoglobin measures favored the Eculizumab treated patients. The exploratory analysis for platelet activity by visit showed that there is no statistically significant change from baseline between the treatment groups. However, analyses of the effect of Eculizumab on the incidence of thrombosis are confounded by the fact that approximately 50% of patients in the Eculizumab treatment arm were on concomitant anticoagulant therapy.

Therefore it appears that Eculizumab is effective in stabilizing hemoglobin and decreasing the number of packed red blood cell transfusions required in transfusion dependent PNH patients. Secondary endpoint analyses for transfusion avoidance and LDH AUC provide additional support that Eculizumab is effective in the treatment of PNH. However, QOL measures using the FACIT- F tool and EORTC QLQ-C30 tool are confounded by the fact that no assessment of effect of transfusion on QOL was performed. Furthermore, with regard to the FACIT-F tool it is not clear if the tool measures all of the components of fatigue because fatigue is a multidimensional concept that encompasses both mental and physical attributes. With regard to the EORTC QLQ-C30 tool there is no evidence available to support the validity of the instrument to measure the individual domain or individual symptom constructs. Analyses of the effect of Eculizumab on the incidence of thrombosis are confounded by the fact that approximately 50% of patients in the Eculizumab treatment arm were on concomitant anticoagulant therapy.

In the open label SHEPHERD study, which was designed primarily to assess the safety of Eculizumab treatment in patients with PNH, Eculizumab decreased the LDH AUC compared to baseline and may improve quality of life as measured by the FACIT-F QOL instrument. Eculizumab treatment resulted in significant improvements in fatigue and hemolysis without meaningful changes in transfusion requirements in the SHEPHERD study population. The sponsor stated that statistically significant improvements in fatigue were observed in the $< 4$ U/year pretreatment transfusion stratum. The sponsor indicated that this improvement in fatigue was obtained in patients with minimal pretreatment transfusion requirements and without demonstrable reductions in their transfusion requirements with Eculizumab treatment. The sponsor indicated that the baseline fatigue score for these patients (n=21) was 27.6. The mean change from baseline fatigue score at week 26 for these patients was 13.1 ($P<0.001$). In this group of 21 patients a median of 0.0 units of red blood cells were transfused during the 26 weeks pretreatment and a median of 0.0 units of packed red blood cells were transfused during the 26 weeks of treatment. Clinically, FACIT-F scores generally $\leq 30$ are considered to be related to difficulty performing everyday activities. Patients with scores above 30 can generally perform activities of daily living.[3] In addition, the SHEPHERD study was able to show that Eculizumab can decrease transfusion requirements and free hemoglobin levels. Using the EORTC QLQ-C30 QOL tool, in an exploratory analysis, the sponsor was able to show that in patients treated with



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Eculizumab there were improvements in 13/15 measures including: global health status, role, social, cognitive, physical, emotional, fatigue, pain, dyspnea, appetite loss, insomnia, nausea/vomiting and diarrhea symptom domains.

Conclusions regarding the effect of Eculizumab on thrombosis are confounded because of the fact that a majority of patients (59/97) were on concomitant anticoagulant therapy in the SHEPHERD. With regard to the FACIT-F tool it is not clear if the tool measures all of the components of fatigue because fatigue is a multidimensional concept that encompasses both mental and physical attributes. With regard to the EORTC QLQ-C30 QOL tool, no evidence is available to support the validity of the instrument to measure the individual domain or individual symptom constructs. (See SEALD review completed January 29, 2007.)

Therefore, it appears that Eculizumab is effective in the treatment of patients with transfusion dependent PNH by decreasing hemolysis which results in a stabilization of hemoglobin levels and avoidance of transfusion. It also appears that Eculizumab may improve QOL in patients with PNH in terms of decreasing fatigue and by improving other QOL parameters. Due to the fact that a large number of patients were on concomitant anticoagulant therapy a conclusion regarding Eculizumab's effect on thrombosis incidence rates cannot be made.

# 7 INTEGRATED REVIEW OF SAFETY

## 7.1 Methods and Findings

In the TRIUMPH study safety was assessed by examination of treatment emergent adverse events, clinical laboratory results, electrocardiogram data and vital sign measurements collected during the treatment phase and the post-treatment phase. All treatment emergent adverse events were presented by the sponsor using descriptive statistics. The Fisher exact test was used to compare the differences in treatment emergent adverse events between the treatment groups. In addition, laboratory data was analyzed using descriptive statistics.

In the TRIUMPH study the extent of study drug exposure in the ITT population is shown in the table below. The duration of months (median 6.1 months for both Eculizumab and placebo treated patients) on study drug and the number of study drug infusions (median 16.0 infusions for both Eculizumab and placebo treated patients) was similar between the two treatment arms.



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**Table 16. Extent of Study Drug Exposure (ITT)**

| | Eculizumab N = 43 | Placebo N = 44 |
|---|---|---|
| **Duration (months) on study drug[a]** | | |
| Mean (standard deviation) | 6.0 (0.85) | 5.2 (1.81) |
| Median (1st and 3rd quartiles) | 6.1 (6.1, 6.1) | 6.1 (6.0, 6.1) |
| Range | 1.9, 7.1 | 0.9, 6.4 |
| **Number of study drug infusions** | | |
| Mean (standard deviation) | 15.9 (1.90) | 14.3 (3.77) |
| Median (1st and 3rd quartiles) | 16.0 (16.0, 16.0) | 16.0 (16.0, 16.0) |
| Range | 7.0, 19.0 | 5.0, 17.0 |
| **Total amount (mg) of eculizumab infused[b]** | | |
| Mean (standard deviation) | 13032.3 (1680.95) | not applicable |
| Median (1st and 3rd quartiles) | 13200.0 (13200.0, 13200.0) | not applicable |
| Range | 5100.0, 15900.0 | not applicable |

[a] Duration = (last dose date – first dose date + 1)/30.

[b] Total amount = 5 * total volume infused

Reference: Table 14.1.3.2

In the SHEPHERD study the extent of drug exposure is shown in the table below. The median number of months on treatment was 6.1 and the median number of drug infusions was 16.

**Table 12. Extent of Study Drug Exposure (PP)**

| | Eculizumab N = 97 |
|---|---|
| **Duration (months) on study drug[a]** | |
| Mean (standard deviation) | 6.0 (0.53) |
| Median (1st and 3rd quartiles) | 6.1 (6.0, 6.1) |
| Range | 1.0, 6.1 |
| **Number of study drug infusions** | |
| Mean (standard deviation) | 15.8 (1.19) |
| Median (1st and 3rd quartiles) | 16.0 (16.0, 16.0) |
| Range | 5.0, 17.0 |
| **Total amount (mg) of eculizumab infused** | |
| Mean (standard deviation) | 12950.5 (1099.37) |
| Median (1st and 3rd quartiles) | 13200.0 (13200.0, 13200.0) |
| Range | 3300.0, 14100.0 |

[a] Duration = (last dose date – first dose date + 1)/30.

Reference: Table 14.1.3.2



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### 7.1.1 Deaths

In the TRIUMPH study no deaths occurred.

Otherwise there were a total of 7 depth deaths in all of the Eculizumab studies combined. There were three deaths in non-PNH studies and four deaths in PNH studies. The narratives for these patients are as follows:

- C99-004 non-PNH Eculizumab treated patient death: this patient was a 37-year-old black male with a history of idiopathic membranous glomerulonephropathy. This patient died due to [redacted]
- E 99-001 non- PNH Eculizumab treated patient death: this patient was a 61-year-old Hispanic female with a history of rheumatoid arthritis. She had been on eight months of Eculizumab treatment in study E 99-001. The patient presented with chest pain and developed fever or chills and a blood culture positive for Klebsiella. The patient was given antibiotics and underwent a laparoscopic cholecystectomy to remove a common bile duct stone. The patient had postoperative complications related to an intra-abdominal abscess. Four weeks after the admission the patient had a further complication with a perforated sigmoid colon which again required antibiotic treatment. However, two weeks after the sigmoid resection the patient developed Candida sepsis and ventricular tachycardia and died. It was considered buying be investigator that his death was unrelated to study medication.
- C 01-004 non--PNH treated with placebo death: this patient was a 55-year-old black woman with a history of rheumatoid arthritis. Two months after the patient was given placebo she developed an incarcerated right inguinal hernia and acute bowel obstruction. She required intensive management with ventilator support and aggressive fluid management due to postoperative sepsis. Three weeks postoperatively she developed acute respiratory distress. The patient subsequently had a myocardial infarction and a presumed pulmonary embolism and died.
- C 04-002 PNH Eculizumab treated patient death: this patient was a 31 year-old Caucasian male with a history of PNH. The patient was admitted to hospital with low back pain and pneumonia two weeks after his last dose of study medication. The patient had been on treatment 11 months prior to the admission. A diagnosis of pulmonary embolism was made based on CT scan; however, the patient refused full anticoagulation due to fear of bleeding. The patient's low back pain was diagnosed as a disc prolapse. He had in underlying history of aplastic anemia which required cyclosporine treatment. While in hospital he developed acute renal failure and was treated with intravenous fluids. The patient had respiratory failure 10 days after admission and was declared brain-dead on day 14 after admission due to cerebral herniation secondary to a cerebral hemorrhage. During his hospitalization it was noted that the patient had LDH levels below his pretreatment levels and the primary investigator observed no serious hemolysis otherwise.
- E 05-001 PNH Eculizumab treated patient death: this patient was a 71 year-old Caucasian male with a history of PNH and myelodysplastic syndrome. During the study the patient developed cellulitis, sepsis and acute renal failure subsequent to a [redacted]



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The patient was hospitalized and subsequently developed a viral infection. In addition the patient was on prednisone and solucortef during the hospitalization. The patient was admitted to hospital with increasing fatigue and lower extremity petechiea and thrombocytopenia. He was diagnosed with progression of his myelodysplastic syndrome to chronic myelomonocytic leukemia. The patient subsequently died due to his underlying disease.

- E 05-001 PNH Eculizumab treated patient death: this patient was a 63-year-old Caucasian female who is enrolled initially in the TRIUMPH study. Subsequently the patient was enrolled in the extension study E 05-001. The patient had a significant past medical history for adenocarcinoma of the stomach which was not completely resected. The patient's treatment with Eculizumab was essentially unremarkable with stabilization of her hemoglobin. Eight months after starting treatment in the extension study, an ultrasound of the patient's abdomen and subsequent CT scan showed multiple lesions in the liver. Ultrasonography showed an enlarged with lymph node in the liver hilus along with mediastinal lymphadenopathy and intrapulmonary lesions. In addition, a paravertebral mass was recognized. The patient underwent ultrasound guided biopsy of the liver lesions which demonstrated metastasis of the adenocarcinoma. The patient was enrolled in the extension study for a full year and received treatment with Eculizumab throughout. The patient died approximately 13 months after having started the extension study due to progression of her underlying adenocarcinoma.
- Physician sponsored PNH Eculizumab treated study patient death: this patient was a 60 year old patient with a history of PNH for 10 years. The patient was [redacted] The patient had undergone 10 months of treatment with Eculizumab. She presented with jaundice, gallstones and bacteremia. The patient was treated with a biliary drain because she was a poor surgical candidate. She progressed with one month of intermittent acute cholecystitis and presumed sepsis while off Eculizumab treatment. The patient had progressive decrease in her hemoglobin to a level of 2.0 g/dl and died due to a presumed anoxic cerebrovascular event. The physician considered the patient's death unlikely to be related to Eculizumab treatment.

Review of the narratives for these cases as well as the case report forms indicates that it is unlikely that Eculizumab was directly related to these patient deaths.

### 7.1.2 Other Serious Adverse Events

The table below shows the serious adverse events that occurred in the TRIUMPH study. In this study 4/43 patients in the Eculizumab group compared to 9/44 patients in the placebo group had serious adverse events. The most prevalent serious adverse event was exacerbation of PNH which occurred and one Eculizumab treated patient and three placebo treated patients. In addition, overall one Eculizumab treated patient reported one serious adverse event associated with infection compared to four placebo patients who reported six infections related adverse events.



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**Table 21. Treatment-emergent Serious Adverse Events by Severity (Safety)**

| | Eculizumab N=43 | | | Placebo N=44 | | |
|---|---|---|---|---|---|---|
| | Mod n | Sev n | Total n (%) | Mod n | Sev n | Total n (%) |
| Total number of events | 3 | 1 | 4 | 7 | 9 | 16 |
| Number of patients reporting SAEs | 3 | 1 | 4 (9.3) | 3 | 6 | 9 (20.5) |
| **System organ class (presents total number of patients reporting at least 1SAE) Preferred term (presents total number of events reported)** | | | | | | |
| **Blood and lymphatic system disorders** | **0** | **1** | **1 (2.3)** | 2 | 5 | 7 (15.9) |
| Anaemia | 0 | 0 | 0 (0.0) | 0 | 1 | 1 (2.3) |
| Haemolysis | 0 | 0 | 0 (0.0) | 1 | 0 | 1 (2.3) |
| Neutropenia | 0 | 0 | 0 (0.0) | 0 | 2 | 2 (4.5) |
| Paroxysmal nocturnal haemoglobinuria | 0 | 1 | 1 (2.3) | 1 | 2 | 3 (6.8) |
| **General disorders and administration site conditions** | **0** | **0** | **0 (0.0)** | **1** | **0** | **1 (2.3)** |
| Pyrexia | 0 | 0 | 0 (0.0) | 1 | 0 | 1 (2.3) |
| **Infections and infestations** | **1** | **0** | **1 (2.3)** | 2 | 2 | 4 (9.1) |
| Cellulitis | 0 | 0 | 0 (0.0) | 0 | 1 | 1 (2.3) |
| Central line infection | 0 | 0 | 0 (0.0) | 1 | 0 | 1 (2.3) |
| Folliculitis | 0 | 0 | 0 (0.0) | 0 | 1 | 1 (2.3) |
| Streptococcal bacteraemia | 1 | 0 | 1 (2.3) | 0 | 0 | 0 (0.0) |
| Upper respiratory tract infection | 0 | 0 | 0 (0.0) | 1 | 0 | 1 (2.3) |
| Urinary tract infection | 0 | 0 | 0 (0.0) | 1 | 0 | 1 (2.3) |
| Viral infection | 0 | 0 | 0 (0.0) | 0 | 1 | 1 (2.3) |
| **Musculoskeletal and connective tissue disorders** | **1** | **0** | **1 (2.3)** | **0** | **0** | **0 (0.0)** |
| Intervertebral disc protrusion | 1 | 0 | 1 (2.3) | 0 | 0 | 0 (0.0) |
| **Renal and urinary disorders** | **1** | **0** | **1 (2.3)** | **0** | **0** | **0 (0.0)** |
| Renal colic | 1 | 0 | 1 (2.3) | 0 | 0 | 0 (0.0) |

Mod = Moderate Sev = Severe

Only the most severe of the adverse events for each patient within each system organ class/preferred term was counted.

Mild SAEs were reported, but only moderate and severe SAEs are summarized in this table.

Reference: Table 14.3.1.4.2

There were three patients who developed meningococcal infection while enrolled in the Eculizumab trials. The narratives for these cases are as follows:

- Meningococcal infection in a vaccinated PNH patient: the patient is a 24-year-old male with a past medical history notable for PNH who had received approximately 12 months of Eculizumab in the E05-001 study after receiving placebo in the C04-001 study. His last dose of Eculizumab was three days prior to the event. The patient was well in the morning but began feeling ill over the course of the day. On presentation the patient had a systolic blood pressure of 90 mmHg and a temperature of 104°F. He underwent a lumbar puncture which was normal and laboratories showed him to have a hemoglobin of 10 g/dl and an LDH of 211 IU/L. The patient was placed on vasopressors and antibiotics and given intravenous fluids. The patient developed hemolysis as evidenced by dark urine and a drop in his hemoglobin to a level of 6.3 g/dl. A blood culture was positive for *Neisseria meningitidis*. The patient was discharged home with antibiotics four days after



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admission. The patient was reported to be doing well with no hemolysis or other PNH complications noted.

- Meningococcal infection in a vaccinated PNH patient: the patient is a 54 year-old female who participated initially in the SHEPHERD study and then was enrolled in the extension study E05-001. The patient had been on Eculizumab for a period of approximately 14 months. The patient presented with a fever, cough, mild frontal headache and vomiting. The patient was hypotensive, tachycardic and febrile. She was given intravenous fluids and antibiotics intravenously at the time of her presentation. The patient's urine was positive for dark blood. Her LDH was reported to be 1242 U/L and her hemoglobin was 67 g/dl. Blood cultures were positive for *Neisseria meningitidis*. The patient was discharged home with a five-day course of oral antibiotics. The patient's LDH at the time of discharge and at one month follow-up was in the 2000-3000 range.
- Meningococcal infection in an unvaccinated non-PNH patient: this patient is a 22 year-old female with a history of idiopathic membranous glomerulonephritis. She was not vaccinated against meningococcal disease. She had been on Eculizumab treatment 8 mg/kg every two weeks for a total of seven months when she developed a one-day history of nausea, vomiting, abdominal pain and body aches. The patient presented with a tachycardia and tachypnea along with a temperature of 104° F. The patient was orthostatic and had a serum creatinine of 2.6 mg/dl (baseline 0.7 mg/dl). The patient had a lumbar puncture which was positive for *Neisseria meningitidis*. The patient was noted to have gangrene in some of her digits requiring partial amputation of several distal hand digits. In addition the patient's course was complicated by pneumonia and a probable pulmonary embolism. The patient was discharged to a rehabilitation facility after surgery and prolonged antibiotic treatment.

The incidence of herpes simplex infection appeared increased in patients treated with Eculizumab in PNH studies. In the TRIUMPH and SHEPHERD studies 8/140 patients developed herpes simplex infection. These infections were mild or moderate in severity in all patients. In 2/8 of the patients it was felt that Eculizumab was possibly related to this adverse event. The sponsor notes that these patients had increased risk factors for developing herpes simplex infection such as:

- Previous herpes infection in four patients.
- Previous aplastic anemia in two patients.
- History of other viral (CMV) reactivation in one patient.
- A history of sickle cell disease and one patient.

The sponsor notes that in the general population the prevalence of herpes simplex is reported to be approximately 68%.[4]

In the SHEPHERD study, 12/97 patients were reported to have serious adverse events. The most common serious adverse event was anemia which was moderate reported in three patients. The table below shows the serious adverse event rates for the SHEPHERD study. There was one patient in this study who died (number 102-005) and is described in section 7.1 .1 of this review.



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**Table 17. Treatment-Emergent Serious Adverse Events by Severity (Safety)**

| | Eculizumab | | | |
|---|---|---|---|---|
| | Mild n | Moderate n | Severe n | Total n (%) |
| **Total number of events** | 0 | 13 | 11 | 24 |
| **Number of patients reporting SAEs** | | 4 | 8 | 12 (12.4) |
| **Blood and lymphatic system disorders** | 0 | 5 | 0 | 5 (5.2) |
| Anaemia | 0 | 3 | 0 | 3 (3.1) |
| Anaemia macrocytic | 0 | 1 | 0 | 1 (1.0) |
| Haemolysis | 0 | 1 | 0 | 1 (1.0) |
| Thrombocytopenia | 0 | 1 | 0 | 1 (1.0) |
| **Gastrointestinal disorders** | 0 | 1 | 0 | 1 (1.0) |
| Abdominal pain | 0 | 1 | 0 | 1 (1.0) |
| **General disorders and administration site conditions** | 0 | 1 | 0 | 1 (1.0) |
| Pyrexia | 0 | 1 | 0 | 1 (1.0) |
| **Hepatobiliary disorders** | 0 | 0 | 1 | 1 (1.0) |
| Cholecystitis | 0 | 0 | 1 | 1 (1.0) |
| **Infections and infestations** | 0 | 1 | 0 | 1 (1.0) |
| Pyelonephritis | 0 | 1 | 0 | 1 (1.0) |
| **Injury, poisoning and procedural complications** | 0 | 1 | 1 | 2 (2.1) |
| Brain herniation | 0 | 0 | 1 | 1 (1.0) |
| Rib fracture | 0 | 1 | 0 | 1 (1.0) |
| **Metabolism and nutrition disorders** | 0 | 1 | 0 | 1 (1.0) |
| Hypokalaemia | 0 | 1 | 0 | 1 (1.0) |
| **Musculoskeletal and connective tissue disorders** | 0 | 0 | 1 | 1 (1.0) |
| Intervertebral disc protrusion | 0 | 0 | 1 | 1 (1.0) |
| **Nervous system disorders** | 0 | 1 | 4 | 5 (5.2) |
| Convulsion | 0 | 0 | 1 | 1 (1.0) |
| Epilepsy | 0 | 0 | 1 | 1 (1.0) |
| Haemorrhagic cerebral infarction | 0 | 0 | 1 | 1 (1.0) |
| Headache | 0 | 1 | 1 | 2 (2.1) |
| **Psychiatric disorders** | 0 | 0 | 1 | 1 (1.0) |
| Anxiety | 0 | 0 | 1 | 1 (1.0) |
| **Renal and urinary disorders** | 0 | 1 | 2 | 3 (3.1) |
| Nephrolithiasis | 0 | 0 | 1 | 1 (1.0) |
| Renal impairment | 0 | 0 | 1 | 1 (1.0) |
| Renal insufficiency | 0 | 1 | 0 | 1 (1.0) |
| **Vascular disorders** | 0 | 0 | 1 | 1 (1.0) |
| Thromboembolism | 0 | 0 | 1 | 1 (1.0) |

N=97
Reference: Table 14.3.1.4.2

### 7.1.3 Dropouts and Other Significant Adverse Events

In the TRIUMPH study the following patients were discontinued from the study:

- Patient 170-001 (Eculizumab) discontinued due to difficulty with travel requirement.

- Patient 028-003 (Eculizumab) was discontinued when it was discovered she was pregnant.

There was one patient who dropped out due to adverse events in the SHEPHERD study. This patient (number 102-005) is described in section 7.1.1 this review.

7.1.3.1 Overall profile of dropouts

The frequency of any discontinuation due to adverse event treatment was similar in the Eculizumab and placebo treated populations in the TRIUMPH study (Eculizumab-2.3%, placebo-0.0%) and in the uncontrolled studies in patients with PNH. The single discontinuation due to adverse event in the TRIUMPH study was a patient treated with Eculizumab who subsequently became pregnant. In the uncontrolled PNH studies there were no discontinuations due to adverse events reported in 193 patients prior to database lock. However it became known that a single patient in the extension study E05-001 withdrew from the study due to a serious adverse event which was determined to be progression of his pre-existing myelodysplastic syndrome to chronic myelomonocytic leukemia and which was considered to be unrelated to study medication. The patient subsequently died due to his pre-existing condition. A second patient discontinued from the uncontrolled study due to a newly diagnosed myelodysplastic syndrome. The patient was withdrawn to prepare for a possible bone marrow transplantation. The cause of the MDS was considered to be the patient's underlying PNH. Discontinuation of Eculizumab treatment or noncompliance with Eculizumab treatment was not associated with subsequent serious hemolysis in the TRIUMPH or SHEPHERD PNH studies. Five patients who discontinued Eculizumab treatment after receiving Eculizumab for a range of 29-715 days prior to withdrawal showed no evidence of serious hemolysis following discontinuation of Eculizumab. In addition, nine patients with 12 episodes of noncompliance with the dosing regimen of Eculizumab showed no episodes in which hemolysis was increased over pretreatment levels. Therefore, it appears that he discontinuation due to adverse events was low in frequency in both the controlled and uncontrolled PNH studies.

Thus far in the SHEPHERD study there was one patient who dropped out due to death (number 102-005). This patient is described in section 7.1 .1 of this review.

7.1.3.2 Adverse events associated with dropouts

The frequency other any adverse event leading to discontinuation was generally similar in the Eculizumab and placebo treated populations in the TRIUMPH study (Eculizumab 2.3% compared to placebo 0.0%) and the uncontrolled PNH studies (Eculizumab 0.0%) as well as the placebo-controlled non-PNH studies (Eculizumab 6.5% compared to placebo 6.8%) and the uncontrolled non-PNH studies (Eculizumab 8.3%). The treatment emergent adverse events leading to premature discontinuation by system organ class and preferred term occurring throughout the PNH studies include:

- Pregnancy 1/43 patients in the TRIUMPH study in the Eculizumab group and 1/458 in the non-PNH uncontrolled study.



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- Respiratory, thoracic and mediastinal disorders in the non-PNH placebo-controlled study (5/526 patients in the Eculizumab group) and 2/458 patients in the non-PNH uncontrolled studies.
- Infections and infestations in the non-PNH placebo-controlled studies 5/526 in the Eculizumab group and 1/221 in the placebo group along with 18/458 in the non-PNH uncontrolled studies.

There was one patient who died in the SHEPHERD study (number 102-005). This patient is described in section 7.1 .1 of this review.

7.1.3.3 Other significant adverse events

In the TRIUMPH study 43/43 patients reported at least one adverse event in the Eculizumab treated group compared to 40/44 and the placebo group. In this study 4/43 Eculizumab treated patients compared to 9/44 placebo group patients reported at least one serious adverse event. In this study there was a higher percentage of mild adverse events reported in the Eculizumab group (84.1%) compared to the placebo group (78.3%). The table below shows the overview of treatment emergent adverse events in this study.

**Table 17. Overview of Treatment-emergent Adverse Events (Safety)**

| | Eculizumab N = 43 n (%) | Placebo N = 44 n (%) |
|---|---|---|
| Overall number of events | 226 | 277 |
| Patients reporting at least 1 event | 43 (100.0) | 40 (90.9) |
| Patients reporting only 1 event | 5 (11.6) | 5 (11.4) |
| Patients reporting 2 events | 5 (11.6) | 5 (11.4) |
| Patients reporting 3 or more events | 33 (76.7) | 30 (68.2) |
| Patients reporting at least 1 SAE | 4 ( 9.3) | 9 (20.5) |
| Patients who withdrew due to an event | 1 ( 2.3) | 0 ( 0.0) |
| Number of events rated as:[a] | | |
| Mild | 190 (84.1) | 217 (78.3) |
| Moderate | 31 (13.7) | 46 (16.6) |
| Severe | 5 ( 2.2) | 14 ( 5.1) |
| Unrelated | 166 (73.5) | 242 (87.4) |
| Possibly related | 52 (23.0) | 30 (10.8) |
| Probably related | 7 ( 3.1) | 5 ( 1.8) |
| Definitely related | 1 ( 0.4) | 0 (0.0) |

[a] Intensity and relationship to study drug are on a per-event occurrence basis rather than on a per-patient basis.

Reference: Table 14.3.1

In the SHEPHERD study there were 599 events in 97 patients reported. Thus far 12/97 patients in this study have reported at least one serious adverse event. The sponsor reports, in this interim



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analysis, that most of the adverse events have been mild (72.3%). The table below shows an overview of treatment emergent adverse events as of the interim analysis time.

**Table 13. Overview of Treatment-Emergent Adverse Events (Safety)**

| | Eculizumab N = 97 n (%) |
|---|---|
| **Overall number of events** | 599 |
| **Patients reporting at least 1 event** | 95 (97.9) |
| Patients reporting only 1 event | 10 (10.3) |
| Patients reporting 2 events | 20 (20.6) |
| Patients reporting 3 or more events | 65 (67.0) |
| Patients reporting at least 1 SAE | 12 (12.4) |
| Number of patients who died | 1 (1.0) |
| Patients who withdrew due to an event | 1 (1.0) |
| **Number of events rated as:**[a] | |
| Mild | 433 (72.3) |
| Moderate | 142 (23.7) |
| Severe | 24 (4.0) |
| | |
| Unrelated | 434 (72.5) |
| Possibly related | 118 (19.7) |
| Probably related | 46 (7.7) |
| Definitely related | 1 (0.2) |

[a] Severity and relationship to study drug are on a per-event occurrence basis rather than on a per-patient basis.

Reference: Table 14.3.1

## 7.1.4 Common Adverse Events

The table below shows the frequency of treatment emergent adverse events in ≥ 5% of the patient population in the TRIUMPH study. In this study 100% of Eculizumab treated patients compared to 90.9% of placebo group patients reported adverse events. In this study more Eculizumab treated patients developed the following adverse events: headache (44.2%), nasopharyngitis (23.3%), back pain (18.6%), nausea (16.3%), cough (11.6%), fatigue (11.6%), pruritus (7%), sinusitis (7%), constipation (7%), myalgia (7%), pain and extremity (7%), respiratory tract infection (7%) and herpes simplex (7%).



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**Table 18. Frequently (≥5%) Reported Treatment-emergent Adverse Events (Safety)**

| | Eculizumab N = 43 | | Placebo N = 44 | | Total N = 87 | |
|---|---|---|---|---|---|---|
| Preferred Term | Patients n (%) | Events | Patients n (%) | Events | Patients n (%) | Events |
| **Total** | **43 (100.0)** | **226** | **40 (90.9)** | **277** | **83 (95.4)** | **503** |
| Headache | 19 (44.2) | 27 | 12 (27.3) | 33 | 31 (35.6) | 60 |
| Nasopharyngitis | 10 (23.3) | 11 | 8 (18.2) | 11 | 18 (20.7) | 22 |
| Upper respiratory tract infection | 6 (14.0) | 6 | 10 (22.7) | 14 | 16 (18.4) | 20 |
| Back pain | 8 (18.6) | 9 | 4 (9.1) | 7 | 12 (13.8) | 16 |
| Nausea | 7 (16.3) | 8 | 5 (11.4) | 7 | 12 (13.8) | 15 |
| Cough | 5 (11.6) | 6 | 4 (9.1) | 5 | 9 (10.3) | 11 |
| Diarrhoea | 4 (9.3) | 6 | 5 (11.4) | 5 | 9 (10.3) | 11 |
| Arthralgia | 3 (7.0) | 4 | 5 (11.4) | 6 | 8 (9.2) | 10 |
| Abdominal pain | 2 (4.7) | 2 | 5 (11.4) | 6 | 7 (8.0) | 8 |
| Dizziness | 2 (4.7) | 2 | 5 (11.4) | 9 | 7 (8.0) | 11 |
| Pharyngolaryngeal pain | 3 (7.0) | 3 | 4 (9.1) | 4 | 7 (8.0) | 7 |
| Vomiting | 2 (4.7) | 2 | 5 (11.4) | 6 | 7 (8.0) | 8 |
| Fatigue | 5 (11.6) | 13 | 1 (2.3) | 1 | 6 (6.9) | 14 |
| Pruritus | 3 (7.0) | 3 | 3 (6.8) | 3 | 6 (6.9) | 6 |
| Sinusitis | 3 (7.0) | 4 | 3 (6.8) | 3 | 6 (6.9) | 7 |
| Viral infection | 1 (2.3) | 1 | 5 (11.4) | 5 | 6 (6.9) | 6 |
| Constipation | 3 (7.0) | 3 | 2 (4.5) | 2 | 5 (5.7) | 5 |
| Urinary tract infection | 1 (2.3) | 1 | 4 (9.1) | 5 | 5 (5.7) | 6 |
| Contusion | 1 (2.3) | 1 | 3 (6.8) | 5 | 4 (4.6) | 6 |
| Ear pain | 1 (2.3) | 1 | 3 (6.8) | 4 | 4 (4.6) | 5 |
| Insomnia | 1 (2.3) | 1 | 3 (6.8) | 3 | 4 (4.6) | 4 |
| Myalgia | 3 (7.0) | 3 | 1 (2.3) | 1 | 4 (4.6) | 4 |
| Neutropenia | 0 (0.0) | 0 | 4 (9.1) | 4 | 4 (4.6) | 4 |
| Pain in extremity | 3 (7.0) | 5 | 1 (2.3) | 1 | 4 (4.6) | 6 |
| Paroxysmal nocturnal haemoglobinuria | 1 (2.3) | 1 | 3 (6.8) | 5 | 4 (4.6) | 6 |
| Rash | 1 (2.3) | 1 | 3 (6.8) | 3 | 4 (4.6) | 4 |
| Respiratory tract infection | 3 (7.0) | 4 | 1 (2.3) | 3 | 4 (4.6) | 7 |
| Dyspnoea | 0 (0.0) | 0 | 3 (6.8) | 3 | 3 (3.4) | 3 |
| Herpes simplex | 3 (7.0) | 3 | 0 (0.0) | 0 | 3 (3.4) | 3 |
| Menorrhagia | 0 (0.0) | 0 | 3 (6.8) | 3 | 3 (3.4) | 3 |

Reference: Table 14.3.1.1

In the SHEPHERD study interim analysis the sponsor reports that the treatment emergent adverse events with highest reported frequency thus far are headache (49.5%) and nasopharyngitis (22.7%).



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**Table 14. Frequently (≥5%) Reported Treatment-Emergent Adverse Events (Safety)**

| | Eculizumab N=97 | |
|---|---|---|
| **Preferred term** | **Patients n (%)** | **Events** |
| **Total** | 95 (97.9) | 599 |
| Headache | 48 (49.5) | 74 |
| Nasopharyngitis | 22 (22.7) | 27 |
| Nausea | 15 (15.5) | 23 |
| Upper respiratory tract infection | 13 (13.4) | 15 |
| Pyrexia | 12 (12.4) | 15 |
| Arthralgia | 11 (11.3) | 14 |
| Abdominal pain | 10 (10.3) | 12 |
| Dizziness | 10 (10.3) | 12 |
| Constipation | 8 (8.2) | 9 |
| Diarrhea | 8 (8.2) | 9 |
| Back pain | 7 (7.2) | 10 |
| Epistaxis | 7 (7.2) | 10 |
| Myalgia | 7 (7.2) | 8 |
| Urinary tract infection | 7 (7.2) | 8 |
| Vomiting | 7 (7.2) | 23 |
| Influenza-like illness | 6 (6.2) | 8 |
| Fatigue | 5 (5.2) | 9 |
| Herpes simplex | 5 (5.2) | 6 |
| Rash | 5 (5.2) | 6 |

Reference: Table 14.3.1.1

7.1.4.1 Eliciting adverse events data in the development program

Patients underwent physical examination, had laboratories drawn according to the schedule of events and had routine follow-up visits according to the schedule of events listed in section 6 of this review.

7.1.4.2 Appropriateness of adverse event categorization and preferred terms

The sponsor's categorization of adverse event is appropriate and based on MedRA preferred terms.

7.1.4.3 Incidence of common adverse events

Adverse events characterized by sponsors as to their relatedness to study drug are shown in the table in section 7.1.3.3 of this review. Only one adverse event in each of the TRIUMPH and SHEPHERD studies was considered by the investigator to be definitely related to Eculizumab.



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7.1.4.4 Common adverse event tables

See section 7.1.4 common adverse event tables for the TRIUMPH and SHEPHERD studies.

7.1.4.5 Identifying common and drug-related adverse events

See section 7.1.4. Only one adverse event in each of the TRIUMPH and SHEPHERD studies was considered by the investigator to be definitely related to Eculizumab.

7.1.4.6 Additional analyses and explorations

Not applicable.

## 7.1.5 Less Common Adverse Events

The sponsor did not provide an analysis of less common adverse events. Narrative descriptions for the patients who died and who experienced meningococcal infections both in PNH and non-PNH studies are provided in the safety section (7) of this review.

Analyses of the infections for the TRIUMPH study are provided in the table below. This table shows that overall 26/43 Eculizumab treated patients compared to 28/44 placebo group patients reported at least one infection. In the Eculizumab treated patients 0/43 compared to 2/44 placebo treated patients developed severe infections. As is expected, 8/43 Eculizumab treated patients compared to 1/44 placebo group patients had infections possibly related to study drug.

**Table 22. Summary of Treatment-emergent Infections (Safety)**

| | Eculizumab N=43 n (%) | Placebo N=44 n (%) |
|---|---|---|
| Patients reporting at least 1 infection | 26 (60.5) | 28 (63.6) |
| Patients reporting at least 1 serious infection | 0 (0.0) | 4 (9.1) |
| **Number of infections reported - Overall** | 26 (60.5) | 28 (63.6) |
| 1 | 18 (41.9) | 13 (29.5) |
| 2 | 5 (11.6) | 7 (15.9) |
| 3 or more | 3 (7.0) | 8 (18.2) |
| **Infection severity[a] - Overall** | 37 | 57 |
| Mild | 32 (86.5) | 44 (77.2) |
| Moderate | 5 (13.5) | 11 (19.3) |
| Severe | 0 (0.0) | 2 (3.5) |
| **Infection relation to study drug - Overall** | 37 | 57 |
| Unrelated | 29 (78.4) | 56 (98.2) |
| Possible | 8 (21.6) | 1 (1.8) |

[a] Only the most severe of the adverse events for each patient within each system organ class/preferred term was counted.

Reference: Table 14.3.1.1.3



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Analyses of the infection rates so far reported in the SHEPHERD study are shown in the table below. This table shows that 71/97 patients so far have reported at least one infection, 2/97 patients reported severe infections and 0/97 patients were considered to have their infections definitely related to Eculizumab treatment.

**Table 19. Summary of Treatment-Emergent Infections (Safety)**

| | Eculizumab N=97 n (%) |
|---|---|
| **Patients reporting at least 1 infection** | 71 (73.2) |
| **Patients reporting at least 1 serious infection** | 3 (3.1) |
| **Number of patients reporting infections** | |
| Overall | 71 (73.2) |
| 1 | 34 (35.1) |
| 2 | 20 (20.6) |
| 3 or more | 17 (17.5) |
| **Number of infections per severity** | |
| Overall | 140 (100.0) |
| Mild | 103 (73.6) |
| Moderate | 35 (25.0) |
| Severe | 2 (1.4) |
| **Infection relation to study drug** | |
| Overall | 140 (100.0) |
| Unrelated | 130 (92.9) |
| Possible | 10 (7.1) |
| Probable | 0 (0.0) |
| Definitely | 0 (0.0) |

Reference: Table 14.3.1.1.3

## 7.1.6 Laboratory Findings

Laboratory findings in the TRIUMPH study showed the following:

- ALT- Median baseline values were 33.0 U/L for the Eculizumab treated patients compared to 34.0 U/L for the placebo group. At all subsequent visits median values for Eculizumab treated patients decreased below baseline levels (- 4.5U/L at visit 17) while placebo treated patients had an increase in ALT (3.0 U/L at visit 15).
- AST- In the Eculizumab treated patients median AST values were 121U/L compared to 129 U/L for the placebo group patients. Median values for Eculizumab treated patients decreased to levels within the normal range while placebo group patients showed an increase in AST.



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- Haptoglobin- Some Eculizumab treated patients had a return to normal compared to no placebo group patients had a return to normal in their haptoglobin levels.
- Creatinine kinase- Creatinine kinase levels were elevated at baseline in both placebo and Eculizumab treated patients. The sponsor stated that this was attributed to the fact that creatinine kinase measurements using spectrophotometric methods and could have been falsely elevated when performed on hemolyzed samples. Baseline creatinine kinase level for the Eculizumab treated patients was at 113.0 U/L compared to 127.0 U/L for the placebo group which was within the normal range. At visit 18 again creatinine kinase level decreased in the Eculizumab treated patients (- 63 .0 U/L) compared to (21.0 U/L) at visit 15 in the placebo group.
- Bicarbonate- The sponsor reported that the influence of Eculizumab on bicarbonate levels was difficult to ascertain primarily due to the difference and handling of specimens at the various study sites worldwide. The sponsor reported that median bicarbonate values were no greater than 1.5 mmoL/L different between treatment groups at all scheduled laboratory evaluation visits after baseline. Most patients had below normal values at baseline and tended to remain below normal or increased to within normal range at subsequent visits after baseline.

7.1.6.1 Overview of laboratory testing in the development program

Laboratory testing was undertaken as per the schedule of events described in section 6 of this review.

7.1.6.2 Selection of studies and analyses for drug-control comparisons of laboratory values

See section 7.1.6.

7.1.6.3 Additional analyses and explorations

In the TRIUMPH study flow cytometry was performed in order to determine the change from baseline in percentages type II and III clone sizes. The table below shows the change from baseline in percentages of type II and III red cell clones. At baseline there were no statistically significant differences between groups in type II or III red blood cells. At visit 18 the percentages of type II and type III PNH cells increased significantly. These data support the conclusion that protection of the PNH red blood cell from complement mediated hemolysis preserves the PNH red cell mass.



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**Table 25. Flow Cytometry Data: Change From Baseline in Percentages of Type II and III Cells (ITT)**

| Parameter | | Eculizumab N=43 | Placebo N=44 | P Value[a] |
|---|---|---|---|---|
| **Type II cells (%)** | | | | |
| Baseline Summary (Visit 1) | N | 43 | 44 | 0.912029901 |
| Mean (standard error) | | 7.7 (1.43) | 8.7 (1.81) | |
| Median | | 3.6 | 4.0 | |
| Range | | (0.0, 41.5) | (0.0, 54.0) | |
| Change from Baseline at Visit 18 | n | 41 | 42 | 0.000264267 |
| Mean (standard error) | | 4.3 (1.62) | 0.2 (2.14) | |
| Median | | 1.4 | -0.6 | |
| Range | | (-28.1, 33.1) | (-29.8, 79.6) | |
| **Type III cells (%)** | | | | |
| Baseline Summary (Visit 1) | n | 43 | 44 | 0.352551026 |
| Mean (standard error) | | 31.6 (2.48) | 36.2 (2.97) | |
| Median | | 28.9 | 32.9 | |
| Range | | (10.7, 79.0) | (6.8, 86.0) | |
| Change from Baseline at Visit 18 | n | 41 | 42 | 0.000000006 |
| Mean (standard error) | | 25.9 (3.22) | -1.2 (2.29) | |
| Median | | 27.5 | -0.5 | |
| Range | | (-25.1, 69.0) | (-54.4, 31.0) | |

[a] *P* values were calculated using Wilcoxon's rank sum test.

Reference: Table 14.3.1.8

7.1.6.4 Special assessments

Not applicable.

## 7.1.7 Vital Signs

7.1.7.1 Overview of vital signs testing in the development program

The TRIUMPH study was the only placebo-controlled study in the development of Eculizumab for patients with PNH. There did not appear to be any trend or pattern with regard to blood pressure, heart rate, body temperature or body weight in terms of individual visit by visit fluctuations or intrapatient variations. There did not appear to be differences between the two treatment groups in terms of vital signs overall.



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### 7.1.8 Electrocardiograms (ECGs)

Investigators in the TRIUMPH study were to conduct an ECG for patients and record the findings as normal, abnormal or not clinically significant or abnormal clinically significant. Statistical comparisons between treatment groups were not performed however, the number of patients having normal or abnormal ECG interpretations were similar at each of the evaluation time points. Only one Eculizumab treated patient (110-007, atrioventricular sequential pacemaker rhythm) and two placebo treated patients (110-003, signs of ischemia; 110-005, left ventricular hypertrophy) had abnormal clinically significant ECG findings. None of these resulted in any serious or non-serious treatment emergent adverse event. The sponsor reports that although there were outliers, most patients median findings appear to be within normal limits for PR interval, QRS duration, QT interval and ventricular heart rate.

#### 7.1.8.1 Selection of studies and analyses for overall drug-control comparisons

The TRIUMPH study was the only placebo-controlled study in PNH patients.

### 7.1.9 Immunogenicity

In the TRIUMPH study immunogenicity was evaluated by determining the presence of IgG or IgM human antihuman antibody (HAHA) against Eculizumab. Only two patients demonstrated weak and transient responses to Eculizumab. These patients (number 110-001 and 110-003) had IgG reactions noted at visit 18. Patient 110-003 was in the placebo group and had a titer of 1:20 and 1:100 which were transient. Patient 110-001 had an IgG antibody titer of 1:20 on study day 182 and at that time the LDH was noted to be 265 U/L. Despite this low titer antibody to Eculizumab, the patient did not display a rebound in hemolysis over the course of the study as the LDH remained generally in the 200-300 U/L range and which remained below the baseline LDH (2728 U/L) for this patient .

In the SHEPHERD study there were two patients who developed antibodies to Eculizumab (number 101-001 and 180-003). Patient 101-001 had a low titer (1:20) IgG antibody identified at study day 365 and at that time the LDH was noted to be 276 U/L. On study day 491 the LDH was 470 U/L, which was the last reported LDH for this patient. Although the LDH for this patient increased to 470 U/L this was still within the range displayed by the patient during the treatment with Eculizumab (200-500 U/L) and the value remained below the baseline LDH (2703 U/L) for this patient. Patient 180-003 had two positive IgM titers reported on study day 36 (1:20) and study day 189 (1:100) respectively. The baseline LDH for this patient was 3054 U/L. On day 36 the LDH was reported to be 291 U/L and on day 189 the LDH was reported to be 297 U/L. After Day 189, the rest of this patient's LDH levels were in the 200-300 U/L range.

In the controlled non-PNH studies the incidences of 24-hour postinfusion adverse events were similar between patients treated with Eculizumab and patients treated with placebo (Eculizumab 49.2% compared to placebo 50.7%). The sponsor states that the same relationship is true for 48 hours post-infusion adverse events (Eculizumab 54.9% compared to placebo 56.6%). Immunogenicity was examined in all non-PNH clinical studies. The incidence of anti-



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Eculizumab immune responses was 26/677 (3.8%) in Eculizumab treated patients compared to 11/206 (5.3%) placebo treated patients.

Therefore, it does not appear that patients who develop HAHA neutralizing antibodies to Eculizumab develop brisk rebound hemolysis. The database for patients exposed to Eculizumab is small and more patients would need to be exposed to determine the incidence of hemolysis after development of a neutralizing antibody.

### 7.1.10 Human Carcinogenicity

No formal human carcinogenicity testing was performed for Eculizumab. However, Eculizumab is highly species specific and therefore a surrogate mouse anti-murine C5 monoclonal antibody was used in toxicology studies. The sponsor reports that there were no treatment related effects or adverse event's in reproductive studies in mice with the surrogate antibody. In addition no treatment related adverse effects were seen in the long-term toxicity studies. In addition no general toxicity or proliferative activity is suggestive of carcinogenic risk were evident in these animal toxicity studies.

### 7.1.11 Special Safety Studies

In the TRIUMPH study meningococcal vaccine titer samples were collected. All patients had detectable levels of quantitative serum IgG after vaccination.

### 7.1.12 Withdrawal Phenomena and/or Abuse Potential

It is not expected that Eculizumab will be abused due to the fact that the sponsor states in the proposed labeling that Eculizumab should be administered by a qualified health professional. See section 7.1.15 for discussion of withdrawal phenomena.

### 7.1.13 Human Reproduction and Pregnancy Data

No studies of Eculizumab on human reproduction or pregnancy have been performed. However one patient did become pregnant while on treatment with Eculizumab in the TRIUMPH study as described previously. This patient subsequently had a normal pregnancy and delivery.

### 7.1.14 Assessment of Effect on Growth

All patients enrolled in PNH studies were age $\geq$ 18 years (range 18-85 years). No assessment on growth has been performed.

### 7.1.15 Overdose Experience

There is no overdose potential for treatment with Eculizumab as the sponsor states in the proposed labeling that the drug should be administered by a qualified health professional. There were no cases of overdose reported during the clinical studies for Eculizumab. There is no



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known deleterious effect of overdose of Eculizumab. PNH patients who had been withdrawn from Eculizumab due to adverse events have shown a return over a period of approximately 1 month to baseline hemolysis levels. No rebound effect has been described in the studies were patients have had a progressive increase in their PNH red blood cell clone and where subsequently discontinued from study while still requiring treatment with Eculizumab. The table below shows the data from patient 028-003 from the TRIUMPH study. This patient was discontinued secondary to pregnancy after having received three months of Eculizumab treatment. The table demonstrates that during the time of treatment the patient's type III red blood cell clone increased from 49.8% to 72.1%. After having discontinued the study drug the patient's type III red blood cell clone percentage decreased back towards baseline. The patient's hemoglobin also decreased back towards her baseline of 7.9 g/dl. This table supports the fact that there does not appear to be a precipitous hemolytic rebound effect after having discontinued Eculizumab therapy.

| Date | Study Day | Red blood cells ($10^{12}$/L) | Hemoglobin (g/dL)[a] | Hematocrit (volume fraction) | Type III cells (%) |
|---|---|---|---|---|---|
| 28 Feb 2005 | 1[b] | | | | |
| 14 Mar 2005 | 15 | | | | |
| 28 Mar 2005 | 29 | | | | |
| 26 Apr 2005 | 58 | | | | |
| 23 May 2005 | 85 | | | | |
| Follow-up laboratory values after study drug discontinuation: | | | | | |
| 08 Jun 2005 | 101 | | | | |
| 14 Jun 2005 | 107 | | | | |
| 15 Jun 2005 | 108 | | | | |
| 30 Jun 2005 | 123 | | | | |
| 26 Jul 2005 | 149 | | | | |

[a] Her hemoglobin set point was [redacted]
[b] Study day 1 is the date of first dose of study drug
[c] Received 1 unit of PRBCs
Reference: Listing 16.2.5.1.0, Listing 16.2.7.1.2, and Listing 16.2.7.4.2

### 7.1.16 Postmarketing Experience

Eculizumab is a new molecular entity and has not been marketed anywhere in the world at present.

## 7.2 Adequacy of Patient Exposure and Safety Assessments

The TRIUMPH study was adequately designed to permit an evaluation for both efficacy and safety in the described population. In addition, the SHEPHERD study provides additional information for the safety database. The remainder of the uncontrolled clinical studies in PNH patients treated with Eculizumab support the safety profile of Eculizumab.



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### 7.2.1 Description of Primary Clinical Data Sources (Populations Exposed and Extent of Exposure) Used to Evaluate Safety

The sponsor provided narratives for patient deaths and infections for the patient's treated with Eculizumab or placebo both in the PNH and non-PNH settings.

#### 7.2.1.1 Study type and design/patient enumeration

The studies used in the analysis for safety are described in section 4.1.

#### 7.2.1.2 Demographics

In the multiple dose double-blind placebo-controlled non-PNH studies, 65.2% of Eculizumab treated patients were women, 80.4% Caucasian and 80.2% were 18-<65 years of age. The median weight was 81.2 kg. In the placebo treated group 661% of patients were women, 81% Caucasian, 75.6% were 18-<65 years of age. The median weight was 77.1 kg.

The demographic patterns of patients enrolled in multiple dose uncontrolled non-PNH studies were generally similar to those from the double-blind placebo-controlled non-PNH studies. This was expected because all uncontrolled non-PNH studies were extension studies to the double-blind placebo-controlled studies. In the multiple dose uncontrolled non-PNH studies 67.5% of patients were women, 81.0% were Caucasian, 77.7% of or 18-<65 years of age and the median weight was 82.8 kg.

In the PNH population there were some differences and baseline demographic parameters for Eculizumab and placebo treated patients in the TRIUMPH study and the SHEPHERD study. Most of the differences in demographics are likely due to either small sample sizes or differences in enrollment criteria between the studies. The table below shows the summary of study demographics between the TRIUMPH and SHEPHERD studies. Fewer patients in the TRIUMPH study had a history of aplastic anemia (14% compared to 28.9% in the SHEPHERD study). The small differences in demographic parameters in the SHEPHERD study compared to the TRIUMPH study reflect the broader inclusion criteria for the SHEPHERD study. The SHEPHERD study had more patients with a history of thrombosis, fewer patients with a baseline platelet count of > 100,000/ml, fewer patients with a baseline hemoglobin > 8.0 g/dl, more patients with baseline PNH type III red blood cells > 50%, fewer patients with > 4 red blood cell units transfused per year.

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Sponsor Table 2.7.4.1.3.2.2-1 Summary of Phase 3 PNH Study Demographics

| | TRIUMPH | | SHEPHERD |
|---|---|---|---|
| **Parameter** | Placebo N = 44 | Eculizumab N = 43 | Eculizumab N = 97 |
| Mean Age (SD) | 38.4 (13.4) | 42.1 (15.5) | 41.1 (14.4) |
| Gender - Female (%) | 29 (65.9) | 23 (53.5) | 49 (50.5) |
| History of AA or MDS (%) | 12 (27.3) | 8 (18.7) | 29 (29.9) |
| Concomitant Anticoagulants (%) | 20 (45.5) | 24 (55.8) | 59 (60.8) |
| Concomitant Steroids (%) | 16 (36.4) | 14 (32.6) | 46 (47.4) |
| Median PRBC in previous 12 months | 17.0 | 18.0 | 8.0 1 |
| Mean Hgb | 7.7 (0.75) | 7.8 (0.79) | N/A |
| Pre-treatment LDH levels | 2,234.5 | 2,032.0 | 2,051.0 |
| Free Hemoglobin at baseline | 46.2 | 40.5 | 34.9 |

7.2.1.3 Extent of exposure (dose/duration)

The total patient exposure to Eculizumab by dose regimen is shown in the table below.

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**Table 2.7.4.1.2.2-1: Total Patient Exposure to Eculizumab by Duration of Dosing and Dosage Regimen[7]**

| Duration of Dosing (weeks) | Dosage Regimens | | | | | | |
|---|---|---|---|---|---|---|---|
| | A[1] | B[2] | C[3] | D[4] | E[5] | X[6] | Total |
| ≤ 4 | 11 | 0 | 17 | 23 | 0 | 50 | 101 |
| > 4 to ≤ 12 | 23 | 2 | 24 | 45 | 4 | 0 | 98 |
| > 12 to ≤ 26 | 36 | 12 | 46 | 55 | 53 | 0 | 202 |
| > 26 to ≤ 39 | 8 | 2 | 12 | 18 | 83 | 0 | 123 |
| > 39 to ≤ 52 | 14 | 0 | 14 | 14 | 16 | 0 | 58 |
| > 52 to ≤ 78 | 79 | 11 | 108 | 90 | 28 | 0 | 316 |
| > 78 to ≤ 104 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| > 104 to ≤ 156 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| > 156 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |

[1] A = 8 mg/kg Q2 wks; or 600 mg Q2 wks
[2] B = 8 mg/kg Q4 wks, or 600 mg Q4 wks
[3] C = 8 mg/kg Q wk for 5 wks, then Q4 wks; or 600 mg Q wk for 5 wks, then Q4 wks
[4] D = 8 mg/kg Q wk for 5 wks, then Q2 wks; or 600 mg Q wk for 5 wks, then Q2 wks
[5] E = 600 mg Q wk for 4 wks, then 900 mg on wk 5, then 900 mg Q2 wks.
[6] X = 0.1mg/kg to 8.0 mg/kg
[7] Source: Table 2.7.4.7-5

The table below shows the patient exposure to Eculizumab in terms of the number of weeks of exposure in PNH and non-PNH patients who had multiple doses of drug. There have been 57 patients exposed to the proposed Eculizumab dosing regimen for PNH patients described in this review for a period up to 26 weeks. Ninety-nine PNH patients exposed to the proposed regimen have had an exposure from 26 to 52 weeks. Thirty-nine PNH patients have been exposed to the proposed regimen for more than 52 weeks. The table below shows the total patient exposure to Eculizumab by duration of dosing and dosage regimen.



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**Table 2.7.4.1.2.2-2: Overview of Patient Exposure to Eculizumab, Multiple Doses[1]**

| Exposure (weeks) | Non-PNH Pts Exposed (Regimens A, B, C, or D) | PNH Pts Exposed (Regimen E) | Total Exposure (Unique Pts) | Summary Exposure |
|---|---|---|---|---|
| 0 to ≤ 26 | 294 | 57 | 351 | 351 |
| > 26 to≤ 52 | 82 | 99 | 181 | 510 |
| > 52 | 290 | 39 | 329 | |

[1]Source: Table 2.7.4.7-5

## 7.2.2 Description of Secondary Clinical Data Sources Used to Evaluate Safety

The safety database was evaluated for all PNH studies listed in section 4.1 of this review.

### 7.2.2.1 Other studies

As noted in the safety section of this review other studies that have been evaluated for safety include the non-PNH studies as listed previously in section 4.1 of this review.

### 7.2.2.2 Postmarketing experience

Not applicable as Eculizumab has not been marketed in the United States or any other country previously.

### 7.2.2.3 Literature

Study CO2-001 and C 04-001 have been published:

- CO2-001 – Hillmen, P et al.: Effect of Eculizumab on hemolysis and transfusion requirements in patients with paroxysmal nocturnal hemoglobinuria. NEJM. 2004; 350: 552-558.
- C04-001 – Hillmen, P et al.: The compliment inhibitor Eculizumab in paroxysmal nocturnal hemoglobinuria. NEJM. 2006; 355: 1233-1243.

## 7.2.3 Adequacy of Overall Clinical Experience

The TRIUMPH study was carried out in a randomized controlled fashion for a period of 26 weeks allowing adequate analysis of the clinical experience. In addition the SHEPHERD study was carried out with a treatment phase of 52 weeks allowing additional analysis of the Eculizumab safety profile. Additional analysis of the Eculizumab safety profile was undertaken



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by examining the other uncontrolled PNH studies and the other non-PNH studies which are listed in section 4.1 of this review.

### 7.2.4 Adequacy of Special Animal and/or In Vitro Testing

Not applicable.

### 7.2.5 Adequacy of Routine Clinical Testing

The TRIUMPH study analyzed the appropriate endpoints and safety data. In addition the SHEPHERD and other studies allowed for additional analysis of the safety profile of Eculizumab.

### 7.2.6 Adequacy of Metabolic, Clearance, and Interaction Workup

No formal analysis of drug interaction was undertaken in the TRIUMPH study. However, patients in the TRIUMPH study were treated with a number of concomitant medications as listed in the table below.

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**Table 8. Summary of Concomitant Medications Taken by at Least 5% of Patients in Either Treatment Group (ITT)**

| Anatomical therapeutic chemical classification level 2 term | Eculizumab N = 43 n (%) | Placebo N = 44 n (%) |
|---|---|---|
| Vaccines | 43 (100) | 44 (100) |
| Antianemic preparations | 31 (72.1) | 36 (81.8) |
| Analgesics | 30 (69.8) | 29 (65.9) |
| Antithrombotic agents | 24 (55.8) | 20 (45.5) |
| Antibacterials for systemic use | 23 (53.5) | 26 (59.1) |
| Corticosteroids for systemic use | 13 (30.2) | 15 (34.1) |
| Antacids, drugs for treatment of peptic ulcers and flatulence | 12 (27.9) | 11 (25.0) |
| Antihistamines for systemic use | 9 (20.9) | 15 (34.1) |
| Vitamins | 9 (20.9) | 8 (18.2) |
| Psycholeptics | 8 (18.6) | 9 (20.5) |
| All other therapeutic products | 6 (14.0) | 7 (15.9) |
| Blood substitutes and perfusion solutions | 6 (14.0) | 4 (9.1) |
| Psychoanaleptics | 6 (14.0) | 4 (9.1) |
| Laxatives | 6 (14.0) | 6 (13.6) |
| Mineral supplements | 6 (14.0) | 8 (18.2) |
| Antiinflammatory and antirheumatic products | 6 (14.0) | 10 (22.7) |
| Beta blocking agents | 5 (11.6) | 2 (4.5) |
| Antidiarrheal, intestinal antiinflammatory/antiinfective agents | 4 (9.3) | 4 (9.1) |
| Antispasmodics and anticholinergic agents and propulsives | 4 (9.3) | 4 (9.1) |
| Sex hormones and modulators of the genital system | 4 (9.3) | 8 (18.2) |
| Agents acting on the renin-angiotensin system | 4 (9.3) | 1 (2.3) |
| Cough and cold preparations | 4 (9.3) | 9 (20.5) |
| Antibiotics and chemotherapy for dermatological use | 3 (7.0) | 1 (2.3) |
| Antivirals for systemic use | 3 (7.0) | 1 (2.3) |
| Corticosteroids, dermatological preparations | 3 (7.0) | 1 (2.3) |
| Nasal preparations | 3 (7.0) | 2 (4.5) |
| Diuretics | 3 (7.0) | 3 (6.8) |
| Ophthalmologicals | 3 (7.0) | 3 (6.8) |
| Calcium channel blockers | 2 (4.7) | 3 (6.8) |
| Antiasthmatics | 1 (2.3) | 3 (6.8) |
| Drugs for treatment of bone diseases | 1 (2.3) | 3 (6.8) |
| Anesthetics | 0 (0.0) | 5 (11.4) |

Reference: Table 14.1.3.1

### 7.2.7 Adequacy of Evaluation for Potential Adverse Events for Any New Drug and Particularly for Drugs in the Class Represented by the New Drug; Recommendations for Further Study

The sponsor's evaluation of the potential adverse events is adequate given the number of studies undertaken in the PNH and non-PNH settings. The sponsor should continue to monitor postmarketing experience as is required in 21 CFR § 314.50 (d) (5) (vi) (b). The sponsor also proposes a risk minimization program for infections and also includes a black box warning in the proposed labeling indicating the potential for *Neisseria meningitidis* infection and the need for prior vaccination for *Neisseria meningitidis*.



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### 7.2.8 Assessment of Quality and Completeness of Data

The sponsor has presented a complete safety profile and complete data for the TRIUMPH study. For the SHEPHERD study the sponsor has presented an adequate analysis of the 26 week interim data. The SHEPHERD study is ongoing. In addition the sponsor has an ongoing extension study as is listed in section 4.1 in this review.

### 7.2.9 Additional Submissions, Including Safety Update

Amendment 4 of this BLA submission contained updated safety information. The sponsor should continue to monitor ongoing studies and, after approval, postmarketing adverse events as is required in 21 CFR § 314.50 (d) (5) (vi) (b).

## 7.3 Summary of Selected Drug-Related Adverse Events, Important Limitations of Data, and Conclusions

Headache was the most common adverse event observed in the TRIUMPH and SHEPHERD studies. This adverse event was described in more detail in section 7.1.4.

Infection with *Neisseria meningitidis* is concerning because this infection can be fatal if not treated quickly and with appropriate antibiotics. There have been three Eculizumab treated patients with *Neisseria meningitidis* infection (two vaccinated PNH patients and one unvaccinated non-PNH patient). The sponsor proposes a risk minimization program for this infection. Also, the proposed labeling contains information in a black box warning regarding the potential for *Neisseria meningitidis* infection and the need for vaccination. This adverse event was described in this review in section 7.1.2.

## 7.4 General Methodology

### 7.4.1 Pooling Data Across Studies to Estimate and Compare Incidence

The table below shows the incidence of adverse events across all PNH studies. The adverse events reported in the TRIUMPH and SHEPHERD studies were discussed throughout section 7 of this review. Overall, in 193 patients in the uncontrolled study database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, the sponsor reports that 99.0% (191/193) of patients experienced at least one adverse event and that 30.6% (59/193) of patients had at least one serious adverse event. Overall, most adverse events associated with Eculizumab treatment were mild to moderate in severity. Serious adverse events by preferred term in more than 2% of the patients in the 193 patient uncontrolled database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, were: pyrexia 3.6% (7/193), viral infection 3.1% (6/193), anemia 2.1% (4/193) and headache 2.1% (4/193). Adverse events by preferred term reported in more than 10% of the patients in the 193 patient uncontrolled study database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, were: headache 52.8% (102/93), nasopharyngitis 39.9% (77/193), upper respiratory tract infection 28.5% (55/193),



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nausea 22.8% (44/193), pyrexia 18.1% (35/193), arthralgia 18.1% (35/193), back pain 17.6% (34/193), diarrhea 17.1% (33/193), vomiting 15.5% (30/193), dizziness 15.0% (29/193), cough 14.5% (28/193), pharyngolaryngeal pain 13.0% (25/193), pain in extremity 12.9% (25/193), influenza-like illness 12.4% (24/193), abdominal pain 11.9% (23/193), insomnia 11.9% (23/193), viral infection 11.4% (22/193), constipation 10.9% (21/193), urinary tract infection 10.9% (21/193), contusion 10.9% (21/193) and myalgia 10.3% (20/193).

Table 5.3.5.3.2.3.2-1 Overall Summary of Treatment Emergent Adverse Events in Multiple-Dose, Double-Blind Placebo-Controlled and Uncontrolled PNH Clinical Studies

| | | C04-001 | | C04-002 | C04-003/ C04-002 | E05-001 [1] | All Uncontrolled Studies [2] |
|---|---|---|---|---|---|---|---|
| | Description | Eculizumab (N = 43) | Placebo (N = 44) | Eculizumab (N = 97) | Eculizumab (N = 140) | Eculizumab (N = 71) | Eculizumab (N = 193) |
| Patients | At Least One TEAE | 43 (100.0%) | 40 ( 90.9%) | 95 ( 97.9%) | 138 ( 98.6%) | 71 (100.0%) | 191 ( 99.0%) |
| | At Least One SAE | 4 ( 9.3%) | 9 ( 20.5%) | 19 ( 19.6%) | 23 ( 16.4%) | 17 ( 23.9%) | 59 ( 30.6%) |
| | Withdrawal due to TEAEs | 1 ( 2.3%) | 0 ( 0.0%) | 0 ( 0.0%) | 1 ( 0.7%) | 1 ( 1.4%) | 1 ( 0.5%) |
| | Number of Patients Died | 0 ( 0.0%) | 0 ( 0.0%) | 1 ( 1.0%) | 1 ( 0.7%) | 1 ( 1.4%) | 2 ( 1.0%) |
| Total number of TEAEs | | 226 | 277 | 965 | 1191 | 806 | 2887 |
| Number of patients reporting | 1 TEAE | 5 ( 11.6%) | 5 ( 11.4%) | 0 ( 0.0%) | 5 ( 3.6%) | 4 ( 5.6%) | 0 ( 0.0%) |
| | 2 TEAEs | 5 ( 11.6%) | 5 ( 11.4%) | 11 ( 11.3%) | 16 ( 11.4%) | 3 ( 4.2%) | 11 ( 5.7%) |
| | 3+ TEAEs | 33 ( 76.7%) | 30 ( 68.2%) | 84 ( 86.6%) | 117 ( 83.6%) | 64 ( 90.1%) | 180 ( 93.3%) |
| TEAE Intensity | Mild | 190 ( 84.1%) | 217 ( 78.3%) | 698 ( 72.3%) | 888 ( 74.6%) | 645 ( 80.0%) | 1939 ( 67.2% |
| | Moderate | 31 ( 13.7%) | 46 ( 16.6%) | 232 ( 24.0%) | 263 ( 22.1%) | 125 ( 15.5%) | 476 ( 16.5%) |
| | Severe | 5 ( 2.2%) | 14 ( 5.1%) | 35 ( 3.6%) | 40 ( 3.4%) | 36 ( 4.5%) | 103 ( 3.6%) |
| | Overall | 226 (100.0%) | 277 (100.0%) | 965 (100.0%) | 1191 (100.0% | 806 (100.0%) | 2887 (100.0% |
| TEAE Relationship to Study Drug [3] | I | 166 ( 73.5%) | 242 ( 87.4%) | 734 ( 76.1%) | 900 ( 75.6%) | 712 ( 88.3%) | 2391 ( 82.8% |
| | II | 60 ( 26.5%) | 35 ( 12.6%) | 231 ( 23.9%) | 291 ( 24.4%) | 94 ( 11.7%) | 496 ( 17.2%) |

[1] Includes C04-001 patients who completed 12 months in E05-001
[2] Includes C02-001, E02-001, X03-001, C04-002 and E05-001
[3] I = Not related or unlikely to be related; II = Possibly, probably or definitely related.

Source: D:\SAS\Eculizumab\ISS\Update\Final\Program\T2321.SAS Run: 15DEC2006 13:02

In the PNH studies, two patients developed *Neisseria meningitidis* infection.

Currently there is no information available regarding the one patient from the physician sponsored IND which was opened after the BLA submission.

## 7.4.2 Explorations for Predictive Factors

Eculizumab blocks the C-5 mediated terminal complement cascade which is important in the prevention of infection with encapsulated organisms. Patients who are exposed to Eculizumab are at an increased risk for infections with encapsulated organisms. Neisseria meningitidis poses the greatest risk due to infection with this organism can rapidly progress and cause death if not recognized and treated early.

The sponsor reported that 88.1% (170/193) of patients in the 193 patient uncontrolled database, which does not include the one patient in the physician sponsored IND submitted after the BLA



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submission, had infection related adverse events. However the rate of other encapsulated organism infection was low. In this database 3/193 (1.6%) had infection reported as beta hemolytic streptococcus infection, hemophilus infection or streptococcal sepsis. The database for Eculizumab in PNH patients is small and the sponsor should continue to evaluate for infections with encapsulated organisms as part of a postmarketing commitment as described in section 1.2.2 of this review.

### 7.4.3 Causality Determination

Eculizumab blocks the C-5 mediated terminal complement cascade which is important in the prevention of infection with encapsulated organisms. There were three cases of *Neisseria meningitidis* infection in the PNH studies. As Eculizumab is designed to interrupt normal immune function by blocking the C-5 mediated terminal complement cascade in patients the cause for these *Neisseria meningitidis* infections can be directly linked to Eculizumab. In the PNH studies the sponsor incorporated an early alert program in order to minimize the risk of infection with *Neisseria meningitidis*. In addition the sponsor proposes a black box warning to highlight the increased risk of *Neisseria meningitides* infection with Eculizumab.

# 8 ADDITIONAL CLINICAL ISSUES

## 8.1 Dosing Regimen and Administration

The dosing of Eculizumab in PNH patients has been evaluated in the TRIUMPH study, SHEPHERD study and other uncontrolled PNH studies. The dosing regimen proposed is Eculizumab a 600 mg IV infusion every 7 +/- 2 days for the first four weeks then 900 mg for the 5$^{th}$ dose 7 +/- two days later than 900 mg every 14 +/- 2 days thereafter. This dosing regimen was found to have the necessary concentration to completely block the terminal complement cascade. The intravenous infusion should be given over [redacted] minutes.

## 8.2 Drug-Drug Interactions

No drug-drug interaction analysis was undertaken. Patients treated with Eculizumab in the PNH studies were also treated with various concomitant medications.

## 8.3 Special Populations

The sponsor proposes that Eculizumab be indicated for the treatment of PNH [redacted]

extension studies in patients with PNH as are listed in section 4.1 of this review. The use of Eculizumab in patients with PNH whose age is < 18 years has not been studied.

Patients treated with Eculizumab in the TRIUMPH study showed improvement in AST, ALT and creatinine kinase compared to baseline levels. Separate analysis of a possible negative effect



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of Eculizumab on levels of liver transaminases or creatinine in patients with hepatic or renal insufficiency would likely be difficult due to the improvement that was observed in these parameters in patients who generally have background elevation in liver transaminases and creatinine due to the underlying hemolysis in PNH.

## 8.4 Pediatrics

Eculizumab for the treatment of patients with PNH was not studied in patients whose age was < 18 years. Cases of PNH and the pediatric setting have been described. However, Eculizumab was granted Orphan Drug Designation (ODD # 03-1732) on August 20, 2003 for the treatment of PNH. The sponsor requests an exemption from the requirement to assess this product in pediatric PNH subpopulations pursuant to 21 CFR § 601.27 (d) given the rarity of PNH in general and the fact that only case reports have been listed for pediatric patients. The sponsor should be granted the exemption.

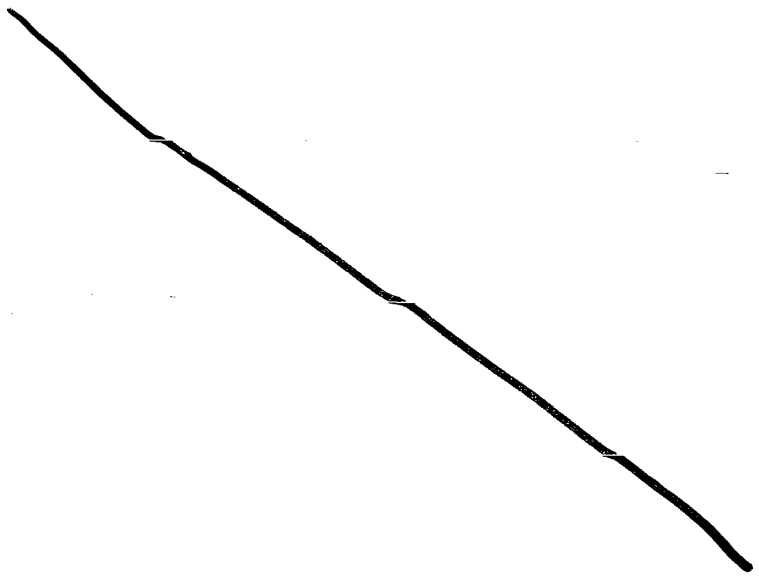
## 8.5 Advisory Committee Meeting

Not applicable.

## 8.6 Literature Review

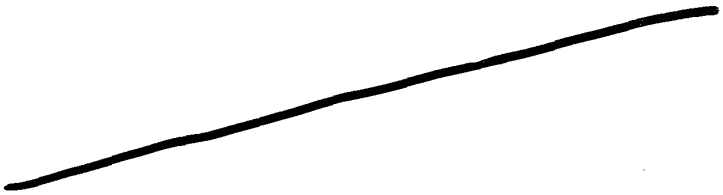
As noted in section 7.2.2.3 there have been 2 published studies of Eculizumab for the treatment of patients with PNH.

## 8.7 Postmarketing Risk Management Plan





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## 8.8 Other Relevant Materials

- SEALD Consult: The results of the SEALD consult are discussed in section 6.1.4 of this review. These recommendations are reflected in the wording in section 9.4 of this review and section 10.3 of this review which shows the proposed draft label.
- CMC Review: The results of the CMC review are discussed in 1.2.2 and 3.1 of this review.
- DMETS Consult: The result of this consult was that the sponsor could use the name trade name Soliris for marketing of the drug Eculizumab.
- Maternal Health Team Consult: The results of this consult are shown in the wording of the draft labeling in section 10.3 of this review.
- Statistics and Clinical Pharmacology reviews were also done.

# 9 OVERALL ASSESSMENT

## 9.1 Conclusions

The sponsor has demonstrated in an adequate and well controlled study (TRIUMPH) that Eculizumab is effective in the treatment of patients with transfusion dependent PNH by decreasing hemolysis [redacted] It also appears that Eculizumab may improve QOL in patients with PNH in terms of decreasing fatigue and by improving other QOL parameters. Due to the fact that a large number of patients were on concomitant anticoagulant therapy a conclusion regarding Eculizumab's effect on thrombosis incidence rates cannot be made.

There were 7 deaths in all of the Eculizumab studies combined. No deaths occurred in the TRIUMPH study. There were three deaths in non-PNH studies and four deaths in PNH studies other than the TRIUMPH study.

In the TRIUMPH study 4/43 patients in the Eculizumab group compared to 9/44 patients in the placebo group had serious adverse events. The most prevalent serious adverse event was exacerbation of PNH which occurred and one Eculizumab treated patient and three placebo treated patients.

In addition, overall one Eculizumab treated patient reported one serious adverse event associated with infection compared to four placebo patients who reported six infection-related serious



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adverse events. Overall, there were three patients who developed meningococcal infection while enrolled in the Eculizumab trials (two PNH patients and one non-PNH patient). In the PNH trials there were two patients who discontinued treatment prematurely. Neither of these discontinuations appeared to be related to Eculizumab treatment (one patient with pregnancy, one patient with myelodysplastic syndrome).

Overall, in 193 patients in the uncontrolled study database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, the sponsor reports that 99.0% (191/193) of patients experienced at least one adverse event and that 30.6% (59/193) of patients had at least one serious adverse event. Overall, most adverse events associated with Eculizumab treatment were mild to moderate in severity. Serious adverse events by preferred term in more than 2% of the patients in the 193 patient uncontrolled database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, were: pyrexia 3.6% (7/193), viral infection 3.1% (6/193), anemia 2.1% (4/193) and headache 2.1% (4/193). Adverse events by preferred term reported in more than 25% of the patients in the 193 patient uncontrolled study database, which does not include the one patient in the physician sponsored IND submitted after the BLA submission, were: headache 52.8% (102/93), nasopharyngitis 39.9% (77/193), upper respiratory tract infection 28.5% (55/193).

In the PNH studies three patients developed human antihuman antibodies (HAHA) after treatment with Eculizumab. Two patients had IgG titers of 1:20 and one patient had IgM titers of 1:20 and 1:100. None of these patients developed a rebound in hemolysis despite the presence of these neutralizing antibodies.

Therefore, Eculizumab appears to be generally safe for the treatment of patients with PNH. However, because of the mechanism of action of Eculizumab on the immune system, patients with PNH who are treated with Eculizumab are at increased risk for infections with encapsulated organisms. The sponsor proposes an early alert program and a registry program in order to minimize the risk of infections in patients with PNH were treated with Eculizumab. In addition patients who are to be treated with Eculizumab must be vaccinated with *Neisseria meningitidis* vaccine at least two weeks prior to treatment with Eculizumab as was described in the protocols in the PNH studies.

## 9.2 Recommendation on Regulatory Action

The indication sought by the sponsor for the treatment of PNH [redacted] should be approved. The Eculizumab dosing regimen is:

- 600 mg of Eculizumab administered every week for the first four weeks, 900 mg of Eculizumab administered in week five and 900 mg dose of Eculizumab every 14 +/- 2 days thereafter. The drug is administered as a [redacted] minute intravenous (IV) infusion.



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# 9 Page(s) Withheld

_____ Trade Secret / Confidential

✔ Draft Labeling

_____ Deliberative Process

*Withheld Track Number: Medical-* 2



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# REFERENCES

[1] http://www.emedicine.com/med/topic2696.htm
[2] Lichtman, M.A. et al.: Williams Manual of Hematology sixth edition. 2003.
[3] Mallinson, T. et al.: Giving meaning to measure: linking self-reported fatigue and function to performance of everyday activities. J. Pain Symp. Manage. 2006. 31(3): 229-241.
[4] Schillinger, J. A. et al.: National seroprevalence and trends in herpes simplex virus type 1 in the United States, 1976-1994. Sex Transm Dis. 2004. 31 (12): 753-760.



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## 9.3 Recommendation on Postmarketing Actions

- The sponsor should continue to monitor adverse events as required by 21 CFR § 314.50 (d) (5) (vi) (b).
- See section 1.2.2 of this review for a list of the recommended postmarketing commitments.

### 9.3.1 Risk Management Activity

The sponsor should institute their risk minimization program for meningococcal infection.

### 9.3.2 Required Phase 4 Commitments

See section 9.3.

### 9.3.3 Other Phase 4 Requests

See section 9.3.

## 9.4 Labeling Review

A draft label was submitted by the sponsor in this BLA submission. Below is attached a label containing changes to the sponsor's proposed label which incorporates wording that is based on this review of the BLA submission.

- The sponsor should include the proposed black box warning which contains wording reflecting the potential for *Neisseria meningiditis* infection, the need for *Neisseria meningiditis* vaccination and enrollment in the sponsor's registry program.
- The INDICATIONS AND USAGE section of the label should contain the wording that Eculizumab is indicated for treatment of patients with PNH [redacted]
- The ADMINISTRATION section of the label should contain the wording that patients should be monitored for at least one hour following the completion of infusion of Eculizumab.
- The LABORATORY MONITORING section of the label should contain wording that adequately describes the Eculizumab discontinuation protocol. This wording should include wording that states that the physician should monitor for potential life-threatening hemolysis:

    - ≥ 25% decrease in type III PNH red blood cells.
    - A decrease in hemoglobin to 5 g/dl or ≥ 4 g/dl decrease in one week.
    - Angina.
    - Change in mental status.
    - 50% increase in serum creatinine.
    - Thrombosis.



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- Follow-up visits at 1, 2, 4, and eight weeks after the discontinuation of Eculizumab.

- The IMMUNOGENICITY section of the label should state that infrequent low titer antibody responses have been detected with Eculizumab.
- The IMMUNIZATION section should contain wording that PNH patients must receive *N. meningiditis* vaccinations according to current immunization guidelines at least two weeks prior to receiving Eculizumab.
- The ADVERSE REACTIONS section of the label should include data from the TRIUMPH study and adverse reactions for all PNH patients exposed to Eculizumab.
- The CLINICAL STUDY section of the label should not include thrombosis or quality-of-life measures for the following reasons:

  - Thrombosis was an exploratory endpoint and approximately 50% of the patients in the controlled TRIUMPH study were concomitantly treated with anticoagulants thereby confounding the effect of Eculizumab on the rate of thrombosis. Similarly, a majority of patients (59/97) were on concomitant anticoagulant therapy in the SHEPHERD study.
  - [redacted]

## 9.5 Comments to Applicant

The indication sought by the sponsor may be approved provided the recommended changes are made in the proposed labeling and postmarketing commitments as presented in section 1.2.2 of this review are undertaken. The sponsor should continue to report on the safety and efficacy of Eculizumab in the PNH population as required by 21 CFR § 314.50 (d) (5) (vi) (b).



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# 10 APPENDICES

## 10.1 Review of Individual Study Reports

The studies used for this review are listed in section 6.0 of this review.

## 10.2 Line-by-Line Labeling Review

The proposed draft labeling based on this review is shown below.

### 10.3 Proposed Product Label

The proposed draft labeling is shown below.



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# CENTER FOR DRUG EVALUATION AND RESEARCH

*APPLICATION NUMBER:*

**125166**

# PHARMACOMETRICS REVIEW



AMG1044

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Attachment



# Pharmacometrics Review

| | |
|---|---|
| **BLA; STN** | 125166/0000 |
| **Submission Date(s)** | 9/15/06 |
| **PDUFA Due Date** | 3/17/07 |
| **Brand Name** | Soliris® |
| **Generic Name** | Eculizumab |
| **Pharmacometrics Reviewer** | Rajanikanth Madabushi, Ph.D. |
| **Pharmacometrics Team Leader** | Joga Gobburu, Ph.D. |
| **Primary Reviewer** | Jang-Ik Lee, Pharm.D., Ph.D. |
| **Primary Review Team Leader** | Hong Zhao, Ph.D. |
| **Sponsor** | Alexion Pharmaceuticals |
| **Relevant IND(s)** | BB-IND [redacted] |
| **Submission Type** | Original BLA (NME) |
| **Formulation** | Solution for intravenous infusion |
| **Proposed indication** | Treatment of paroxysmal nocturnal hemoglobinuria |
| **Proposed Dosage and Administration** | 600 mg qwk x4, 900 mg qwk x1, then 900 mg q2wk |

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## Executive Summary

Eculizumab is a humanized monoclonal antibody that binds to the human C5 complement protein and inhibits terminal complement-mediated activation. In the present submission, the sponsor is seeking for the approval of eculizumab for the treatment of paroxysmal nocturnal hemoglobinuria (PNH), an acquired genetic deficiency of endogenous complement inhibitors on the surface of blood cells.

In the present submission, the sponsor has used pharmacokinetic modeling to derive the pharmacokinetic parameters from the sparse trough and peak serum concentration data collected in the pivotal trial. Relationship between eculizumab activity as assessed by a serum complement hemolysis assay and eculizumab concentrations has also been evaluated using direct PK/PD model.

The summary of the review is:

1) Based on the population pharmacokinetic modeling, the clearance of eculizumab for a typical PNH patient weighing 70 kg was 0.022 L/hr and the volume of distribution was 7 7 L. The half-life was 272 ± 82 hrs (mean ± SD).
2) The mean observed peak and trough serum concentrations of eculizumab by week 26 were 194 ± 76 µg/mL and 97 ± 60 mcg/mL respectively.
3) Based on the PK/PD modeling, the total serum (free and bound) concentration of eculizumab required to block 50% of terminal complement activation is roughly 43 µg/mL ($EC_{50}$).
4) Treatment with Eculizumab with the proposed dosing regimen results in immediate (from 2109 ± 965 U/L to 652 ± 278 U/L by week 1) and sustained (326 ± 438 U/L by week 26) lowering of LDH levels.

Signatures:

Rajanikanth Madabushi, Ph.D.

Pharmacometrics Reviewer

Office of Clinical Pharmacology

Jogarao V. Gobburu, Ph.D.

Pharmacometrics Team Leader

Office of Clinical Pharmacology



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Pharmacometric Review

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## Introduction

Eculizumab is a humanized monoclonal antibody that binds to the human C5 complement protein and inhibits terminal complement-mediated cell lysis and activation. In the present submission, the sponsor is seeking for the approval of eculizumab for the treatment of paroxysmal nocturnal hemoglobinuria (PNH).

PNH is an acquired genetic deficiency of endogenous complement inhibitors on the surface of blood cells, referred to as PNH cells. The pathophysiology of PNH is directly linked to complement-mediated destruction of the susceptible PNH red blood cells (RBSs), which result in intravascular hemolysis, the primary clinical manifestation in all PNH patients and contributes to mortality in these patients.

A single phase 3, double-blind, placebo-controlled, comparative pivotal clinical trial (C4-001, n=87) combined with a phase 3 open-label safety and efficacy trial (C04-002, n=97) form the basis of the present marketing application. Additional support for the efficacy and safety of eculizumab as a treatment for PNH patients is provided in the associated PNH extension trial (E05-001).

The primary objective of the pivotal trial (C4-001) was to evaluate the safety and efficacy of eculizumab in patients with transfusion-dependent hemolytic PNH. This trial was a randomized, double-blind, placebo-controlled, multicenter study of eculizumab or placebo administered by intravenous (IV) infusion to 87 patients with hemolytic, transfusion-dependent PNH. Randomization was stratified according to the number of packed red blood cell (PRBC) units transfused within 1 year prior to Screening. Patients randomly assigned to the placebo group received 1 dose of IV placebo weekly for 5 weeks, then once every 2 weeks for 21 weeks for a total of 26 weeks of treatment. Patients randomly assigned to the eculizumab group received 600 mg of eculizumab IV once a week for 4 doses, followed by 900 mg eculizumab IV 1 week later for 1 dose, then 900 mg eculizumab IV every 2 weeks for 21 weeks. There was a total of 26 weeks of treatment. The co-primary endpoints were hemoglobin stabilization and number of PRBC units transfused. For the hemoglobin stabilization endpoint, a 2-sided Fisher exact test was performed. For the number of units of PRBCs transfused, each patient's units of PRBCs transfused after randomization to Week 26 (Visit 18) were calculated and the primary analysis method applied was the Wilcoxon rank sum test. Secondary objectives were transfusion avoidance, hemolysis as measured by lactate dehydrogenase (LDH) area under the curve (AUC) during the treatment period from Baseline to week 26, and Functional Assessment of Chronic Illness Therapy fatigue (FACIT-Fatigue) scale changes from Baseline to week 26.

The pharmacokinetics (PK) and the pharmacodynamics (PD) of eculizumab were studied in clinical trials for six different indications: paroxysmal nocturnal hemoglobinuria (PNH), idiopathic membranous glomerulopathy (IMG), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), dermatomyositis, and psoriasis. Single dose studies of eculizumab were performed in RA and SLE patients, which are reviewed by Dr. Jang-Ik Lee, Clinical Pharmacology Reviewer. Data from multiple dose studies were available from phase-II studies conducted in patients with RA, IMG, and PNH. Also PK/PD data were collected in the

pivotal trial (C04-001). The present Pharmacometrics review focuses on population PK/PD reports generated from the multiple dose studies and the pivotal trial.

## Sponsor's Analysis

### *Objectives*

- To describe the PK of eculizumab and develop a compartmental PK model suitable for population PK analysis of sparsely sampled eculizumab serum concentration data.
- To describe the PK of eculizumab based on data from patients with a variety of diseases.
- To identify clinically important and statistically significant covariates with respect to the PK parameters.
- To explore predicted eculizumab concentration variability in PNH patients using the derived model parameter estimates from PNH patients in a simulation analysis.
- To describe the relationship between eculizumab activity (PD) (as assessed by a serum complement hemolysis assay) and eculizumab concentrations, and to link the PD data to the PK data in a direct PK/PD model.
- To assess PK/PD data collected from PNH patients with the developed models.

### *Data*

Total concentrations (bound + free) of eculizumab in human serum samples (PK) were measured using a validated enzyme-linked immunosorbent assay (ELISA) method. The complement hemolytic activity in serum (PD) were measure using an *ex vivo* hemolytic assay.

These PK/PD data were collected from patients diagnosed with 6 different diseases (RA, IMG, psoriasis, PNH, and SLE). In these studies, 6 dose levels and 6 schedules were used. PK/PD data from a total of 209 patients who participated in 5 clinical trials was used to develop the PK/PD models. These studies included C97-001, C97-002, C01-004, C02-001, and C99-004.

In addition, PK/PD data from patients with a diagnosis of PNH who participated in the pivotal trial (C04-001) was subsequently analyzed with the models after they had been developed.

The PK/PD data in the PNH patients was obtained following multiple doses at trough and 1-hour post-dose. The PK/PD sampling for the 11 PNH patients in the C02-001 study included 4 sets of trough and 1-hour postdose peak samples for each patient. These were obtained at the first dose, at 2 doses in the middle portion of the study, and at the last dosing interval. A mid-interval (1-week postdose) sample was also obtained in mid study. PK and PD samples in the C04-001 (N=40) were drawn at baseline. Continuing into the treatment

period, trough and peak samples were drawn at Weeks 1, 4, 6, 12, and 26. A trough sample was obtained at end of study. The dosing regimen studied in the PNH studies were same and are described under Introduction.

The summary of the patient demographics for the population PK/PD analysis is shown in Table 1 below.

**Table 1: Patient demographics for PK/PD model development (per sponsor PK/PD report)**

| | Age (y) | Height (cm) | Weight (kg) | SCr (mg/dL) | Dose (mg/kg) |
|---|---|---|---|---|---|
| N | 209 | 198 | 209 | 209 | 209 |
| Min | 19.0 | 132.0 | 48.5 | 0.5 | 2.0 |
| Max | 84.0 | 195.0 | 157.2 | 2.2 | 16.8 |
| Median | 52.0 | 168.0 | 84.0 | 0.9 | 8.0 |
| Mean | 52.0 | 169.2 | 85.4 | 0.9 | 7.9 |
| SD | 13.56 | 10.46 | 20.43 | 0.27 | 1.89 |

## *Methods*

Compartmental models were fitted to the data to obtain the estimates of the population-derived PK parameters using the USC*PACK suite of software. Specifically, the IT2B as well as the NPAG (an improved version of the nonparametric expectation maximization fitter [NPEM]) were used. Other software and programs used to analyze the data were: SAAM II and SAAM II Population Kinetics, GNU G-77 and G-95 Fortran Compiler, ActivePerl 5.8.7, JMP® version 5.01 for Windows®.

All data fitted was weighted by the reciprocal of that datum estimated variance. Weighting was accomplished by making the assumption that total observation variance was proportional to assay variance. A rough estimate of the assay error, as computed by the USC*PACK assay procedure was used throughout this analysis. The analysis could also be performed with adaptive gamma (γ), a scalar that multiplies the polynomial described above and is optimized with each cycle. The objective functions, as well as other measures of goodness-of-fit including mean error, mean squared error, and Akaike information criterion (aic) were used to construct and select the most appropriate model.

### Covariate Analyses

Covariates of eculizumab PK parameter estimates were explored using a cluster analysis in all 209 patients. In addition, a 1-way analysis of variance (ANOVA) was performed for each variable: gender, race, age, height, weight, and estimated creatinine clearance (CCr) with each of the PK parameters from the final model for the 209 patients in whom adequate data were suitable for analysis. Each of the PK parameters was subjected to analysis for each of the variables

and for relationships with each other. The model was fit using JMP 5.01 statistical discovery software from SAS Institute, Inc.

### Population Variability – Monte Carlo Simulation

A Monte Carlo simulation of estimated PNH patient PK parameters were derived from the model parameter means and SDs from the 11 PNH patients studied in study C02-001 and fit with the final population PK model. A Monte Carlo simulation was done exploring a maximum variability of 2 SDs of all 5 PK parameters conducted randomly and simultaneously. Three dosing regimens were simulated: 600 mg given weekly 4 times followed by 600 mg Q2wks, 900 mg given weekly 4 times followed by 900 mg Q2wks, and 600 mg given weekly 4 times followed by 900 mg Q2wks beginning 1 week after the last 600-mg dose.

### Model Assessment with Data from the Phase 3 PNH Study (C04-001)

The population variability simulation for PNH patients was updated with sparsely sampled PK data from 40 PNH patients who participated in the C04-001 (TRIUMPH) pivotal study. This updated data were analyzed with the models.

### PK/PD Relationship

The relationship of the eculizumab concentrations with the PD measurement of hemolysis was explored using maximum PD effect (Emax) model of hemolysis inhibition and eculizumab concentrations. The data set used included paired eculizumab concentration and % hemolysis data from 209 patients: 11 with PNH, 121 with RA, 71 with IMG, and 6 with SLE. The model was fitted using JMP 5.01 software.

The PD effect of eculizumab binding to C5 was evaluated using an assay that measures the % hemolysis of antibody-coated RBCs. Antibody-coated chicken RBCs are very sensitive to lysis by the presence of the membrane attack complex formed by the formation of C5b-9, the terminal product of the complement cascade. These RBCs lyse when small amounts of C5b-9 deposit on the cell membrane and thus are a sensitive measure of complement lysis activity. This complement hemolysis assay served as the primary assay to determine the effectiveness of eculizumab in blocking terminal complement activity in serum of patients. The assay had a steep dose-response curve because of the sensitivity of the antibody-coated RBCs.

Hemolysis data was inverted and normalized by subtracting every datum from the maximum value recorded for that particular patient.

## *Results*

### Pharmacokinetic modeling

A total of 39 models were explored to characterize total eculizumab serum concentration – time profile. None of the simple linear models tested could describe the complete data set without significant individual bias. This included

regular 2- and 3-compartment models, which gave a fairly good overall fit of the data, but showed considerable bias in selected single-dose (data-rich) patients. The PK of total concentrations of eculizumab were, best characterized by a model with 2-compartments with a nonlinear element expressed as the central volume of distribution expanding as a linear function of the mass in the central compartment (LVF model) using the single dose data. Mass exchange was parameterized either by rate constants or by the corresponding clearance (CL) and volume terms (V). The schematic representation of the model is shown in Figure 1 below. The mean parameter predictions are shown in Table 2 below. Bivariate fits of the observed and the predicted by individual parameter estimates and mean estimates are shown in Figure 2. Further results from the application of this model to the 4 patient populations are shown in Table 3. The results of the fitting for the single-dose and the multiple-dose data are shown Figure 3.

**Figure 1: Schematic representation of the final pharmacokinetic model (2-compartment with mass-dependent linear volume expansion)**

*Differential equations:*

$$\frac{dX_{(1)}}{dt} = R_{(1)} - \left[\frac{CLd2}{V1 + (A + X_{(1)})}\right] \cdot X1 + \left[\frac{CLd2}{V2}\right] \cdot X_{(2)}$$

$$\frac{dX_{(2)}}{dt} = \left[\frac{CLd2}{V1 + (A + X_{(1)})}\right] \cdot X_{(1)} - \left[\frac{CLd2}{V2}\right] \cdot X_{(2)}$$

*Output:*

$$Y = \left[\frac{X(1)}{V1 + (A + X(1))}\right]$$

Legends:

| | |
|---|---|
| n: | Compartment number |
| $X_0$ | Dose |
| X(n) | Mass in Compartment n (at time t) |
| Vn | Volume associated with Compartment n |
| CL | Clearance (elimination) |
| CLd2 | Inter compartmental clearance |

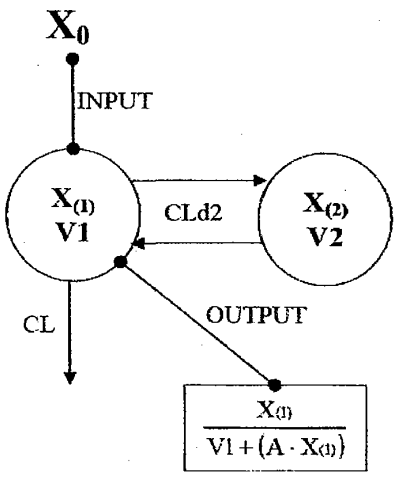



**Table 2: Mean parameter predictions for the final pharmacokinetic model (Mass-dependent linear volume expansion) from single dose patients only**



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| Model and Statistic | $AUC_{tr}$ (hr*µg/mL) | CL (area) (mL/hr) | CL (mL/hr/kg) | $CL_{d2}$ (mL/hr/kg) | $V_2$ (mL/kg) | A (mL/µg) | $V_1$ (mL/kg) |
|---|---|---|---|---|---|---|---|
| 2CLVFCLI | | | | | | | |
| Mean | 26161 | 0.2589 | 0.3391 | 0.8256 | 25.777 | 0.003821 | 19.0635 |
| SD | 12772 | 0.0837 | 0.2724 | 1.3097 | 24.751 | 0.001059 | 12.1166 |
| Median | 28756 | 0.2315 | 0.2350 | 0.4756 | 25.019 | 0.004175 | 17.8632 |
| % SD | 48.8 | 32.3 | 80.3 | 158.6 | 96.0 | 27.7 | 63.6 |

**Figure 2: Bivariate fit of (a) Observed by Individual predicted and (b) Observed by Mean predicted**

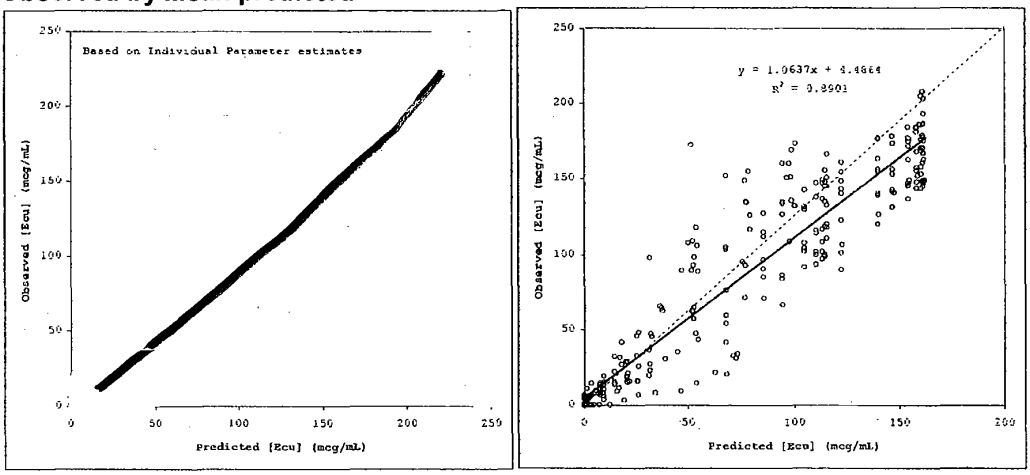
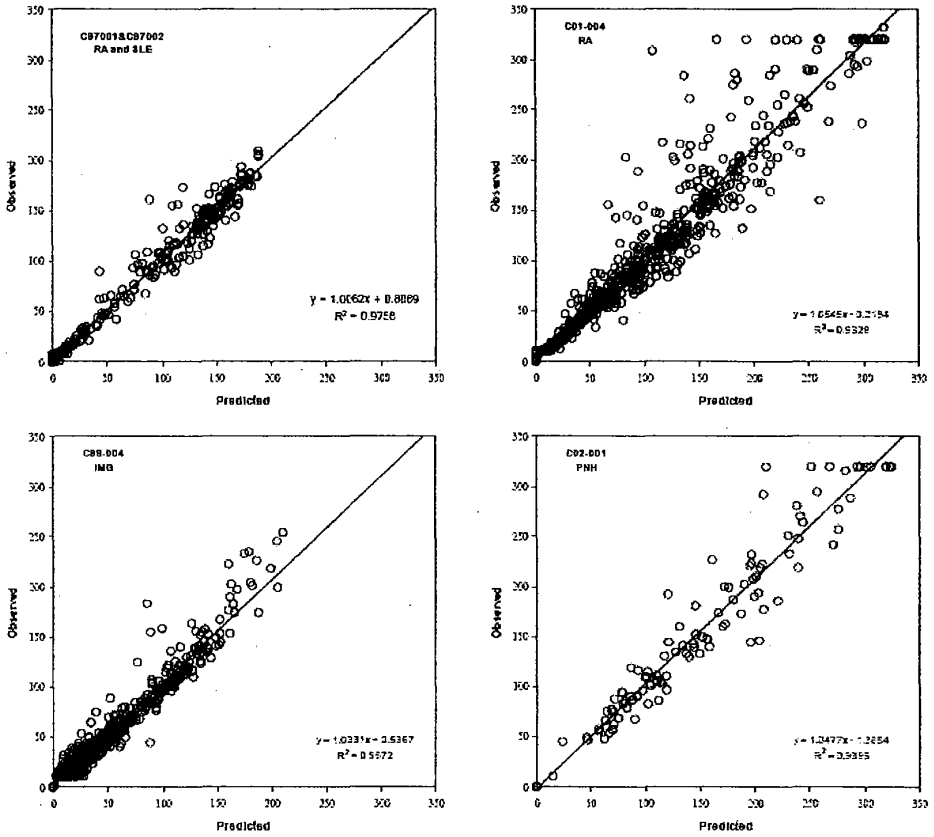



**Table 3: Mean parameter predictions for the final pharmacokinetic model (Mass-dependent linear volume expansion) from the entire database**

| | IMG N=71 | | PNH N=11 | | RA N=121 | | SLE N=6 | | Total N=209 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| CL (mL/hr/kg) | 0.41 | 0.139 | 0.25 | 0.069 | 0.30 | 0.117 | 0.30 | 0.106 | 0.333 | 0.134 |
| $Cl_{d2}$ (mL/hr/kg) | 0.21 | 0.174 | 0.21 | 0.055 | 0.54 | 0.156 | 0.59 | 0.562 | 0.43 | 0.241 |
| $V_2$ (mL/kg) | 149.5 | 44.92 | 26.5 | 7.37 | 42.3 | 9.68 | 20.6 | 10.84 | 77.5 | 58.70 |
| A (mL/µg) | 0.0007 | 0.0021 | 0.0020 | 0.0042 | 0.0042 | 0.0075 | 0.0040 | 0.0002 | 0.0029 | 0.0018 |
| $V_1$ (mL/kg) | 64.9 | 31.53 | 32.5 | 16.50 | 12.7 | 8.54 | 18.7 | 4.84 | 31.66 | 31.32 |

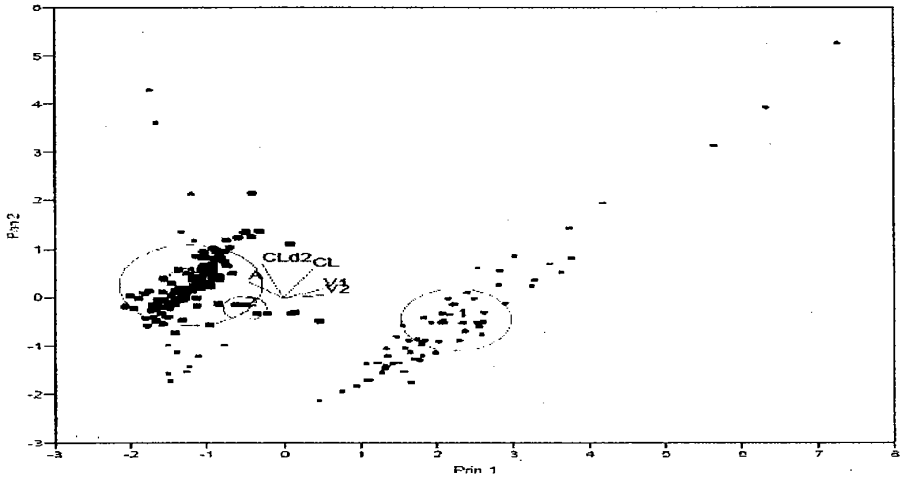
**Figure 3: Bivariate fit of observed and predicted eculizumab concentrations for the single-dose and multiple-dose studies for the different diseases**




## Analysis of Covariates

Patients with a diagnosis of IMG were found to be different from patients with the other diseases studied with regard to the PK parameter estimates when analyzed in a cluster analysis. The cluster analysis included all parameters estimated (CL, CLd2, V2, A, V1) with the number of allowed clusters set to the number of tested indications (IMG, RA, PNH, and SLE). The IMG patient group had higher total CL and Vd than did the other patient groups as shown in Figure 4 and Table 4. Statistically significant correlations were observed for a number of the covariate/parameter pairs, including body weight vs CL in both IMG and the other disease indications. While these covariate/parameter pairs appear to be statistically correlated, there were PD observations which demonstrated these correlations were not clinically relevant. Consequently no covariates, apart from IMG were incorporated in the final compartmental model.

**Figure 4: Bi-plot of K-means Cluster Analysis of Parameter Distributions: Cluster Centers Linked to Indication**




Cluster 1- IMG; Cluster 2-PNH; Cluster 3-RA; Cluster 4-SLE

**Table 4: Cluster summary statistics for different disease states**

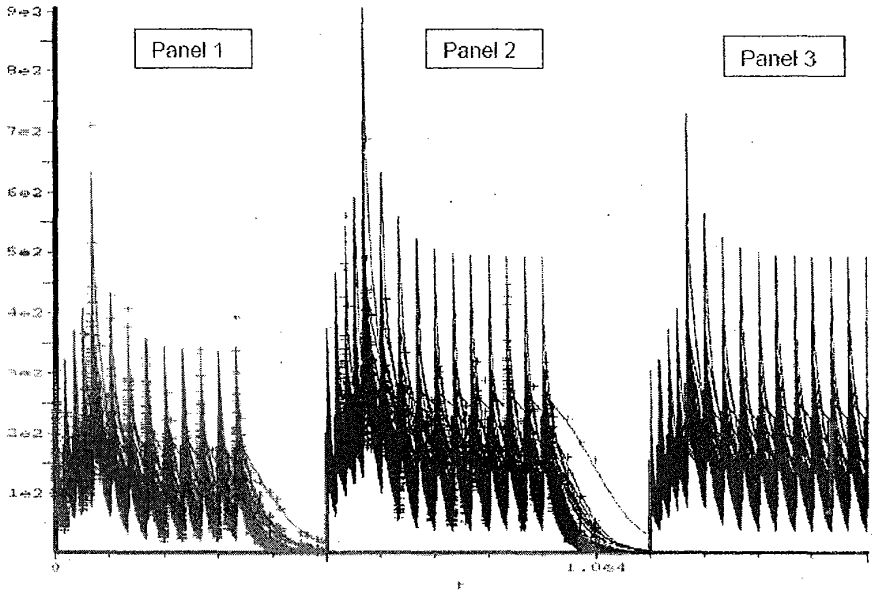
| Indication | CL (mL/hr/kg) | $CL_{d2}$ (mL/hr/kg) | $V_2$ (mL/kg) | A (mL/μg) | $V_1$ (mL/kg) |
|---|---|---|---|---|---|
| IMG | 0.41±0.139 | 0.21±0.174 | 149.57±44.924 | 0.000699±0.000207 | 64.908±31.529 |
| PNH | 0.26±0.066 | 0.543±0.168 | 29.97±8.094 | 0.0019±0.00148 | 32.51±16.289 |
| RA | 0.29±0.117 | 0.542±0.155 | 42.30±9.680 | 0.0042±0.00074 | 12.72±8.541 |
| SLE | 0.304±0.106 | 0.591±0.562 | 20.57±10.835 | 0.00397±0.00042 | 18.74±4.843 |

Data expressed as mean ± SD

## Population Variability – Monte Carlo simulation

A Monte Carlo simulation was conducted exploring a maximum variability of 2 SDs of all 5 PK parameters conducted randomly and simultaneously. The simulated PK parameters were derived from the model parameter means and SDs from the 11 PNH patients studied in study C02-001 and fit with the final pharmacokinetic model (2-compatment with mass-dependent linear volume expansion). Three dosing regimens were simulated: 600 mg given weekly for 4 weeks followed by 600 mg Q2wks (Figure 5: 1st panel); 900 mg given weekly for 4 weeks followed by 900 mg Q2wks (Figure 5: 2nd panel), and 600 mg given weekly for 4 weeks followed by 900 mg Q2wks beginning 1 week after the last 600 mg dose (Figure 5: 3rd panel; dose schedule used to treat PNH patients). The serum concentrations in the simulations show acceptable variability, as they are relatively well conserved in the population. Also the simulations indicate that excessive accumulation does not occur in PNH patients.

**Figure 5: Monte carlo simulation of eculizumab concentrations in 50 simulated PNH patients based on PNH patient mean parameters from the final pharmacokinetic model**




*Concentrations in µg/mL are plotted on the y-axis in scientific notation as 10 raised to the exponential. The time frame is plotted on the x-axis in hours raised to the exponent.*

### Analysis of PK in the Pivotal Trial

A standard 1-compartmental model analysis on the C04-001 patients' sparsely sampled PK data was conducted. The summary of the parameter mean estimates from the compartmental analysis are shown in Table 5 below.

**Table 5: Parameter mean estimates of the data in PNH patients from pivotal trial (N=40, 1-compartment model)**

| | CL (mL/hr/kg) | $V_d$ (mL/kg) | $K_{el}$ (1/hr) | $t_{1/2}$ (hr) |
|---|---|---|---|---|
| Mean | 0.311183 | 110.3 | 0.002776 | 271.7 |
| SD | 0.125097 | 17.9 | 0.000817 | 81.6 |
| % SD | 40.20 | 16.2 | 29.45 | 30.0 |
| Min | [redacted] | | | |
| Max | [redacted] | | | |
| Median | 0.289969 | 108.3 | 0.002793 | 248.2 |

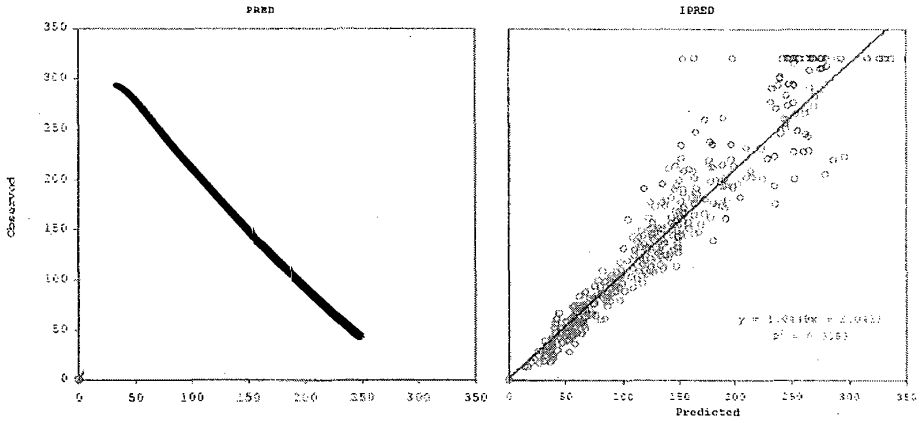
1C-p = 1CPNCLI; 1-compartment clearance parameterization IT2B method



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A 1-compartment model with mass-dependent volume expansion model did not result in improved fit of the data; hence the parsimonious model was preferred. Bivariate fits of the observed and the predicted by individual parameter estimates and mean estimates are shown in Figure 6.

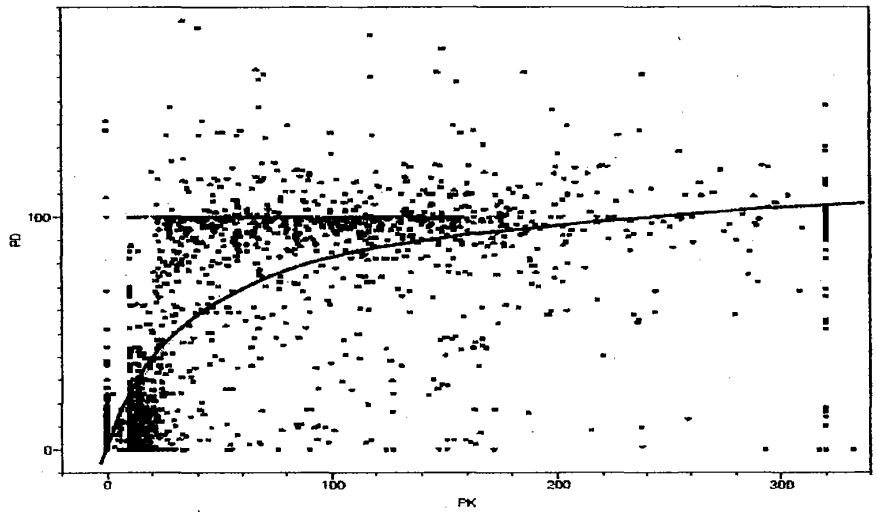
**Figure 6: Bivariate fit of (a) Observed by Individual predicted and Mean predicted**




## PK/PD Relationship

The relationship between eculizumab concentrations and C5 activity as measured by a serum complement hemolysis assay was described using a simple Emax model. The fit of the data to the Emax model was acceptable (Figure 7) given the limits of the assay, number of points, and patients involved. The x-axis in Figure 7 represents eculizumab concentrations and the y-axis the inverted normalized % hemolysis in the paired samples. The samples were obtained at anytime after dosing had begun during the relevant study. The 2 offsets seen on the y-axis are caused by the BLQ samples being set to zero or to [redacted]. The Emax was estimated to be 118% ± 27% hemolysis (95% CI for the mean is 114-123%). The E50 was estimated to be 43 ± 2.7 µg/mL (95% CI for the mean is 39-48 µg/mL). Because the PK assay used to determine eculizumab concentrations in human serum measures both bound and free eculizumab levels, an overestimated $EC_{50}$ of 43 µg/mL reflects the total serum level of eculizumab required to block terminal complement activation.

**Figure 7: Emax model of inhibition of % hemolysis by eculizumab concentrations from patients with IMG, RA and PNH**




The x-axis represents eculizumab concentrations. The y-axis represents the inverted normalized % hemolysis in the paired samples.

## *Conclusions*

- A 2-compartmental LVF PK model suitable for population PK analysis of sparsely sampled eculizumab serum concentration data was developed and validated.
- The PK of eculizumab was adequately described by the selected model based on data from patients with a variety of diseases.
- No clinically important covariates with respect to the PK parameters were found.
- Population eculizumab concentration variability in PNH patients was explored using the derived model parameter estimates from PNH patients in a Monte Carlo simulation. In this analysis, no excessive accumulation of eculizumab was observed.
- The relationship between eculizumab concentration and hemolytic activity was described using a simple Emax PK/PD model.
- PK/PD data collected from PNH patients were assessed with the developed models and were found to fit well to accurately predict PK parameters.
- A successful link between the mass-dependent linear volume expansion model and PD response (hemolytic activity) was described.

## Reviewer's Comments

The conduct of the population pharmacokinetic analysis, PK/PD analysis and the interpretation of the results were reasonable.
The following are the comments:

- It is unclear as to the purpose of two different population analyses – (i) analysis conducted from the data derived from SLE. RA, IMG and phase II PNH data - a two compartment model with mass-dependent linear volume expansion model and (ii) one compartment analysis of the data derived from the phase III pivotal trial in PNH patients.
- One of the objectives of the report was to asses the models developed from the data in different disease states with the data from PNH patients from the phase III C04-001 study. Instead of testing the two compartment model developed, the sponsor chose to develop a different model.

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# Reviewer's Analysis

## *Objective*

The focus of the analysis was aimed at characterizing the time course of the lactate dehydrogenase (LDH) levels, a description of the pharmacodynamics of eculizumab, in the pivotal trial (C04-001).

## *Introduction*

LDH has long been considered as a useful marker of intravascular hemolysis[1]. Its serum levels are mildly elevated in extravascular hemolysis, such as immune hemolytic anemia, but are substantially elevated with intravascular hemolysis, such as thrombotic thrombocytopenic purpura and PNH[2]. RBCs contain large amounts of LDH, and quantitation of total LDH and hemoglobin in osmotically lysed RBCs show a near uniform correlation between these parameters *in vitro*[3].

## *Data*

LDH levels as a part of the clinical chemistry monitoring in the pivotal trial (C04-001) were collected in the trial at Visits 1, 2, 3 (Baseline), 4, 5, 6, 7, 9, 11, 13, 15, 17 and 18 or early termination. From baseline the visits corresponded to Study weeks of 0, 1, 2, 3, 4, 8, 12, 16, 20, 24 and 26, respectively.

## *Method*

Descriptive statistics for LDH levels on placebo and eculizumab treatment were derived at each of the visits and the time course of LDH were plotted. Exposure-LDH relationship could not be modeled using the routine PK/PD modeling as the time course of LDH following single dose was not available. Further, the available trough and peak eculizumab concentrations available from the trial corresponded to a significant effect, making it difficult to get a precise estimate of the $EC_{50}$.

## *Results*

A summary of the levels of LDH over the time course of the trial for placebo and eculizumab treatment arms is shown in Table 6. A graphical representation of the same data is shown in Figure 8. It is clearly evident that LDH levels are decreased at least 3 fold by end of the first dose (week 1) and this effect is consistently maintained over the duration of the treatment. LDH levels at baseline are approximately 10 times the upper limit normal (ULN) and by the

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[1] ***Kato etal. Blood, 15 March 2006, Vol 107, No. 6; 2279-2285.***
[2] ***Tabbara IA. Med Clin North Am. 1992; 76: 649-668.***
[3] ***Van Lente etal. Clin Chem. 1981; 27:1453-1455.***

second week the levels on eculizumab treatment are reduced to approximately 1.5 X ULN. However, the LDH levels on placebo are unchanged from baseline to week 26. The huge standard deviation at the latter visits on treatment arm was predominantly driven by a single subject (011-001), who had a baseline value of 5962 U/L and 1776 U/L by week 1 and 2984 U/L at week 26.

**Table 6: Summary of the LDH levels on placebo during the pivotal trial (C04-001)**

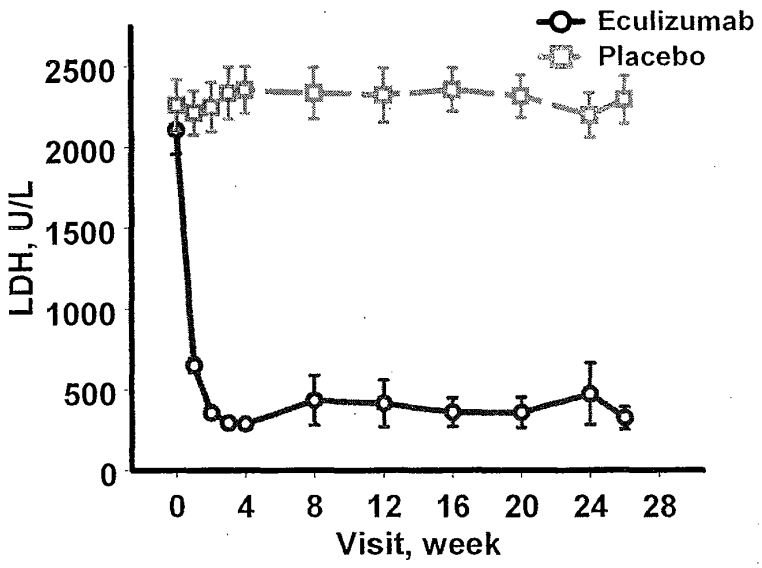
| N | Visit | Week | Mean | SD |
|---|---|---|---|---|
| 43 | 3 | 0 | 2259.0 | 1039.2 |
| 44 | 4 | 1 | 2215.1 | 905.1 |
| 44 | 5 | 2 | 2250.7 | 1007.4 |
| 43 | 6 | 3 | 2336.4 | 1049.0 |
| 42 | 7 | 4 | 2353.7 | 940.6 |
| 39 | 9 | 8 | 2336.4 | 996.6 |
| 37 | 11 | 12 | 2323.7 | 1015.9 |
| 34 | 13 | 16 | 2356.9 | 781.3 |
| 33 | 15 | 20 | 2318.0 | 752.6 |
| 33 | 17 | 24 | 2199.7 | 790.6 |
| 34 | 18 | 26 | 2294.4 | 864.5 |

**Table 7: Summary of the LDH levels on eculizumab during the pivotal trial (C04-001)**

| N | Visit | Week | Mean | SD |
|---|---|---|---|---|
| 41 | 3 | 0 | 2108.5 | 965.3 |
| 41 | 4 | 1 | 651.9 | 278.3 |
| 40 | 5 | 2 | 359.3 | 100.7 |
| 41 | 6 | 3 | 294.7 | 97.3 |
| 41 | 7 | 4 | 289.6 | 168.6 |
| 40 | 9 | 8 | 436.0 | 975.6 |
| 40 | 11 | 12 | 415.8 | 925.1 |
| 40 | 13 | 16 | 361.5 | 556.7 |
| 39 | 15 | 20 | 358.8 | 596.9 |

| N | Visit | Week | Mean | SD |
|---|---|---|---|---|
| 39 | 17 | 24 | 475.8 | 1194.2 |
| 40 | 18 | 26 | 325.9 | 438.3 |

**Figure 8: Treatment with Eculizumab results in immediate and sustained lowering of LDH levels**




### *Conclusion*

Treatment with Eculizumab with the proposed dosing regimen result in immediate and sustained decrease in intravascular hemolysis as evidence by lowering of LDH levels.

## 1.14.1.3 Labeling Text

**AVASTIN®**
**(Bevacizumab)**

**For Intravenous Use**

**WARNINGS**

**Gastrointestinal Perforations/Wound Healing Complications**

AVASTIN administration can result in the development of gastrointestinal perforation and wound dehiscence, in some instances resulting in fatality. Gastrointestinal perforation, sometimes associated with intra-abdominal abscess, occurred throughout treatment with AVASTIN (i.e., was not correlated to duration of exposure). The incidence of gastrointestinal perforation in patients receiving bolus-IFL with AVASTIN was 2%. The typical presentation was reported as abdominal pain associated with symptoms such as constipation and vomiting. Gastrointestinal perforation should be included in the differential diagnosis of patients presenting with abdominal pain on AVASTIN. AVASTIN therapy should be permanently discontinued in patients with gastrointestinal perforation or wound dehiscence requiring medical intervention. The appropriate interval between termination of AVASTIN and subsequent elective surgery required to avoid the risks of impaired wound healing/wound dehiscence has not been determined. (See **WARNINGS: Gastrointestinal Perforations/Wound Healing Complications** and **DOSAGE AND ADMINISTRATION: Dose Modifications**.)

**Hemorrhage**

Serious, and in some cases fatal, hemoptysis has occurred in patients with non-small cell lung cancer treated with chemotherapy and AVASTIN. In a small study, the incidence of serious or fatal hemoptysis was 31% in patients with squamous histology and 4% in patients with adenocarcinoma receiving AVASTIN as compared to no cases in patients treated with chemotherapy alone. Patients with recent hemoptysis should not receive AVASTIN. (See **WARNINGS: Hemorrhage** and **DOSAGE AND ADMINISTRATION: Dose Modifications**.)

## DESCRIPTION

AVASTIN™ (Bevacizumab) is a recombinant humanized monoclonal IgG1 antibody that binds to and inhibits the biologic activity of human vascular endothelial growth factor (VEGF) in *in vitro* and *in vivo* assay systems. Bevacizumab contains human framework regions and the complementarity-determining regions of a murine antibody that binds to VEGF (1). Bevacizumab is produced in a Chinese Hamster Ovary mammalian cell expression system in a nutrient medium containing the antibiotic gentamicin and has a molecular weight of approximately 149 kilodaltons. AVASTIN is a clear to slightly opalescent, colorless to pale brown, sterile, pH 6.2 solution for intravenous (IV) infusion. AVASTIN is supplied in 100 mg and 400 mg preservative-free, single-use vials to deliver 4 mL or 16 mL of AVASTIN (25 mg/mL). The 100 mg product is formulated in 240 mg α,α-trehalose dihydrate, 23.2 mg sodium phosphate (monobasic, monohydrate), 4.8 mg sodium phosphate (dibasic, anhydrous), 1.6 mg polysorbate 20, and Water for Injection, USP. The 400 mg product is formulated in 960 mg α,α-trehalose dihydrate, 92.8 mg sodium phosphate (monobasic, monohydrate), 19.2 mg sodium phosphate (dibasic, anhydrous), 6.4 mg polysorbate 20, and Water for Injection, USP.

## CLINICAL PHARMACOLOGY

### Mechanism of Action

Bevacizumab binds VEGF and prevents the interaction of VEGF to its receptors (Flt-1 and KDR) on the surface of endothelial cells. The interaction of VEGF with its receptors leads to endothelial cell proliferation and new blood vessel formation in *in vitro* models of angiogenesis. Administration of Bevacizumab to xenotransplant models of colon cancer in nude (athymic) mice caused reduction of microvascular growth and inhibition of metastatic disease progression.

### Pharmacokinetics

The pharmacokinetic profile of Bevacizumab was assessed using an assay that measures total serum Bevacizumab concentrations (i.e., the assay did

not distinguish between free Bevacizumab and Bevacizumab bound to VEGF ligand). Based on a population pharmacokinetic analysis of 491 patients who received 1 to 20 mg/kg of AVASTIN weekly, every 2 weeks, or every 3 weeks, the estimated half-life of Bevacizumab was approximately 20 days (range 11–50 days). The predicted time to reach steady state was 100 days. The accumulation ratio following a dose of 10 mg/kg of Bevacizumab every 2 weeks was 2.8.

The clearance of Bevacizumab varied by body weight, by gender, and by tumor burden. After correcting for body weight, males had a higher Bevacizumab clearance (0.262 L/day vs. 0.207 L/day) and a larger $V_c$ (3.25 L vs. 2.66 L) than females. Patients with higher tumor burden (at or above median value of tumor surface area) had a higher Bevacizumab clearance (0.249 L/day vs. 0.199 L/day) than patients with tumor burdens below the median. In a randomized study of 813 patients (Study 1), there was no evidence of lesser efficacy (hazard ratio for overall survival) in males or patients with higher tumor burden treated with AVASTIN as compared to females and patients with low tumor burden. The relationship between Bevacizumab exposure and clinical outcomes has not been explored.

## Special Populations

Analyses of demographic data suggest that no dose adjustments are necessary for age or sex.

*Patients with renal impairment.* No studies have been conducted to examine the pharmacokinetics of Bevacizumab in patients with renal impairment.

*Patients with hepatic dysfunction.* No studies have been conducted to examine the pharmacokinetics of Bevacizumab in patients with hepatic impairment.

## CLINICAL STUDIES

The safety and efficacy of AVASTIN in the initial treatment of patients with metastatic carcinoma of the colon and rectum were studied in two randomized, controlled clinical trials in combination with intravenous 5-fluorouracil□based chemotherapy.

### AVASTIN in Combination with Bolus-IFL

Study 1 was a randomized, double-blind, active-controlled clinical trial evaluating AVASTIN as first-line treatment of metastatic carcinoma of the colon or rectum. Patients were randomized to bolus-IFL (irinotecan 125 mg/m$^2$ IV, 5-fluorouracil 500 mg/m$^2$ IV, and leucovorin 20 mg/m$^2$ IV given once weekly for 4 weeks every 6 weeks) plus placebo (Arm 1), bolus-IFL plus AVASTIN (5 mg/kg every 2 weeks) (Arm 2), or 5-FU/LV plus AVASTIN (5 mg/kg every 2 weeks) (Arm 3). Enrollment in Arm 3 was discontinued, as pre-specified, when the toxicity of AVASTIN in combination with the bolus-IFL regimen was deemed acceptable.

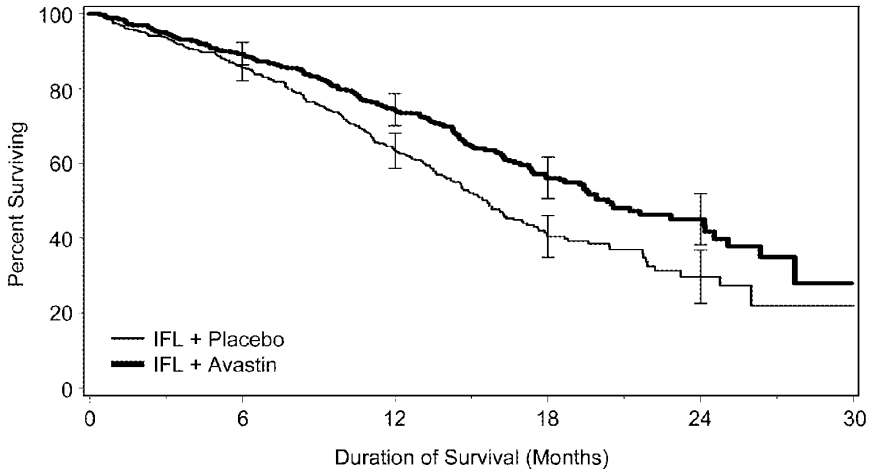
Of the 813 patients randomized to Arms 1 and 2, the median age was 60, 40% were female, and 79% were Caucasian. Fifty-seven percent had an ECOG performance status of 0. Twenty-one percent had a rectal primary and 28% received prior adjuvant chemotherapy. In the majority of patients, 56%, the dominant site of disease was extra-abdominal, while the liver was the dominant site in 38% of patients. The patient characteristics were similar across the study arms. The primary endpoint of this trial was overall survival. Results are presented in Table 1 and Figure 1.

**Table 1**
Study 1 Efficacy Results

| | IFL + Placebo | IFL + AVASTIN 5 mg/kg q 2 wks |
|---|---|---|
| Number of Patients | 411 | 402 |
| Overall Survival[a] | | |
| Median (months) | 15.6 | 20.3 |
| Hazard ratio | | 0.66 |
| Progression-Free Survival[a] | | |
| Median (months) | 6.4 | 10.6 |
| Hazard ratio | | 0.54 |
| Overall Response Rate[b] | | |
| Rate (percent) | 35% | 45% |
| Duration of Response | | |
| Median (months) | 7.1 | 10.4 |

[a] $p < 0.001$ by stratified logrank test.
[b] $p < 0.01$ by $\chi^2$ test.

**Figure 1**
Duration of Survival in Study 1




Error bars represent 95% confidence intervals.

The clinical benefit of AVASTIN, as measured by survival in the two principal arms, was seen in all subgroups tested. The subgroups examined

were based on age, sex, race, ECOG performance status, location of primary tumor, prior adjuvant therapy, number of metastatic sites, and tumor burden.

Among the 110 patients enrolled in Arm 3, median overall survival was 18.3 months, median progression-free survival was 8.8 months, overall response rate was 39%, and median duration of response was 8.5 months.

**AVASTIN in Combination with 5-FU/LV Chemotherapy**

Study 2 was a randomized, active-controlled clinical trial testing AVASTIN in combination with 5-FU/LV as first-line treatment of metastatic colorectal cancer. Patients were randomized to receive 5-FU/LV (5-fluorouracil 500 mg/m$^2$, leucovorin 500 mg/m$^2$ weekly for 6 weeks every 8 weeks) or 5-FU/LV plus AVASTIN (5 mg/kg every 2 weeks) or 5-FU/LV plus AVASTIN (10 mg/kg every 2 weeks). Patients were treated until disease progression. The primary endpoints of the trial were objective response rate and progression-free survival. Results are presented in Table 2.

**Table 2**
Study 2 Efficacy Results

| | 5-FU/LV | 5-FU/LV + AVASTIN 5 mg/kg | 5-FU/LV + AVASTIN 10 mg/kg |
|---|---|---|---|
| Number of Patients | 36 | 35 | 33 |
| Overall Survival | | | |
| Median (months) | 13.6 | 17.7 | 15.2 |
| Progression-Free Survival | | | |
| Median (months) | 5.2 | 9.0 | 7.2 |
| Overall Response Rate | | | |
| Rate (percent) | 17 | 40 | 24 |

Progression-free survival was significantly better in patients receiving 5-FU/LV plus AVASTIN at 5 mg/kg when compared to those not receiving AVASTIN. However, overall survival and overall response rate

were not significantly different. Outcomes for patients receiving 5-FU/LV plus AVASTIN at 10 mg/kg were not significantly different than for patients who did not receive AVASTIN.

### AVASTIN as a Single Agent

The efficacy of AVASTIN as a single agent in colorectal cancer has not been established. However, in an ongoing, randomized study of patients with metastatic colorectal cancer that had progressed following a 5-fluorouracil and irinotecan–based regimen, the arm in which patients were treated with single-agent AVASTIN was closed early due to evidence of an inferior survival in that arm as compared with patients treated with the FOLFOX regimen of 5-fluorouracil, leucovorin, and oxaliplatin.

## INDICATIONS AND USAGE

AVASTIN, used in combination with intravenous 5-fluorouracil□based chemotherapy, is indicated for first-line treatment of patients with metastatic carcinoma of the colon or rectum.

## CONTRAINDICATIONS

There are no known contraindications to the use of AVASTIN.

## WARNINGS

### Gastrointestinal Perforations/Wound Healing Complications (See DOSAGE AND ADMINISTRATION: Dose Modifications)

Gastrointestinal perforation and wound dehiscence, complicated by intra-abdominal abscesses, occurred at an increased incidence in patients receiving AVASTIN as compared to controls. AVASTIN has also been shown to impair wound healing in pre-clinical animal models.

In Study 1, one of 396 (0.3%) patients receiving bolus-IFL plus placebo, six of 392 (2%) patients receiving bolus-IFL plus AVASTlN, and four of 109 (4%) patients receiving 5-FU/LV plus AVASTIN developed gastrointestinal perforation, in some instances with fatal outcome. These episodes occurred with or without intra-abdominal abscesses and at

various time points during treatment. The typical presentation was reported as abdominal pain associated with symptoms such as constipation and vomiting.

In addition, two of 396 (0.5%) patients receiving bolus-IFL plus placebo, four of 392 (1%) patients receiving bolus-IFL plus AVASTIN, and one of 109 (1%) patients receiving 5-FU/LV plus AVASTIN developed a wound dehiscence during study treatment.

The appropriate interval between surgery and subsequent initiation of AVASTIN required to avoid the risks of impaired wound healing has not been determined. In Study 1, the clinical protocol did not permit initiation of AVASTIN for at least 28 days following surgery. There was one patient (among 501 patients receiving AVASTIN on Study 1) in whom an anastomotic dehiscence occurred when AVASTIN was initiated per protocol. In this patient, the interval between surgery and initiation of AVASTIN was greater than 2 months.

Similarly, the appropriate interval between termination of AVASTIN and subsequent elective surgery required to avoid the risks of impaired wound healing has not been determined. In Study 1, 39 patients who were receiving bolus-IFL plus AVASTIN underwent surgery following AVASTIN therapy and, of these patients, six (15%) had wound healing/bleeding complications. In the same study, 25 patients in the bolus-IFL arm underwent surgery and, of these patients, one of 25 (4%) had wound healing/bleeding complications. The longest interval between last dose of study drug and dehiscence was 56 days; this occurred in a patient on the bolus-IFL plus AVASTIN arm. The interval between termination of AVASTIN and subsequent elective surgery should take into consideration the calculated half-life of AVASTIN (approximately 20 days).

AVASTIN therapy should be discontinued in patients with gastrointestinal perforation or wound dehiscence requiring medical intervention.

**Hemorrhage (See DOSAGE AND ADMINISTRATION: Dose Modifications)**

Two distinct patterns of bleeding have occurred in patients receiving AVASTIN. The first is minor hemorrhage, most commonly Grade 1 epistaxis. The second is serious, and in some cases fatal, hemorrhagic events. Serious hemorrhagic events occurred primarily in patients with non-small cell lung cancer, an indication for which AVASTIN is not approved. In a randomized study in patients with non–small cell lung cancer receiving chemotherapy with or without AVASTIN, four of 13 (31%) AVASTIN-treated patients with squamous cell histology and two of 53 (4%) AVASTIN-treated patients with non-squamous histology experienced life-threatening or fatal pulmonary hemorrhage as compared to none of the 32 (0%) patients receiving chemotherapy alone. Of the patients experiencing events of life-threatening pulmonary hemorrhage, many had cavitation and/or necrosis of the tumor, either pre-existing or developing during AVASTIN therapy. These serious hemorrhagic events occurred suddenly and presented as major or massive hemoptysis.

The risk of central nervous system (CNS) bleeding in patients with CNS metastases receiving AVASTIN has not been evaluated because these patients were excluded from Genentech-sponsored studies following development of CNS hemorrhage in a patient with a CNS metastasis in Phase 1 studies.

Other serious bleeding events reported in patients receiving AVASTIN were uncommon and included gastrointestinal hemorrhage, subarachnoid hemorrhage, and hemorrhagic stroke.

Patients with serious hemorrhage i.e., requiring medical intervention, should have AVASTIN treatment discontinued and receive aggressive medical management. Patients with recent hemoptysis should not receive AVASTIN.

**Hypertension (See DOSAGE AND ADMINISTRATION: Dose Modifications)**

The incidence of hypertension and severe hypertension was increased in patients receiving AVASTIN in Study 1 (see Table 3).

**Table 3**

Incidence of Hypertension and Severe Hypertension in Study 1

| | Arm 1 IFL+Placebo (n=394) | Arm 2 IFL+AVASTIN (n=392) | Arm 3 5-FU/LV+AVASTIN (n=109) |
|---|---|---|---|
| Hypertension[a] (>150/100 mmHg) | 43% | 60% | 67% |
| Severe Hypertension[a] (>200/110 mmHg) | 2% | 7% | 10% |

[a] This includes patients with either a systolic or diastolic reading greater than the cutoff value on one or more occasions.

Among patients with severe hypertension in the AVASTIN arms, slightly over half the patients (51%) had a diastolic reading greater than 110 associated with a systolic reading less than 200.

Medication classes used for management of patients with Grade 3 hypertension receiving AVASTIN included angiotensin-converting enzyme inhibitors, beta blockers, diuretics, and calcium channel blockers. Four months after discontinuation of therapy, persistent hypertension was present in 18 of 26 patients that received bolus-IFL plus AVASTIN and 8 of 10 patients that received bolus-IFL plus placebo.

Across all clinical studies (n=1032), development or worsening of hypertension resulted in hospitalization or discontinuation of AVASTIN in 17 patients. Four of these 17 patients developed hypertensive encephalopathy. Severe hypertension was complicated by subarachnoid hemorrhage in one patient.

AVASTIN should be permanently discontinued in patients with hypertensive crisis. Temporary suspension is recommended in patients with severe hypertension that is not controlled with medical management.

**Proteinuria (See DOSAGE AND ADMINISTRATION: Dose Modifications)**

In Study 1, both the incidence and severity of proteinuria (defined as a urine dipstick reading of 1+ or greater) was increased in patients receiving AVASTIN as compared to those receiving bolus-IFL plus placebo. Urinary dipstick readings of 2+ or greater occurred in 14% of patients receiving bolus-IFL plus placebo, 17% receiving bolus-IFL plus AVASTIN, and in 28% of patients receiving 5-FU/LV plus AVASTIN. Twenty-four□hour urine collections were obtained in patients with new onset or worsening proteinuria. None of the 118 patients receiving bolus-IFL plus placebo, three of 158 patients (2%) receiving bolus-IFL plus AVASTIN, and two of 50 (4%) patients receiving 5-FU/LV plus AVASTIN who had a 24-hour collection experienced NCI-CTC Grade 3 proteinuria (>3.5 gm protein/24 hours).

In a dose-ranging, placebo-controlled, randomized study of AVASTIN in patients with metastatic renal cell carcinoma, an indication for which AVASTIN is not approved, 24-hour urine collections were obtained in approximately half the patients enrolled. Among patients in whom 24-hour urine collections were obtained, four of 19 (21%) patients receiving AVASTIN at 10 mg/kg every two weeks, two of 14 (14%) receiving AVASTIN at 3 mg/kg every two weeks, and none of the 15 placebo patients experienced NCI-CTC Grade 3 proteinuria (>3.5 gm protein/24 hours).

Nephrotic syndrome occurred in five of 1032 (0.5%) patients receiving AVASTIN in Genentech-sponsored studies. One patient died and one required dialysis. In three patients, proteinuria decreased in severity several months after discontinuation of AVASTIN. No patient had

normalization of urinary protein levels (by 24-hour urine) following discontinuation of AVASTIN.

AVASTIN should be discontinued in patients with nephrotic syndrome. The safety of continued AVASTIN treatment in patients with moderate to severe proteinuria has not been evaluated. In most clinical studies, AVASTIN was interrupted for ≥2 grams of proteinuria/24 hours and resumed when proteinuria was <2 gm/24 hours. Patients with moderate to severe proteinuria based on 24-hour collections should be monitored regularly until improvement and/or resolution is observed.

### Congestive Heart Failure

Congestive heart failure (CHF), defined as NCI-CTC Grade 2–4 left ventricular dysfunction, was reported in 22 of 1032 (2%) patients receiving AVASTIN in Genentech-sponsored studies. Congestive heart failure occurred in six of 44 (14%) patients receiving AVASTIN and concurrent anthracyclines. Congestive heart failure occurred in 13 of 299 (4%) patients who received prior anthracyclines and/or left chest wall irradiation. In a controlled study, the incidence was higher in patients receiving AVASTIN plus chemotherapy as compared to patients receiving chemotherapy alone. The safety of continuation or resumption of AVASTIN in patients with cardiac dysfunction has not been studied.

## PRECAUTIONS

### General

AVASTIN should be used with caution in patients with known hypersensitivity to AVASTIN or any component of this drug product.

### Infusion Reactions

Infusion reactions with the first dose of AVASTIN were uncommon (< 3%). Severe reactions during the infusion of AVASTIN occurred in two patients. One patient developed stridor and wheezing during their first dose. A second patient, receiving paclitaxel followed by AVASTIN, developed a Grade 3 hypersensitivity reaction requiring hospitalization

during their third infusion of AVASTIN. Both patients responded to medical management. Information on rechallenge is not available.

AVASTIN infusion should be interrupted in all patients with severe infusion reactions and appropriate medical therapy administered.

There are no data regarding the most appropriate method of identification of patients who may safely be retreated with AVASTIN after experiencing a severe infusion reaction.

### Surgery

AVASTIN therapy should not be initiated for at least 28 days following major surgery. The surgical incision should be fully healed prior to initiation of AVASTIN. Because of the potential for impaired wound healing, AVASTIN should be suspended prior to elective surgery. The appropriate interval between the last dose of AVASTIN and elective surgery is unknown; however, the half-life of AVASTIN is estimated to be 20 days (see **CLINICAL PHARMACOLOGY: Pharmacokinetics**) and the interval chosen should take into consideration the half-life of the drug. (See **WARNINGS: Gastrointestinal Perforations/Wound Healing Complications**.)

### Cardiovascular Disease

Patients were excluded from participation in AVASTIN clinical trials if, in the previous year, they had experienced clinically significant cardiovascular disease. Thus, the safety of AVASTIN in patients with clinically significant cardiovascular disease has not been adequately evaluated.

### Immunogenicity

As with all therapeutic proteins, there is a potential for immunogenicity. The incidence of antibody development in patients receiving AVASTIN has not been adequately determined because the assay sensitivity was inadequate to reliably detect lower titers. Enzyme-linked immunosorbant assays (ELISAs) were performed on sera from approximately 500 patients

treated with AVASTIN, primarily in combination with chemotherapy. High titer human anti-AVASTIN antibodies were not detected.

Immunogenicity data are highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody positivity in an assay may be influenced by several factors, including sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to AVASTIN with the incidence of antibodies to other products may be misleading.

### Laboratory Tests

Blood pressure monitoring should be conducted every two to three weeks during treatment with AVASTIN. Patients who develop hypertension on AVASTIN may require blood pressure monitoring at more frequent intervals. Patients with AVASTIN-induced or -exacerbated hypertension who discontinue AVASTIN should continue to have their blood pressure monitored at regular intervals.

Patients receiving AVASTIN should be monitored for the development or worsening of proteinuria with serial urinalyses. Patients with a 2+ or greater urine dipstick reading should undergo further assessment, e.g., a 24-hour urine collection. (See **WARNINGS: Proteinuria** and **DOSAGE AND ADMINISTRATION: Dose Modifications**.)

### Drug Interactions

No formal drug interaction studies with anti-neoplastic agents have been conducted. In Study 1, patients with colorectal cancer were given irinotecan/5-FU/leucovorin (bolus-IFL) with or without AVASTIN. Irinotecan concentrations were similar in patients receiving bolus-IFL alone and in combination with AVASTIN. The concentrations of SN38, the active metabolite of irinotecan, were on average 33% higher in patients receiving bolus-IFL in combination with AVASTIN when compared with bolus-IFL alone. In Study 1, patients receiving bolus-IFL plus AVASTIN

had a higher incidence of Grade 3–4 diarrhea and neutropenia. Due to high inter-patient variability and limited sampling, the extent of the increase in SN38 levels in patients receiving concurrent irinotecan and AVASTIN is uncertain.

### Carcinogenesis, Mutagenesis, Impairment of Fertility

No carcinogenicity data are available for AVASTIN in animals or humans.

AVASTIN may impair fertility. Dose-related decreases in ovarian and uterine weights, endometrial proliferation, number of menstrual cycles, and arrested follicular development or absent corpora lutea were observed in female cynomolgus monkeys treated with 10 or 50 mg/kg of AVASTIN for 13 or 26 weeks. Following a 4- or 12-week recovery period, which examined only the high□dose group, trends suggestive of reversibility were noted in the two females for each regimen that were assigned to recover. After the 12-week recovery period, follicular maturation arrest was no longer observed, but ovarian weights were still moderately decreased. Reduced endometrial proliferation was no longer observed at the 12-week recovery time point, but uterine weight decreases were still notable, corpora lutea were absent in 1 out of 2 animals, and the number of menstrual cycles remained reduced (67%).

### Pregnancy Category C

AVASTIN has been shown to be teratogenic in rabbits when administered in doses that are two-fold greater than the recommended human dose on a mg/kg basis. Observed effects included decreases in maternal and fetal body weights, an increased number of fetal resorptions, and an increased incidence of specific gross and skeletal fetal alterations. Adverse fetal outcomes were observed at all doses tested.

Angiogenesis is critical to fetal development and the inhibition of angiogenesis following administration of AVASTIN is likely to result in adverse effects on pregnancy. There are no adequate and well-controlled

studies in pregnant women. AVASTIN should be used during pregnancy or in any woman not employing adequate contraception only if the potential benefit justifies the potential risk to the fetus. All patients should be counseled regarding the potential risk of AVASTIN to the developing fetus prior to initiation of therapy. If the patient becomes pregnant while receiving AVASTIN, she should be apprised of the potential hazard to the fetus and/or the potential risk of loss of pregnancy. Patients who discontinue AVASTIN should also be counseled concerning the prolonged exposure following discontinuation of therapy (half-life of approximately 20 days) and the possible effects of AVASTIN on fetal development.

### Nursing Mothers

It is not known whether AVASTIN is secreted in human milk. Because human IgG1 is secreted into human milk, the potential for absorption and harm to the infant after ingestion is unknown. Women should be advised to discontinue nursing during treatment with AVASTIN and for a prolonged period following the use of AVASTIN, taking into account the half-life of the product, approximately 20 days [range 11-50 days]. (See **CLINICAL PHARMACOLOGY: Pharmacokinetics**.)

### Pediatric Use

The safety and effectiveness of AVASTIN in pediatric patients has not been studied. However, physeal dysplasia was observed in juvenile cynomolgus monkeys with open growth plates treated for four weeks with doses that were less than the recommended human dose based on mg/kg and exposure. The incidence and severity of physeal dysplasia were dose-related and were at least partially reversible upon cessation of treatment.

### Geriatric Use

In Study 1, NCI-CTC Grade 3–4 adverse events were collected in all patients receiving study drug (396 bolus-IFL plus placebo; 392 bolus-IFL plus AVASTIN; 109 5-FU/LV plus AVASTIN), while NCI-CTC Grade 1 and 2 adverse events were collected in a subset of 309 patients. There

were insufficient numbers of patients 65 years and older in the subset in which Grade 1-4 adverse events were collected to determine whether the overall adverse event profile was different in the elderly as compared to younger patients. Among the 392 patients receiving bolus-IFL plus AVASTIN, 126 were at least 65 years of age. Severe adverse events that occurred at a higher incidence (≥ 2%) in the elderly when compared to those less than 65 years were asthenia, sepsis, deep thrombophlebitis, hypertension, hypotension, myocardial infarction, congestive heart failure, diarrhea, constipation, anorexia, leukopenia, anemia, dehydration, hypokalemia, and hyponatremia. The effect of AVASTIN on overall survival was similar in elderly patients as compared to younger patients.

Of the 742 patients enrolled in Genentech-sponsored clinical studies in which all adverse events were captured, 212 (29%) were age 65 or older and 43 (6%) were age 75 or older. Adverse events of any severity that occurred at a higher incidence in the elderly as compared to younger patients, in addition to those described above, were dyspepsia, gastrointestinal hemorrhage, edema, epistaxis, increased cough, and voice alteration.

## ADVERSE EVENTS

The most serious adverse events associated with AVASTIN were:

- Gastrointestinal Perforations/Wound Healing Complications (see **WARNINGS**)
- Hemorrhage (see **WARNINGS**)
- Hypertensive Crises (see **WARNINGS)**
- Nephrotic Syndrome (see **WARNINGS**)
- Congestive Heart Failure (see **WARNINGS**)

The most common severe (NCI-CTC Grade 3–4) adverse events among 1032 patients receiving AVASTIN in Genentech-sponsored studies were asthenia, pain, hypertension, diarrhea, and leukopenia.

The most common adverse events of any severity among the 742 patients receiving AVASTIN in Genentech-sponsored studies were asthenia, pain, abdominal pain, headache, hypertension, diarrhea, nausea, vomiting, anorexia, stomatitis, constipation, upper respiratory infection, epistaxis, dyspnea, exfoliative dermatitis, and proteinuria.

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The adverse reaction information from clinical trials does, however, provide a basis for identifying the adverse events that appear to be related to drug use and for approximating rates.

A total of 1032 patients with metastatic colorectal cancer (n=568) and with other cancers (n=464) received AVASTIN either as a single agent (n=157) or in combination with chemotherapy (n=875) in Genentech-sponsored clinical trials. All adverse events were collected in 742 of the 1032 patients; for the remaining 290, all NCI-CTC Grade 3 and 4 adverse events and only selected Grade 1 and 2 adverse events (hypertension, proteinuria, thromboembolic events) were collected. Adverse events across all Genentech-sponsored studies were used to further characterize specific adverse events. (See **WARNINGS: Hemorrhage, Hypertension, Proteinuria, Congestive Heart Failure** and **PRECAUTIONS: Geriatric Use**.)

Comparative data on adverse experiences, except where indicated, are limited to Study 1, a randomized, active-controlled study in 897 patients receiving initial treatment for metastatic colorectal cancer. All NCI-CTC Grade 3 and 4 adverse events and selected Grade 1 and 2 adverse events (hypertension, proteinuria, thromboembolic events) were reported for the overall study population. In Study 1, the median age was 60, 60% were male, 78% had colon primary lesion, and 29% had prior adjuvant or neoadjuvant chemotherapy. The median duration of exposure to

AVASTIN in Study 1 was 8 months in Arm 2 and 7 months in Arm 3. All adverse events, including all NCI-CTC Grade 1 and 2 events, were reported in a subset of 309 patients. The baseline entry characteristics in the 309 patient safety subset were similar to the overall study population and well-balanced across the three study arms.

Severe and life-threatening (NCI-CTC Grade 3 and 4) adverse events, which occurred at a higher incidence (≥2%) in patients receiving bolus-IFL plus AVASTIN as compared to bolus-IFL plus placebo, are presented in Table 4.

**Table 4**
NCI-CTC Grade 3 and 4 Adverse Events in Study 1
(Occurring at Higher Incidence (≥2%) in AVASTIN vs. Control)

| | Arm 1 IFL+Placebo (n=396) | | Arm 2 IFL+AVASTIN (n=392) | |
|---|---|---|---|---|
| Grade 3–4 Events | 295 | (74%) | 340 | (87%) |
| Body as a Whole | | | | |
| Asthenia | 28 | (7%) | 38 | (10%) |
| Abdominal Pain | 20 | (5%) | 32 | (8%) |
| Pain | 21 | (5%) | 30 | (8%) |
| Cardiovascular | | | | |
| Deep Vein Thrombosis | 19 | (5%) | 34 | (9%) |
| Hypertension | 10 | (2%) | 46 | (12%) |
| Intra-Abdominal Thrombosis | 5 | (1%) | 13 | (3%) |
| Syncope | 4 | (1%) | 11 | (3%) |
| Digestive | | | | |
| Diarrhea | 99 | (25%) | 133 | (34%) |
| Constipation | 9 | (2%) | 14 | (4%) |
| Hemic/Lymphatic | | | | |
| Leukopenia | 122 | (31%) | 145 | (37%) |
| Neutropenia[a] | 41 | (14%) | 58 | (21%) |

[a] Central laboratories were collected on Days 1 and 21 of each cycle. Neutrophil counts are available in 303 patients in Arm 1 and 276 in Arm 2.

Adverse events of any severity, which occurred at a higher incidence (≥5%) in the initial phase of the study in patients receiving AVASTIN (bolus-IFL plus AVASTIN or 5-FU/LV plus AVASTIN) as compared to the bolus-IFL plus placebo arm, are presented in Table 5.

**Table 5**

NCI-CTC Grade 1–4 Adverse Events in Study 1 Subset
(Occurring at Higher Incidence (≥5%) in AVASTIN vs. Control)

| | Arm 1 IFL+Placebo (n=98) | Arm 2 IFL+AVASTIN (n=102) | Arm 3 5-FU/LV+AVASTIN (n=109) |
|---|---|---|---|
| Body as a Whole | | | |
| Asthenia | 68 (70%) | 75 (74%) | 80 (73%) |
| Pain | 54 (55%) | 62 (61%) | 67 (62%) |
| Abdominal Pain | 54 (55%) | 62 (61%) | 55 (50%) |
| Headache | 19 (19%) | 27 (26%) | 30 (26%) |
| Cardiovascular | | | |
| Hypertension | 14 (14%) | 23 (23%) | 37 (34%) |
| Hypotension | 7 (7%) | 15 (15%) | 8 (7%) |
| Deep Vein Thrombosis | 3 (3%) | 9 (9%) | 6 (6%) |
| Digestive | | | |
| Vomiting | 46 (47%) | 53 (52%) | 51 (47%) |
| Anorexia | 29 (30%) | 44 (43%) | 38 (35%) |
| Constipation | 28 (29%) | 41 (40%) | 32 (29%) |
| Stomatitis | 18 (18%) | 33 (32%) | 33 (30%) |
| Dyspepsia | 15 (15%) | 25 (24%) | 19 (17%) |
| Weight Loss | 10 (10%) | 15 (15%) | 18 (16%) |
| Flatulence | 10 (10%) | 11 (11%) | 21 (19%) |
| GI Hemorrhage | 6 (6%) | 25 (24%) | 21 (19%) |
| Dry Mouth | 2 (2%) | 7 (7%) | 4 (4%) |
| Colitis | 1 (1%) | 6 (6%) | 1 (1%) |
| Hemic/Lymphatic | | | |
| Thrombocytopenia | 0 | 5 (5%) | 5 (5%) |
| Metabolic/Nutrition | | | |
| Hypokalemia | 11 (11%) | 12 (12%) | 18 (16%) |
| Bilirubinemia | 0 | 1 (1%) | 7 (6%) |
| Musculoskeletal | | | |
| Myalgia | 7 (7%) | 8 (8%) | 16 (15%) |
| Nervous | | | |
| Dizziness | 20 (20%) | 27 (26%) | 21 (19%) |
| Confusion | 1 (1%) | 1 (1%) | 6 (6%) |
| Abnormal Gait | 0 | 1 (1%) | 5 (5%) |

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**Table 5 (cont'd)**
NCI-CTC Grade 1–4 Adverse Events in Study 1 Subset

| | Arm 1 IFL+Placebo (n=98) | Arm 2 IFL+AVASTIN (n=102) | Arm 3 5-FU/LV+AVASTIN (n=109) |
|---|---|---|---|
| Respiratory | | | |
| Upper Respiratory Infection | 38 (39%) | 48 (47%) | 44 (40%) |
| Dyspnea | 15 (15%) | 26 (26%) | 27 (25%) |
| Epistaxis | 10 (10%) | 36 (35%) | 35 (32%) |
| Voice Alteration | 2 (2%) | 9 (9%) | 6 (6%) |
| Skin/Appendages | | | |
| Alopecia | 25 (26%) | 33 (32%) | 6 (6%) |
| Dry Skin | 7 (7%) | 7 (7%) | 22 (20%) |
| Exfoliative Dermatitis | 3 (3%) | 3 (3%) | 21 (19%) |
| Nail Disorder | 3 (3%) | 2 (2%) | 9 (8%) |
| Skin Discoloration | 3 (3%) | 2 (2%) | 17 (16%) |
| Skin Ulcer | 1 (1%) | 6 (6%) | 7 (6%) |
| Special Senses | | | |
| Taste Disorder | 9 (9%) | 14 (14%) | 23 (21%) |
| Excess Lacrimation | 2 (2%) | 6 (6%) | 20 (18%) |
| Urogenital | | | |
| Proteinuria | 24 (24%) | 37 (36%) | 39 (36%) |
| Urinary Frequency/Urgency | 1 (1%) | 3 (3%) | 6 (6%) |

## Mucocutaneous Hemorrhage

In Study 1, both serious and non-serious hemorrhagic events occurred at a higher incidence in patients receiving AVASTIN. (See **WARNINGS: Hemorrhage**.) In the 309 patients in which Grade 1–4 events were collected, epistaxis was common and reported in 35% of patients receiving bolus-IFL plus AVASTIN compared with 10% of patients receiving bolus-IFL plus placebo. These events were generally mild in severity (NCI–CTC Grade 1) and resolved without medical intervention. Other mild to moderate hemorrhagic events reported more frequently in patients receiving bolus-IFL plus AVASTIN when compared to those receiving bolus-IFL plus placebo included gastrointestinal hemorrhage (24% vs.

6%), minor gum bleeding (2% vs. 0), and vaginal hemorrhage (4% vs. 2%).

### Thromboembolism

In Study 1, 18% of patients receiving bolus-IFL plus AVASTIN and 15% of patients receiving bolus-IFL plus placebo experienced a Grade 3–4 thromboembolic event. The incidence of the following Grade 3 and 4 thromboembolic events were higher in patients receiving bolus-IFL plus AVASTIN as compared to patients receiving bolus-IFL plus placebo: cerebrovascular events (4 vs. 0 patients), myocardial infarction (6 vs. 3), deep venous thrombosis (34 vs. 19), and intra-abdominal thrombosis (13 vs. 5). In contrast, the incidence of pulmonary embolism was higher in patients receiving bolus-IFL plus placebo (16 vs. 20).

In Study 1, 53 of 392 (14%) patients who received bolus-IFL plus AVASTIN and 30 of 396 (8%) patients who received bolus-IFL plus placebo had a thromboembolic event and received full-dose warfarin. Two patients in each treatment arm (four total) developed bleeding complications. In the two patients treated with full-dose warfarin and AVASTIN, these events were associated with marked elevations in their INR. Eleven of 53 (21%) patients receiving bolus-IFL plus AVASTIN and one of 30 (3%) patients receiving bolus-IFL developed an additional thromboembolic event.

### Other Serious Adverse Events

The following other serious adverse events are considered unusual in cancer patients receiving cytotoxic chemotherapy and occurred in at least one subject treated with AVASTIN in clinical studies.

*Body as a Whole: polyserositis*

*Digestive: intestinal obstruction, intestinal necrosis, mesenteric venous occlusion, anastomotic ulceration*

*Hemic and lymphatic: pancytopenia*

*Metabolic and nutritional disorders: hyponatremia.*

*Urogenital: ureteral stricture*

## OVERDOSAGE

The maximum tolerated dose of AVASTIN has not been determined. The highest dose tested in humans (20 mg/kg IV) was associated with headache in nine of 16 patients and with severe headache in three of 16 patients.

## DOSAGE AND ADMINISTRATION

The recommended dose of AVASTIN is 5 mg/kg given once every 14 days as an IV infusion until disease progression is detected.

AVASTIN therapy should not be initiated for at least 28 days following major surgery. The surgical incision should be fully healed prior to initiation of AVASTIN.

### Dose Modifications

There are no recommended dose reductions for the use of AVASTIN. If needed, AVASTIN should be either discontinued or temporarily suspended as described below.

AVASTIN should be permanently discontinued in patients who develop gastrointestinal perforation, wound dehiscence requiring medical intervention, serious bleeding, nephrotic syndrome, or hypertensive crisis.

Temporary suspension of AVASTIN is recommended in patients with evidence of moderate to severe proteinuria pending further evaluation and in patients with severe hypertension that is not controlled with medical management. The risk of continuation or temporary suspension of AVASTIN in patients with moderate to severe proteinuria is unknown.

AVASTIN should be suspended at least several weeks prior to elective surgery. (See **WARNINGS: Gastrointestinal Perforation/Wound Healing Complications** and **PRECAUTIONS: Surgery**.) AVASTIN should not be resumed until the surgical incision is fully healed.

## Preparation for Administration

AVASTIN should be diluted for infusion by a healthcare professional using aseptic technique. Withdraw the necessary amount of AVASTIN for a dose of 5 mg/kg and dilute in a total volume of 100 mL of 0.9% Sodium Chloride Injection, USP. Discard any unused portion left in a vial, as the product contains no preservatives. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration.

Diluted AVASTIN solutions for infusion may be stored at 2–8°C (36–46°F) for up to 8 hours. No incompatibilities between AVASTIN and polyvinylchloride or polyolefin bags have been observed.

**AVASTIN infusions should not be administered or mixed with dextrose solutions.**

## Administration

**DO NOT ADMINISTER AS AN IV PUSH OR BOLUS**. The initial AVASTIN dose should be delivered over 90 minutes as an IV infusion following chemotherapy. If the first infusion is well tolerated, the second infusion may be administered over 60 minutes. If the 60-minute infusion is well tolerated, all subsequent infusions may be administered over 30 minutes.

## Stability and Storage

AVASTIN vials must be refrigerated at 2–8°C (36–46°F). AVASTIN vials should be protected from light. Store in the original carton until time of use. **DO NOT FREEZE. DO NOT SHAKE.**

## HOW SUPPLIED

AVASTIN is supplied as 4 mL and 16 mL of a sterile solution in single□ use glass vials to deliver 100 and 400 mg of Bevacizumab per vial, respectively.

Single unit 100 mg carton: Contains one 4 mL vial of AVASTIN (25 mg/mL). NDC 50242-060-01

Single unit 400 mg carton: Contains one 16 mL vial of AVASTIN (25 mg/mL). NDC 50242-060-02

## REFERENCES

1. Presta LG, Chen H, O'Connor SJ, Chisholm V, Meng YG, Krummen L, et al. Humanization of an anti-vascular endothelial growth factor monoclonal antibody for the therapy of solid tumors and other disorders. Cancer Res 1997;57:4593–9.

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**AVASTIN®**
**(Bevacizumab)**

**For Intravenous Use**

Manufactured by:

**Genentech, Inc.** G#####-R0
1 DNA Way February 2004
South San Francisco, CA 94080-4990 ©2004 Genentech, Inc.

**HIGHLIGHTS OF PRESCRIBING INFORMATION**
**These highlights do not include all the information needed to use LUCENTIS safely and effectively. See full prescribing information for LUCENTIS.**

**LUCENTIS® (ranibizumab injection)**

**Initial U.S. Approval: 2006**

**----------INDICATIONS AND USAGE----------**

LUCENTIS is indicated for the treatment of patients with neovascular (wet) age-related macular degeneration (1).

**----------DOSAGE AND ADMINISTRATION----------**

- FOR OPHTHALMIC INTRAVITREAL INJECTION ONLY (2.1)
- LUCENTIS 0.5 mg (0.05 mL) is recommended to be administered by intravitreal injection once a month (2.2).
- Although less effective, treatment may be reduced to one injection every three months after the first four injections if monthly injections are not feasible. Compared to continued monthly dosing, dosing every 3 months will lead to an approximate 5-letter (1-line) loss of visual acuity benefit, on average, over the following 9 months. Patients should be evaluated regularly (2.2).

**----------DOSAGE FORMS AND STRENGTHS----------**

- 10 mg/mL single-use vial (3)

**----------CONTRAINDICATIONS----------**

- Ocular or periocular infections (4.1)
- Hypersensitivity (4.2)

**----------WARNINGS AND PRECAUTIONS----------**

- Endophthalmitis and retinal detachments may occur following intravitreal injections. Patients should be monitored during the week following the injection (5.1).
- Increases in intraocular pressure have been noted within 60 minutes of intravitreal injection (5.2).

**----------ADVERSE REACTIONS----------**

The most common adverse reactions (reported ≥ 6% higher in LUCENTIS-treated subjects than control subjects) are conjunctival hemorrhage, eye pain, vitreous floaters, increased intraocular pressure, and intraocular inflammation (6.2).

**To report SUSPECTED ADVERSE REACTIONS, contact Genentech at 1-888-835-2555 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.**

See Section 17 for PATIENT COUNSELING INFORMATION.

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**FULL PRESCRIBING INFORMATION**

## 1 INDICATIONS AND USAGE

LUCENTIS is indicated for the treatment of patients with neovascular (wet) age-related macular degeneration.

## 2 DOSAGE AND ADMINISTRATION

### 2.1 General Dosing Information

FOR OPHTHALMIC INTRAVITREAL INJECTION ONLY.

### 2.2 Dosing

LUCENTIS 0.5 mg (0.05 mL) is recommended to be administered by intravitreal injection once a month.

Although less effective, treatment may be reduced to one injection every three months after the first four injections if monthly injections are not feasible. Compared to continued monthly dosing, dosing every 3 months will lead to an approximate 5-letter (1-line) loss of visual acuity benefit, on average, over the following 9 months. Patients should be evaluated regularly [*see Clinical Studies (14.2)*].

### 2.3 Preparation for Administration

Using aseptic technique, all (0.2 mL) of the LUCENTIS vial contents are withdrawn through a 5-micron 19-gauge filter needle attached to a 1-cc tuberculin syringe. The filter needle should be discarded after withdrawal of the vial contents and should not be used for intravitreal injection. The filter needle should be replaced with a sterile 30-gauge × 1/2-inch needle for the intravitreal injection. The contents should be expelled until the plunger tip is aligned with the line that marks 0.05 mL on the syringe.

### 2.4 Administration

The intravitreal injection procedure should be carried out under controlled aseptic conditions, which include the use of sterile gloves, a sterile drape, and a sterile eyelid speculum (or equivalent). Adequate anesthesia and a broad-spectrum microbicide should be given prior to the injection.

Following the intravitreal injection, patients should be monitored for elevation in intraocular pressure and for endophthalmitis. Monitoring may consist of a check for perfusion of the optic nerve head immediately after the injection, tonometry within 30 minutes following the injection, and biomicroscopy between two and seven days following the injection. Patients should be instructed to report any symptoms suggestive of endophthalmitis without delay.

Each vial should only be used for the treatment of a single eye. If the contralateral eye requires treatment, a new vial should be used and the sterile field, syringe, gloves, drapes, eyelid speculum, filter, and injection needles should be changed before LUCENTIS is administered to the other eye.

No special dosage modification is required for any of the populations that have been studied (e.g., gender, elderly).

### 2.5 Stability and Storage

LUCENTIS should be refrigerated at 2°-8°C (36°-46°F). DO NOT FREEZE. Do not use beyond the date stamped on the label. LUCENTIS vials should be protected from light. Store in the original carton until time of use.

## 3 DOSAGE FORMS AND STRENGTHS

Single-use glass vial designed to deliver 0.05 mL of 10 mg/mL.

## 4 CONTRAINDICATIONS

### 4.1 Ocular or Periocular Infections

LUCENTIS is contraindicated in patients with ocular or periocular infections.

### 4.2 Hypersensitivity

LUCENTIS is contraindicated in patients with known hypersensitivity to ranibizumab or any of the excipients in LUCENTIS.

## 5 WARNINGS AND PRECAUTIONS

### 5.1 Endophthalmitis and Retinal Detachments

Intravitreal injections, including those with LUCENTIS, have been associated with endophthalmitis and retinal detachments. Proper aseptic injection technique should always be used when administering LUCENTIS. In addition, patients should be monitored during the week following the injection to permit early treatment should an infection occur [*see Dosage and Administration (2.3, 2.4) and Patient Counseling Information (17)*].

### 5.2 Increases in Intraocular Pressure

Increases in intraocular pressure have been noted within 60 minutes of intravitreal injection with LUCENTIS. Therefore, intraocular pressure as well as the perfusion of the optic nerve head should be monitored and managed appropriately [*see Dosage and Administration (2.4)*].

### 5.3 Thromboembolic Events

Although there was a low rate (<4%) of arterial thromboembolic events observed in the LUCENTIS clinical trials, there is a theoretical risk of arterial thromboembolic events following intravitreal use of inhibitors of VEGF [*see Adverse Reactions (6.3)*].

## 6 ADVERSE REACTIONS

### 6.1 Injection Procedure

Serious adverse events related to the injection procedure have occurred in <0.1% of intravitreal injections, including endophthalmitis [*see Warnings and Precautions (5.1)*], rhegmatogenous retinal detachments, and iatrogenic traumatic cataracts.

### 6.2 Clinical Trials Experience □Ocular Events

Other serious ocular adverse events observed among LUCENTIS-treated patients occurring in <2% of patients

included intraocular inflammation and increased intraocular pressure [*see Warnings and Precautions (5.1, 5.2)*].

The available safety data include exposure to LUCENTIS in 874 patients with neovascular age-related macular degeneration in three double-masked, controlled studies with dosage regimens of 0.3 mg (375 patients) or 0.5 mg (379 patients) administered monthly by intravitreal injection (Studies 1 and 2) [*see Clinical Studies (14.1)*] and dosage regimens of 0.3 mg (59 patients) or 0.5 mg (61 patients) administered once a month for 3 consecutive doses followed by a dose administered once every 3 months (Study 3) [*see Clinical Studies (14.2)*].

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in one clinical trial of a drug cannot be directly compared with rates in the clinical trials of the same or another drug and may not reflect the rates observed in practice.

Table 1 shows the most frequently reported ocular adverse events that were reported with LUCENTIS treatment. The ranges represent the maximum and minimum rates across all three studies for control, and across all three studies and both dose groups for LUCENTIS.

**Table 1**

| Adverse Event | LUCENTIS | Control |
|---|---|---|
| Conjunctival hemorrhage | 77%-43% | 66%-29% |
| Eye pain | 37%-17% | 33%-11% |
| Vitreous floaters | 32%-3% | 10%-3% |
| Retinal hemorrhage | 26%-15% | 56%-37% |
| Intraocular pressure increased | 24%-8% | 7%-3% |
| Vitreous detachment | 22%-7% | 18%-13% |
| Intraocular inflammation | 18%-5% | 11%-3% |
| Eye irritation | 19%-4% | 20%-6% |
| Cataract | 16%-5% | 16%-6% |
| Foreign body sensation in eyes | 19%-6% | 14%-6% |
| Lacrimation increased | 17%-3% | 16%-0% |
| Eye pruritis | 13%-0% | 12%-3% |
| Visual disturbance | 14%-0% | 9%-2% |
| Blepharitis | 13%-3% | 9%-4% |
| Subretinal fibrosis | 13%-0% | 19%-10% |
| Ocular hyperemia | 10%-5% | 10%-1% |
| Maculopathy | 10%-3% | 11%-3% |
| Visual acuity blurred/decreased | 17%-4% | 24%-10% |
| Detachment of the retinal pigment epithelium | 11%-1% | 15%-3% |
| Dry eye | 10%-3% | 8%-5% |
| Ocular discomfort | 8%-0% | 5%-0% |
| Conjunctival hyperemia | 9%-0% | 7%-0% |
| Posterior capsule opacification | 8%-0% | 5%-0% |
| Retinal exudates | 9%-1% | 11%-3% |

### 6.3 Clinical Trials Experience Non-Ocular Events

Table 2 shows the most frequently reported non-ocular adverse events with LUCENTIS treatment. The ranges represent the maximum and minimum rates across all three studies for control, and across all three studies and both dose groups for LUCENTIS.

**Table 2**

| Adverse Event | LUCENTIS | Control |
|---|---|---|
| Hypertension/elevated blood pressure | 23%-5% | 23%-8% |
| Nasopharyngitis | 16%-5% | 13%-5% |
| Arthralgia | 11%-3% | 9%-0% |
| Headache | 15%-2% | 10%-3% |
| Bronchitis | 10%-3% | 8%-2% |
| Cough | 10%-3% | 7%-2% |
| Anemia | 8%-3% | 8%-0% |
| Nausea | 9%-2% | 6%-4% |
| Sinusitis | 8%-2% | 6%-4% |
| Upper respiratory tract infection | 15%-2% | 10%-4% |
| Back pain | 10%-1% | 9%-0% |
| Urinary tract infection | 9%-4% | 8%-5% |
| Influenza | 10%-2% | 5%-1% |
| Arthritis | 8%-0% | 8%-2% |
| Dizziness | 8%-2% | 10%-2% |
| Constipation | 7%-3% | 8%-2% |

The rate of arterial thromboembolic events in the three studies in the first year was 2.1% of patients (18 out of 874) in the combined group of patients treated with 0.3 mg or 0.5 mg LUCENTIS compared with 1.1% of patients (5 out of 441) in the control arms of the studies. In the second year of Study 1, the rate of arterial thromboembolic events was 3.0% of patients (14 out of 466) in the combined group of patients treated with 0.3 mg or 0.5 mg LUCENTIS compared with 3.2% of patients (7 out of 216) in the control arm [*see Warnings and Precautions (5.3)*].

### 6.4 Immunogenicity

The pre-treatment incidence of immunoreactivity to LUCENTIS was 0%-3% across treatment groups. After monthly dosing with LUCENTIS for 12 to 24 months, low titers of antibodies to LUCENTIS were detected in approximately 1%-6% of patients. The immunogenicity data reflect the percentage of patients whose test results were considered positive for antibodies to LUCENTIS in an electrochemiluminescence assay and are highly dependent on the sensitivity and specificity of the assay. The clinical significance of immunoreactivity to LUCENTIS is unclear at this time, although some patients with the highest levels of immunoreactivity were noted to have iritis or vitritis.

## 7 DRUG INTERACTIONS

Drug interaction studies have not been conducted with LUCENTIS.

LUCENTIS intravitreal injection has been used adjunctively with verteporfin photodynamic therapy (PDT). Twelve of 105 (11%) patients developed serious intraocular inflammation; in 10 of the 12 patients, this occurred when LUCENTIS was administered 7 days (± 2 days) after verteporfin PDT.

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy
Pregnancy Category C. Animal reproduction studies have not been conducted with ranibizumab. It is also not known whether ranibizumab can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. LUCENTIS should be given to a pregnant woman only if clearly needed.

### 8.3 Nursing Mothers
It is not known whether ranibizumab is excreted in human milk. Because many drugs are excreted in human milk, and because the potential for absorption and harm to infant growth and development exists, caution should be exercised when LUCENTIS is administered to a nursing woman.

### 8.4 Pediatric Use
The safety and effectiveness of LUCENTIS in pediatric patients has not been established.

### 8.5 Geriatric Use
In the controlled clinical studies, approximately 94% (822/879) of the patients randomized to treatment with LUCENTIS were ≥ 65 years of age and approximately 68% (601/879) were ≥ 75 years of age. No notable difference in treatment effect was seen with increasing age in any of the studies. Age did not have a significant effect on systemic exposure in a population pharmacokinetic analysis after correcting for creatinine clearance.

### 8.6 Patients with Renal Impairment
No formal studies have been conducted to examine the pharmacokinetics of ranibizumab in patients with renal impairment. Sixty-eight percent of patients (136 of 200) in the population pharmacokinetic analysis had renal impairment (46.5% mild, 20% moderate, and 1.5% severe). Reduction in ranibizumab clearance is minimal in patients with renal impairment and is considered clinically insignificant. Dose adjustment is not expected to be needed for patients with renal impairment.

### 8.7 Patients with Hepatic Dysfunction
No formal studies have been conducted to examine the pharmacokinetics of ranibizumab in patients with hepatic impairment. Dose adjustment is not expected to be needed for patients with hepatic dysfunction.

## 10 OVERDOSAGE
Planned initial single doses of ranibizumab injection 1.0 mg were associated with clinically significant intraocular inflammation in 2 of 2 patients injected. With an escalating regimen of doses beginning with initial doses of ranibizumab injection 0.3 mg, doses as high as 2.0 mg were tolerated in 15 of 20 patients.

## 11 DESCRIPTION
LUCENTIS™ (ranibizumab injection) is a recombinant humanized IgG1 kappa isotype monoclonal antibody fragment designed for intraocular use. Ranibizumab binds to and inhibits the biologic activity of human vascular endothelial growth factor A (VEGF-A). Ranibizumab has a molecular weight of approximately 48 kilodaltons and is produced by an *E. coli* expression system in a nutrient medium containing the antibiotic tetracycline. Tetracycline is not detectable in the final product.

LUCENTIS is a sterile, colorless to pale yellow solution in a single-use glass vial. LUCENTIS is supplied as a preservative-free, sterile solution in a single-use glass vial designed to deliver 0.05 mL of 10 mg/mL LUCENTIS aqueous solution with 10 mM histidine HCl, 10% α, α-trehalose dihydrate, 0.01% polysorbate 20, pH 5.5.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action
Ranibizumab binds to the receptor binding site of active forms of VEGF-A, including the biologically active, cleaved form of this molecule, $VEGF_{110}$. VEGF-A has been shown to cause neovascularization and leakage in models of ocular angiogenesis and is thought to contribute to the progression of the neovascular form of age-related macular degeneration (AMD). The binding of ranibizumab to VEGF-A prevents the interaction of VEGF-A with its receptors (VEGFR1 and VEGFR2) on the surface of endothelial cells, reducing endothelial cell proliferation, vascular leakage, and new blood vessel formation.

### 12.2 Pharmacodynamics
Neovascular AMD is associated with foveal retinal thickening as assessed by optical coherence tomography (OCT) and leakage from CNV as assessed by fluorescein angiography.

In Study 3, foveal retinal thickness was assessed by OCT in 118/184 patients. OCT measurements were collected at baseline, Months 1, 2, 3, 5, 8, and 12. In patients treated with LUCENTIS, foveal retinal thickness decreased, on average, more than the sham group from baseline through Month 12. Retinal thickness decreased by Month 1 and decreased further at Month 3, on average. Foveal retinal thickness data did not provide information useful in influencing treatment decisions [*see Clinical Studies (14.2)*].

In patients treated with LUCENTIS, the area of vascular leakage, on average, decreased by Month 3 as assessed by fluorescein angiography. The area of vascular leakage for an individual patient was not correlated with visual acuity.

### 12.3 Pharmacokinetics
In animal studies, following intravitreal injection, ranibizumab was cleared from the vitreous with a half-life of approximately 3 days. After reaching a maximum at approximately 1 day,

the serum concentration of ranibizumab declined in parallel with the vitreous concentration. In these animal studies, systemic exposure of ranibizumab is more than 2000-fold lower than in the vitreous.

In patients with neovascular AMD, following monthly intravitreal administration, maximum ranibizumab serum concentrations were low (0.3 ng/mL to 2.36 ng/mL). These levels were below the concentration of ranibizumab (11 ng/mL to 27 ng/mL) thought to be necessary to inhibit the biological activity of VEGF-A by 50%, as measured in an in vitro cellular proliferation assay. The maximum observed serum concentration was dose proportional over the dose range of 0.05 to 1.0 mg/eye. Based on a population pharmacokinetic analysis, maximum serum concentrations of 1.5 ng/mL are predicted to be reached at approximately 1 day after monthly intravitreal administration of LUCENTIS 0.5 mg/eye. Based on the disappearance of ranibizumab from serum, the estimated average vitreous elimination half-life was approximately 9 days. Steady-state minimum concentration is predicted to be 0.22 ng/mL with a monthly dosing regimen. In humans, serum ranibizumab concentrations are predicted to be approximately 90,000-fold lower than vitreal concentrations.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

No carcinogenicity or mutagenicity data are available for ranibizumab injection in animals or humans.

No studies on the effects of ranibizumab on fertility have been conducted.

## 14 CLINICAL STUDIES

The safety and efficacy of LUCENTIS were assessed in three randomized, double-masked, sham- or active-controlled studies in patients with neovascular AMD. A total of 1323 patients (LUCENTIS 879, Control 444) were enrolled in the three studies.

### 14.1 Study 1 and Study 2

In Study 1, patients with minimally classic or occult (without classic) CNV lesions received monthly LUCENTIS 0.3 mg or 0.5 mg intravitreal injections or monthly sham injections. Data are available through Month 24. Patients treated with LUCENTIS in Study 1 received a mean of 22 total treatments out of a possible 24 from Day 0 to Month 24.

In Study 2, patients with predominantly classic CNV lesions received one of the following: 1) monthly LUCENTIS 0.3 mg intravitreal injections and sham PDT; 2) monthly LUCENTIS 0.5 mg intravitreal injections and sham PDT; or 3) sham intravitreal injections and active verteporfin PDT. Sham PDT (or active verteporfin PDT) was given with the initial LUCENTIS (or sham) intravitreal injection and every 3 months thereafter if fluorescein angiography showed persistence or recurrence of leakage. Data are available through Month 12. Patients treated with LUCENTIS in Study 2 received a mean of 12 total treatments out of a possible 13 from Day 0 through Month 12.

In both studies, the primary efficacy endpoint was the proportion of patients who maintained vision, defined as losing fewer than 15 letters of visual acuity at 12 months compared with baseline. Almost all LUCENTIS-treated patients (approximately 95%) maintained their visual acuity. 34%-40% of LUCENTIS-treated patients experienced a clinically significant improvement in vision, defined as gaining 15 or more letters at 12 months. The size of the lesion did not significantly affect the results. Detailed results are shown in the tables below.

**Table 3**
Outcomes at Month 12 and Month 24 in Study 1

| Outcome Measure | Month | Sham n = 238 | LUCENTIS 0.5 mg n = 240 | Estimated Difference (95% CI)[a] |
|---|---|---|---|---|
| Loss of < 15 letters in visual acuity (%)[b] | Month 12 | 62% | 95% | 32% (26%, 39%) |
| | Month 24 | 53% | 90% | 37% (29%, 44%) |
| Gain of ≥ 15 letters in visual acuity (%)[b] | Month 12 | 5% | 34% | 29% (22%, 35%) |
| | Month 24 | 4% | 33% | 29% (23%, 35%) |
| Mean change in visual acuity (letters) (SD)[b] | Month 12 | -10.5 (16.6) | +7.2 (14.4) | 17.5 (14.8, 20.2) |
| | Month 24 | -14.9 (18.7) | +6.6 (16.5) | 21.1 (18.1, 24.2) |

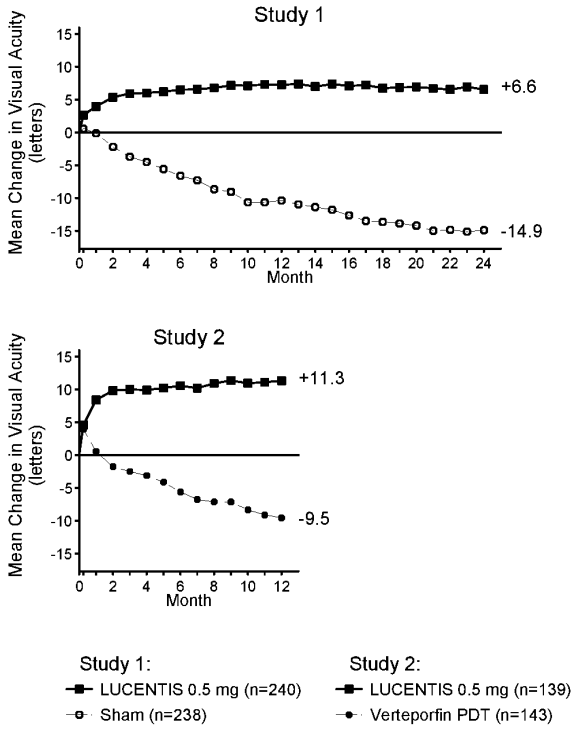
[a] Adjusted estimate based on the stratified model.
[b] $p < 0.01$.

**Table 4**
Outcomes at Month 12 in Study 2

| Outcome Measure | Verteporfin PDT n = 143 | LUCENTIS 0.5 mg n = 140 | Estimated Difference (95% CI)[a] |
|---|---|---|---|
| Loss of < 15 letters in visual acuity (%)[b] | 64% | 96% | 33% (25%, 41%) |
| Gain of ≥ 15 letters in visual acuity (%)[b] | 6% | 40% | 35% (26%, 44%) |
| Mean change in visual acuity (letters) (SD)[b] | -9.5 (16.4) | +11.3 (14.6) | 21.1 (17.5, 24.6) |

[a] Adjusted estimate based on the stratified model.
[b] $p<0.01$.

**Figure 1**
Mean Change in Visual Acuity from Baseline to Month 24 in Study 1 and to Month 12 in Study 2




Patients in the group treated with LUCENTIS had minimal observable CNV lesion growth, on average. At Month 12, the mean change in the total area of the CNV lesion was 0.1-0.3 DA for LUCENTIS versus 2.3-2.6 DA for the control arms.

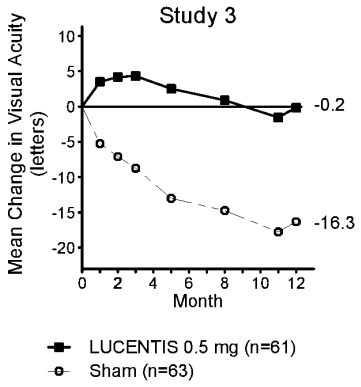
The use of LUCENTIS beyond 24 months has not been studied.

### 14.2 Study 3

Study 3 was a randomized, double-masked, sham-controlled, two-year study designed to assess the safety and efficacy of LUCENTIS in patients with neovascular AMD (with or without a classic CNV component). Data are available through Month 12. Patients received LUCENTIS 0.3 mg or 0.5 mg intravitreal injections or sham injections once a month for 3 consecutive doses, followed by a dose administered once every 3 months. A total of 184 patients were enrolled in this study (LUCENTIS 0.3 mg, 60; LUCENTIS 0.5 mg, 61; sham, 63); 171 (93%) completed 12 months of this study. Patients treated with LUCENTIS in Study 3 received a mean of 6 total treatments out of possible 6 from Day 0 through Month 12.

In Study 3, the primary efficacy endpoint was mean change in visual acuity at 12 months compared with baseline (see Figure 2). After an initial increase in visual acuity (following monthly dosing), on average, patients dosed once every three months with LUCENTIS lost visual acuity, returning to baseline at Month 12. In Study 3, almost all LUCENTIS-treated patients (90%) maintained their visual acuity at Month 12.

**Figure 2**
Mean Change in Visual Acuity from Baseline to Month 12 in Study 3




## 16 HOW SUPPLIED/STORAGE AND HANDLING

Each LUCENTIS carton, NDC 50242-080-01, contains one 2-cc glass vial of ranibizumab, one 5-micron, 19-gauge × 1-1/2-inch filter needle for withdrawal of the vial contents, one 30-gauge × 1/2-inch injection needle for the intravitreal injection, and one package insert [*see Dosage and*

*Administration (2.4)*]. VIALS ARE FOR SINGLE EYE USE ONLY.

**17 PATIENT COUNSELING INFORMATION**

In the days following LUCENTIS administration, patients are at risk of developing endophthalmitis. If the eye becomes red, sensitive to light, painful, or develops a change in vision, the patient should seek immediate care from an ophthalmologist [*see Warnings and Precautions (5.1)*].

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**LUCENTIS® [ranibizumab injection]**

Manufactured by:

**Genentech, Inc.**
1 DNA Way
South San Francisco, CA 94080-4990

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Mmmmmm YYYY
©YYYY Genentech, Inc.



Samsung Bioepis Exhibit No. 1002
Page 4296

**RAPTIVA®**
**[efalizumab]**

**For injection, subcutaneous**

**WARNING:**

**RISK OF PROGRESSIVE MULTIFOCAL LEUKOENCEPHALOPATHY (PML)**

- **RAPTIVA increases the risk for PML, a rapidly progressive viral infection of the central nervous system that has no known treatment and that leads to death or severe disability. The risk of PML may markedly increase with longer duration of RAPTIVA exposure. The time dependent threshold when the risk for PML increases is unknown (see WARNINGS).**
    - **Patients on RAPTIVA should be monitored frequently to ensure they are receiving significant clinical benefit, to ensure they understand the significance of the risk of PML, and for any sign or symptom that may be suggestive of PML (see WARNINGS).**
    - **RAPTIVA dosing should be withheld immediately at the first sign or symptom suggestive of PML. For diagnosis, brain magnetic resonance imaging (MRI) and, when indicated, cerebrospinal fluid analysis for JC viral DNA are recommended (see WARNINGS).**

**RISK OF SERIOUS INFECTIONS**

- **Infections, including serious infections leading to hospitalizations or death, have been observed in patients treated with RAPTIVA (see WARNINGS and ADVERSE REACTIONS). These infections have included bacterial sepsis, viral meningitis, invasive fungal disease and other opportunistic infections. Patients should be educated about the symptoms of infection and be closely monitored for signs and symptoms of infection during and after treatment with RAPTIVA. If a patient develops a serious infection, RAPTIVA should be discontinued and appropriate therapy instituted.**

## DESCRIPTION

RAPTIVA® (efalizumab) is an immunosuppressive recombinant humanized IgG1 kappa isotype monoclonal antibody that binds to human CD11a. Efalizumab has a molecular weight of approximately 150 kilodaltons and is produced in a Chinese hamster ovary mammalian cell expression system in a nutrient medium containing the antibiotic gentamicin. Gentamicin is not detectable in the final product.

RAPTIVA is supplied as a sterile, white to off-white, lyophilized powder in single-use glass vials for subcutaneous (SC) injection. Reconstitution of the single-use vial with 1.3 mL of the supplied sterile water for injection (non-USP) yields approximately 1.5 mL of solution to deliver 125 mg per 1.25 mL (100 mg/mL) of RAPTIVA. The sterile water for injection supplied does not comply with USP requirement for pH. After

reconstitution, RAPTIVA is a clear to pale yellow solution with a pH of approximately 6.2. Each single-use vial of RAPTIVA contains 150 mg of efalizumab, 123.2 mg of sucrose, 6.8 mg of L-histidine hydrochloride monohydrate, 4.3 mg of L-histidine and 3 mg of polysorbate 20 and is designed to deliver 125 mg of efalizumab in 1.25 mL.

## CLINICAL PHARMACOLOGY

### Mechanism of Action

RAPTIVA binds to CD11a, the α subunit of leukocyte function antigen-1 (LFA-1), which is expressed on all leukocytes, and decreases cell surface expression of CD11a. RAPTIVA inhibits the binding of LFA-1 to intercellular adhesion molecule-1 (ICAM-1), thereby inhibiting the adhesion of leukocytes to other cell types. Interaction between LFA-1 and ICAM-1 contributes to the initiation and maintenance of multiple processes, including activation of T lymphocytes, adhesion of T lymphocytes to endothelial cells, and migration of T lymphocytes to sites of inflammation including psoriatic skin. Lymphocyte activation and trafficking to skin play a role in the pathophysiology of chronic plaque psoriasis. In psoriatic skin, ICAM-1 cell surface expression is upregulated on endothelium and keratinocytes. CD11a is also expressed on the surface of B lymphocytes, monocytes, neutrophils, natural killer cells, and other leukocytes. Therefore, the potential exists for RAPTIVA to affect the activation, adhesion, migration, and numbers of cells other than T lymphocytes.

### Pharmacokinetics

In patients with moderate to severe plaque psoriasis, following an initial SC RAPTIVA dose of 0.7 mg/kg followed by 11 weekly SC doses of 1 mg/kg/wk, serum concentrations reached a steady-state at 4 weeks with a mean trough concentration of approximately 9 μg/mL (n=26). After the last dose, the mean peak concentration was approximately 12 μg/mL (n=25). Mean steady-state clearance was 24 mL/kg/day (range=5–76 mL/kg/day, n=25). Mean time to eliminate RAPTIVA after the last steady-state dose was 25 days (range=13–35 days, n=17). The mean estimated RAPTIVA SC bioavailability was 50%. In a population pharmacokinetic analysis of 1088 patients, body weight was found to be the most significant covariate affecting RAPTIVA clearance. In patients receiving weekly SC doses of 1 mg/kg, RAPTIVA exposure was similar across body weight quartiles. RAPTIVA clearance was not

significantly affected by gender or race. The pharmacokinetics of RAPTIVA in pediatric patients have not been studied. The effects of renal or hepatic impairment on the pharmacokinetics of RAPTIVA have not been studied.

**Pharmacodynamics**

At a dose of 1 mg/kg/wk SC, RAPTIVA reduced expression of CD11a on circulating T lymphocytes to approximately 15–25% of pre-dose values and reduced free CD11a binding sites to a mean of ≤ 5% of pre-dose values. These pharmacodynamic effects were seen 1–2 days after the first dose, and were maintained between weekly 1 mg/kg SC doses. Following discontinuation of RAPTIVA, CD11a expression returned to a mean of 74% of baseline at 5 weeks and stayed at comparable levels at 8 and 13 weeks. Following discontinuation of RAPTIVA, free CD11a binding sites returned to a mean of 86% of baseline at 8 weeks and stayed at comparable levels at 13 weeks. No assessments of CD11a expression or free CD11a binding sites were made after 13 weeks.

In clinical trials, RAPTIVA treatment resulted in a mean increase (relative to baseline) in white blood cell (WBC) count of 34%, a doubling of mean lymphocyte counts and an increase in eosinophil counts of 29% due to decreased leukocyte adhesion to blood vessel walls and decreased trafficking from the vascular compartment to tissues. At Day 56 of 1 mg/kg/wk RAPTIVA treatment, 32% (213/676) of patients had a shift in total WBC from low or normal baseline value to above normal, 46% (324/701) had a shift to above normal absolute lymphocyte counts, and 5% (35/675) had a shift to above normal eosinophil counts. Following discontinuation of RAPTIVA treatment, the abnormal elevated lymphocyte counts took approximately 8 weeks to normalize among patients who had above normal lymphocyte counts. Plasma samples collected after first administration of 0.3 mg/kg IV RAPTIVA indicate that at 2 hours TNF-α and IL-6 plasma levels were elevated 9- and 90-fold, respectively, compared with baseline. Plasma samples collected after first administration of 0.7 mg/kg SC RAPTIVA indicate that at 2 days, IL-6 levels were elevated (10 pg/mL as compared with 5 pg/mL at baseline), whereas TNF-α was not detectable. In RAPTIVA-treated patients the mean levels of C reactive protein increased from baseline by 67% and the mean levels of fibrinogen increased by 15%.

**CLINICAL STUDIES**

RAPTIVA was evaluated in four randomized, double-blind, placebo-controlled studies in adults with chronic (>6 months), stable, plaque psoriasis, who had a minimum body surface area involvement of 10% and who were candidates for, or had previously received systemic therapy or phototherapy. In these studies 54–70% of patients had previously received systemic therapy or phototherapy (PUVA) for psoriasis. Patients with clinically significant flares and patients with guttate, erythrodermic, or pustular psoriasis as the sole form of psoriasis were excluded from the studies. Patients were randomized to receive doses of 1 mg/kg or 2 mg/kg of RAPTIVA or placebo administered once a week for 12 weeks. Patients randomized to RAPTIVA received 0.7 mg/kg as the first dose prior to receiving the full assigned dose in subsequent weeks. During the studies, patients could receive concomitant low potency topical steroids. No other concomitant psoriasis therapies were allowed during treatment or the follow-up period.

Patients were evaluated using the Psoriasis Area and Severity Index (PASI) during the study. The PASI is a composite score that takes into consideration both the fraction of body surface area affected and the nature and severity of the psoriatic changes within the affected regions (erythema, infiltration/plaque thickness, and desquamation). Both treatment groups in all four studies had baseline median PASI scores of 17. Both treatment groups across all four studies had baseline median body surface area involvement ranging between 22–28%. Compared with placebo, more patients randomized to RAPTIVA had at least a 75% reduction from baseline PASI score (PASI-75) 1 week after the 12-week treatment period (Table 1). RAPTIVA 2 mg/kg was not superior to RAPTIVA 1 mg/kg.

**Table 1**
Proportion of Patients with ≥75% Improvement
in PASI after 12 Weeks of Treatment (PASI-75)

| | Placebo | RAPTIVA 1 mg/kg/wk | Difference (95%CI) |
|---|---|---|---|
| Study 1 | 4% n=187 | 27%[a] n=369 | 22% (16%, 29%) |
| Study 2 | 2% n=170 | 39%[a] n=162 | 37% (28%, 46%) |
| Study 3 | 5% n=122 | 22%[a] n=232 | 17% (9%, 27%) |
| Study 4 | 3% n=236 | 24%[a] n=450 | 21% (15%, 27%) |

[a] $p<0.001$ for comparison of RAPTIVA group with placebo group using Fisher's exact test within each study.

All three components of the PASI (plaque induration, scaling, and erythema) contributed comparably to the improvement in PASI. Other clinical responses evaluated (Table 2) included the proportion of patients who achieved minimal or clear status by a static Physician Global Assessment (sPGA) and the proportion of patients with a reduction in PASI of at least 50% from baseline (PASI-50) 1 week following the 12-week treatment period. The sPGA is a 6 category scale ranging from "very severe" to "clear" indicating the physician's overall assessment of the psoriasis severity focusing on plaque, scaling and erythema. Treatment success of minimal or clear consisted of none or slight elevation in plaque, none or minimal white color in scaling, and up to moderate definite red coloration in erythema. Across all four studies, the percentage of patients with baseline sPGA classifications of moderate was 48–56%, severe 33–43%, and 3–6% were classified as very severe.

**Table 2**
Percentage of Patients Responding after 12 Weeks of Treatment

| Outcome Measurement | Study | Placebo | RAPTIVA 1 mg/kg/wk | Difference[a] (95% CI) |
|---|---|---|---|---|
| sPGA: Minimal or Clear | 1 | 3% | 26% | 23% (16, 30) |
| | 2 | 3% | 32% | 29% (21, 39) |
| | 3 | 3% | 19% | 16% (8, 25) |
| | 4 | 4% | 20% | 16% (11, 22) |
| >50% improvement in PASI (PASI-50) | 1 | 14% | 59% | 45% (37, 53) |
| | 2 | 15% | 61% | 46% (37, 56) |
| | 3 | 16% | 52% | 36% (26, 47) |
| | 4 | 14% | 52% | 38% (31, 45) |

The number of patients in each study and treatment group is the same as listed in Table 1.

[a] $p < 0.001$ for comparison of RAPTIVA group to placebo group using Fisher's exact test for all comparisons between groups.

In Study 1, 12% of RAPTIVA-treated patients achieved a PASI-50 at Week 4 compared with 5% for placebo. The median time to PASI-50 among PASI-75 achievers was approximately 6 weeks. Similar results were observed in Studies 2, 3, and 4.

In Study 3, sustained response to extended RAPTIVA treatment was evaluated. RAPTIVA-treated patients who achieved a PASI-75 response at Week 12 were re-randomized to receive RAPTIVA or placebo for a second contiguous 12-week treatment period. Sixty-one of 79 patients (77%) re-randomized to a second 12-week treatment period with RAPTIVA maintained PASI-75 response compared with 8 of 40 patients (20%) re-randomized to placebo. Sustained responses to RAPTIVA have also been observed in uncontrolled, open-label extension treatment trials when patients received RAPTIVA without interruption for 24 weeks.

In Study 2, response to intermittent RAPTIVA treatment was evaluated among patients who achieved PASI-75 response with 12 weeks of RAPTIVA treatment and were followed off-treatment until relapse of psoriasis (50% loss of treatment response). In patients who resumed RAPTIVA treatment upon relapse of psoriasis, 31% (17/55) re-established a PASI-75 response (compared with the initial baseline). After 12 weeks of treatment, the median duration of a PASI-75 response after RAPTIVA discontinuation was between 1 and 2 months.

The safety and efficacy of RAPTIVA therapy beyond 1 year have not been established.

**INDICATIONS AND USAGE**

RAPTIVA® (efalizumab) is indicated for the treatment of adult patients (18 years or older) with chronic moderate to severe plaque psoriasis who are candidates for systemic therapy or phototherapy.

**CONTRAINDICATIONS**

RAPTIVA should not be administered to patients with known hypersensitivity to RAPTIVA or any of its components.

RAPTIVA should not be administered to patients who have been diagnosed with PML (see **BOXED WARNING** and **WARNINGS: Progressive Multifocal Leukoencephalopathy**).

**WARNINGS**

**Progressive Multifocal Leukoencephalopathy (PML)**

PML is a rapidly progressive infection of the central nervous system caused by the JC virus that leads to death or severe disability.

RAPTIVA increases the risk for PML and this risk may markedly increase with longer duration of RAPTIVA exposure. Post-marketing cases of PML have been reported with RAPTIVA used as monotherapy. Three reports of confirmed PML were associated with exposure for greater than 3 years. At the time of these 3 reports, it is estimated that approximately 46,000 patients had been exposed to RAPTIVA worldwide; however, relatively few patients had been exposed beyond 2 years. Approximately 14,000 patients have been exposed for greater than 1 year, 5,100 patients have been exposed for greater then 2 years and 1,900 patients have been exposed for greater than 3 years. The time dependent threshold when the risk for PML increases is unknown since additional cases may have been misdiagnosed and/or not reported.

The effect of intermittent use of RAPTIVA, or the concomitant or sequential use of other immunosuppressant drugs, on the risk of PML is not known (see **BOXED WARNING, CONTRAINDICATIONS**). There are no known screening tests or medical interventions that can reliably predict, prevent, or treat PML. Typical symptoms

associated with PML are diverse, progress over days to weeks, and may include progressive weakness on one side of the body or clumsiness of limbs, disturbance of vision, and/or changes in thinking, memory, and orientation leading to confusion and personality changes.

Healthcare providers treating patients with RAPTIVA should consider PML in any patient with new-onset neurologic manifestations. Patients being treated with RAPTIVA should be instructed to immediately report to their healthcare provider any new neurological signs or symptoms that they or anyone close to them notices. RAPTIVA should be withheld immediately at the first sign or symptom suggestive of PML (see **WARNINGS: Psoriasis Worsening and Variants)**. It is not known whether early detection of PML and discontinuation of RAPTIVA will mitigate risk of irreversible neurological damage and death associated with the disease. Consultation with a neurologist, brain MRI and cerebrospinal fluid analysis for JC viral DNA should be considered. Patients should be evaluated frequently to ensure they are receiving significant clinical benefit that justifies continued treatment in light of the risks, to ensure they understand the significance of the risk of PML, and for any sign or symptom that is suggestive of PML. Patients who discontinue RAPTIVA should continue to be carefully monitored for the onset of neurologic symptoms that may represent PML and for worsening of psoriasis (see **BOXED WARNING**).

**Serious Infections**

RAPTIVA is an immunosuppressive agent and has the potential to increase the risk of infection and reactivate latent, chronic infections. RAPTIVA should not be administered to patients with compromised immune systems or clinically important infections. Caution should be exercised when considering the use of RAPTIVA in patients with a chronic infection or history of recurrent infections. If a patient develops a serious infection, RAPTIVA should be discontinued. New infections developing during RAPTIVA treatment should be monitored closely. During the first 12 weeks of controlled trials, serious infections occurred in 7 of 1620 (0.4 %) RAPTIVA-treated patients compared with 1 of 715 (0.1%) placebo-treated patients (see **ADVERSE REACTIONS: Infections**). Serious infections requiring hospitalization included cellulitis, pneumonia, abscess, sepsis, bronchitis, gastroenteritis, aseptic meningitis,

Legionnaire's disease, and vertebral osteomyelitis (note some patients had more than one infection).

In postmarketing experience, serious bacterial, viral, fungal, and opportunistic infections have occurred, including pneumonia, sepsis, meningitis, and encephalitis. Some of these infections have been fatal. Postmarketing reports include cytomegaloviral infections; blastomyces, cryptococcal and tuberculous pneumonia; serious herpes infection; severe pneumonia with neutropenia (ANC 60/$mm^3$); sepsis with seeding of distant sites; necrotizing fasciitis; and worsening of infection (e.g. cellulitis, pneumonia) despite antimicrobial treatment (see **BOXED WARNING**).

**Malignancies**

The immunosuppression caused by RAPTIVA may have the potential to increase the risk of malignancy. The role of RAPTIVA in the development of malignancies is not known. Caution should be exercised when considering the use of RAPTIVA in patients at high risk for malignancy or with a history of malignancy. If a patient develops a malignancy, RAPTIVA should be discontinued (see **ADVERSE REACTIONS: Malignancies**).

**Immunosuppression**

RAPTIVA causes immunosuppression. The safety and efficacy of RAPTIVA in combination with other immunosuppressive agents or phototherapy have not been evaluated. Patients receiving other systemic immunosuppressive agents should not receive concurrent therapy with RAPTIVA because of the possibility of increased risk of infections and malignancies. RAPTIVA should not be administered to patients with compromised immune systems, for example, due to HIV infection or AIDS, leukemia, or lymphoma.

**Immune-Mediated Thrombocytopenia**

Platelet counts at or below 52,000 cells per μL were observed in 8 (0.3%) RAPTIVA-treated patients during clinical trials compared with none among the placebo-treated patients (see **ADVERSE REACTIONS: Immune-Mediated Thrombocytopenia**). Five of the 8 patients received a course of systemic steroids for thrombocytopenia. Thrombocytopenia resolved in the 7 patients receiving adequate follow-up (1 patient was lost to follow-up). Reports of severe thrombocytopenia have

also been received postmarketing. Physicians should follow patients closely for signs and symptoms of thrombocytopenia. Assessment of platelet counts is recommended during treatment with RAPTIVA (see **PRECAUTIONS: Laboratory Tests**) and RAPTIVA should be discontinued if thrombocytopenia develops.

**Immune-Mediated Hemolytic Anemia**

Reports of hemolytic anemia, some serious, diagnosed 4-6 months after the start of RAPTIVA treatment have been received. RAPTIVA should be discontinued if hemolytic anemia occurs.

**Psoriasis Worsening and Variants**

Worsening of psoriasis can occur during or after discontinuation of RAPTIVA. During clinical studies, 19 of 2589 (0.7%) of RAPTIVA-treated patients had serious worsening of psoriasis during treatment (n=5) or worsening past baseline after discontinuation of RAPTIVA (n=14) (see **ADVERSE REACTIONS: Adverse Events of Psoriasis**). In some patients these events took the form of psoriatic erythroderma, pustular psoriasis, or development of new plaque lesions. Some patients required hospitalization and alternative antipsoriatic therapy to manage the psoriasis worsening. Patients, including those not responding to RAPTIVA treatment, should be closely observed following discontinuation of RAPTIVA, and appropriate psoriasis treatment instituted as necessary.

**Neurologic Events**

One case of transverse myelitis was observed during the clinical development program (2762 RAPTIVA-treated patients); neurologic events, including cases of Guillain-Barré Syndrome, chronic inflammatory demyelinating polyneuropathy, facial palsy, and transverse myelitis have been observed in patients receiving RAPTIVA in the postmarketing setting (see **ADVERSE REACTIONS: Postmarketing Experience**). Patients being treated with RAPTIVA should be instructed to immediately report any new neurological signs or symptoms to their physician. Prescribers should not use RAPTIVA in patients with significant existing or new onset nervous system adverse events. RAPTIVA should be discontinued in patients who develop PML

## PRECAUTIONS

### First Dose Reactions

First dose reactions including headache, fever, nausea, and vomiting are associated with RAPTIVA treatment and are dose-level related in incidence and severity (see **ADVERSE REACTIONS**). Therefore, a conditioning dose of 0.7 mg/kg is recommended to reduce the incidence and severity of reactions associated with initial dosing (see **DOSAGE AND ADMINISTRATION**). Cases of aseptic meningitis resulting in hospitalization have been observed in association with initial dosing (see **ADVERSE REACTIONS**; **Inflammatory/Immune-Mediated Reactions**).

### Arthritis Events

Infrequent new onset or recurrent severe arthritis events, including psoriatic arthritis events, have been reported in clinical trials and postmarketing. These arthritis events began while on treatment or following discontinuation of RAPTIVA and were uncommonly associated with flare of psoriasis. Patients improved after discontinuation of RAPTIVA with or without anti-arthritis therapy.

### Immunizations

Prior to initiating therapy with RAPTIVA, psoriatic patients should receive all immunizations appropriate for age as recommended by current immunization guidelines. Patients on treatment with RAPTIVA should not receive live (including live-attenuated) vaccines. Vaccinations that are not live, which are received during a course of RAPTIVA, may not elicit an immune response sufficient to prevent disease. Patients receiving RAPTIVA should be cautioned if household contacts receive live vaccines, because of the potential risk for shedding and transmission.

In a small clinical study with IV administered RAPTIVA, a single-dose of 0.3 mg/kg given before primary immunization with a neoantigen decreased the secondary immune response, and a dose of 1 mg/kg almost completely ablated it. A dose of 0.3 mg/kg IV has comparable pharmacodynamic effects to the recommended dose of 1 mg/kg SC. In chimpanzees exposed to RAPTIVA at > 10 times the clinical exposure level (based on mean peak plasma levels) antibody responses were decreased following immunization with tetanus toxoid compared with untreated control animals.

**Information for Patients**

Healthcare providers should counsel patients about the risks and benefits of RAPTIVA before an initial prescription, including the risks of PML and other serious infections. Prescribers should monitor patients frequently while on therapy to ensure significant clinical benefit that justifies continued treatment in light of the risks, to ensure they understand the significance of the risk of PML, to assess for any sign or symptom that is suggestive of PML, to assess for adverse events, and to continue patient education about the risks and benefits of RAPTIVA (see **BOXED WARNING, CONTRAINDICATIONS, WARNINGS: Progressive Multifocal Leukoencephalopathy**).

*Patients should be instructed to:*

- Read the Medication Guide before starting RAPTIVA and before each RAPTIVA injection. They should be encouraged to ask questions about what they have read.
- Have frequent follow-up with their health care provider while on therapy (see **BOXED WARNING, WARNINGS: Progressive Multifocal Leukoencephalopathy**).
- Report and seek immediate medical attention if they experience any new or worsening medical problems, such as an infection that does not go away, or if they or people close to them notice a new or sudden change in the patient's thinking; if they develop a new or sudden change in balance, strength, talking, walking, or vision; if they develop any of the signs and symptoms associated with severe thrombocytopenia (such as easy bleeding from the gums, bruising, or petechiae) or with severe hemolytic anemia (such as weakness, orthostatic light-headedness, hemoglobinuria or jaundice), or with worsening of psoriasis or arthritis (see **BOXED WARNING, CONTRAINDICATIONS, WARNINGS, PRECAUTIONS**).

Patients should also be informed that RAPTIVA is an immunosuppressant, and should not be used with other systemic immunosuppressive therapies due to the potential for an increased risk of developing an infection (including PML) or a malignancy that could lead to hospitalization, disability, or death.

Patients should be advised to inform all of their healthcare providers that they are receiving RAPTIVA and to immediately call their physician's office if they develop any signs of, or receive a diagnosis of infection, including PML, or malignancy while undergoing treatment with RAPTIVA. Patients should also be informed that their physician may monitor platelet counts during therapy.

Female patients should also be advised to notify their physicians if they become pregnant while taking RAPTIVA (or within 6 weeks of discontinuing RAPTIVA) and be advised of the existence of and encouraged to enroll in the RAPTIVA Pregnancy Registry by calling 1-877-RAPTIVA (1-877-727-8482).

If a patient or caregiver is to administer RAPTIVA, he/she should be instructed regarding injection techniques and how to measure the correct dose to ensure proper administration of RAPTIVA. Patients should be also referred to the RAPTIVA Medication Guide. In addition, patients should have available materials for and be instructed in the proper disposal of needles and syringes to comply with state and local laws. Patients should also be cautioned against reuse of syringes and needles.

**Laboratory Tests**

Assessment of platelet counts is recommended upon initiating and periodically while receiving RAPTIVA treatment. It is recommended that assessments be more frequent when initiating therapy (e.g., monthly) and may decrease in frequency with continued treatment (e.g., every 3 months). Severe thrombocytopenia has been observed (see **WARNINGS, Immune-Mediated Thrombocytopenia**).

**Drug Interactions**

No formal drug interaction studies have been performed with RAPTIVA. RAPTIVA should not be used with other immunosuppressive drugs (see **WARNINGS: Immunosuppression**).

Live (including live-attenuated) vaccines should not be administered during RAPTIVA treatment (see **PRECAUTIONS: Immunizations**).

**Drug/Laboratory Test Interactions**

Increases in lymphocyte counts related to the pharmacologic mechanism of action are frequently observed during RAPTIVA treatment (see **CLINICAL PHARMACOLOGY: Pharmacodynamics).**

**Carcinogenesis, Mutagenesis, Impairment of Fertility**

Long-term animal studies have not been conducted to evaluate the carcinogenic potential of RAPTIVA.

Subcutaneous injections of male and female mice with an anti-mouse CD11a antibody, a murine surrogate for efalizumab, at up to 30 times the equivalent of the 1 mg/kg clinical dose of RAPTIVA had no adverse effects on mating, fertility, or reproduction parameters. The clinical significance of this observation is uncertain.

Genotoxicity studies were not conducted.

**Pregnancy (Category C)**

Animal reproduction studies have not been conducted with RAPTIVA. It is also not known whether RAPTIVA can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. RAPTIVA should be given to a pregnant woman only if clearly needed.

In a developmental toxicity study conducted in mice using an anti-mouse CD11a antibody at up to 30 times the equivalent of the recommended clinical dose of RAPTIVA, no evidence of maternal toxicity, embryotoxicity, or teratogenicity was observed when administered during organogenesis. No adverse effects on behavioral, reproductive, or growth parameters were observed in offspring of female mice subcutaneously treated with an anti-mouse CD11a antibody during gestation and lactation using doses 3- to 30-times the equivalent of the recommended clinical dose of RAPTIVA. At 11 weeks of age, the offspring of these females exhibited a significant reduction in their ability to mount an antibody response, which showed evidence of partial reversibility by 25 weeks of age. Animal studies, however, are not always predictive of human response, and there are no adequate and well-controlled studies in pregnant women.

Since the effects of RAPTIVA on pregnant women and fetal development, including immune system development are not known, healthcare providers are encouraged to enroll patients who become pregnant while taking RAPTIVA (or within 6 weeks of discontinuing RAPTIVA) in the RAPTIVA Pregnancy Registry by calling 1-877-RAPTIVA (1-877-727-8482).

**Nursing Mothers**

It is not known whether RAPTIVA is excreted in human milk. An anti-mouse CD11a antibody was detected in milk samples of lactating mice exposed to anti-mouse CD11a antibody and the offspring of the exposed females exhibited significant reduction in antibody responses (see **PRECAUTIONS: Pregnancy**). Since maternal immunoglobulins are known to be present in the milk of lactating mothers, and animal data suggest the potential for adverse effects in nursing infants from RAPTIVA, a decision should be made whether to discontinue nursing while taking the drug or to discontinue the use of the drug, taking into account the importance of the drug to the mother.

**Pediatric Use**

FDA has not required pediatric studies in ages 0 to 17 because of the potential risk of non-recoverable suppression of humoral immunity with repeat dose administration of RAPTIVA in pediatric patients, based on data from juvenile animal studies.

An immunotoxicity study was conducted in juvenile mice dosed from 3 to 11 weeks of age (human age equivalent approximately 1-14 years) using an anti-mouse CD11a antibody. Immediately following 8 weekly doses at 3 to 30 times the human equivalent dose of RAPTIVA, the mice exhibited a significant reduction in the ability to mount a humoral antibody response consistent with the mechanism of action of blocking LFA-1/ICAM interactions. Complete reversibility of the treatment related suppression of humoral immunity was not achieved following a 13 week recovery period.

**Geriatric Use**

Of the 1620 patients who received RAPTIVA in controlled trials, 128 were ≥65 years of age, and 2 were ≥75 years of age. Although no differences in safety or efficacy were observed between older and younger patients, the number of patients aged 65 and over is

not sufficient to determine whether they respond differently from younger patients. Because the incidence of infections is higher in the elderly population, in general, caution should be used in treating the elderly. There have been postmarketing reports of PML occurring in elderly patients who received RAPTIVA for more than three years (see **BOXED WARNING, WARNINGS: Progressive Multifocal Leukoencephalopathy**).

**ADVERSE REACTIONS**

The most serious adverse reactions observed during treatment with RAPTIVA are serious infections, including PML, malignancies, thrombocytopenia, hemolytic anemia, arthritis events, psoriasis worsening and variants, and neurologic events (see **WARNINGS**).

The most common adverse reactions associated with RAPTIVA were a first dose reaction complex that included headache, chills, fever, nausea, and myalgia within two days following the first two injections. These reactions are dose-level related in incidence and severity and were largely mild to moderate in severity when a conditioning dose of 0.7 mg/kg was used as the first dose. In placebo-controlled trials, 29% of patients treated with RAPTIVA 1 mg/kg developed one or more of these symptoms following the first dose compared with 15% of patients receiving placebo. After the third dose, 4% and 3% of patients receiving RAPTIVA 1 mg/kg and placebo, respectively, experienced these symptoms. Less than 1% of patients discontinued RAPTIVA treatment because of these adverse events.

Other adverse events resulting in discontinuation of RAPTIVA treatment were psoriasis (0.6%), pain (0.4%), arthritis (0.4%), and arthralgia (0.3%).

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of one drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The data described below reflect RAPTIVA exposure for 2762 adult psoriasis patients (age range 18 to 75 years), including 2400 patients exposed for three months, 904 for six months, and 218 exposed for one year or more, in all controlled and uncontrolled studies. The median age of patients receiving RAPTIVA was 44 years, with 189 patients above the age of 65; 67% were men, and 89% were Caucasian. These data include patients treated at doses higher than the recommended dose of 1 mg/kg weekly.

Controlled clinical trials provide the most informative basis for estimating the frequency of RAPTIVA-related adverse drug reactions. Table 3 enumerates the adverse events occurring during controlled periods of the clinical trials where the frequency of the adverse events is at least 2% greater in the RAPTIVA-treated group than the placebo group.

**Table 3**
Adverse Events in Placebo Controlled Study Periods
Reported at a ≥2% Higher Rate in the 1 mg/kg/wk
RAPTIVA Treatment than Placebo Groups

| | Placebo (n=715) | RAPTIVA 1 mg/kg/wk (n=1213) |
|---|---|---|
| Headache | 159 (22%) | 391 (32%) |
| Infection[a] | 188 (26%) | 350 (29%) |
| Chills | 32 (4%) | 154 (13%) |
| Nausea | 51 (7%) | 128 (11%) |
| Pain | 38 (5%) | 122 (10%) |
| Myalgia | 35 (5%) | 102 (8%) |
| Flu Syndrome | 29 (4%) | 83 (7%) |
| Fever | 24 (3%) | 80 (7%) |
| Back pain | 14 (2%) | 50 (4%) |
| Acne | 4 (1%) | 45 (4%) |

[a] Includes diagnosed infections and other non-specific infections. Most common non-specific infection was upper respiratory infection.

Adverse events occurring at a rate between 1 and 2% greater in the RAPTIVA group compared with placebo were arthralgia, asthenia, peripheral edema, and psoriasis.

The following serious adverse reactions were observed in RAPTIVA-treated patients.

**Infections**

In the first 12 weeks of placebo-controlled studies, the proportion of patients with serious infection was 0.4% (7/1620) in the RAPTIVA-treated group (5 of these were hospitalized, 0.3%) and 0.1% (1/715) in the placebo group (see **WARNINGS: Serious Infections**). In the complete safety data from both controlled and uncontrolled studies,

the overall incidence of hospitalization for infections was 1.6 per 100 patient-years for RAPTIVA-treated patients compared with 1.2 per 100 patient-years for placebo-treated patients. Including controlled, uncontrolled, and follow-up study treatment periods there were 27 serious infections in 2475 RAPTIVA-treated patients. These infections included cellulitis, pneumonia, abscess, sepsis, sinusitis, bronchitis, gastroenteritis, aseptic meningitis, Legionnaire's disease, septic arthritis, and vertebral osteomyelitis. In controlled trials, the overall rate of infections in RAPTIVA-treated patients was 3% higher than in placebo-treated patients (Table 3).

In postmarketing experience, serious bacterial, viral, fungal, and opportunistic infections have occurred, including JC virus infection resulting in PML. Some of these infections have been fatal. Worsening of infection despite antimicrobial treatment has been observed (see **BOXED WARNING, CONTRAINDICATIONS, WARNINGS: Serious Infections, Progressive Multifocal Leukoencephalopathy**).

**Malignancies**

Among the 2762 psoriasis patients who received RAPTIVA at any dose (median duration 8 months), 31 patients were diagnosed with 37 malignancies (see **WARNINGS: Malignancies**). The overall incidence of malignancies of any kind was 1.8 per 100 patient-years for RAPTIVA-treated patients compared with 1.6 per 100 patient-years for placebo-treated patients. Malignancies observed in the RAPTIVA-treated patients included non-melanoma skin cancer, non-cutaneous solid tumors, Hodgkin's lymphoma and non-Hodgkin's lymphoma, and malignant melanoma. The incidence of non-cutaneous solid tumors (8 in 1790 patient-years) and malignant melanoma were within the range expected for the general population.

The majority of the malignancies were non-melanoma skin cancers; 26 cases (13 basal, 13 squamous) in 20 patients (0.7% of 2762 RAPTIVA-treated patients). The incidence was comparable for RAPTIVA-treated and placebo-treated patients. However, the size of the placebo group and duration of follow-up were limited and a difference in rates of non-melanoma skin cancers cannot be excluded.

**Immune-Mediated Thrombocytopenia**

In the combined safety database of 2762 RAPTIVA-treated patients, there were eight occurrences (0.3%) of thrombocytopenia of < 52,000 cells per µL reported (see **WARNINGS: Immune-Mediated Thrombocytopenia**). Three of the eight patients were hospitalized for thrombocytopenia, including one patient with heavy uterine bleeding; all cases were consistent with an immune-mediated thrombocytopenia. Antiplatelet antibody was evaluated in one patient and was found to be positive. Each case resulted in discontinuation of RAPTIVA. Based on available platelet count measurements, the onset of platelet decline was between 8 and 12 weeks after the first dose of RAPTIVA in 5 of the patients. Onset was more delayed in 3 patients, occurring as late as one year in 1 patient. In these cases, the platelet count nadirs occurred between 12 and 72 weeks after the first dose of RAPTIVA.

**Immune-Mediated Hemolytic Anemia**

Two reports of hemolytic anemia were observed in clinical trials. Additional cases were reported in the postmarketing setting. The anemia was diagnosed 4-6 months after the start of RAPTIVA and in two serious cases the hemoglobin level decreased to 6 and 7 g/dl. RAPTIVA treatment was discontinued, erythrocyte transfusions and other therapies were administered (see **WARNINGS: Immune-Mediated Hemolytic Anemia**).

**Adverse Events of Psoriasis**

In the combined safety database from all studies, serious psoriasis adverse events occurred in 19 RAPTIVA-treated patients (0.7%) including hospitalization in 17 patients (see **WARNINGS: Psoriasis Worsening/Variants**). Most of these events (14/19) occurred after discontinuation of study drug and occurred in both patients responding and not responding to RAPTIVA treatment. Serious adverse events of psoriasis included pustular, erythrodermic, and guttate subtypes. During the first 12 weeks of treatment within placebo-controlled studies, the rate of psoriasis adverse events (serious and non-serious) was 3.2% (52/1620) in the RAPTIVA-treated patients and 1.4% (10/715) in the placebo-treated patients.

**Arthritis Events**

Infrequent new onset or recurrent severe arthritis events, including psoriatic arthritis events, have been reported in clinical trials and postmarketing (see **PRECAUTIONS: Arthritis Events**).

**Hypersensitivity Reactions**

Symptoms associated with a hypersensitivity reaction (e.g., dyspnea, asthma, urticaria, angioedema, maculopapular rash) were evaluated by treatment group. In the first 12 weeks of the controlled clinical studies, the proportion of patients reporting at least one hypersensitivity reaction was 8% (95/1213) in the 1 mg/kg/wk group and 7% (49/715) of patients in the placebo group. Urticaria was observed in 1% of patients (16/1213) receiving RAPTIVA and 0.4% of patients (3/715) receiving placebo during the initial 12-week treatment period. Other observed adverse events in patients receiving RAPTIVA that may be indicative of hypersensitivity included: laryngospasm, angioedema, erythema multiforme, asthma, and allergic drug eruption. One patient was hospitalized with a serum sickness-like reaction.

**Inflammatory/Immune-Mediated Reactions**

In the entire RAPTIVA clinical development program of 2762 RAPTIVA-treated patients, inflammatory, potentially immune-mediated adverse events resulting in hospitalization included inflammatory arthritis (12 cases, 0.4% of patients) and interstitial pneumonitis (2 cases). One case each of the following serious adverse reactions was observed: transverse myelitis, bronchiolitis obliterans, aseptic meningitis, idiopathic hepatitis, sialadenitis, and sensorineural hearing loss. Myositis, eosinophilic pneumonitis, resolving after discontinuation of RAPTIVA have been reported postmarketing.

**Postmarketing Experience**

The following adverse reactions have been identified during postapproval use of RAPTIVA. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Infections: serious bacterial, fungal, viral and other opportunistic infections, including JC virus resulting in PML (see **BOXED WARNING, WARNINGS: Serious Infections, Progressive Multifocal Leukoencephalopathy**).

*Malignancies:* lymphoma
*Skin*: toxic epidermal necrolysis and photosensitivity reactions
*Neurologic*: Guillain-Barré Syndrome, chronic inflammatory demyelinating polyneuropathy, transverse myelitis, and facial palsy (see **WARNINGS: Neurologic Events**).

**Laboratory Values**

In RAPTIVA-treated patients, a mean elevation in alkaline phosphatase (5 Units/L) was observed; 4% of RAPTIVA-treated patients experienced a shift to above normal values compared with 0.6% of placebo-treated patients. The clinical significance of this change is unknown. Higher numbers of RAPTIVA-treated patients experienced elevations above normal in two or more liver function tests than placebo (3.1% vs. 1.5%).

Other laboratory adverse reactions that were observed included thrombocytopenia (see **WARNINGS,** and **ADVERSE REACTIONS: Immune-Mediated Thrombocytopenia**), lymphocytosis (40%) (including three cases of transient atypical lymphocytosis), and leukocytosis (26%).

**Immunogenicity**

In patients evaluated for antibodies to RAPTIVA after RAPTIVA treatment ended, predominantly low-titer antibodies to RAPTIVA or other protein components of the RAPTIVA drug product were detected in 6.3% (67/1063) of patients. The long-term immunogenicity of RAPTIVA is unknown.

The data reflect the percentage of patients whose test results were considered positive for antibodies to RAPTIVA in the ELISA assay, and are highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody positivity in an assay may be influenced by several factors including sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to RAPTIVA with the incidence of antibodies to other products may be misleading.

**OVERDOSAGE**

Doses up to 4 mg/kg/wk SC for 10 weeks following a conditioning (0.7 mg/kg) first dose have been administered without an observed increase in acute toxicity. The maximum administered single dose was 10 mg/kg IV. This was administered to one patient, who subsequently was admitted to the hospital for severe vomiting. In case of overdose, it is recommended that the patient be monitored for 24~48 hours for any acute signs or symptoms of adverse reactions or effects and appropriate treatment instituted.

**DOSAGE AND ADMINISTRATION**

The recommended dose of RAPTIVA (efalizumab) is a single 0.7 mg/kg SC conditioning dose followed by weekly SC doses of 1 mg/kg (maximum single dose not to exceed a total of 200 mg).

RAPTIVA is intended for use under the guidance and supervision of a physician. If it is determined to be appropriate, patients may self-inject RAPTIVA after proper training in the preparation and injection technique and with medical follow-up (see **PRECAUTIONS: Information for Patients**).

**Preparation for Administration**

RAPTIVA should be administered using the sterile, disposable syringe and needles provided (see **HOW SUPPLIED** section). Remove the cap from the pre-filled syringe containing sterile water for injection (non-USP) and attach the needle to the syringe. Remove the plastic cap protecting the rubber stopper of the RAPTIVA vial and wipe the top of the rubber stopper with one of the provided alcohol swabs. After cleaning with the alcohol swab, do not touch the top of the vial. To prepare the RAPTIVA solution, using the provided pre-filled diluent syringe slowly inject the 1.3 mL of sterile water for injection (non-USP) into the RAPTIVA vial. Swirl the vial with a GENTLE rotary motion to dissolve the product. DO NOT SHAKE. Shaking will cause foaming of the RAPTIVA solution. Generally, dissolution of RAPTIVA takes less than 5 minutes. RAPTIVA is provided as a single-use vial and contains no antibacterial preservatives. Reconstitute immediately before use and use only once. If the reconstituted RAPTIVA is not used immediately, store the RAPTIVA vial at room temperature and use within 8 hours. The reconstituted solution should be clear to pale yellow and free of particulates.

**Administration**

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to subcutaneous administration. If particulates or discolorations are noted, the product should not be used.

Insert the needle into the vial containing the RAPTIVA solution, invert the vial, and keeping the needle below the level of the liquid, withdraw the dose to be given into the syringe. Replace the needle on the syringe with a new needle.

No other medications should be added to solutions containing RAPTIVA, and RAPTIVA should not be reconstituted with other diluents.

Sites for injection include thigh, abdomen, buttocks, or upper arm. Injection sites should be rotated.

Following administration, discard any unused reconstituted RAPTIVA solution.

**Stability and Storage**

Do not use a vial beyond the expiration date stamped on the carton or vial label. RAPTIVA (lyophilized powder) must be refrigerated at 2–8°C (36–46°F). Protect the vial from exposure to light. Store in original carton until time of use.

**HOW SUPPLIED**

RAPTIVA (efalizumab) is supplied as a lyophilized, sterile powder to deliver 125 mg of efalizumab per single-use vial.

Each RAPTIVA carton contains four trays. Each tray contains one single-use vial designed to deliver 125 mg of efalizumab, one single-use prefilled diluent syringe containing 1.3 mL sterile water for injection (non-USP), two 25 gauge×5/8 inch needles, two alcohol prep pads, a package insert with an accompanying patient information insert. The NDC number for the four administration dose pack carton is 50242-058-04.

**MEDICATION GUIDE**
**RAPTIVA®** (Rap-TEE-vah)
**(efalizumab)**
**for injection, subcutaneous**

Read the Medication Guide that comes with RAPTIVA® (efalizumab) before you start using it and before each injection. There may be new information. This information does not take the place of talking with your doctor about your condition or your treatment with RAPTIVA. Ask your doctor if you have any questions about this Medication Guide or RAPTIVA.

**What is the most important information I should know about RAPTIVA?**

**RAPTIVA has serious side effects that can lead to death:**

- **Progressive Multifocal Leukoencephalopathy (PML).** PML is a serious brain infection caused by a virus. PML results in death or severe disability. Using RAPTIVA will increase your risk for PML. Your risk of PML may rise even more the longer you use RAPTIVA. Some patients who took RAPTIVA for 3 years died from PML and patients on RAPTIVA for less time could develop PML. There is no way to know ahead of time who will get PML. There is no treatment or cure for PML, and it almost always causes death. People who do live with PML are severely disabled.

  Symptoms of PML include a new or sudden change in:
  - thinking
  - balance
  - strength
  - talking
  - walking
  - vision

Call your doctor right away if you have any of these symptoms or if anyone close to you notices a new or sudden change in your thinking.

Taking RAPTIVA increases your chances of PML because RAPTIVA weakens the ability of your immune system to fight the virus that causes PML. Your chance of getting PML may even be higher if you are also being treated with other medications that can weaken your immune system. You can still get PML even if you use RAPTIVA alone.

- **Serious infections.** Some of these infections have led to hospitalization or death and have been caused by bacteria, fungi, and viruses.

  Symptoms of a serious infection include:
  - fever
  - cough
  - flu-like symptoms

- feeling especially tired
- chills
- muscle aches
- stiff neck

Before you start using RAPTIVA, tell your doctor if you have an infection. During your RAPTIVA treatment, tell your doctor right away if you get an infection. Do not use RAPTIVA if you have a serious infection.

**Stopping treatment with RAPTIVA**. Stopping RAPTIVA may lead to serious side effects, such as severe worsening of your psoriasis, that can lead to hospitalization. Tell your doctor if you want to stop using RAPTIVA so that you and your doctor can carefully plan how to change to another psoriasis medicine.

**What is RAPTIVA?**

RAPTIVA is a prescription medicine used to treat adults with the type of psoriasis that is not adequately treated with medicines that go on the skin.

RAPTIVA has not been studied in children under 18 years of age.

**Who should not use RAPTIVA?**

- Do not use RAPTIVA if you have ever had an allergic reaction to RAPTIVA.
- Do not use RAPTIVA if you have been diagnosed with PML.

**What should I tell my doctor before using RAPTIVA?**

- **Vaccinations**. Ask your doctor whether you need any vaccinations **before** you start using RAPTIVA. Some vaccinations should not be given or will not work while you use RAPTIVA. Talk to your doctor about whether anyone in your household needs a vaccination. Some types of vaccines can spread to people with weakened immune systems, causing serious problems.

Tell your doctor about all of your medical conditions, including:

- **If you have any infections or a weakened immune system.** See "What is the most important information I should know about RAPTIVA?"
- **If you have or have had cancer.**
- **If you are pregnant, planning to become pregnant, or become pregnant while using RAPTIVA.** It is not known if RAPTIVA can harm your unborn baby. If you become pregnant while taking RAPTIVA, call your doctor right away. You and your doctor will decide if RAPTIVA is right for you during pregnancy. If you use RAPTIVA when you are pregnant, call 1-877-RAPTIVA (1-877-727-8482) to be included in the RAPTIVA Pregnancy Registry. This registry collects information to help understand the effects of RAPTIVA during pregnancy.

- **Breast feeding.** It is not known if RAPTIVA passes into your milk. It may harm your baby. You will need to decide whether to use RAPTIVA or breast feed, but you should not do both.

**Tell your doctor about all the medicines you take**, including prescription and nonprescription medicines, vitamins, and herbal supplements. It is not known if RAPTIVA and other medicines affect each other.

Especially, tell your doctor if you use:

- **Medicines that weaken your immune system.** Ask your doctor or pharmacist if you are not sure.
- **Other medicines or treatments for your psoriasis.**

**How should I use RAPTIVA?**

See the **Instructions for Use** at the end of this Medication Guide for how to prepare and inject RAPTIVA. Ask your doctor or pharmacist if you have any questions about using RAPTIVA.

- **Use RAPTIVA exactly as prescribed by your doctor.** Tell your doctor if you want to stop using RAPTIVA so that they can plan for other psoriasis treatment. Your psoriasis can worsen to severe levels quickly when RAPTIVA is stopped.
- RAPTIVA is an injection (shot) that you give yourself once a week. Your dose of RAPTIVA is based on your body weight. Tell your doctor if your weight changes. Do not change your dose without talking to your doctor.
- RAPTIVA is injected under the skin of your upper leg (thigh), upper arm, abdomen, or buttocks once a week. Use a different skin injection site (rotate) each time you give yourself an injection.
- Use RAPTIVA the same day each week. If you miss your dose of RAPTIVA, call your doctor to find out when to take your next dose of RAPTIVA and what schedule to follow after that.
- If you take more than your regular dose of RAPTIVA, call your doctor right away.
- Do not take light treatments for your psoriasis (UVB, PUVA, phototherapy) unless directed by your doctor.

**What are the possible side effects of RAPTIVA?**

Serious side effects with RAPTIVA include:

- **Progressive Multifocal Leukoencephalopathy (PML).** See "What is the most important information I should know about RAPTIVA?"
- **Serious infections.** See "What is the most important information I should know about RAPTIVA?"

- **Nervous system disorders.** People who use RAPTIVA can have serious disorders that affect the brain and nervous system.

  Symptoms of a nervous system disorder include:

  - sudden numbness or tingling
  - weakness in your arms, legs, or face
  - new or sudden change in thinking, balance, strength, talking, walking, or vision

- **Worsening of psoriasis.** Some people have severe worsening or a new psoriasis rash while taking RAPTIVA or after stopping RAPTIVA. Tell your doctor right away if your psoriasis gets worse or if you see any new rashes during or after treatment with RAPTIVA.

  Call your doctor right away if you have any of these symptoms.

- **Cancer.** RAPTIVA weakens your immune system. When your immune system is weakened, you may have a higher chance of getting new cancer or making your cancer worse.

- **Low platelet counts (thrombocytopenia).** Platelets are cells that help your blood clot. Low platelets give you a higher chance for bleeding. Call your doctor right away if you have bleeding including your gums, a red rash, or more bruises than usual. Your doctor may do blood tests to check your platelets while you take RAPTIVA.

- **Low blood counts (anemia).** Some people who use RAPTIVA develop very low red blood cell counts. Call your doctor right away if you are:
  - weak
  - dizzy
  - lightheaded
  - out of breath
  - your skin or eyes turn yellow
  - your urine turns red or dark

- **Arthritis.** Some people have worsening or new arthritis while taking RAPTIVA or after stopping RAPTIVA. Tell your doctor if you get redness, pain, swelling, or stiffness of your joints.

**The most common side effects of RAPTIVA** usually happen within the first 48 hours after your RAPTIVA injection. Common side effects include:

- headache
- chills
- fever
- nausea
- muscle aches

Call your doctor if you are not sure if these problems are from an infection. See "What is the most important information I should know about RAPTIVA?

These are not all the side effects of RAPTIVA. Talk to your doctor for medical advice about any signs and symptoms that bother you. Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

**How should I store RAPTIVA?**

- Store RAPTIVA vials in the refrigerator at 36° to 46°F (2° to 8°C) until you are ready to prepare your injection.
- Do not freeze or store at room temperature.
- Once RAPTIVA has been mixed with sterile water, you should use it right away to inject yourself. If you are unable to inject the RAPTIVA after mixing, the mixture can stay at room temperature for up to 8 hours. Do not use RAPTIVA that was mixed for more than 8 hours.
- If you are traveling, be sure to store RAPTIVA at the right temperature. If you have any questions, ask your doctor or pharmacist.
- Store RAPTIVA vials away from light.
- Throw away RAPTIVA vials that are out of date. The expiration date is marked on each vial of RAPTIVA.

**Keep RAPTIVA and all medicines out of the reach of children.**

**GENERAL INFORMATION ABOUT RAPTIVA**

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use RAPTIVA for a condition for which it was not prescribed. Do not give RAPTIVA to other people, even if they have the same symptoms you have. It may harm them.

This Medication Guide summarizes the most important information about RAPTIVA. If you would like more information, talk with your doctor. You can ask your doctor or pharmacist for information about RAPTIVA that is written for health professionals. For more information, you can also call 1-877-RAPTIVA (toll free).

**What are the ingredients in RAPTIVA?**

Active ingredient: efalizumab

Inactive ingredients: sucrose, L-histidine hydrochloride monohydrate, L-histidine, polysorbate 20, and sterile water for injection.

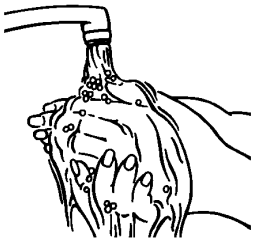
**Instructions for use**

**How do I prepare and give a RAPTIVA injection?**

If your dose is more than 1.25 mL, you will need to use 2 RAPTIVA blister trays, and you will give yourself 2 injections of RAPTIVA.

**Setting up the Equipment**

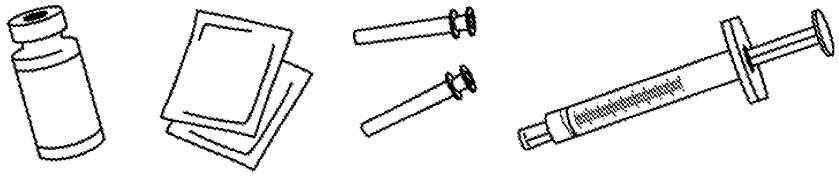
1. Take the RAPTIVA (efalizumab) blister tray out of the refrigerator, and place it on a flat, well-lit, clean work surface.
2. Wash your hands with soap and water before opening the blister tray.
3. Open the tray and lay out the contents. Allow the contents to come to room temperature.



As shown below, the tray contains:

- One RAPTIVA vial
- One 1.3-mL prefilled syringe of sterile water
- Two 25-gauge needles
- Two alcohol prep pads

Contact your doctor or pharmacist if you are missing any of the items listed above.



RAPTIVA Vial | Alcohol Prep Pads (2) | Needles (2) | Prefilled Syringe

4. Check the expiration date on the RAPTIVA vial label and prefilled syringe label. If the expiration date has passed, do not use the RAPTIVA vial or the prefilled syringe containing the sterile water. Contact your doctor.

5. Partially peel open the needle pack and place it on a clean surface. Be sure to grasp the needle by the plastic cover and avoid touching the end of the syringe and the needle.



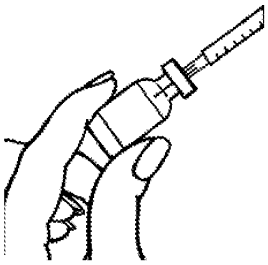

6. Remove the plastic cap protecting the rubber stopper of the RAPTIVA vial. Open one alcohol prep pad package and wipe the rubber stopper with an alcohol prep pad. Do not touch the top of the vial after wiping.
7. Remove the cap covering the prefilled syringe tip. Remove one of the 25-gauge needles from its package by grasping the needle by the plastic cover and without touching the end of the needle. Carefully place the capped 25-gauge needle onto the syringe tip. Twist needle to secure.

**Mixing RAPTIVA**

1. Remove the needle cap. **Do not touch the needle.** Keep the RAPTIVA vial upright on a firm surface, and slowly puncture the rubber stopper with the needle. Slowly push down on the syringe plunger to inject all of the 1.3 mL of sterile water onto the side wall of the vial to cause less foaming. Some foaming may happen; this is normal.



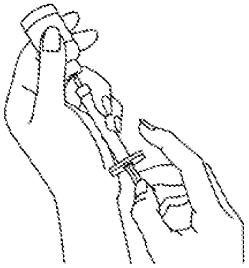
2. With the needle and syringe still in the vial stopper, gently swirl the vial to mix. Wait 5 minutes for the medicine to completely dissolve. To avoid excess foaming, **do not shake the vial.** The RAPTIVA solution should be clear to pale yellow. **Do not use the solution if it is discolored or cloudy or if particles (solid matter) are in the solution.**



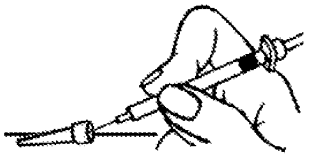
**Preparing the RAPTIVA Dose for Injection**

If you need more than one vial of RAPTIVA for the correct dose (dose amount is greater than 1.25 mL), repeat Steps 1-6 of this section using a second RAPTIVA blister tray, and divide your dose between two syringes.

1. Turn the vial upside down, keeping the needle in the vial. (The needle will now be pointing upward.) Make sure the tip of the needle is covered all the way by the medicine in the vial. Pull back the syringe slightly if necessary. This will make it easier to get the medicine into the syringe.
2. Pull back on the plunger to fill the syringe. Withdraw the correct dose of medicine by reading the numbers on the syringe. Remove the syringe from the vial.



3. Slide the needle into the cap on a flat surface to pick up the needle cap. To lower the chance of a needlestick injury, do not touch the cap until it covers the needle all the way. Push the cap all the way down over the needle

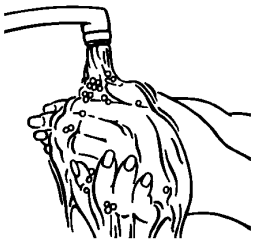


4. Hold the syringe upright and tap the side of the syringe to let air bubbles rise to the top. Gently push in the plunger of the syringe to push the air bubbles out.

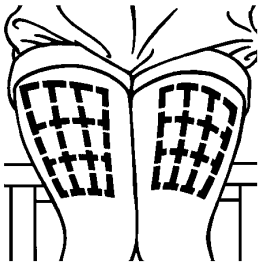
5. After removing the bubbles, recheck the dose of medicine in the syringe. If necessary, push the plunger again to remove any amount of medicine beyond the line that indicates your dose. Make sure you have the right dose as instructed by your doctor. Twist the capped needle off the syringe and discard it in a puncture-resistant container (see **DISPOSAL OF THE SYRINGE, NEEDLES, AND SUPPLIES**). **Never reuse a needle or syringe.**
6. Remove the other 25-gauge needle from its package by grasping **the needle by the plastic cover and** without **touching the end of the needle**. Carefully place the capped 25-gauge needle onto the syringe tip. Twist to secure. Put the syringe down while preparing your skin for injection.

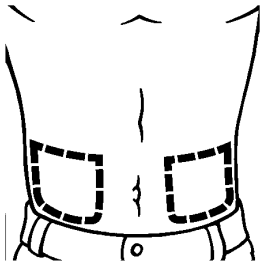
**Selecting and Preparing the Injection Site**

1. Wash your hands well with soap and water.



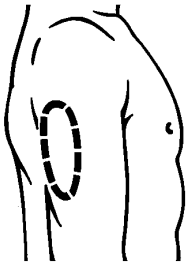
2. Choose an area of the body for the injection. Avoid, if possible, skin involved with psoriasis. Possible injection sites include the following:
   - Outer area of the upper legs (thighs)
   - Stomach area around the belly button

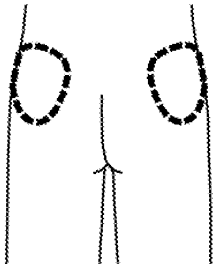




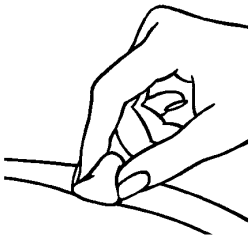
If someone else is giving you an injection, you can also use:

- Back of upper arms
- Buttocks





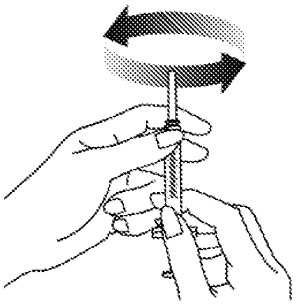
3. It is important to change (rotate) the injection site each time you take RAPTIVA to lower your chances of soreness and redness at the injection site. Changing the injection site will also improve absorption of the medication. Repeat injections given in the same area should be at least 1 inch apart. **Do not give an injection close to a vein that you can see under the surface of your skin.**
4. Wash the skin at the site of injection with soap and water. Let it air dry.
5. Cleanse the skin at the injection site with an alcohol prep pad using a circular motion. Let the area air dry all the way. **Do not touch this area again before giving the injection.**



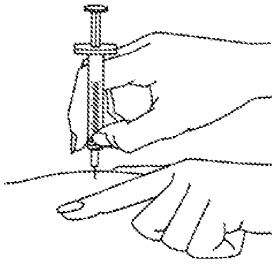
**Giving the RAPTIVA Injection under the Skin**

Your doctor will teach you how to inject RAPTIVA. Do not inject RAPTIVA unless you have been taught the right way to give the injection.

1. Hold the syringe and remove the needle cover. Twisting the needle cover while pulling will help in the removal. **Do not touch the needle or allow the needle to touch anything.**

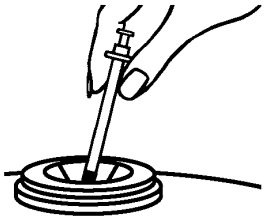


2. Hold the syringe in the hand you use to inject yourself. Use your other hand to pinch a patch of skin at the clean injection site. **Do not** lay the syringe down or allow the needle to touch anything.
3. Hold the syringe firmly between your thumb and fingers so that you have steady control. Insert the needle straight down at a 90-degree angle. This is important to make sure the medicine is injected into fatty tissue.



4. After the needle is inserted all the way into the skin, you can gently let go of the pinched skin. Be sure the needle stays in your skin. Slowly and smoothly push the plunger down into the syringe until it stops.

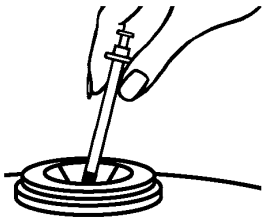
5. When all of the medicine has been injected, remove the needle and do not re-cap it. Discard the used syringe with the attached needle into a puncture resistant container (see **DISPOSAL OF THE SYRINGE, NEEDLES, AND SUPPLIES**). **Never reuse a needle or syringe**. Press a dry, sterile gauze (not provided) over the injection site. Do not use the alcohol prep pad. A small bandage may be put over the injection site.



6. If your dose amount is more than 1.25 mL, you will need to give a second injection. Choose the second injection site at least 1 inch from the first injection site.

**DISPOSAL OF THE SYRINGE, NEEDLES, AND SUPPLIES**

1. As stated earlier, place the used syringe with the attached needle in a puncture-resistant container, like a sharps container. You can buy a sharps container at your local pharmacy.



2. Talk to your doctor about how to properly dispose of a filled container of your used syringes and needles. There may be special local and state laws for disposing of used needles and syringes. **Do not throw the filled container in the household trash and do not recycle.**
3. The needle cap, alcohol prep pads, and other used supplies can be thrown out with your regular trash.
4. **Always keep syringes, injection supplies, and disposal containers out of the reach of children.**
5. **Do not reuse these single-use syringes or needles.**

**Rx Only**

**This Medication Guide has been approved by the U.S. Food and Drug Administration.**

**RAPTIVA® [efalizumab]**

Manufactured by:

**Genentech, Inc.**
1 DNA Way
South San Francisco, CA 94080-4990

4826404
FDA Approval October 2003
Code revision Month YYYY
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**XOLAIR®**
**Omalizumab**

**For Subcutaneous Use**

**WARNING**

Anaphylaxis, presenting as bronchospasm, hypotension, syncope, urticaria, and/or angioedema of the throat or tongue, has been reported to occur after administration of Xolair. Anaphylaxis has occurred as early as after the first dose of Xolair, but also has occurred beyond 1 year after beginning regularly administered treatment. Because of the risk of anaphylaxis, patients should be closely observed for an appropriate period of time after Xolair administration, and health care providers administering Xolair should be prepared to manage anaphylaxis that can be life-threatening. Patients should also be informed of the signs and symptoms of anaphylaxis and instructed to seek immediate medical care should symptoms occur (see WARNINGS, and PRECAUTIONS, Information for Patients).

## DESCRIPTION

Xolair (Omalizumab) is a recombinant DNA-derived humanized IgG1κ monoclonal antibody that selectively binds to human immunoglobulin E (IgE). The antibody has a molecular weight of approximately 149 kilodaltons. Xolair is produced by a Chinese hamster ovary cell suspension culture in a nutrient medium containing the antibiotic gentamicin. Gentamicin is not detectable in the final product.

Xolair is a sterile, white, preservative-free, lyophilized powder contained in a single-use vial that is reconstituted with Sterile Water for Injection (SWFI), USP, and administered as a subcutaneous (SC) injection. A Xolair vial contains 202.5 mg of Omalizumab, 145.5 mg sucrose, 2.8 mg L-histidine hydrochloride monohydrate, 1.8 mg L-histidine, and 0.5 mg polysorbate 20, and is designed to deliver 150 mg of Omalizumab in 1.2 mL after reconstitution with 1.4 mL SWFI, USP.

## CLINICAL PHARMACOLOGY

### Mechanism of Action

Xolair inhibits the binding of IgE to the high-affinity IgE receptor (FcεRI) on the surface of mast cells and basophils. Reduction in surface-bound IgE on FcεRI-bearing cells limits the degree of release of mediators of the allergic response. Treatment with Xolair also reduces the number of FcεRI receptors on basophils in atopic patients.



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## Pharmacokinetics

After SC administration, Omalizumab is absorbed with an average absolute bioavailability of 62%. Following a single SC dose in adult and adolescent patients with asthma, Omalizumab was absorbed slowly, reaching peak serum concentrations after an average of 7–8 days. The pharmacokinetics of Omalizumab are linear at doses greater than 0.5 mg/kg. Following multiple doses of Omalizumab, areas under the serum concentration-time curve from Day 0 to Day 14 at steady state were up to 6-fold of those after the first dose.

*In vitro*, Omalizumab forms complexes of limited size with IgE. Precipitating complexes and complexes larger than 1 million daltons in molecular weight are not observed *in vitro* or *in vivo*. Tissue distribution studies in cynomolgus monkeys showed no specific uptake of $^{125}$I-Omalizumab by any organ or tissue. The apparent volume of distribution in patients following SC administration was 78 ± 32 mL/kg.

Clearance of Omalizumab involves IgG clearance processes as well as clearance via specific binding and complex formation with its target ligand, IgE. Liver elimination of IgG includes degradation in the liver reticuloendothelial system (RES) and endothelial cells. Intact IgG is also excreted in bile. In studies with mice and monkeys, Omalizumab:IgE complexes were eliminated by interactions with Fcγ receptors within the RES at rates that were generally faster than IgG clearance. In asthma patients Omalizumab serum elimination half-life averaged 26 days, with apparent clearance averaging 2.4 ± 1.1 mL/kg/day. In addition, doubling body weight approximately doubled apparent clearance.

## Pharmacodynamics

In clinical studies, serum free IgE levels were reduced in a dose dependent manner within 1 hour following the first dose and maintained between doses. Mean serum free IgE decrease was greater than 96% using recommended doses. Serum total IgE levels (i.e., bound and unbound) increased after the first dose due to the formation of Omalizumab:IgE complexes, which have a slower elimination rate compared with free IgE. At 16 weeks after the first dose, average serum total IgE levels were five-fold higher compared with pre-treatment when using standard assays. After discontinuation of Xolair dosing, the Xolair-induced increase in total IgE and decrease in free IgE were reversible, with no observed rebound in IgE levels after drug washout. Total IgE levels did not return to pre-treatment levels for up to one year after discontinuation of Xolair.



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### Special Populations

The population pharmacokinetics of Xolair were analyzed to evaluate the effects of demographic characteristics. Analyses of these limited data suggest that no dose adjustments are necessary for age (12–76 years), race, ethnicity, or gender.

## CLINICAL STUDIES

The safety and efficacy of Xolair were evaluated in three randomized, double-blind, placebo-controlled, multicenter trials.

The trials enrolled patients 12 to 76 years old, with moderate to severe persistent (NHLBI criteria) asthma for at least one year, and a positive skin test reaction to a perennial aeroallergen. At screening, patients in Studies 1 and 2 had a forced expiratory volume in one second (FEV1) between 40% and 80% predicted, while in Study 3 there was no restriction on screening FEV1. All patients had a FEV1 improvement of at least 12% following beta-agonist administration. All patients were symptomatic and were being treated with inhaled corticosteroids (ICS) and short acting beta-agonists. In Study 3, long-acting beta-agonists were allowed. Study 3 patients were receiving at least 1000 μg/day fluticasone propionate and a subset was also receiving oral corticosteroids. Patients receiving other concomitant controller medications were excluded, and initiation of additional controller medications while on study was prohibited. Patients currently smoking were excluded.

Each study was comprised of a run-in period to achieve a stable conversion to a common ICS (beclomethasone dipropionate, for Studies 1 and 2; fluticasone propionate for Study 3), followed by randomization to Xolair or placebo. In Study 3, patients were stratified by use of ICS-only or ICS with concomitant use of oral steroids. Patients received Xolair for 16 weeks with an unchanged corticosteroid dose unless an acute exacerbation necessitated an increase. Patients then entered an ICS reduction phase of 12 weeks (Studies 1 and 2) or 16 weeks (Study 3) during which ICS (or oral steroid in Study 3 subset) dose reduction was attempted in a step-wise manner.

Xolair dosing was based on body weight and baseline serum total IgE concentration. All patients were required to have a baseline IgE between 30 and 700 IU/mL and body weight not more than 150 kg. Patients were treated according to a dosing table to administer at least 0.016 mg/kg/IU (IgE/mL) of Xolair or a matching volume of placebo over each 4-week period. The maximum Xolair dose per 4 weeks was 750 mg; patients who had a weight-IgE combination that yielded a



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dose greater than 750 mg were excluded from the studies. Patients who were to receive more than 300 mg within the 4-week period were administered half the total dose every 2 weeks.

The distribution of the number of asthma exacerbations per patient in each group during a study was analyzed separately for the stable steroid and steroid-reduction periods. In all three studies an exacerbation was defined as a worsening of asthma that required treatment with systemic corticosteroids or a doubling of the baseline ICS dose.

In both Studies 1 and 2 the number of exacerbations per patient was reduced in patients treated with Xolair compared with placebo (Table 1). In Study 3 the number of exacerbations in patients treated with Xolair was similar to that in placebo-treated patients (Table 2). The absence of an observed treatment effect in Study 3 may be related to differences in the patient population compared with Studies 1 and 2, study sample size, or other factors. In all three studies most exacerbations were managed in the out-patient setting and the majority were treated with systemic steroids. Hospitalization rates were not significantly different between Xolair and placebo-treated patients; however, the overall hospitalization rate was small. Among those patients who experienced an exacerbation, the distribution of exacerbation severity was similar between treatment groups.



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**Table 1**
Frequency of Asthma Exacerbations per Patient by Phase in Studies 1 and 2

| | Stable Steroid Phase (16 wks) | | | |
|---|---|---|---|---|
| | Study 1 | | Study 2 | |
| Exacerbations per patient | Xolair N=268 (%) | Placebo N=257 (%) | Xolair N=274 (%) | Placebo N=272 (%) |
| 0 | 85.8 | 76.7 | 87.6 | 69.9 |
| 1 | 11.9 | 16.7 | 11.3 | 25.0 |
| ≥2 | 2.2 | 6.6 | 1.1 | 5.1 |
| p-Value | 0.005 | | <0.001 | |
| Mean number exacerbations/patient | 0.2 | 0.3 | 0.1 | 0.4 |
| | Steroid Reduction Phase (12 wks) | | | |
| Exacerbations per patient | Xolair N=268 (%) | Placebo N=257 (%) | Xolair N=274 (%) | Placebo N=272 (%) |
| 0 | 78.7 | 67.7 | 83.9 | 70.2 |
| 1 | 19.0 | 28.4 | 14.2 | 26.1 |
| ≥2 | 2.2 | 3.9 | 1.8 | 3.7 |
| p-Value | 0.004 | | <0.001 | |
| Mean number exacerbations/patient | 0.2 | 0.4 | 0.2 | 0.3 |

**Table 2**
Percentage of Patients with Asthma Exacerbations by Subgroup and Phase in Study 3

| | Stable Steroid Phase (16 wks) | | | |
|---|---|---|---|---|
| | Inhaled Only | | Oral + Inhaled | |
| | Xolair N = 126 | Placebo N = 120 | Xolair N = 50 | Placebo N = 45 |
| % Patients with ≥ 1 exacerbations | 15.9 | 15.0 | 32.0 | 22.2 |
| Difference (95% CI) | 0.9 (−9.7, 13.7) | | 9.8 (−10.5, 31.4) | |
| | Steroid Reduction Phase (16 wks) | | | |
| | Xolair N = 126 | Placebo N = 120 | Xolair N = 50 | Placebo N = 45 |
| % Patients with ≥ 1 exacerbations | 22.2 | 26.7 | 42.0 | 42.2 |
| Difference (95% CI) | −4.4 (−17.6, 7.4) | | −0.2 (−22.4, 20.1) | |

In all three of the studies, a reduction of asthma exacerbations was not observed in the Xolair-treated patients who had FEV1 >80% at the time of randomization. Reductions in exacerbations were not seen in patients who required oral steroids as maintenance therapy.

In Studies 1 and 2 measures of airflow (FEV1) and asthma symptoms were evaluated (Table 3). The clinical relevance of the treatment-associated differences is unknown.



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**Table 3**
Asthma Symptoms and Pulmonary Function During Stable Steroid Phase of Study 1

| | Xolair N=268[a] | | Placebo N=257[a] | |
|---|---|---|---|---|
| Endpoint | Mean Baseline | Median Change (Baseline to Wk 16) | Mean Baseline | Median Change (Baseline to Wk 16) |
| Total asthma symptom score | 4.3 | −1.5[b] | 4.2 | −1.1[b] |
| Nocturnal asthma score | 1.2 | −0.4[b] | 1.1 | −0.2[b] |
| Daytime asthma score | 2.3 | −0.9[b] | 2.3 | −0.6[b] |
| FEV1 % predicted | 68 | 3[b] | 68 | 0[b] |

Asthma symptom scale: total score from 0 (least) to 9 (most); nocturnal and daytime scores from 0 (least) to 4 (most symptoms).

[a] Number of patients available for analysis ranges 255–258 in the Xolair group and 238–239 in the placebo group.

[b] Comparison of Xolair versus placebo ($p < 0.05$).

Results from the stable steroid phase of Study 2 and the steroid reduction phases of both Studies 1 and 2 were similar to those presented in Table 3.

## INDICATIONS AND USAGE

Xolair (Omalizumab) is indicated for adults and adolescents (12 years of age and above) with moderate to severe persistent asthma who have a positive skin test or *in vitro* reactivity to a perennial aeroallergen and whose symptoms are inadequately controlled with inhaled corticosteroids. Xolair has been shown to decrease the incidence of asthma exacerbations in these patients. Safety and efficacy have not been established in other allergic conditions.

## CONTRAINDICATIONS

Xolair should not be administered to patients who have experienced a severe hypersensitivity reaction to Xolair (see WARNINGS: Anaphylaxis).

## WARNINGS

### Anaphylaxis

Anaphylaxis has been reported to occur after administration of Xolair in premarketing clinical trials and in postmarketing spontaneous reports. Signs and symptoms in these reported cases



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have included bronchospasm, hypotension, syncope, urticaria, and/or angioedema of the throat or tongue. Some of these events have been life-threatening. In premarketing clinical trials the frequency of anaphylaxis attributed to Xolair use was estimated to be 0.1%. In postmarketing spontaneous reports, the frequency of anaphylaxis attributed to Xolair use was estimated to be at least 0.2% of patients based on an estimated exposure of about 57,300 patients from June 2003 through December 2006. Anaphylaxis has occurred as early as after the first dose of Xolair, but also has occurred beyond one year after beginning regularly scheduled treatment.

Xolair should only be administered in a healthcare setting by healthcare providers prepared to manage anaphylaxis that can be life-threatening. Patients should be closely observed for an appropriate period of time after administration of Xolair, taking into account the time to onset of anaphylaxis seen in premarketing clinical trials and postmarketing spontaneous reports (see ADVERSE REACTIONS). Patients should be informed of the signs and symptoms of anaphylaxis, and instructed to seek immediate medical care should signs or symptoms occur (See PRECAUTIONS, Information for Patients).

Xolair should be discontinued in patients who experience a severe hypersensitivity reaction (see CONTRAINDICATIONS).

### Malignancy

Malignant neoplasms were observed in 20 of 4127 (0.5%) Xolair-treated patients compared with 5 of 2236 (0.2%) control patients in clinical studies of asthma and other allergic disorders. The observed malignancies in Xolair-treated patients were a variety of types, with breast, non-melanoma skin, prostate, melanoma, and parotid occurring more than once, and five other types occurring once each. The majority of patients were observed for less than 1 year. The impact of longer exposure to Xolair or use in patients at higher risk for malignancy (e.g., elderly, current smokers) is not known (see ADVERSE REACTIONS: Malignancy).

## PRECAUTIONS

### General

Xolair has not been shown to alleviate asthma exacerbations acutely and should not be used for the treatment of acute bronchospasm or status asthmaticus.



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### Information for Patients

Patients should be given and instructed to read the accompanying Medication Guide before starting treatment and before each subsequent treatment. The complete text of the Medication Guide is reprinted at the end of this document.

Patients should be advised of the risk of life-threatening anaphylaxis with Xolair and that there have been reports of anaphylaxis up to 4 days after administration of Xolair. Xolair should only be administered in a healthcare setting by healthcare providers. Patients should be closely observed following its administration. Patients should be informed of the signs and symptoms of anaphylaxis. Patients should be instructed to seek immediate medical care should such signs or symptoms occur. (See WARNINGS, Anaphylaxis).

Patients receiving Xolair should be told not to decrease the dose of, or stop taking any other asthma medications unless otherwise instructed by their physician. Patients should be told that they may not see immediate improvement in their asthma after beginning Xolair therapy.

### Corticosteroid Reduction

Systemic or inhaled corticosteroids should not be abruptly discontinued upon initiation of Xolair therapy. Decreases in corticosteroids should be performed under the direct supervision of a physician and may need to be performed gradually.

### Parasitic (Helminth) Infection

In a one-year clinical trial conducted in Brazil in patients at high risk for geohelminthic infections (roundworm, hookworm, whipworm, threadworm), 53% (36/68) of omalizumab-treated patients experienced an infection, as diagnosed by standard stool examination, compared to 42% (29/69) of placebo controls. The point estimate of the odds ratio for infection was 1.96, with a 95% confidence interval (0.88, 4.36) indicating that in this study a patient who had an infection was anywhere from 0.88 to 4.36 times as likely to have received Omalizumab than a patient who did not have an infection. Response to appropriate anti-geohelminth treatment of infection as measured by stool egg counts was not different between treatment groups. Patients at high risk of geohelminth infection should be monitored for such infections while on Xolair therapy. Insufficient data are available to determine the length of monitoring required for geohelminth infections after stopping Xolair treatment.



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### Laboratory Tests

Serum total IgE levels increase following administration of Xolair due to formation of Xolair:IgE complexes (see CLINICAL PHARMACOLOGY, DOSAGE AND ADMINISTRATION). Elevated serum total IgE levels may persist for up to 1 year following discontinuation of Xolair. Serum total IgE levels obtained less than 1 year following discontinuation may not reflect steady state free IgE levels and should not be used to reassess the dosing regimen.

### Drug Interactions

No formal drug interaction studies have been performed with Xolair. The concomitant use of Xolair and allergen immunotherapy has not been evaluated.

### Carcinogenesis, Mutagenesis, Impairment of Fertility

No long-term studies have been performed in animals to evaluate the carcinogenic potential of Xolair.

No evidence of mutagenic activity was observed in Ames tests using six different strains of bacteria with and without metabolic activation at Omalizumab concentrations up to 5000 μg/mL.

The effects of Omalizumab on male and female fertility have been assessed in cynomolgus monkey studies. Administration of Omalizumab at doses up to and including 75 mg/kg/week did not elicit reproductive toxicity in male cynomolgus monkeys and did not inhibit reproductive capability, including implantation, in female cynomolgus monkeys. These doses provide a 2- to 16-fold safety factor based on total dose and 2- to 5-fold safety factor based on AUC over the range of adult clinical doses.

### Pregnancy (Category B)

Reproduction studies in cynomolgus monkeys have been conducted with Omalizumab. Subcutaneous doses up to 75 mg/kg (12-fold the maximum clinical dose) of Omalizumab did not elicit maternal toxicity, embryotoxicity, or teratogenicity when administered throughout organogenesis and did not elicit adverse effects on fetal or neonatal growth when administered throughout late gestation, delivery, and nursing.

IgG molecules are known to cross the placental barrier. There are no adequate and well-controlled studies of Xolair in pregnant women. Because animal reproduction studies are



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not always predictive of human response, Xolair should be used during pregnancy only if clearly needed.

### Pregnancy Exposure Registry

To monitor outcomes of pregnant women exposed to Xolair, including women who are exposed to at least one dose of Xolair within 8 weeks prior to conception or any time during pregnancy, a pregnancy exposure registry has been established. Healthcare providers should encourage their patients to call 1-866-4XOLAIR (1-866-496-5247) to enroll in the Xolair Pregnancy Exposure Registry. Healthcare providers can call this number to obtain further information about this registry.

### Nursing Mothers

The excretion of Omalizumab in milk was evaluated in female cynomolgus monkeys receiving SC doses of 75 mg/kg/week. Neonatal plasma levels of Omalizumab after *in utero* exposure and 28 days of nursing were between 11% and 94% of the maternal plasma level. Milk levels of Omalizumab were 1.5% of maternal blood concentration. While Xolair presence in human milk has not been studied, IgG is excreted in human milk and therefore it is expected that Xolair will be present in human milk. The potential for Xolair absorption or harm to the infant are unknown; caution should be exercised when administering Xolair to a nursing woman.

### Pediatric Use

Safety and effectiveness in pediatric patients below the age of 12 have not been established.

### Geriatric Use

In clinical trials 134 patients 65 years of age or older were treated with Xolair. Although there were no apparent age-related differences observed in these studies, the number of patients aged 65 and over is not sufficient to determine whether they respond differently from younger patients.

## ADVERSE REACTIONS

#### Clinical Trials Experience

The most serious adverse reactions occurring in clinical trials with Xolair were anaphylaxis and malignancies (see WARNINGS). Anaphylaxis was reported in 3 of 3507 (0.1%) patients in clinical trials. Anaphylaxis occurred with the first dose of Xolair in two patients and with the



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fourth dose in one patient. The time to onset of anaphylaxis was 90 minutes after administration in two patients and 2 hours after administration in one patient.

In clinical trials the observed incidence of malignancy among Xolair-treated patients (0.5%) was numerically higher than among patients in control groups (0.2%).

The adverse reactions most commonly observed among patients treated with Xolair in clinical studies included injection site reaction (45%), viral infections (23%), upper respiratory tract infection (20%), sinusitis (16%), headache (15%), and pharyngitis (11%). These events were observed at similar rates in Xolair-treated patients and control patients. These were also the most frequently reported adverse reactions resulting in clinical intervention (e.g., discontinuation of Xolair, or the need for concomitant medication to treat an adverse reaction).

Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in the clinical studies of one drug cannot be directly compared with rates in the clinical studies of another drug and may not reflect the rates observed in medical practice.

The data described above reflect Xolair exposure for 2076 adult and adolescent patients ages 12 and older, including 1687 patients exposed for six months and 555 exposed for one year or more, in either placebo-controlled or other controlled asthma studies. The mean age of patients receiving Xolair was 42 years, with 134 patients 65 years of age or older; 60% were women, and 85% Caucasian. Patients received Xolair 150 to 375 mg every 2 or 4 weeks or, for patients assigned to control groups, standard therapy with or without a placebo.

Table 4 shows adverse events that occurred ≥ 1% more frequently in patients receiving Xolair than in those receiving placebo in the placebo-controlled asthma studies. Adverse events were classified using preferred terms from the International Medical Nomenclature (IMN) dictionary. Injection site reactions were recorded separately from the reporting of other adverse events and are described following Table 4.



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**Table 4**
Adverse Events ≥ 1% More Frequent in Xolair-Treated Patients

| Adverse event | Xolair n=738 (%) | Placebo n=717 (%) |
|---|---|---|
| Body as a whole | | |
| Pain | 7 | 5 |
| Fatigue | 3 | 2 |
| Musculoskeletal system | | |
| Arthralgia | 8 | 6 |
| Fracture | 2 | 1 |
| Leg pain | 4 | 2 |
| Arm pain | 2 | 1 |
| Nervous system | | |
| Dizziness | 3 | 2 |
| Skin and appendages | | |
| Pruritus | 2 | 1 |
| Dermatitis | 2 | 1 |
| Special senses | | |
| Earache | 2 | 1 |

Age (among patients under age 65), race, and gender did not appear to affect the between group differences in the rates of adverse events.

### Injection Site Reactions

Injection site reactions of any severity occurred at a rate of 45% in Xolair-treated patients compared with 43% in placebo-treated patients. The types of injection site reactions included: bruising, redness, warmth, burning, stinging, itching, hive formation, pain, indurations, mass, and inflammation.

Severe injection-site reactions occurred more frequently in Xolair-treated patients compared with patients in the placebo group (12% versus 9%).

The majority of injection site reactions occurred within 1 hour-post injection, lasted less than 8 days, and generally decreased in frequency at subsequent dosing visits.



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### Immunogenicity

Low titers of antibodies to Xolair were detected in approximately 1/1723 (<0.1%) of patients treated with Xolair. The data reflect the percentage of patients whose test results were considered positive for antibodies to Xolair in an ELISA assay and are highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody positivity in the assay may be influenced by several factors including sample handling, timing of sample collection, concomitant medications, and underlying disease. Therefore, comparison of the incidence of antibodies to Xolair with the incidence of antibodies to other products may be misleading.

### Postmarketing Spontaneous Reports

Anaphylaxis: Based on spontaneous reports and an estimated exposure of about 57,300 patients from June 2003 through December 2006, the frequency of anaphylaxis attributed to Xolair use was estimated to be at least 0.2% of patients. Diagnostic criteria of anaphylaxis were skin or mucosal tissue involvement, and, either airway compromise, and/or reduced blood pressure with or without associated symptoms, and a temporal relationship to Xolair administration with no other identifiable cause. Signs and symptoms in these reported cases included bronchospasm, hypotension, syncope, urticaria, angioedema of the throat or tongue, dyspnea, cough, chest tightness, and/or cutaneous angioedema. Pulmonary involvement was reported in 89% of the cases. Hypotension or syncope was reported in 14% of cases. Fifteen percent of the reported cases resulted in hospitalization. A previous history of anaphylaxis unrelated to Xolair was reported in 24% of the cases.

Of the reported cases of anaphylaxis attributed to Xolair, 39% occurred with the first dose, 19% occurred with the second dose, 10% occurred with the third dose, and the rest after subsequent doses. One case occurred after 39 doses (after 19 months of continuous therapy, anaphylaxis occurred when treatment was restarted following a 3 month gap). The time to onset of anaphylaxis in these cases was up to 30 minutes in 35%, greater than 30 and up to 60 minutes in 16%, greater than 60 and up to 90 minutes in 2%, greater than 90 and up to 120 minutes in 6%, greater than 2 hours and up to 6 hours in 5%, greater than 6 hours and up to 12 hours in 14%, greater than 12 hours and up to 24 hours in 8%, and greater than 24 hours and up to 4 days in 5%. In 9% of cases the times to onset were unknown.



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Twenty-three patients who experienced anaphylaxis were rechallenged with Xolair and 18 patients had a recurrence of similar symptoms of anaphylaxis. In addition, anaphylaxis occurred upon rechallenge with Xolair in 4 patients who previously experienced urticaria only.

Hematologic: Severe thrombocytopenia has been reported in postapproval use of Xolair.

Skin: Hair loss has been reported in postapproval use of Xolair.

## OVERDOSAGE

The maximum tolerated dose of Xolair has not been determined. Single intravenous doses of up to 4000 mg have been administered to patients without evidence of dose-limiting toxicities. The highest cumulative dose administered to patients was 44,000 mg over a 20-week period, which was not associated with toxicities.

## DOSAGE AND ADMINISTRATION

Xolair (Omalizumab) 150 to 375 mg is administered SC every 2 or 4 weeks. Because the solution is slightly viscous, the injection may take 5-10 seconds to administer. Doses (mg) and dosing frequency are determined by serum total IgE level (IU/mL), measured before the start of treatment, and body weight (kg). See the dose determination charts below (Table 5 and Table 6) for appropriate dose assignment. Doses of more than 150 mg are divided among more than one injection site to limit injections to not more than 150 mg per site.

The need for continued therapy should be periodically reassessed based upon the patient' s disease severity and level of asthma control.



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**Table 5**
ADMINISTRATION EVERY 4 WEEKS
Xolair Doses (milligrams) Administered by Subcutaneous Injection Every 4 Weeks for Adults and Adolescents (12 Years of Age and Older) with Asthma

| Pre-treatment Serum IgE (IU/mL) | Body Weight (kg) | | | |
|---|---|---|---|---|
| | 30–60 | > 60–70 | > 70–90 | > 90–150 |
| ≥ 30–100 | 150 | 150 | 150 | 300 |
| > 100–200 | 300 | 300 | 300 | |
| > 200–300 | 300 | | | |
| > 300–400 | **SEE TABLE 6** | | | |
| > 400–500 | | | | |
| > 500–600 | | | | |

**Table 6**
ADMINISTRATION EVERY 2 WEEKS
Xolair Doses (milligrams) Administered by Subcutaneous Injection Every 2 Weeks for Adults and Adolescents (12 Years of Age and Older) with Asthma

| Pre-treatment Serum IgE (IU/mL) | Body Weight (kg) | | | |
|---|---|---|---|---|
| | 30–60 | > 60–70 | > 70–90 | > 90–150 |
| ≥ 30–100 | **SEE TABLE 5** | | | |
| > 100–200 | | | | 225 |
| > 200–300 | | 225 | 225 | 300 |
| > 300–400 | 225 | 225 | 300 | |
| > 400–500 | 300 | 300 | 375 | |
| > 500–600 | 300 | 375 | **DO NOT DOSE** | |
| > 600–700 | 375 | | | |



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### Dosing Adjustments

Total IgE levels are elevated during treatment and remain elevated for up to one year after the discontinuation of treatment. Therefore, re-testing of IgE levels during Xolair treatment cannot be used as a guide for dose determination. Dose determination after treatment interruptions lasting less than 1 year should be based on serum IgE levels obtained at the initial dose determination. Total serum IgE levels may be re-tested for dose determination if treatment with Xolair has been interrupted for one year or more.

Doses should be adjusted for significant changes in body weight. (See Table 5 and Table 6.)

### Preparation for Administration

Xolair for SC administration should be prepared using SWFI, USP, ONLY.

Xolair is for single use only and contains no preservatives. The solution should be used for SC administration within 8 hours following reconstitution when stored in the vial at 2–8°C (36–46°F), or within 4 hours of reconstitution when stored at room temperature.

The lyophilized product takes 15–20 minutes to dissolve. The fully reconstituted product will appear clear or slightly opalescent and may have a few small bubbles or foam around the edge of the vial. The reconstituted product is somewhat viscous; in order to obtain the full 1.2 mL dose, ALL OF THE PRODUCT MUST BE WITHDRAWN from the vial before expelling any air or excess solution from the syringe.

**STEP 1:** Draw 1.4 mL of SWFI, USP into a 3-cc syringe equipped with a 1-inch, 18-gauge needle.

**STEP 2:** Place the vial upright on a flat surface and using standard aseptic technique, insert the needle and inject the SWFI, USP directly onto the product.

**STEP 3:** Keeping the vial upright, gently swirl the upright vial for approximately 1 minute to evenly wet the powder. Do not shake.

**STEP 4:** After completing STEP 3, gently swirl the vial for 5–10 seconds approximately every 5 minutes in order to dissolve any remaining solids. There should be no visible gel-like particles in the solution. Do not use if foreign particles are present.

> Note: Some vials may take longer than 20 minutes to dissolve completely. If this is the case, repeat STEP 4 until there are no visible gel-like particles in the solution. It is acceptable to have small bubbles or foam around the edge of the vial. Do not use if the contents of the vial do not dissolve completely by 40 minutes.



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**STEP 5:** Invert the vial for 15 seconds in order to allow the solution to drain toward the stopper. Using a new 3-cc syringe equipped with a 1-inch, 18-gauge needle, insert the needle into the inverted vial. Position the needle tip at the very bottom of the solution in the vial stopper when drawing the solution into the syringe. Before removing the needle from the vial, pull the plunger all the way back to the end of the syringe barrel in order to remove all of the solution from the inverted vial.

**STEP 6:** Replace the 18-gauge needle with a 25-gauge needle for subcutaneous injection.

**STEP 7:** Expel air, large bubbles, and any excess solution in order to obtain the required 1.2 mL dose. A thin layer of small bubbles may remain at the top of the solution in the syringe. Because the solution is slightly viscous, the injection may take 5–10 seconds to administer.

A vial delivers 1.2 mL (150 mg) of Xolair. For a 75 mg dose, draw up 0.6 mL into the syringe and discard the remaining product (see Table 7).

**Table 7**
Number of Injections and Total Injection Volumes for Asthma

| Dose (mg) | Number of Injections | Total Volume Injected (mL)[a] |
|---|---|---|
| 150 | 1 | 1.2 |
| 225 | 2 | 1.8 |
| 300 | 2 | 2.4 |
| 375 | 3 | 3.0 |

[a] 1.2 mL maximum delivered volume per vial.

### Stability and Storage

Xolair should be shipped at controlled ambient temperature (≤30°C [≤86°F]). Xolair should be stored under refrigerated conditions 2–8°C (36–46°F). Do not use beyond the expiration date stamped on carton.

Xolair is for single-use only and contains no preservatives. The solution may be used for SC administration within 8 hours following reconstitution when stored in the vial at 2–8°C (36–46°F), or within 4 hours of reconstitution when stored at room temperature.

Reconstituted Xolair vials should be protected from direct sunlight.

### HOW SUPPLIED

Xolair (Omalizumab) is supplied as a lyophilized, sterile powder in a single-use, 5-cc vial that is designed to deliver 150 mg of Xolair upon reconstitution with 1.4 mL SWFI, USP.



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Each carton contains one single-use vial of Xolair® (Omalizumab) NDC 50242-040-62.

---

**XOLAIR®**
**Omalizumab**

**For Subcutaneous Use**

**Manufactured by:**

**Genentech, Inc.**

**1 DNA Way**

**South San Francisco, CA 94080-4990**

7390205/XOL-400050

LX1331

4840201

**Initial US Approval: June 2003**

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Jointly marketed by:

**Genentech, Inc.**
1 DNA Way
South San Francisco, CA 94080-4990

**Novartis Pharmaceuticals Corporation**
One Health Plaza
East Hanover, NJ 07936-1080



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**MEDICATION GUIDE**

**XOLAIR®**

**(omalizumab)**

***IMPORTANT: XOLAIR SHOULD ALWAYS BE INJECTED IN YOUR DOCTOR'S OFFICE.***

## WHAT IS THE MOST IMPORTANT INFORMATION I SHOULD KNOW ABOUT XOLAIR?

**A severe allergic reaction called anaphylaxis has happened in some patients after they received Xolair.** Anaphylaxis is a life-threatening condition and can lead to death so get emergency medical treatment right away if symptoms occur.

**Signs and Symptoms of anaphylaxis include:**

- wheezing, shortness of breath, cough, chest tightness, or trouble breathing
- low blood pressure, dizziness, fainting, rapid or weak heartbeat, anxiety, or feeling of □impending doom□
- flushing, itching, hives, or feeling warm
- swelling of the throat or tongue, throat tightness, hoarse voice, or trouble swallowing

Get emergency medical treatment right away if you have signs or symptoms of anaphylaxis after receiving Xolair.

**Anaphylaxis from Xolair can happen:**

- right after receiving a Xolair injection or hours later
- after any Xolair injection. Anaphylaxis has occurred after the first Xolair injection or after many Xolair injections.

Your healthcare provider should watch you for some time in the office for signs or symptoms of anaphylaxis after injecting Xolair. If you have signs or symptoms of anaphylaxis, tell your healthcare provider right away.

Your healthcare provider should instruct you about getting emergency medical treatment and further medical care if you have signs or symptoms of anaphylaxis after leaving the doctor's office.

## WHAT IS XOLAIR?

Xolair is an injectable medicine for patients ages 12 and older with moderate to severe persistent allergic asthma whose asthma symptoms are not controlled by asthma medicines called inhaled corticosteroids. A skin or blood test is done to see if you have allergic asthma.

## what else should I know about XOLAIR?

- You should not receive Xolair if you have ever had an allergic reaction to a Xolair injection.
- Do not change or stop taking any of your other asthma medicines unless your healthcare provider tells you to do so.
- There are other possible side effects with Xolair. Talk to your doctor for more information. You can also go to www.xolair.com or call 1-866-4XOLAIR (1-866-496-5247).

**This Medication Guide has been approved by the U.S. Food and Drug Administration.**



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# Antibodies

## A LABORATORY MANUAL



Ed Harlow
David Lane



AMG1015

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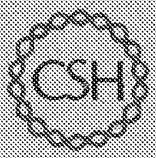
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# Antibodies

## A LABORATORY MANUAL

Ed Harlow
Cold Spring Harbor Laboratory

David Lane
Imperial Cancer Research Fund Laboratories




Cold Spring Harbor Laboratory
1988



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# Antibodies
## A LABORATORY MANUAL

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# 2 ANTIBODY MOLECULES

Antibodies are host proteins produced in response to the presence of foreign molecules in the body. They are synthesized primarily by plasma cells, a terminally differentiated cell of the B-lymphocyte lineage, and circulate throughout the blood and lymph where they bind to foreign antigens. The antibody–antigen complexes are then removed from circulation primarily through phagocytosis by macrophages.

Antibodies are a large family of glycoproteins that share key structural and functional features. Functionally, they can be characterized by their ability to bind both to antigens and to specialized cells or proteins of the immune system. Structurally, antibodies are composed of one or more copies of a characteristic unit that can be visualized as forming a Y shape (Fig. 2.1). Each Y contains four polypeptides—two identical copies of a polypeptide known as the heavy chain and two identical copies of a polypeptide called the light chain. Antibodies are divided into five classes, IgG, IgM, IgA, IgE, and IgD, on the basis of the number of Y-like units and the type of heavy-chain polypeptide they contain.

Many of the important structural features of antibodies are easiest to discuss by considering IgG antibodies, which contain only one structural Y unit and are also the most abundant in serum. For simplicity, mouse antibodies are used as examples in the discussions below, but their key properties are similar to those from other species.

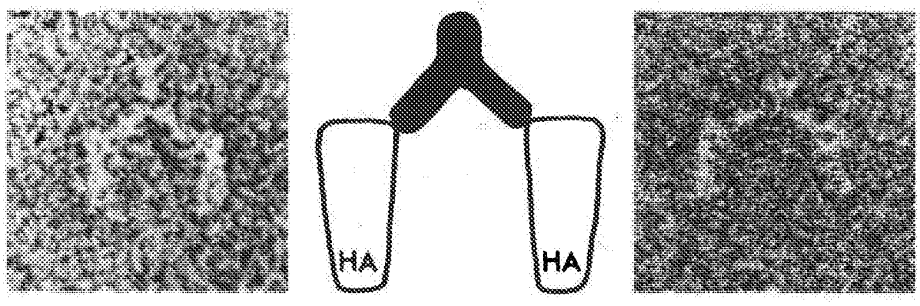



**FIGURE 2.1**
Two influenza hemagglutinin (HA) molecules bound by an IgG molecule. (Adapted from Wrigley et al. 1983.)



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## Antibodies from the IgG class have two identical antigen binding sites

IgG molecules have three protein domains, and Figure 2.2 shows how these domains are organized. Two of the domains are identical and form the arms of the Y. Each arm contains a site that can bind to an antigen, making IgG molecules bivalent. The third domain forms the base of the Y, and this region is important in certain aspects of the immune response. The three domains may be separated from each other by cleavage with the protease papain. The two domains that carry the antigen binding sites are known as Fab fragments (named for the *f*ragment having the *a*ntigen *b*inding site), and the protein domain that is involved in immune regulation is termed the Fc fragment (for the *f*ragment that *c*rystallizes). The region between the Fab and Fc fragments is called the hinge. This segment allows lateral and rotational movement of the two antigen binding domains. In practice, this allows the binding domains freedom to interact with a large number of different antigen conformations (Fig. 2.3).

The two heavy-chain polypeptides in the Y structure are identical and are approximately 55,000 daltons. The two light chains are also identical and are about 25,000 daltons (Fig. 2.4). One light chain associates with the amino-terminal region of one heavy chain to form an antigen binding domain. The carboxy-terminal regions of the two

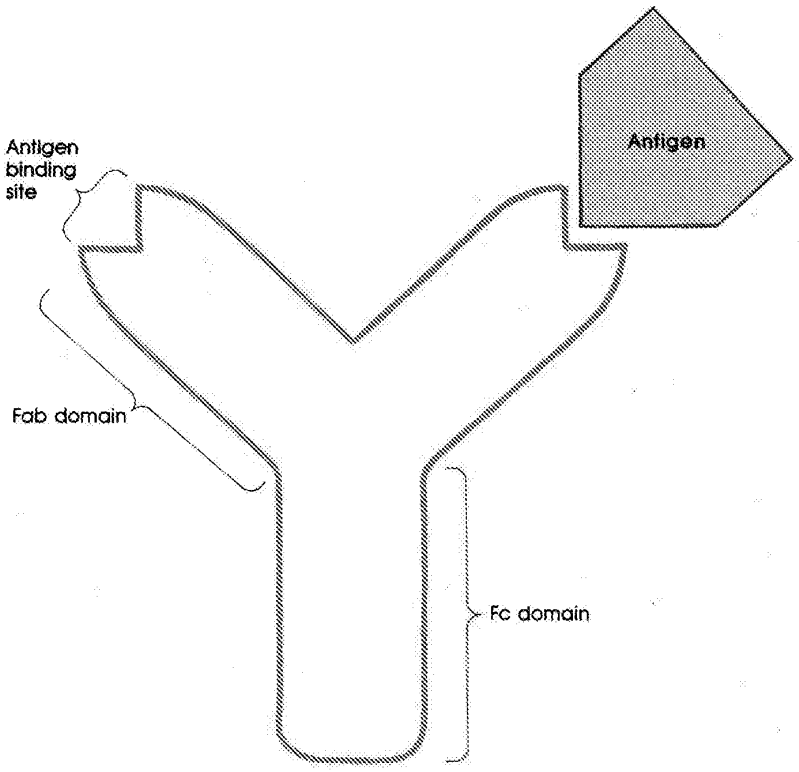



**FIGURE 2.2**
Antibody domains.



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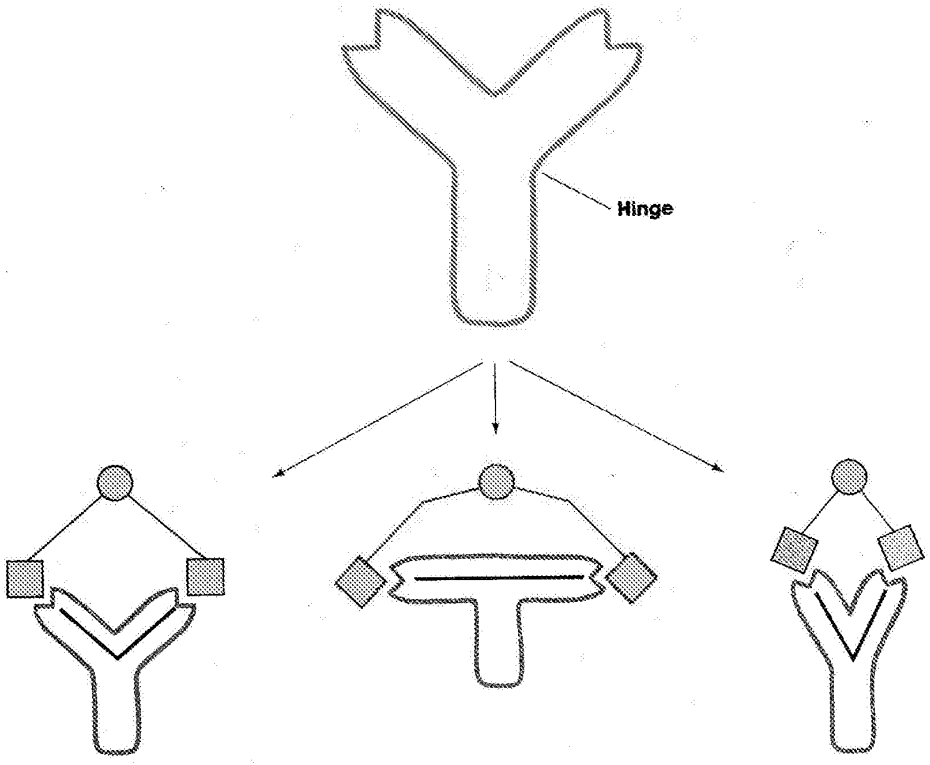



**FIGURE 2.3**
Hinge and flexibility.

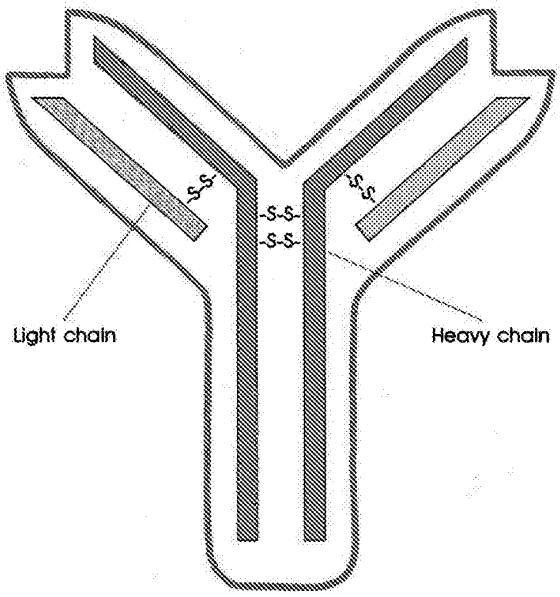



**FIGURE 2.4**
Heavy and light chains combine to form antibody.



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heavy chains fold together to make the Fc domain. The four polypeptide chains are held together by disulfide bridges and noncovalent bonds.

## In addition to the IgG molecules, serum contains other classes of antibody molecules

The other antibody classes, IgM, IgA, IgE, and IgD, are distinguished by the type of heavy chain found in the molecule. Where IgG molecules have heavy chains known as $\gamma$-chains, IgMs have $\mu$-chains, IgAs have $\alpha$-chains, IgEs have $\epsilon$-chains, and IgDs have $\delta$-chains. The differences in the heavy-chain polypeptides allow these proteins to function in different types of immune responses and at particular stages of the maturation of the immune response. The protein sequences responsible for these differences are found primarily in the Fc fragment. Different classes of antibodies may also vary in the number of Y-like units that join to form the complete protein. IgM antibodies, for example, have five Y-shaped units. Because each Y unit has two antigen binding sites, IgMs have 10 identical antigen binding sites. The sites for association between the different Y units are also found in the Fc region. Table 2.1 summarizes many of the properties of these antibody classes.

While there are five different types of heavy chains, there are only two light chains, $\kappa$ and $\lambda$. One light chain always associates with one

**TABLE 2.1**
**Classes of Antibodies**

| Characteristics | IgG | IgM | IgA | IgE | IgD |
|---|---|---|---|---|---|
| Heavy Chain | $\gamma$ | $\mu$ | $\alpha$ | $\epsilon$ | $\delta$ |
| Light Chain | $\kappa$ or $\lambda$ | $\kappa$ or $\lambda$ | $\kappa$ or $\lambda$ | $\kappa$ or $\lambda$ | $\kappa$ or $\lambda$ |
| Molecular Formula | $\gamma_2\kappa_2$ or $\gamma_2\lambda_2$ | $(\mu_2\kappa_2)_5$ or $(\mu_2\lambda_2)_5$ | $(\alpha_2\kappa_2)_n$ [a] or $(\alpha_2\lambda_2)_n$ | $\epsilon_2\kappa_2$ or $\epsilon_2\lambda_2$ | $\delta_2\kappa_2$ or $\delta_2\lambda_2$ |
| Y Structure |  | | | | |
| Valency | 2 | 10 | 2, 4, or 6 | 2 | 2 |
| Concentration in Serum | 8–16 mg/ml | 0.5–2 mg/ml | 1–4 mg/ml | 10–400 ng/ml | 0–0.4 mg/ml |
| Function | Secondary response | Primary response | Protects mucous membranes | Protects against parasites (?) | ? |

[a] $n = 1$, 2, or 3.



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heavy chain, so the total number of light chains will always equal the number of heavy chains. Since the basic structural Y unit has two heavy chains and two light chains, IgMs, which have five Y-units, have 10 light chains and 10 heavy chains. However, any one antibody molecule will have only one type of light chain and one type of heavy chain. There are no restrictions on which types of heavy or light chains can form antibodies, so antibodies of all classes (i.e., with different heavy chains) can contain either $\kappa$ or $\lambda$ light chains.

## Comparison of the primary amino acid sequences of light chains reveals a constant and a variable region

Light chains are approximately 220 amino acids long and can be divided into two regions, each about 110 amino acids in length (Fig. 2.5). When sequences from a number of light chains were first com-

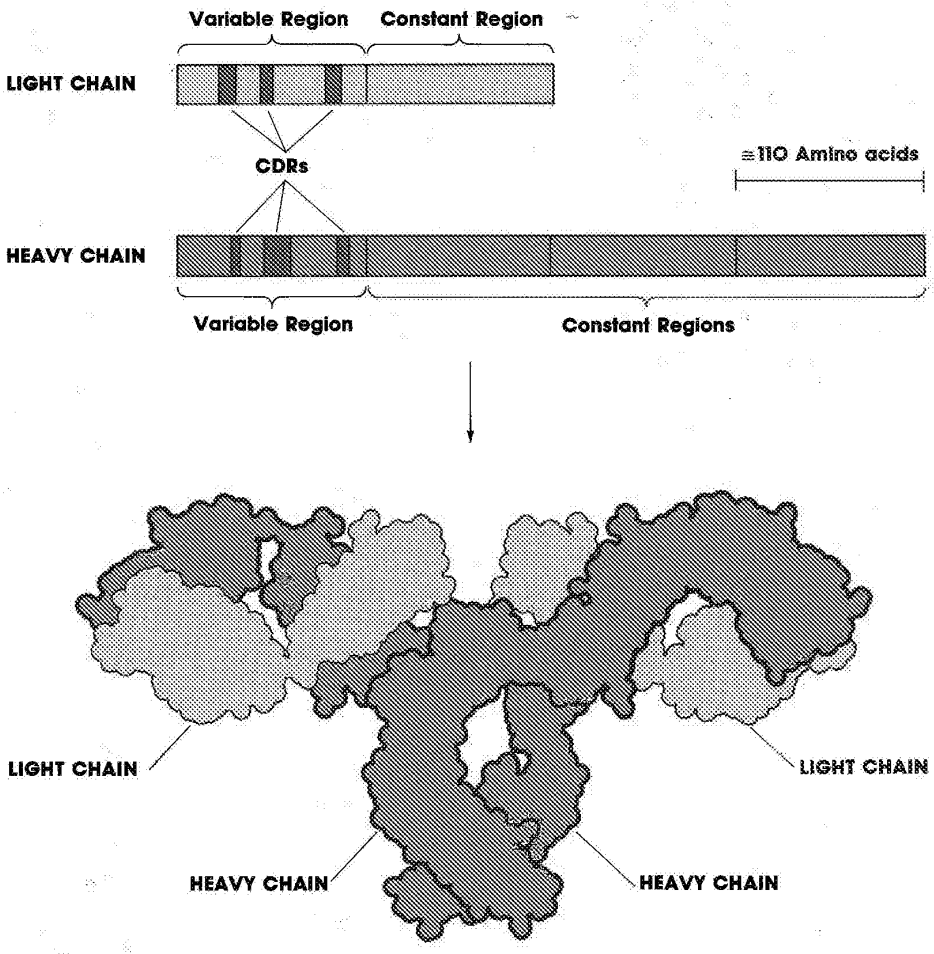



**FIGURE 2.5**
Light- and heavy-chain structure. (Adapted from Silverton et al. 1977.)



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pared, it was found that the amino-terminal half was heterogeneous. This region is known as the variable ($V$) region. The carboxy-terminal half is known as the constant (C) region, and amino acid sequencing studies have shown that there are only two types of constant regions, one for $\kappa$ light chains and one for $\lambda$ light chains. In the mouse the gene for the $\kappa$ light chain is located on chromosome 6, and the $\lambda$ gene is found on chromosome 16.

## Comparison of the sequences of heavy chains also reveal variable and constant regions

The IgG heavy chains are approximately 440 amino acids long and are also divided into variable and constant regions (Fig. 2.5). However, IgG heavy chains contain one variable region and three constant regions. Like the light chain, each of these four regions is about 110 amino acids in length. Heavy chains from different classes may have additional constant regions. For example, $\mu$-chains from IgMs have one variable region but four constant regions. The sequences of the IgG heavy chains have also shown that there are four subclasses of $\gamma$-chains. In the mouse, these subclasses of IgG antibodies are known as $IgG_1$, $IgG_{2a}$, $IgG_{2b}$, and $IgG_3$. The coding region for the heavy-chain polypeptides is found on chromosome 12 in the mouse.

## The variable regions of the heavy and light chains form the antigen binding site

The variable regions of one heavy chain and one light chain combine to form one antigen binding site. The heterogeneity of the variable regions provides the structural basis for the large repertoire of binding sites used by an animal to mount an effective immune response. Perhaps not surprisingly, the sequence heterogeneity does not occur randomly throughout the variable region, but is concentrated in regions that form the sites of contact with the antigen. Most of the variability occurs in three short regions of each chain, giving three hypervariable regions for the light chain and three hypervariable regions for the heavy chain. These hypervariable regions form the majority of contact residues for the binding of the antibody to the antigen and are located on short loops extending into the region that interacts with the antigen. Because they are the actual binding site for the antigen, they are referred to as the complementarity determining regions or CDRs. More information on the structure of the antibody–antigen complex is found in Chapter 3.

The genetic basis for diversity in the variable region has been elucidated during recent years. These studies have shown how $\kappa$, $\lambda$, and heavy-chain genes are organized and how these genes are manipulated to generate different variable regions. The heterogeneity in the



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variable regions of both light and heavy chains is due to an intricate combination of recombination and mutation. The simplest case is found with the $\kappa$ gene.

## DNA rearrangements are required for the formation of a functional $\kappa$ gene

One of the remarkable features of the $\kappa$, $\lambda$, and heavy-chain genes is that the organization of these genes is not the same in all cells. For example, cells synthesizing functional $\kappa$ chains have a different $\kappa$ gene structure from cells in which the polypeptide is not expressed. In germ-line and non-B-cell DNA, the coding sequences for the variable and constant regions of the $\kappa$ light chain are separated by several hundred kilobase pairs. The gene is silent in these cells. During B-cell differentiation, the DNA between these regions is removed, joining the variable and constant regions and producing a functional gene (Fig. 2.6). There are approximately 200 different $\kappa$ variable regions and only one constant region. During the maturation of B cells, recombination brings one of the variable regions and the constant region together to produce a functional gene. The selection of the variable region is essentially random.

During studies of the fine structure of the recombination points between the variable and constant coding regions, it became clear that simple joining of these two regions did not account for all the variation that was detected. These studies led to the discovery of a third segment between the variable and constant regions called the *J* region for joining. Recombination brings the variable region just upstream of one of five *J* regions, producing a variable region–*J* region–constant region alignment. This alignment yields a functional $\kappa$ gene. As discussed below, the recombination events do not always occur at exactly

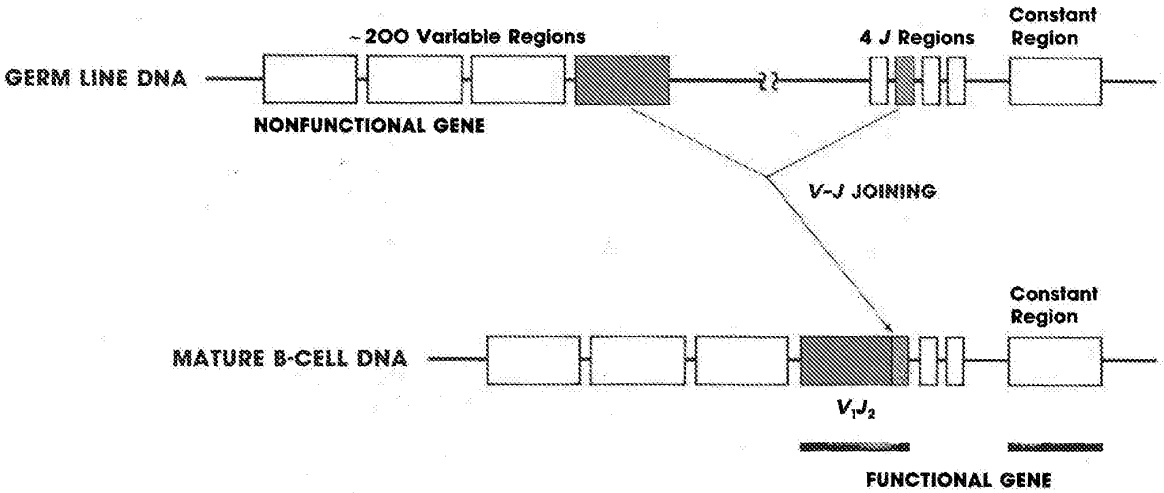



**FIGURE 2.6**
Kappa rearrangements in germ line and B lymphocytes.



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the same nucleotides, and this allows for some variation in the amino acids found at the $V$–$J$ junction.

Although five different $J$ regions for $\kappa$-chains have been found in genomic DNA sequences, only four of these can be used to synthesize functional polypeptides. The other, $J_3$, has a mutated donor splice site and cannot produce a functional mRNA. Therefore, in the maturation of a functional $\kappa$ light-chain gene, recombination must occur between one of the approximately 200 variable regions and one of the four functional $J$ regions (Fig. 2.6), yielding approximately 800 different $\kappa$-chain polypeptides for homozygous mice.

## DNA rearrangements are also required to form a functional $\lambda$ gene

Similar types of recombination events are required to produce a functional $\lambda$ light-chain polypeptide (Fig. 2.7). In the germ-line DNA, there are two variable regions and four constant regions in the $\lambda$ coding region. Each constant region is paired with a single $J$ region, and recombination occurs between the variable and $J$ regions. However, unlike the $\kappa$ gene, the two variable regions are not found upstream of the four constant regions, but are separated from each other. Each is paired with two $J$–constant regions. Analysis of the DNA sequences around the $J_4$ region has shown that it carries several mutations which block the successful production of mRNA. Also, no recombination events have ever been reported that join a downstream variable region to an upstream constant region. Therefore, this organization allows the production of five possible $\lambda$ light chains.

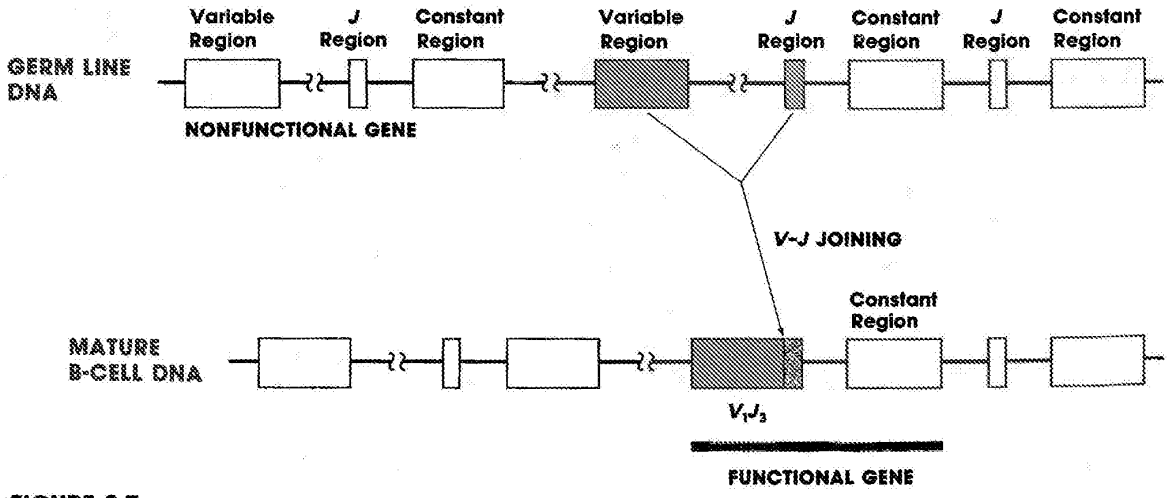



**FIGURE 2.7**
Lambda $V$–$J$ joining.



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## Forming a functional heavy-chain gene requires two DNA rearrangements

In addition to the variable, *J*, and constant regions, heavy chains also contain a fourth coding region referred to as the *D*, or diversity, region (Fig. 2.8). The *D* region is located between the variable regions and the *J*–constant region. The production of a functional heavy chain requires two recombination events, one joining a *D* region to a *J*–constant region, and another joining a variable region to the *D* region. There are approximately 50–100 variable, 12 *D*, and 4 *J* chain regions that form the heavy-chain gene cluster on chromosome 12 in the mouse. However, the *D* regions produce functional proteins in all three reading frames, so, because the recombination events are not precise, the *D* regions can code for 36 different sequences. Most experimental work has suggested that the first recombination event joins a *D* region to a *J* region. Then the variable to *D* region recombination occurs. Having multiple regions helps to generate a large number of heavy chains, with at least 7200 different possibilities for homozygous mice.

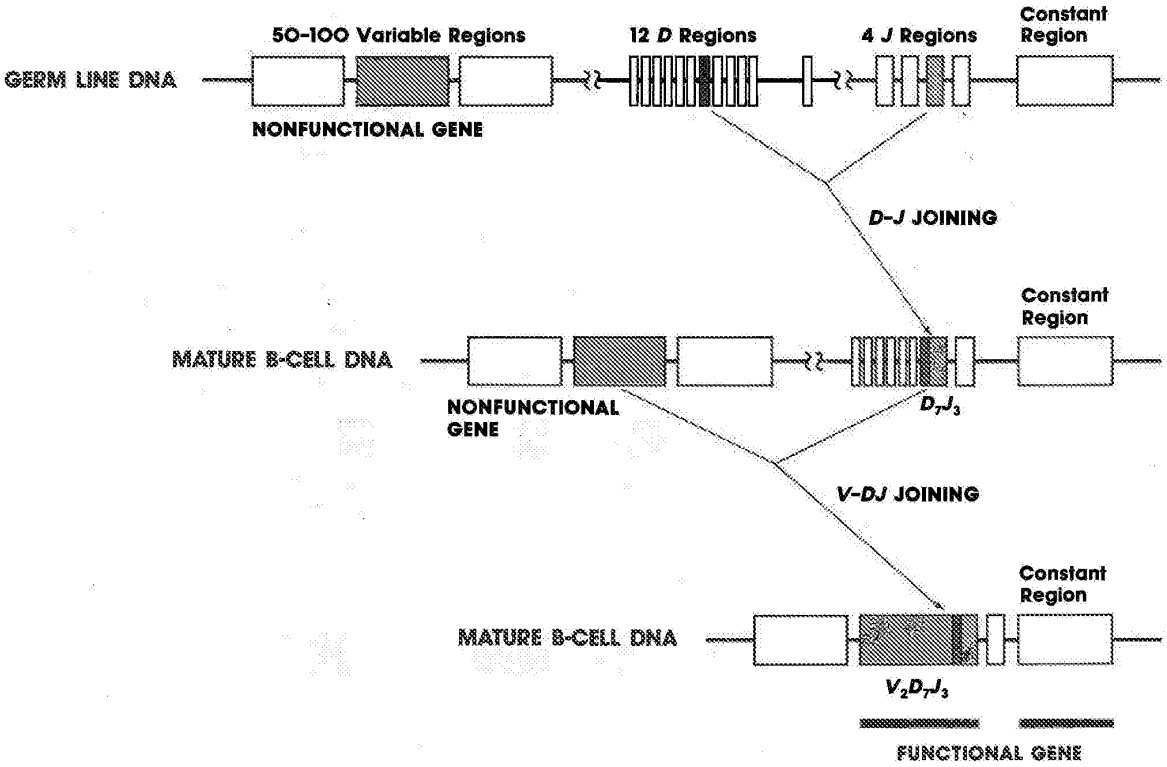



**FIGURE 2.8**
Heavy-chain *VDJ* joining.



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## These rearrangements and additional special mechanisms create a vast number of antigen binding sites

As discussed above, recombination between the variable, *D*, and *J* regions produces a large number of different heavy- and light-chain polypeptide sequences. The variable regions themselves contain the coding sequences for CDR 1 and CDR 2 of both the heavy and light chains. As shown in Figure 2.9, the recombination junctions produce sequences that encode amino acids for the third CDR. As discussed in Chapter 3, the CDRs are the primary sites of antigen binding, and therefore, recombination provides both different assortments of the various CDRs and, because the recombination is not always precise, diversity in the third CDR.

For the mouse, there are at least 800 potential $\kappa$ chains, five $\lambda$ chains, and 7200 heavy chains. If all light chains have a chance to pair with all heavy chains in the production of the antigen binding site, there are potentially $5.8 \times 10^6$ binding domains ($[800 + 5] \times 7200$). Diversity at the recombination junctions raises the number of possible combinations. Sequencing of $\kappa$ chains has shown that a number of mutations can be introduced at the recombination sites. These types of mutations are also seen for heavy chains. Heavy chains show another type of mutation found at recombination sites in which a random number of nucleotides are introduced, further increasing the number of available coding variations. Recombination and random assortment of the light and heavy chains create the lower limit for the number of different antigen binding sites.

Another mechanism also increases antibody diversity. Greater than half of the heavy- or light-chain variable regions carry point mutations in the antigen binding regions. Although the mechanisms that generate these mutations are not known, they appear to provide a system that fine-tunes the binding site, thus creating a better fit for the antigen–antibody interaction. This process is known as affinity maturation and is discussed in more detail in Chapter 4.

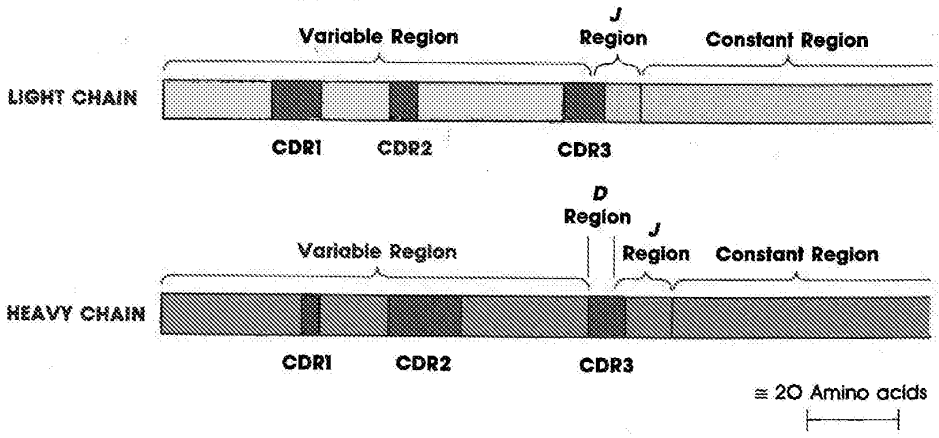



**FIGURE 2.9**
Heavy- and light-chain rearrangements both reassort and restructure CDRs.



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Although calculating the number of different antigen binding sites that can be formed by recombination, junctional diversity, mutation, and association of different light and heavy chains quickly becomes an algebraic rather than an immunochemical problem, it does serve to highlight the ability of humoral immunity to respond to a large number of antigens.

## Allelic exclusion ensures that only one rearranged light-chain gene and one rearranged heavy-chain gene are expressed in any one B cell

The recombination events that produce different heavy and light chains do not always lead to a functional gene. During B-cell differentiation, light-chain rearrangements begin within the $\kappa$ region, and, if the first rearrangement of one of the diploid genes results in a nonfunctional allele, the other copy undergoes recombination. If both recombination events lead to nonfunctional genes, then recombination begins at the $\lambda$ locus. Similar mechanisms lead to the generation of a functional heavy-chain gene. Once recombination yields a functional antibody, an unknown mechanism prevents further recombination, fixing the antigen binding site for the life of the cell. This mechanism is called allelic exclusion and explains why B lymphocytes secrete antibodies with only one type of antigen binding site and why antibodies have only one type of light chain.

## Additional recombination events are used to generate the different classes and subclasses of antibodies

One fascinating aspect of the maturation of an immune response has been the discovery of a second set of recombination events that

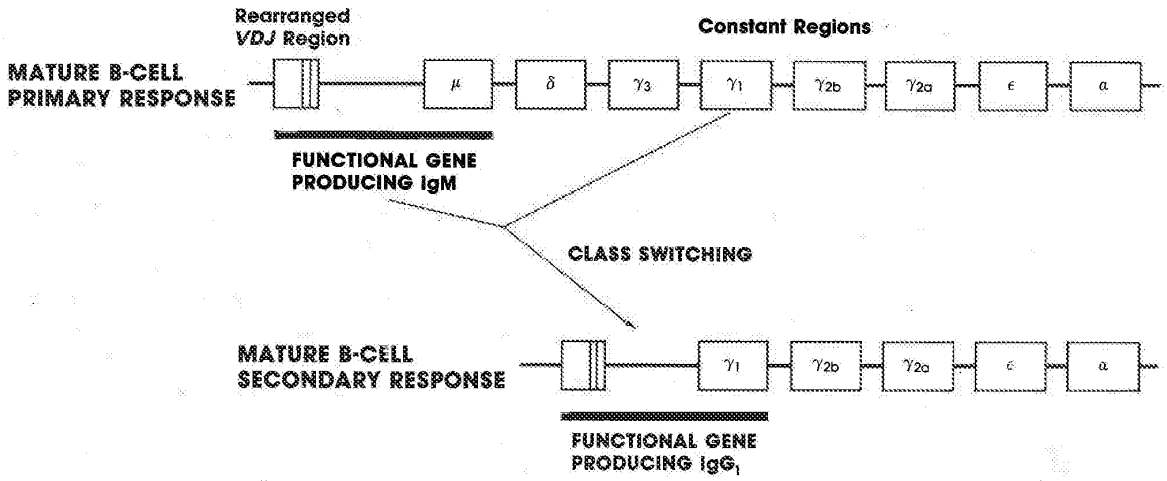



**FIGURE 2.10**
Class and subclass switching.



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involve the heavy-chain constant regions. These rearrangements do not affect the variable region and do not alter the antigen binding domain. They do not contribute to the diversity of binding sites, but instead allow the replacement of one heavy-chain constant region with another. The rearrangement occurs downstream of the *J* region. Aligned here in germ-line DNA is a tandem array of the heavy-chain constant region genes: $\mu$-chain (IgM), $\delta$-chain (IgD), $\gamma_3$-chain ($IgG_3$), $\gamma_1$-chain ($IgG_1$), $\gamma_{2b}$-chain ($IgG_{2b}$), $\gamma_{2a}$-chain ($IgG_{2a}$), $\epsilon$-chain (IgE), and $\alpha$-chain (IgA) (Fig. 2.10). In essence, these rearrangements move the same antigen binding site onto different antibody classes and subclasses. This process is known as class switching and is one of the characteristic events of the maturation of the antibody response (Chapter 4). Because the different classes and subclasses determine many of the functional properties of antibodies—for example, whether they will appear in serum or mucous secretions—this class switching creates an important mechanism for controlling where and how the antigen binding site will be used.

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# NATURAL HISTORY OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA

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**Abstract** *Background.* Paroxysmal nocturnal hemoglobinuria (PNH), which is characterized by intravascular hemolysis and venous thrombosis, is an acquired clonal disorder associated with a somatic mutation in a totipotent hematopoietic stem cell. An understanding of the natural history of PNH is essential to improve therapy.

*Methods.* We have followed a group of 80 consecutive patients with PNH who were referred to Hammersmith Hospital, London, between 1940 and 1970. They were treated with supportive measures, such as oral anticoagulant therapy after established thromboses, and transfusions.

*Results.* The median age of the patients at the time of diagnosis was 42 years (range, 16 to 75), and the median survival after diagnosis was 10 years, with 22 patients (28 percent) surviving for 25 years. Sixty patients have died; 28 of the 48 patients for whom the cause of death is known died from either venous thrombosis or hemorrhage. Thirty-one patients (39 percent) had one or more episodes of venous thrombosis during their illness. Of the 35 patients who survived for 10 years or more, 12 had a spontaneous clinical recovery. No PNH-affected cells were found among the erythrocytes or neutrophils of the patients in prolonged remission, but a few PNH-affected lymphocytes were detectable in three of the four patients tested. Leukemia did not develop in any of the patients.

*Conclusions.* PNH is a chronic disorder that curtails life. A spontaneous long-term remission can occur, which must be taken into account when considering potentially dangerous treatments, such as bone marrow transplantation. Platelet transfusions should be given, as appropriate, and long-term anticoagulation therapy should be considered for all patients. (N Engl J Med 1995;333:1253-8.)

PAROXYSMAL nocturnal hemoglobinuria (PNH) is an acquired disorder of hematopoiesis characterized by intravascular hemolysis and manifested by episodes of hemoglobinuria and life-threatening venous thromboses.[1] The cellular abnormality in this disorder is caused by a somatic mutation in a totipotent hematopoietic stem cell.[2,3] The cells derived from the abnormal clone are deficient in all surface proteins normally attached to the cell membrane by a glycosylphosphatidylinositol anchor.[4,5]

PNH was first described as a distinct clinical entity in 1882.[6] The cardinal diagnostic test, introduced in the late 1930s, is Ham's test,[7] which is based on the increased sensitivity of PNH-affected erythrocytes to lysis by complement. Deficiency of an antigen known as the membrane inhibitor of reactive lysis (CD59) is largely responsible for the hemolysis[8,9] and is implicated in the tendency for patients to have thromboses.[9] In the past two years the biochemical defect underlying PNH has been pinpointed at an early step in the biosynthesis of glycosylphosphatidylinositol molecules — namely, the transfer of *N*-acetylglucosamine to phosphatidylinositol.[10-12] The protein required for this step is encoded by a gene, *PIG-A*, that is somatically mutated in patients with PNH.[13-17]

Despite the remarkable progress in our understanding of this disorder, treatment has remained largely supportive. The only potentially curative therapy currently available is bone marrow transplantation,[18,19] which is associated with substantial morbidity and mortality.[20] To determine whether the management of PNH can be improved, it is important to know its natural history. We report the results of a long-term study (up to 48 years after the diagnosis) of a group of 80 patients with PNH seen at one institution between 1940 and 1970. This study has uncovered some surprising information on the natural history of the disorder and has identified relatively simple therapies that may reduce the associated morbidity and mortality.

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## METHODS

### Patients

Eighty patients with PNH were referred to Hammersmith Hospital in London between 1940 and 1970. In all patients the diagnosis was established or confirmed by a positive Ham's test.[21] This group of patients was last described in 1972.[22] Follow-up data have been obtained by contacting the patients' primary physicians and reviewing death certificates.

### Complications and Causes of Death

The complications and causes of death reported were either unequivocally diagnosable on clinical grounds or were diagnosed after death. If a complication was not confirmed, it is not reported here. Thus, the reported incidence of complications is likely to be an underestimate, because many of the patients were seen at Hammersmith Hospital only infrequently. We compared the survival of the patients with the survival of a control group matched for sex and age.

### Analysis of Blood Samples

In 1993 venous blood samples were obtained from five patients in either acid–citrate–dextrose or EDTA for the performance of Ham's tests and flow cytometric studies of the expression of glycosylphosphatidylinositol-linked proteins on erythrocytes and white cells, as previously described.[23,24] By definition, normal cells express normal levels of glycosylphosphatidylinositol-linked proteins, whereas PNH-affected cells are deficient in all these proteins.

## RESULTS

### Follow-up Studies

Sixty of the 80 patients were known to have died, and 6 patients were lost to follow-up before 1972. The remaining 14 patients were alive when last seen between

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1975 and 1994, and 9 of the 14 were known to be alive in 1994.

### Clinical Presentation

The presenting features or initial diagnoses were reported previously.[22] The median age at the time of diagnosis was 42 years (range, 16 to 75). Forty-three (84 percent) of the 51 patients for whom reliable information was available had episodes of hemoglobinuria as a chief symptom at some time during their illness.

### Course of Illness and Survival

The course of the disease in each of the 80 patients is shown in Figure 1. From the actuarial survival curve for the group, we calculated a median survival of approximately 10 years (Fig. 2). Twenty-five years after the diagnosis, 58 patients (72 percent) had died, and 22 (28 percent) were alive. The median age at the time of death was 56 years (range, 20 to 84), with a median interval of 10 years (range, 0 to 48) between diagnosis and death. Patient 10 received the diagnosis of PNH in 1939, had a spontaneous remission in 1949, and died of bronchial carcinoma in 1987, 48 years after the diagnosis.

### Cause of Death

For 12 of the 60 patients who died (Table 1), the cause of death was unknown. In 28 of the other 48 patients (58 percent), the cause of death (either thrombosis or hemorrhage attributable to thrombocytopenia) was directly related to PNH. In the other 20 patients (42 percent), the cause of death was unrelated to PNH.

### Venous Thrombosis

Thirty-one patients (39 percent) were known to have had one or more episodes of venous thrombosis during the course of their illness (Table 2), and several patients had repeated thromboses. In many patients the thrombosis was either fatal or life-threatening, and it was often unheralded.

### Spontaneous Remission

Twelve patients (15 percent) had spontaneous clinical remissions (Fig. 1), with negative Ham's tests in all nine who were tested. We later obtained blood samples from five of these nine patients; in all five the erythrocytes expressed normal levels of glycosylphosphatidylinositol-linked proteins, with no demonstrable PNH-affected erythrocytes (Fig. 3A). In addition, of the four patients tested, none had PNH-affected neutrophils (Fig. 3A), but three of the four had small numbers of PNH-affected lymphocytes (Fig. 3B). Further analysis by double fluorescent staining demonstrated a subpopulation of PNH-affected lymphocytes among CD4+

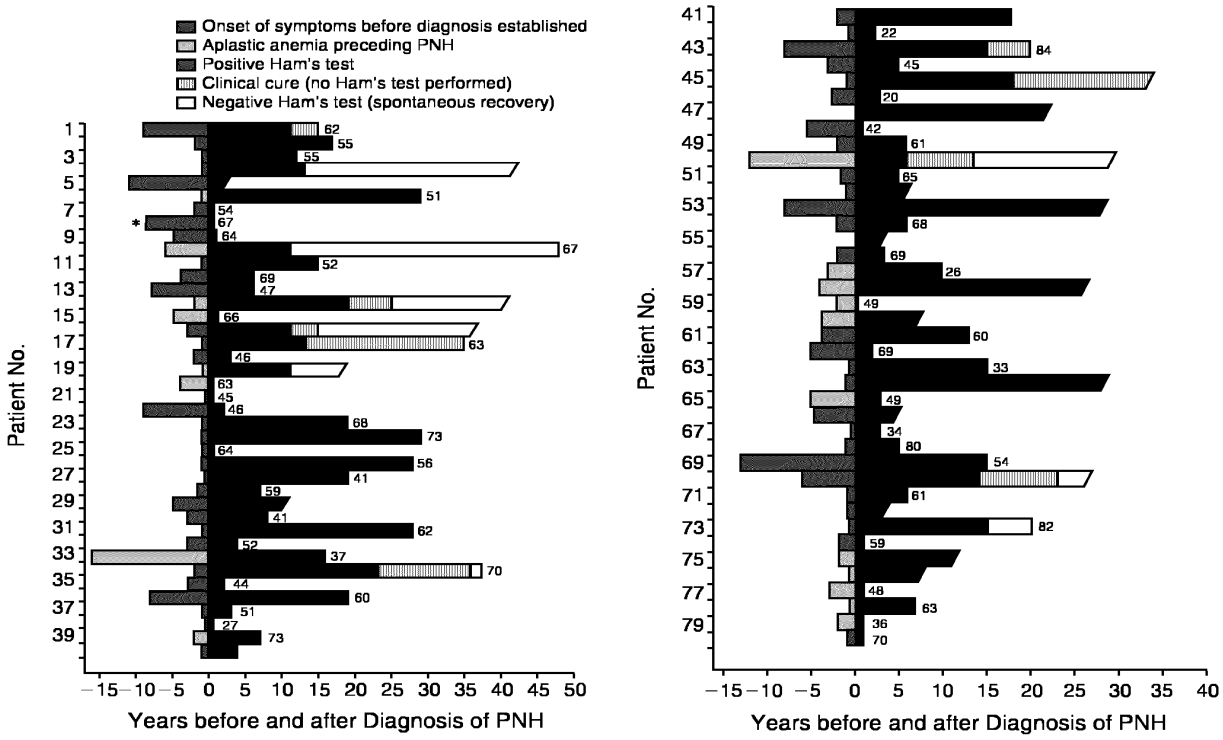



Figure 1. Course of Illness in 80 Consecutive Patients with PNH.

The x axis indicates the years before and after the diagnosis of PNH, which is denoted by the zero on the axis. Bars ending in a straight line indicate patients who died, and their ages at death are shown; bars ending in a diagonal line indicate surviving patients. Nine patients had complete clinical recovery, with negative Ham's tests. Three additional patients had protracted clinical remissions, but Ham's test was not repeated during remission. The asterisk indicates a prolonged but unspecified period of symptoms before the diagnosis was established.

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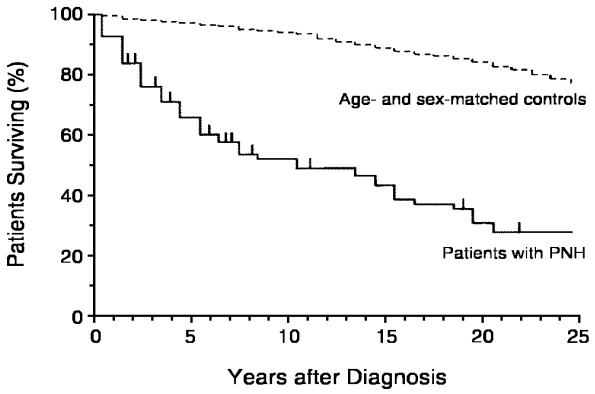



Figure 2. Actuarial Survival from the Time of Diagnosis in 80 Patients with PNH.

The median survival was 10 years. The expected survival of an age- and sex-matched control group is shown for comparison.

T cells, CD8+ T cells, and CD19+ B cells in all three patients.

### Associated Disorders

Twenty-three patients (29 percent) received a diagnosis of aplastic anemia before the diagnosis of PNH. Nine of these patients subsequently had hemolytic PNH, with episodes of overt hemoglobinuria, and six did not; whether the remaining eight patients ever had hemoglobinuria could not be reliably determined.

At the time of the diagnosis, 64 of the 80 patients (80 percent) had thrombocytopenia (platelet count, <150,000 per cubic millimeter), and 38 patients (48 percent) had severe thrombocytopenia (platelet count, <50,000 per cubic millimeter). In addition, 44 patients (55 percent) had neutropenia (neutrophil count, <1500 per cubic millimeter).

In five patients the disorder progressed from hemolytic PNH to aplasia. Ham's test remained positive in four of these patients, but the fifth (Patient 34) subsequently had a negative Ham's test, with no PNH-affected erythrocytes or neutrophils. The patient died from bleeding due to severe thrombocytopenia 37 years after the diagnosis of PNH and at least 8 years after Ham's test had become negative.

Leukemia was not known to have developed in any of the patients.

## Discussion

### Clinical Features

In this group of 80 patients who were followed for up to 48 years, the median actuarial survival was 10 years, with 28 percent of the patients surviving for 25 years. Death was directly attributable to PNH or to bone marrow hypoplasia in 58 percent of the patients who died. Therapy with platelet concentrates should reduce mortality from hemorrhage due to thrombocytopenia.

At least 39 percent of the patients had venous thrombosis at some time during their illness. Many patients had initial thromboses that were life-threatening, but two (Patients 17 and 70), who probably had postpartum hepatic-vein thrombosis, recovered and survived for 34 and 27 years, respectively, after the thrombosis. One other patient (Patient 34) survived for 24 years after a thrombosis of the inferior mesenteric vein.

### Spontaneous Remission

In some patients with PNH, the severity of the illness diminishes with time,[25] and some patients have a complete clinical remission,[22,26] although laboratory abnormalities may persist for years.[27] In this series 15 percent of the patients had spontaneous clinical remissions, and Ham's test became negative in the patients who were tested. Neither the severity of symptoms or complications nor the proportion of red cells lysed in Ham's test was correlated with an eventual remission. Among the patients with remissions, one (Patient 14) had severe, transfusion-dependent PNH and thromboses, and at

Table 1. Causes of Death in 60 Patients with PNH.

| Cause of Death | No. of Patients |
|---|---|
| Probably related to PNH | |
| Venous thrombosis | |
| Hepatic vein | 7 |
| Inferior vena cava | 1 |
| Cerebral vein | 1 |
| Mesenteric vein | 2 |
| Pulmonary embolism | 3 |
| Hemorrhage | |
| Gastrointestinal | 6 |
| Subarachnoid | 3 |
| Intracerebral | 2 |
| Miscellaneous | |
| Liver failure | 2 |
| Intraabdominal event | 1 |
| Probably unrelated to PNH | |
| Arterial thrombosis | |
| Myocardial infarction | 6 |
| Cerebrovascular accident | 2 |
| Bronchopneumonia | 3 |
| Chronic obstructive airways disease plus cor pulmonale | 2 |
| Cardiac tamponade | 1 |
| Constrictive pericarditis | 1 |
| Renal failure | 1 |
| Amyloidosis | 1 |
| Lymphoma | 1 |
| Bronchial carcinoma | 1 |
| Epilepsy | 1 |
| Unknown | 12 |

Table 2. Sites and Types of Thrombosis.

| Site and Type of Thrombosis | No. of Patients |
|---|---|
| Intraabdominal | |
| Hepatic vein | 8 |
| Inferior vena cava | 3 |
| Mesenteric vein | 4 |
| Splenic vein | 1 |
| Renal vein | 1 |
| Unspecified | 1 |
| Other venous sites | |
| Cerebral vein | 4 |
| Pulmonary embolism | 9 |
| Deep vein | 7 |
| Superficial | 3 |
| Arterial | |
| Myocardial infarction | 6 |
| Cerebrovascular accident | 2 |

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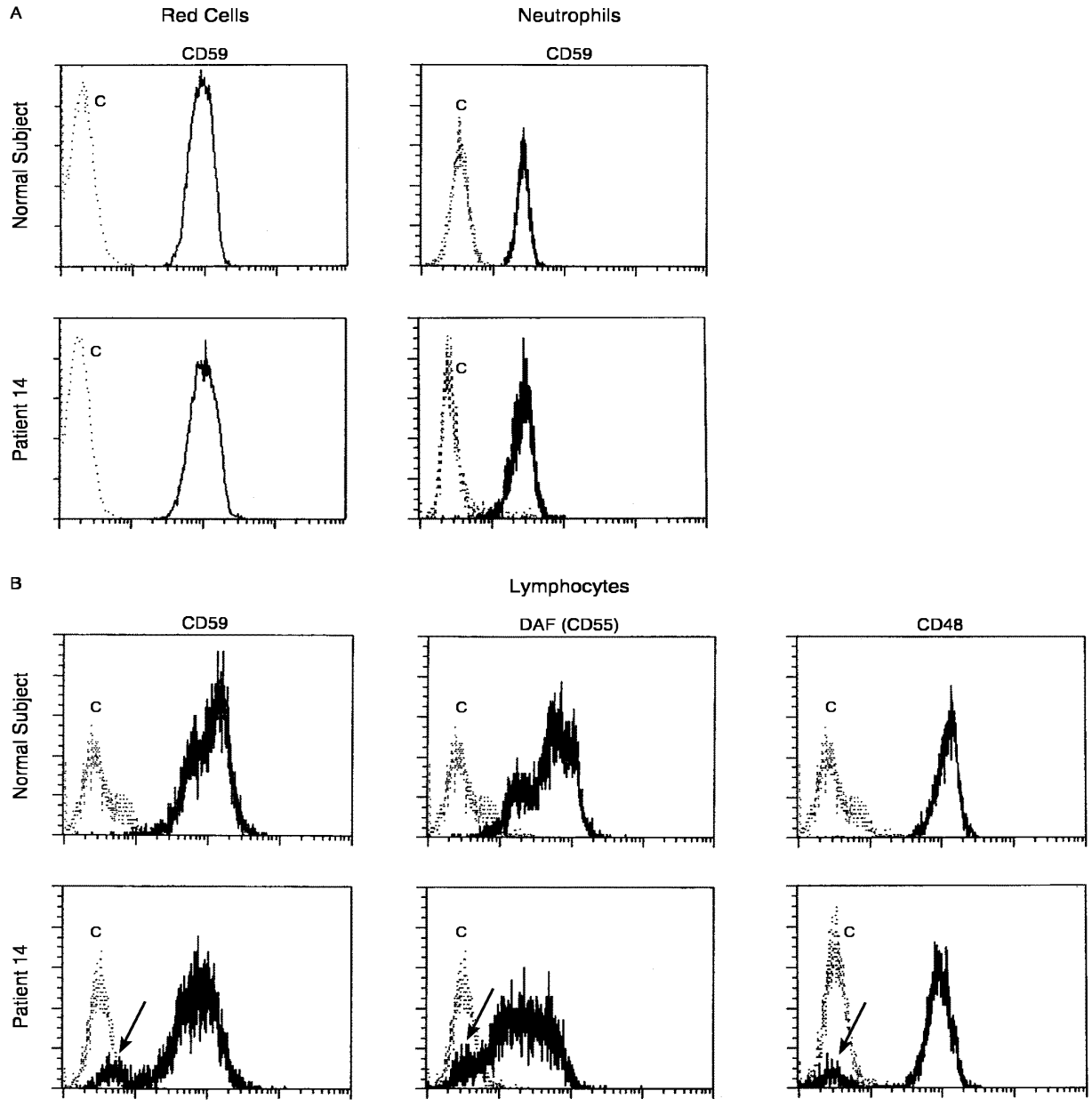



Figure 3. Flow-Cytometric Analysis of Blood Cells from a Normal Subject and Patient 14 after Spontaneous Recovery from PNH.

The analysis was carried out 20 years after the patient's clinical remission began and 17 years after her Ham's test had become negative. Panel A shows a unimodal distribution of cells with normal reactivity after reaction with anti-CD59 antibody (a molecule absent from the surface of PNH-affected cells). The distributions obtained with the patient's red cells and neutrophils are indistinguishable from those of the cells from a normal subject, demonstrating that no PNH-affected cells remain. C indicates distributions obtained in control experiments with an antibody directed against a molecule absent from normal blood cells.

Panel B shows the results of an analysis, similar to that in Panel A, carried out on peripheral-blood lymphocytes. The distributions of cells from a normal subject show that, as compared with the results of analyses with negative control antibody (C), all the lymphocytes reacted with all three antibodies used. The distribution is unimodal for CD48 and bimodal for CD59 and CD55. In contrast, the cells from Patient 14 have a small population of lymphocytes that are unreactive with all three antibodies (arrows), which indicates that these cells lack the corresponding antigen protein molecules on their surfaces. The fact that there is a peak of antigen-negative cells for three different proteins that are normally attached to the cell membrane by a glycosylphosphatidylinositol anchor means that the anchor is absent, which is characteristic of the PNH phenotype. The finding that the PNH clone was still present when there were no PNH-affected erythroid or myeloid cells in Patient 14 during a clinical and hematologic remission is consistent with the notion that this clone does not have a selective advantage once normal hematopoiesis has resumed. DAF denotes decay-accelerating factor.

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least two had over 50 percent lysis in earlier Ham's tests, suggesting that they had few residual normal stem cells at the height of their illness. The spontaneous remissions occurred between 10 and 20 years after the diagnosis of PNH. Of the 35 patients who survived 10 years or more, 12 (34 percent) eventually had remissions. A possible explanation for spontaneous remission is that the clones of PNH-affected cells have a finite life span, like normal somatic cells. Recovery may thus depend on the presence of normal stem cells capable of repopulating the bone marrow.[28]

There were no erythrocytes or neutrophils affected by PNH after recovery, but three of four patients tested had some residual abnormal lymphocytes. These results are consistent with the fact that lymphocytes have a much longer life span than myeloid and erythroid cells and that committed lymphocyte progenitor cells undergo division less frequently than the other cells. If the aging process postulated as being responsible for the gradual disappearance of clones of PNH-affected cells is related to the number of cell divisions, this may explain why abnormal lymphocytes persist for many years after the disappearance of abnormal neutrophils and erythrocytes.

### PNH and Bone Marrow Failure

The data on this series of patients provide further evidence of the close relation between PNH and aplastic anemia. The coexistence of the two conditions in one patient was first reported in 1944,[29] with subsequent reports in 1952[30] and 1961.[31] Cultures of peripheral blood and bone marrow from patients with PNH consistently show reduced numbers of erythroid progenitor cells (erythroid burst-forming units) and myeloid progenitor cells (granulocyte–macrophage colony-forming units), even in the absence of pancytopenia,[32,33] as in patients with aplastic anemia.[34] In addition, PNH eventually develops in 10 to 31 percent of patients with aplastic anemia treated with immunosuppressive agents.[35] It is important to emphasize that PNH is not a complication of immunosuppressive treatment. Instead, the majority of patients with this disorder probably have an underlying aplastic process. Clones of PNH-affected cells may thus have a relative growth or survival advantage over the residual normal bone marrow in patients who have aplastic anemia.[1,28,36] It is conceivable that the mutation leading to the development of PNH occurs quite frequently but that, in the absence of marrow hypoplasia, the clone has difficulty establishing itself.[28]

### PNH and Leukemia

Because of the reports of myelodysplasia and leukemia[1] — invariably, acute myeloid leukemia — in patients with PNH, it has been regarded as a preleukemic condition. Leukemia did not develop in any of our 80 patients, however, indicating that it is relatively rare in unselected patients with PNH. Acute myeloid leukemia eventually develops in approximately 5 percent of patients with aplastic anemia who survive the marrow aplasia.[35] Thus, aplastic anemia may predispose patients to both PNH and acute myeloid leukemia, but the development of PNH may not add to the risk of leukemia associated with uncomplicated aplastic anemia.

In most reported cases of leukemia in patients with PNH in whom the leukemic cells were studied,[37,38] the leukemic clone was derived from the PNH clone. According to a recent report of a patient with PNH who subsequently had a myelodysplastic syndrome, the blasts expressed normal levels of glycosylphosphatidylinositol-linked proteins,[39] indicating that the leukemic event may occur in the residual normal stem cells.

### Management

The natural history of PNH is an important factor in decisions about therapy for individual patients. Thrombolytic treatment of hepatic-vein thrombosis with tissue plasminogen activator has been reported to be effective.[40] Oral anticoagulation therapy after venous thrombosis has been used since the 1950s.[25] In view of the high incidence of potentially fatal thrombosis, a strong case can be made for prophylactic anticoagulation treatment in all patients with PNH in whom there is no contraindication (such as severe thrombocytopenia). This approach may improve survival and reduce morbidity.

The only curative therapy at present is bone marrow transplantation, but it is available to only a small proportion of patients and is associated with substantial morbidity and mortality. The recent advances in the understanding of the pathogenesis of PNH and, in particular, of the molecular lesion open opportunities to explore new treatments, such as gene therapy. The possibility of spontaneous remission and of long-term survival must be taken into account when considering either bone marrow transplantation or other new treatments for this disorder.

We are indebted to the late Miss Eleanor Lloyd for her assistance in this project, to the patients, and to the physicians who originally referred the patients and provided follow-up data.

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IMMUNOBIOLOGY

# Effective induction of naive and recall T-cell responses by targeting antigen to human dendritic cells via a humanized anti–DC-SIGN antibody

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**Current dendritic cell (DC)–based vaccines are based on ex vivo–generated autologous DCs loaded with antigen prior to readministration into patients. A more direct and less laborious strategy is to target antigens to DCs in vivo via specific surface receptors. Therefore, we developed a humanized antibody, hD1V1G2/G4 (hD1), directed against the C-type lectin DC-specific intercellular adhesion molecule 3–grabbing nonintegrin (DC-SIGN) to explore its capacity to serve as a target receptor for vaccination purposes. hD1 was cross-linked to a model antigen, keyhole limpet hemocyanin (KLH). We observed that the chimeric antibody-protein complex (hD1-KLH) bound specifically to DC-SIGN and was rapidly internalized and translocated to the lysosomal compartment. To determine the targeting efficiency of hD1-KLH, monocyte-derived DCs and peripheral blood lymphocytes (PBLs) were obtained from patients who had previously been vaccinated with KLH-pulsed DCs. Autologous DCs pulsed with hD1-KLH induced proliferation of patient PBLs at a 100-fold lower concentration than KLH-pulsed DCs. In addition, hD1-KLH–targeted DCs induced proliferation of naive T cells recognizing KLH epitopes in the context of major histocompatibility complex (MHC) classes I and II. We conclude that antibody-mediated targeting of antigen to DCs via DC-SIGN effectively induces antigen-specific naive as well as recall T-cell responses. This identifies DC-SIGN as a promising target molecule for DC-based vaccination strategies. (Blood. 2005;106:1278-1285)**

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## Introduction

Dendritic cells (DCs) are professional antigen-presenting cells (APCs) that play a key role in regulating antigen-specific immunity. DCs capture antigens, process them into peptides, and present these to T cells.[1] The interaction between DC and T-cell controls the type and magnitude of the resulting immune response. Recently, preclinical and clinical studies have exploited DCs in an attempt to improve vaccine efficacy.[2] Most of these studies involve ex vivo antigen loading of autologous monocyte-derived DCs that are readministrated to the patient, a laborious and costly procedure. A more direct strategy involves targeting of antigens specifically to antigen uptake receptors on the DC in vivo. Potential candidate receptors highly expressed by DCs include Fc receptors[3-5] and members of the C-type lectin family.[6,7] Whereas Fc receptors are expressed by many different cell types, the expression of some members of the C-type lectin family are more DC restricted.[8]

C-type lectins bind sugar residues in a calcium-dependent manner via a highly conserved carbohydrate recognition domain. C-type lectin receptors expressed by DCs are implicated in immunoregulatory processes, such as antigen capture, DC trafficking, and DC–T-cell interactions.[8] Based on the location of the amino (N) terminus, 2 types of membrane-bound C-type lectins can be distinguished on DCs. Type I C-type lectins have their N terminus located outside, while type II C-type lectins have their N terminus located inside the cell. Several studies have been conducted on antigen targeting to C-type lectin receptors for vaccination purposes, mainly focusing on the type I C-type lectins mannose receptor (MR)[9] and DEC-205.[6,10,11] Vaccines based on natural MR ligands have been shown to effectively induce humoral and cellular responses.[9] However, these ligands lack specificity for the MR, and may target multiple lectins with overlapping binding specificities, including soluble lectins and lectin receptors expressed by cells that are not specialized in antigen presentation. More specific receptor targeting can be obtained by the use of antibodies directed against specific C-type lectins, a strategy that has been successfully applied in MR[7,12] and DEC-205[6,10,11] targeting studies. Antibody-mediated targeting of antigen to the MR on human DCs results in antigen presentation and activation of naive T cells in vitro.[7,12] Moreover, in vivo studies on antibody-mediated targeting of DEC-205 in mice demonstrate presentation of the antigen to naive $CD4^+$ and $CD8^+$ T cells.[6,10]

DC-specific intercellular adhesion molecule 3 (ICAM-3)–grabbing nonintegrin (DC-SIGN) represents a member of the

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# ZENAPAX®

## (daclizumab)

## STERILE CONCENTRATE FOR INJECTION

**Rx only**

**WARNING**

**Only physicians experienced in immunosuppressive therapy and management of organ transplant patients should prescribe ZENAPAX® (daclizumab). The physician responsible for ZENAPAX administration should have complete information requisite for the follow-up of the patient. ZENAPAX should only be administered by healthcare personnel trained in the administration of the drug who have available adequate laboratory and supportive medical resources.**

## DESCRIPTION

ZENAPAX® (daclizumab) is an immunosuppressive, humanized IgG1 monoclonal antibody produced by recombinant DNA technology that binds specifically to the alpha subunit (p55 alpha, CD25, or Tac subunit) of the human high-affinity interleukin-2 (IL-2) receptor that is expressed on the surface of activated lymphocytes.

Daclizumab is a composite of human (90%) and murine (10%) antibody sequences. The human sequences were derived from the constant domains of human IgG1 and the variable framework regions of the Eu myeloma antibody. The murine sequences were derived from the complementarity-determining regions of a murine anti-Tac antibody. The molecular weight predicted from the DNA sequence is 144 kilodaltons.

ZENAPAX 25 mg/5 mL is supplied as a clear, sterile, colorless concentrate for further dilution and intravenous administration. Each milliliter of ZENAPAX contains 5 mg of daclizumab and 3.6 mg sodium phosphate monobasic monohydrate, 11 mg sodium phosphate dibasic heptahydrate, 4.6 mg sodium chloride, 0.2 mg polysorbate 80, and may contain hydrochloric acid or sodium hydroxide to adjust the pH to 6.9. No preservatives are added.

## CLINICAL PHARMACOLOGY

### General

#### Mechanism of Action

Daclizumab functions as an IL-2 receptor antagonist that binds with high-affinity to the Tac subunit of the high-affinity IL-2 receptor complex and inhibits IL-2 binding. Daclizumab binding is highly specific for Tac, which is expressed on activated but not resting lymphocytes. Administration of ZENAPAX inhibits IL-2-mediated activation of lymphocytes, a critical pathway in the cellular immune response involved in allograft rejection.



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## ZENAPAX® (daclizumab)

While in the circulation, ZENAPAX impairs the response of the immune system to antigenic challenges. Whether the ability to respond to repeated or ongoing challenges with those antigens returns to normal after ZENAPAX is cleared is unknown (see **PRECAUTIONS**).

### Pharmacokinetics

#### Adults

In clinical trials involving renal allograft patients treated with a 1 mg/kg IV dose of ZENAPAX every 14 days for a total of five doses, peak serum concentration (mean ± SD) rose between the first dose (21 ± 14 μg/mL) and fifth dose (32 ± 22 μg/mL). The mean trough serum concentration before the fifth dose was 7.6 ± 4.0 μg/mL. Population pharmacokinetic analysis of the data using a two-compartment open model gave the following values for a reference patient (45-year-old male Caucasian patient with a body weight of 80 kg and no proteinuria): systemic clearance = 15 mL/hour, volume of central compartment = 2.5 liter, volume of peripheral compartment = 3.4 liter. The estimated terminal elimination half-life for the reference patient was 20 days (480 hours), which is similar to the terminal elimination half-life for human IgG (18 to 23 days). Bayesian estimates of terminal elimination half-life ranged from 11 to 38 days for the 123 patients included in the population analysis. The influence of body weight on systemic clearance supports the dosing of ZENAPAX on a milligram per kilogram (mg/kg) basis. For patients studied, this dosing maintained drug exposure within 30% of the reference exposure. Covariate analyses showed that no dosage adjustments based on age, race, gender or degree of proteinuria, are required for renal allograft patients. The estimated interpatient variability (percent coefficient of variation) in systemic clearance and central volume of distribution were 15% and 27%, respectively.

#### Pediatrics

Pharmacokinetic parameters were evaluated in 61 pediatric patients treated with a 1 mg/kg IV dose of ZENAPAX every 14 days for a total of five doses. Peak serum concentration (mean ± SD) rose between the first dose (16 ± 12 μg/mL) and fifth dose (21 ± 14 μg/mL). The mean trough serum concentration before the fifth dose was 5.0 ± 2.7 μg/mL. Population pharmacokinetic analysis of the data using a two-compartment open model gave the following values for a reference patient (Caucasian patient with a body weight of 29.7 kg): systemic clearance = 10 mL/hour, volume of central compartment = 2.0 liter, volume of peripheral compartment = 1.4 liter. The estimated terminal elimination half-life for the reference patient was 13 days (317 hours). For the patients studied, this dosing maintained drug exposure within 50% of the reference exposure. Covariate analyses suggested that disposition parameters were not influenced to a clinically relevant extent by race, gender or degree of proteinuria. The estimated interpatient variability (percent coefficient of variation) in systemic clearance and central volume of distribution were 30% and 40%, respectively.

### Pharmacodynamics

In vitro and in vivo data suggest that serum levels of 5 to 10 μg/mL are necessary for saturation of the Tac subunit of the IL-2 receptors to block the responses of activated T

lymphocytes. At the recommended dosage regimen, daclizumab saturates the Tac subunit of the IL-2 receptor for approximately 90 and 120 days posttransplant, respectively in pediatric and adult patients. The duration of clinically significant IL-2 receptor blockade after the recommended course of ZENAPAX is not known. No significant changes to circulating lymphocyte numbers or cell phenotypes were observed by flow cytometry. Cytokine release syndrome has not been observed after ZENAPAX administration.

## CLINICAL STUDIES

The safety and efficacy of ZENAPAX for the prophylaxis of acute organ rejection in adult patients receiving their first cadaveric kidney transplant were assessed in two randomized, double-blind, placebo-controlled, multicenter trials. These trials compared a dose of 1.0 mg/kg of ZENAPAX with placebo when each was administered as part of standard immunosuppressive regimens containing either cyclosporine and corticosteroids (double-therapy trial, no US sites) or cyclosporine, corticosteroids, and azathioprine (triple-therapy trial, predominantly US sites) to prevent acute renal allograft rejection. ZENAPAX dosing was initiated within 24 hours pretransplant, with subsequent doses given every 14 days for a total of five doses.

The primary efficacy endpoint of both trials was the proportion of patients who developed a biopsy-proven acute rejection episode within the first 6 months following transplantation. As shown in **Table 1**, this incidence was significantly lower in the group treated with ZENAPAX in both the double-therapy and triple-therapy trials.

**Table 1 Efficacy Parameters**

| | Triple-therapy Regimen (cyclosporine, corticosteroids, and azathioprine) | | | Double-therapy Regimen (cyclosporine and corticosteroids) | | |
|---|---|---|---|---|---|---|
| | Placebo (N=134) | ZENAPAX (N=126) | p-value | Placebo (N=134) | ZENAPAX (N=141) | p-value |
| **Incidence of biopsy-proven acute rejection at 6 months** | | | | | | |
| No. of patients | 47 (35%) | 28 (22%) | 0.03 | 63 (47%) | 39 (28%) | 0.001 |
| **Incidence of biopsy-proven acute rejection at 1 year** | | | | | | |
| No. of patients | 51 (38%) | 35 (28%) | n.s. | 65 (49%) | 39 (28%) | <0.001 |
| **Graft survival at 3 years posttransplant** | | | | | | |
| No. of patients with functioning graft | 111 (83%) | 106 (84%) | n.s. | 105 (78%) | 116 (82%) | n.s. |
| **Patient survival at 3 years posttransplant** | | | | | | |
| No. of patients | 126 (94%) | 116 (92%) | n.s. | 118 (88%) | 135 (96%) | 0.02 |

n.s. = not significant

Treatment with ZENAPAX was associated with better patient survival up to 3 years posttransplant in the double-therapy study. No difference in patient survival was observed in the triple-therapy study between patients treated with ZENAPAX or placebo up to 3 years posttransplant. No difference was observed for graft survival between treatment groups in both studies at 3 years posttransplant.

The incidence of delayed graft function was not different between patients treated with placebo or ZENAPAX in either study. No difference in graft function was observed 1

year and 3 years posttransplant in either study between patients treated with placebo or ZENAPAX.

In a randomized, double-blind study to assess tolerability, pharmacokinetics, and drug interactions in renal allograft recipients, ZENAPAX (50 patients) or placebo (25 patients) was added to an immunosuppressive regimen of cyclosporine, mycophenolate mofetil, and corticosteroids. In this study, the addition of ZENAPAX did not result in an increased incidence of adverse events or a change in the types of adverse events reported. The incidence of the combined endpoint of biopsy-proven or clinically presumptive acute rejection was 20% (5 of 25 patients) in the placebo group and 12% (6 of 50 patients) in the ZENAPAX group. Although numerically lower, the difference in acute rejection was not significant. However, in a randomized, double-blind, placebo-controlled trial of ZENAPAX in cardiac transplant recipients (n=434) receiving concomitant cyclosporine, mycophenolate mofetil, and corticosteroids, mortality was increased in patients randomized to receive ZENAPAX compared with those randomized to receive placebo (see **WARNINGS** and **ADVERSE REACTIONS**).

## INDICATION AND USAGE

ZENAPAX is indicated for the prophylaxis of acute organ rejection in patients receiving renal transplants. It is used as part of an immunosuppressive regimen that includes cyclosporine and corticosteroids.

The efficacy of ZENAPAX for the prophylaxis of acute rejection in recipients of other solid organ allografts has not been demonstrated.

## CONTRAINDICATION

ZENAPAX is contraindicated in patients with known hypersensitivity to daclizumab or to any components of this product.

## WARNINGS (see Boxed WARNING)

The use of ZENAPAX as part of an immunosuppressive regimen including cyclosporine, mycophenolate mofetil, and corticosteroids may be associated with an increase in mortality. In a randomized, double-blind, placebo-controlled trial of ZENAPAX for the prevention of allograft rejection in 434 cardiac transplant recipients receiving concomitant cyclosporine, mycophenolate mofetil, and corticosteroids, mortality at 6 and 12 months was increased in those patients receiving ZENAPAX compared to those receiving placebo (7% vs 5%, respectively at 6 months; 10% vs 6% respectively at 12 months). Some, but not all, of the increase in mortality appeared related to a higher incidence of severe infections. Concomitant use of anti-lymphocyte antibody therapy may also be a factor in some of the fatal infections.

ZENAPAX should be administered under qualified medical supervision. Patients should be informed of the potential benefits of therapy and the risks associated with administration of immunosuppressive therapy.

While the incidence of lymphoproliferative disorders and opportunistic infections in the limited clinical trial experience was no higher in patients treated with ZENAPAX

compared with placebo-treated patients, patients on immunosuppressive therapy are at increased risk for developing lymphoproliferative disorders and opportunistic infections and should be monitored accordingly.

### Hypersensitivity

Severe, acute (onset within 24 hours) hypersensitivity reactions including anaphylaxis have been observed both on initial exposure to ZENAPAX and following re-exposure. These reactions may include hypotension, bronchospasm, wheezing, laryngeal edema, pulmonary edema, cyanosis, hypoxia, respiratory arrest, cardiac arrhythmia, cardiac arrest, peripheral edema, loss of consciousness, fever, rash, urticaria, diaphoresis, pruritus, and/or injection site reactions. If a severe hypersensitivity reaction occurs, therapy with ZENAPAX should be permanently discontinued. Medications for the treatment of severe hypersensitivity reactions including anaphylaxis should be available for immediate use. Patients previously administered ZENAPAX should only be re-exposed to a subsequent course of therapy with caution. The potential risks of such re-administration, specifically those associated with immunosuppression, are not known.

## PRECAUTIONS

### General

It is not known whether ZENAPAX use will have a long-term effect on the ability of the immune system to respond to antigens first encountered during ZENAPAX-induced immunosuppression.

Re-administration of ZENAPAX after an initial course of therapy has not been studied in humans. The potential risks of such re-administration, specifically those associated with immunosuppression and/or the occurrence of anaphylaxis/anaphylactoid reactions, are not known.

### Drug Interactions

The following medications have been administered with ZENAPAX in clinical trials in renal allograft patients with no incremental increase in adverse reactions: cyclosporine, mycophenolate mofetil, ganciclovir, acyclovir, azathioprine, and corticosteroids. Very limited experience exists in these patients with the use of ZENAPAX concomitantly with tacrolimus, muromonab-CD3, antithymocyte globulin, and anti-lymphocyte globulin.

In renal allograft recipients (n=50) treated with ZENAPAX and mycophenolate mofetil, no pharmacokinetic interaction between ZENAPAX and mycophenolic acid, the active metabolite of mycophenolate mofetil, was observed.

However, in a large clinical study in cardiac transplant recipients (n=434), the use of ZENAPAX as part of an immunosuppression regimen including cyclosporine, mycophenolate mofetil, and corticosteroids was associated with an increase in mortality, particularly in patients receiving concomitant anti-lymphocyte antibody therapy and in patients who developed severe infections (see **WARNINGS** and **ADVERSE REACTIONS: Incidence of Infectious Episodes**).

## ZENAPAX® (daclizumab)

### Carcinogenesis, Mutagenesis and Impairment of Fertility

Long-term studies to evaluate the carcinogenic potential of ZENAPAX have not been performed. ZENAPAX was not genotoxic in the Ames or the V79 chromosomal aberration assays, with or without metabolic activation. The effect of ZENAPAX on fertility is not known, because animal reproduction studies have not been conducted with ZENAPAX (see **WARNINGS** and **ADVERSE REACTIONS**).

### Pregnancy

Pregnancy Category C: A preclinical developmental toxicity study with ZENAPAX has shown an increased risk of early prenatal loss in cynomolgus monkeys compared to placebo. However, the clinical experience of ZENAPAX exposed pregnancies is still limited. In general, IgG molecules are known to cross the placental barrier. ZENAPAX should not be used in pregnant women unless the potential benefit justifies the potential risk to the fetus. Women of childbearing potential should use effective contraception before beginning ZENAPAX therapy, during therapy, and for 4 months after completion of ZENAPAX therapy.

### Nursing Mothers

It is not known whether ZENAPAX is excreted in human milk. However, in preclinical developmental toxicity studies with ZENAPAX, four out of seven lactating cynomolgus monkeys given a 5-10 fold multiple (10mg/kg) of the normal human dose were found to secrete very low levels of ZENAPAX (0.17 – 0.28% of maternal serum levels) in breast milk. Because many drugs are excreted in human milk, including human antibodies, and because of the potential for adverse reactions, a decision should be made to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

### Pediatric Use

The safety and effectiveness of ZENAPAX have been established in pediatric patients from 11 months to 17 years of age. Use of ZENAPAX in this age group is supported by evidence from adequate and well-controlled studies of ZENAPAX in adults with additional pediatric pharmacokinetic data (see **CLINICAL PHARMACOLOGY**). Data from the pediatric pharmacokinetic study were also analyzed for efficacy, immunogenicity and safety. In an open-label study, 60 pediatric renal transplant recipients [median age of 10 years] received standard immunosuppressive agents in addition to a regimen of ZENAPAX administered at a dose of 1.0 mg/kg at intervals of 14 days for a total of 5 doses, starting immediately before transplantation. In this study, the combined incidence of biopsy-proven and clinically presumptive acute rejection at 1 year posttransplant was 17% (10/60). Patient and graft survival at 1 year posttransplant were 100% and 96.7%, respectively. The incidence of anti-daclizumab antibodies (34%) observed in the first 3 months posttransplant was higher than the incidence previously observed in adult patients (14%) (see **ADVERSE REACTIONS: Immunogenicity**).

The safety profile of ZENAPAX in pediatric transplant patients was shown to be comparable with that in adult transplant patients with the exception of the following adverse events, which occurred more frequently in pediatric patients (>15% difference in



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incidence): diarrhea, post-operative pain, fever, vomiting, aggravated hypertension, pruritus, and infections of the upper respiratory tract and urinary tract.

It is not known whether the immune response to vaccines, infection, and other antigenic stimuli administered or encountered during ZENAPAX therapy is impaired or whether such response will remain impaired after ZENAPAX therapy.

Also see **CLINICAL PHARMACOLOGY** and **DOSAGE AND ADMINISTRATION**.

### Geriatric Use

Clinical studies of ZENAPAX did not include sufficient numbers of subjects age 65 and older to determine whether they respond differently from younger subjects. Caution must be used in giving immunosuppressive drugs to elderly patients.

## ADVERSE REACTIONS

Because clinical trials are conducted under widely varying conditions, adverse reactions rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug. Rates observed in clinical studies may not reflect those observed in clinical practice. Adverse reaction information obtained in clinical trials does, however, provide a basis for identifying adverse events that appear to be related to drug use and for approximating the rate of occurrence.

The safety of ZENAPAX was determined in four clinical studies of renal allograft rejection, three of which were randomized controlled clinical trials, in 629 patients receiving renal allografts of whom 336 received ZENAPAX and 293 received placebo. All patients received concomitant cyclosporine and corticosteroids. In these clinical trials, ZENAPAX did not appear to alter the pattern, frequency or severity of known major toxicities associated with the use of immunosuppressive drugs.

The use of ZENAPAX was associated with a higher incidence of mortality when compared to placebo in a large (n=434) randomized controlled study of patients receiving cardiac transplants (see **WARNINGS** and **Incidence of Infectious Episodes**).

Adverse events were reported by 95% of the patients in the placebo-treated group and 96% of the patients in the group treated with ZENAPAX. The proportion of patients prematurely withdrawn from the combined studies because of adverse events was 8.5% in the placebo-treated group and 8.6% in the group treated with ZENAPAX.

ZENAPAX did not increase the number of serious adverse events observed compared with placebo. The most frequently reported adverse events were gastrointestinal disorders, which were reported with equal frequency in ZENAPAX- (67%) and placebo-treated (68%) patient groups.

The incidence and types of adverse events were similar in both placebo-treated patients and patients treated with ZENAPAX. The following adverse events occurred in ≥5% of patients treated with ZENAPAX. These events included: *Gastrointestinal System:* constipation, nausea, diarrhea, vomiting, abdominal pain, pyrosis, dyspepsia, abdominal distention, epigastric pain not food-related; *Metabolic and Nutritional:* edema

extremities, edema; *Central and Peripheral Nervous System:* tremor, headache, dizziness; *Urinary System:* oliguria, dysuria, renal tubular necrosis; *Body as a Whole - General:* posttraumatic pain, chest pain, fever, pain, fatigue; *Autonomic Nervous System:* hypertension, hypotension, aggravated hypertension; *Respiratory System:* dyspnea, pulmonary edema, coughing; *Skin and Appendages:* impaired wound healing without infection, acne; *Psychiatric:* insomnia; *Musculoskeletal System:* musculoskeletal pain, back pain; *Heart Rate and Rhythm:* tachycardia; *Vascular Extracardiac:* thrombosis; *Platelet, Bleeding and Clotting Disorders:* bleeding; *Hemic and Lymphatic:* lymphocele.

The following adverse events occurred in <5% and ≥2% of patients treated with ZENAPAX. These included: *Gastrointestinal System:* flatulence, gastritis, hemorrhoids; *Metabolic and Nutritional:* fluid overload, diabetes mellitus, dehydration; *Urinary System:* renal damage, hydronephrosis, urinary tract bleeding, urinary tract disorder, renal insufficiency; *Body as a Whole - General:* shivering, generalized weakness; *Central and Peripheral Nervous System:* urinary retention, leg cramps, prickly sensation; *Respiratory System:* atelectasis, congestion, pharyngitis, rhinitis, hypoxia, rales, abnormal breath sounds, pleural effusion; *Skin and Appendages:* pruritus, hirsutism, rash, night sweats, increased sweating; *Psychiatric:* depression, anxiety; *Musculoskeletal System:* arthralgia, myalgia; *Vision:* vision blurred; *Application Site:* application site reaction.

### Incidence of Malignancies

One and 3 years posttransplant, the incidence of malignancies was 2.7% and 7.8%, respectively, in the placebo group compared with 1.5% and 6.4%, respectively, in the ZENAPAX group. Addition of ZENAPAX did not increase the number of posttransplant lymphomas up to 3 years posttransplant. Lymphomas occurred at a frequency of ≤1.5% in both placebo-treated and ZENAPAX-treated groups.

### Hyperglycemia

No differences in abnormal hematologic or chemical laboratory test results were seen between groups treated with placebo or ZENAPAX with the exception of fasting blood glucose. Fasting blood glucose was measured in a small number of patients treated with placebo or ZENAPAX. A total of 16% (10 of 64 patients) of placebo-treated and 32% (28 of 88 patients) of patients treated with ZENAPAX had high fasting blood glucose values. Most of these high values occurred either on the first day posttransplant when patients received high doses of corticosteroids or in patients with diabetes.

### Incidence of Infectious Episodes

The overall incidence of infectious episodes, including viral infections, fungal infections, bacteremia and septicemia, and pneumonia, was not higher in patients treated with ZENAPAX than in placebo-treated patients in trials of renal transplantation. In a large randomized study of ZENAPAX used for the prevention of allograft rejection in patients receiving cardiac allografts, more patients receiving ZENAPAX experienced severe or fatal infections after 12 months of therapy when compared to those receiving placebo (10% vs 7%, respectively). The risks of infection or death may be increased in patients receiving concomitant anti-lymphocyte antibody therapy (see **WARNINGS**).

The types of infections reported in trials of renal transplantation were similar in both the ZENAPAX-treated and the placebo-treated groups. Cytomegalovirus infection was reported in 16% of the patients in the placebo group and 13% of the patients in the ZENAPAX group. One exception was cellulitis and wound infections, which occurred in 4.1% of placebo-treated patients and 8.4% of patients treated with ZENAPAX. At 1 year posttransplant, 7 placebo patients and 1 patient treated with ZENAPAX had died of an infection. At 3 years posttransplant, 8 placebo patients and 4 patients treated with ZENAPAX had died of infection.

### Immunogenicity

Low titers of anti-idiotype antibodies to daclizumab were detected in the adult patients treated with ZENAPAX with an overall incidence of 14%. The incidence of anti-daclizumab antibodies observed in the pediatric patients was 34%. No antibodies that affected efficacy, safety, serum daclizumab levels or any other clinically relevant parameter examined were detected. The data reflect the percentage of patients whose test results were considered positive for antibodies to daclizumab in an ELISA assay and are highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody positivity in the assay may be influenced by several factors including sample handling, timing of sample collection, concomitant medications and underlying disease. For these reasons, comparison of the incidence of antibodies to daclizumab with the incidence of antibodies to other products may be misleading.

### Post-Marketing Experience

The following adverse reactions have been identified and reported during post-approval use of ZENAPAX (daclizumab). Because the reports of these reactions are voluntary and the population is of uncertain size, it is not always possible to reliably estimate the frequency of the reaction or establish a causal relationship to drug exposure.

Severe acute hypersensitivity reactions including anaphylaxis characterized by hypotension, bronchospasm, wheezing, laryngeal edema, pulmonary edema, cyanosis, hypoxia, respiratory arrest, cardiac arrhythmia, cardiac arrest, peripheral edema, loss of consciousness, fever, rash, urticaria, diaphoresis, pruritus, and/or injection site reactions, as well as cytokine release syndrome, have been reported during post-marketing experience with ZENAPAX. The relationship between these reactions and the development of antibodies to ZENAPAX is unknown.

## OVERDOSAGE

There have not been any reports of overdoses with ZENAPAX. A maximum tolerated dose has not been determined in patients. A dose of 1.5 mg/kg has been administered to bone marrow transplant recipients without any associated adverse events.

## DOSAGE AND ADMINISTRATION

ZENAPAX is used as part of an immunosuppressive regimen that includes cyclosporine and corticosteroids. The recommended dose for ZENAPAX in adult and pediatric patients is 1.0 mg/kg (see **PRECAUTIONS: Pediatric Use**). The calculated volume of





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## ZENAPAX® (daclizumab)

ZENAPAX should be mixed with 50 mL of sterile 0.9% sodium chloride solution and administered via a peripheral or central vein over a 15-minute period.

Based on the clinical trials, the standard course of ZENAPAX therapy is five doses. The first dose should be given no more than 24 hours before transplantation. The four remaining doses should be given at intervals of 14 days.

No dosage adjustment is necessary for patients with severe renal impairment. No dosage adjustments based on other identified covariates (age, gender, proteinuria, race) are required for renal allograft patients. No data are available for administration in patients with severe hepatic impairment.

### Instructions for Administration

- ZENAPAX IS NOT FOR DIRECT INJECTION. The calculated volume should be diluted in 50 mL of sterile 0.9% sodium chloride solution before intravenous administration to patients. When mixing the solution, gently invert the bag in order to avoid foaming; DO NOT SHAKE.
- Parenteral drug products should be inspected visually for particulate matter and discoloration before administration. If particulate matter is present or the solution colored, do not use.
- Care must be taken to assure sterility of the prepared solution, since the drug product does not contain any antimicrobial preservative or bacteriostatic agents.
- ZENAPAX is a colorless solution provided as a single-use vial; any unused portion of the drug should be discarded.
- Once the infusion is prepared, it should be administered intravenously within 4 hours. If it must be held longer, it should be refrigerated between 2° to 8°C (36° to 46°F) for up to 24 hours. After 24 hours, the prepared solution should be discarded.
- No incompatibility between ZENAPAX and polyvinyl chloride or polyethylene bags or infusion sets has been observed. No data are available concerning the incompatibility of ZENAPAX with other drug substances. Other drug substances should not be added or infused simultaneously through the same intravenous line.
- ZENAPAX should only be administered by healthcare personnel trained in the administration of the drug who have available adequate laboratory and supportive medical resources.

### HOW SUPPLIED

ZENAPAX is supplied in single-use glass vials. Each vial contains 25 mg of daclizumab in 5 mL of solution (NDC 0004-0501-09). Vials should be stored between the temperatures of 2° to 8°C (36° to 46°F); do not shake or freeze. Protect undiluted solution against direct light. Diluted medication is stable for 24 hours at 4°C or for 4 hours at room temperature.

**ZENAPAX® (daclizumab)**

Roche Pharmaceuticals

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# CENTER FOR DRUG EVALUATION AND RESEARCH AND CENTER FOR BIOLOGICS EVALUATION AND RESEARCH

*APPLICATION NUMBER:*

**125057/0**

# APPROVED LABELING



AMG1062

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(Nos. 3797, 3799)
NEW

**HUMIRA™**
**(adalimumab)**

**Rx only**
**Tear at Perforation to Dispense Patient Information**

**WARNING**

**RISK OF INFECTIONS**

**Cases of tuberculosis (frequently disseminated or extrapulmonary at clinical presentation) have been observed in patients receiving HUMIRA.**

**Patients should be evaluated for latent tuberculosis infection with a tuberculin skin test. Treatment of latent tuberculosis infection should be initiated prior to therapy with HUMIRA.**

## DESCRIPTION

HUMIRA (adalimumab) is a recombinant human IgG1 monoclonal antibody specific for human tumor necrosis factor (TNF). HUMIRA was created using phage display technology resulting in an antibody with human-derived heavy and light chain variable regions and human IgG1:κ constant regions. HUMIRA is produced by recombinant DNA technology in a mammalian cell expression system and is purified by a process that includes specific viral inactivation and removal steps. It consists of 1330 amino acids and has a molecular weight of approximately 148 kilodaltons.

HUMIRA is supplied in single-use, 1 mL pre-filled glass syringes, and also 2 mL glass vials as a sterile, preservative-free solution for subcutaneous administration. The solution of HUMIRA is clear and colorless, with a pH of about 5.2. Each syringe delivers 0.8 mL (40 mg) of drug product. Each vial contains approximately 0.9 mL of solution to deliver 0.8 mL (40 mg) of drug product. Each 0.8 mL HUMIRA contains 40 mg adalimumab, 4.93 mg sodium chloride, 0.69 mg monobasic sodium phosphate dihydrate, 1.22 mg dibasic sodium phosphate dihydrate, 0.24 mg sodium citrate, 1.04 mg citric acid monohydrate, 9.6 mg mannitol, 0.8 mg polysorbate 80 and Water for Injection, USP. Sodium hydroxide added as necessary to adjust pH.

## CLINICAL PHARMACOLOGY

### General



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Adalimumab binds specifically to TNF-alpha and blocks its interaction with the p55 and p75 cell surface TNF receptors. Adalimumab also lyses surface TNF expressing cells *in vitro* in the presence of complement. Adalimumab does not bind or inactivate lymphotoxin (TNF-beta). TNF is a naturally occurring cytokine that is involved in normal inflammatory and immune responses. Elevated levels of TNF are found in the synovial fluid of rheumatoid arthritis patients and play an important role in both the pathologic inflammation and the joint destruction that are hallmarks of rheumatoid arthritis.

Adalimumab also modulates biological responses that are induced or regulated by TNF, including changes in the levels of adhesion molecules responsible for leukocyte migration (ELAM-1, VCAM-1, and ICAM-1 with an $IC_{50}$ of 1-2 X $10^{-10}$M).

## Pharmacodynamics

After treatment with HUMIRA, a rapid decrease in levels of acute phase reactants of inflammation (C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR)) and serum cytokines (IL-6) was observed compared to baseline in patients with rheumatoid arthritis. Serum levels of matrix metalloproteinases (MMP-1 and MMP-3) that produce tissue remodeling responsible for cartilage destruction were also decreased after HUMIRA administration.

## Pharmacokinetics

The maximum serum concentration ($C_{max}$) and the time to reach the maximum concentration ($T_{max}$) were 4.7 ± 1.6 μg/mL and 131 ± 56 hours respectively, following a single 40 mg subcutaneous administration of HUMIRA to healthy adult subjects. The average absolute bioavailability of adalimumab estimated from three studies following a single 40 mg subcutaneous dose was 64%. The pharmacokinetics of adalimumab were linear over the dose range of 0.5 to 10.0 mg/kg following a single intravenous dose.

The single dose pharmacokinetics of adalimumab were determined in several studies with intravenous doses ranging from 0.25 to 10 mg/kg. The distribution volume ($V_{ss}$) ranged from 4.7 to 6.0 L. The systemic clearance of adalimumab is approximately 12 mL/hr. The mean terminal half-life was approximately 2 weeks, ranging from 10 to 20 days across studies. Adalimumab concentrations in the synovial fluid from five rheumatoid arthritis patients ranged from 31- 96% of those in serum.

Adalimumab mean steady-state trough concentrations of approximately 5 μg/mL and 8 to 9 μg/mL, were observed without and with methotrexate (MTX) respectively. The serum adalimumab trough levels at steady state increased approximately proportionally with dose following 20, 40 and 80 mg every other week and every week subcutaneous dosing. In long-term studies with dosing more than two years, there was no evidence of changes in clearance over time.



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Population pharmacokinetic analyses revealed that there was a trend toward higher apparent clearance of adalimumab in the presence of anti-adalimumab antibodies, and lower clearance with increasing age in patients aged 40 to >75 years.

Minor increases in apparent clearance were also predicted in patients receiving doses lower than the recommended dose and in patients with high rheumatoid factor or CRP concentrations. These increases are not likely to be clinically important.

No gender-related pharmacokinetic differences were observed after correction for a patient's body weight. Healthy volunteers and patients with rheumatoid arthritis displayed similar adalimumab pharmacokinetics.

No pharmacokinetic data are available in patients with hepatic or renal impairment.

HUMIRA has not been studied in children.

### Drug Interactions

MTX reduced adalimumab apparent clearance after single and multiple dosing by 29% and 44% respectively.

## CLINICAL STUDIES

The efficacy and safety of HUMIRA were assessed in four randomized, double-blind studies in patients ≥ age 18 with active rheumatoid arthritis diagnosed according to American College of Rheumatology (ACR) criteria. Patients had at least 6 swollen and 9 tender joints. HUMIRA was administered subcutaneously in combination with MTX (12.5 to 25 mg, Studies I and III) or as monotherapy (Study II) or with other disease-modifying anti-rheumatic drugs (DMARDs) (Study IV).

Study I evaluated 271 patients who had failed therapy with at least one but no more than four DMARDs and had inadequate response to MTX. Doses of 20, 40 or 80 mg of HUMIRA or placebo were given every other week for 24 weeks.

Study II evaluated 544 patients who had failed therapy with at least one DMARD. Doses of placebo, 20 or 40 mg of HUMIRA were given as monotherapy every other week or weekly for 26 weeks.

Study III evaluated 619 patients who had an inadequate response to MTX. Patients received placebo, 40 mg of HUMIRA every other week with placebo injections on alternate weeks, or 20 mg of HUMIRA weekly for up to 52 weeks. Study III had an additional primary endpoint at 52 weeks of inhibition of disease progression (as detected by X-ray results).

Study IV assessed safety in 636 patients who were either DMARD-naive or were permitted to remain on their pre-existing rheumatologic therapy provided that therapy was stable for a minimum of 28 days. Patients were randomized to 40 mg of HUMIRA or placebo every other week for 24 weeks.



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The percent of HUMIRA treated patients achieving ACR 20, 50 and 70 responses in Studies II and III are shown in Table 1.

**Table 1 : ACR Responses in Placebo-Controlled Trials (Percent of Patients)**

| | **Study II Monotherapy (26 weeks)** | | | **Study III Methotrexate Combination (24 and 52 weeks)** | |
|---|---|---|---|---|---|
| Response | Placebo<br><br>N=110 | HUMIRA 40 mg every other week<br>N=113 | HUMIRA 40 mg weekly<br>N=103 | Placebo/MTX<br><br>N=200 | HUMIRA/MTX 40 mg every other week<br>N=207 |
| **ACR20** | | | | | |
| Month 6 | 19% | 46%* | 53%* | 30% | 63%* |
| Month 12 | NA | NA | NA | 24% | 59%* |
| **ACR50** | | | | | |
| Month 6 | 8% | 22%* | 35%* | 10% | 39%* |
| Month 12 | NA | NA | NA | 10% | 42%* |
| **ACR70** | | | | | |
| Month 6 | 2% | 12%* | 18%* | 3% | 21%* |
| Month 12 | NA | NA | NA | 5% | 23%* |

* $p<0.01$, HUMIRA vs. placebo

The results of Study I were similar to Study III; patients receiving HUMIRA 40 mg every other week in Study I also achieved ACR 20, 50 and 70 response rates of 65%, 52% and 24%, respectively, compared to placebo responses of 13%, 7% and 3% respectively, at 6 months ($p<0.01$).

The results of the components of the ACR response criteria for Studies II and III are shown in Table 2. Improvement was seen in all components and was maintained to week 52.



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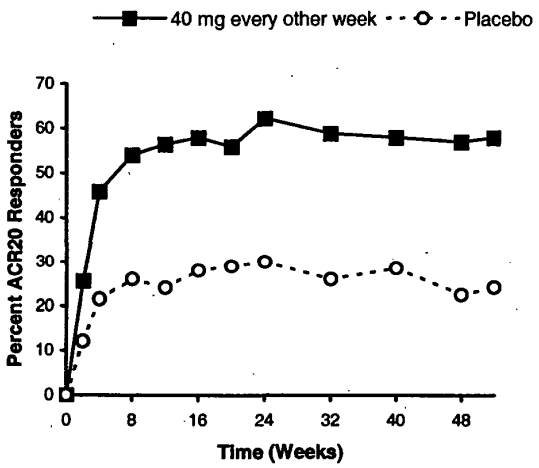
**Table 2: Components of ACR Response in Studies II and III**

| Parameter (median) | Study II | | | | Study III | | | |
|---|---|---|---|---|---|---|---|---|
| | Placebo N=110 | | HUMIRA[a] N=113 | | Placebo/MTX N=200 | | HUMIRA[a]/MTX N=207 | |
| | Baseline | Wk 26 | Baseline | Wk 26 | Baseline | Wk 24 | Baseline | Wk 24 |
| Number of tender joints (0-68) | 35 | 26 | 31 | 16* | 26 | 15 | 24 | 8* |
| Number of swollen joints (0-66) | 19 | 16 | 18 | 10* | 17 | 11 | 18 | 5* |
| Physician global assessment[b] | 7.0 | 6.1 | 6.6 | 3.7* | 6.3 | 3.5 | 6.5 | 2.0* |
| Patient global assessment[b] | 7.5 | 6.3 | 7.5 | 4.5* | 5.4 | 3.9 | 5.2 | 2.0* |
| Pain[b] | 7.3 | 6.1 | 7.3 | 4.1* | 6.0 | 3.8 | 5.8 | 2.1* |
| Disability index (HAQ)[c] | 2.0 | 1.9 | 1.9 | 1.5* | 1.5 | 1.3 | 1.5 | 0.8* |
| CRP (mg/dL) | 3.9 | 4.3 | 4.6 | 1.8* | 1.0 | 0.9 | 1.0 | 0.4* |

[a] 40 mg HUMIRA administered every other week
[b] Visual analogue scale; 0 = best, 10 = worst
[c] Disability Index of the Health Assessment Questionnaire[2]; 0 = best, 3 = worst, measures the patient's ability to perform the following: dress/groom, arise, eat, walk, reach, grip, maintain hygiene, and maintain daily activity
* p<0.001, HUMIRA vs. placebo, based on mean change from baseline

The time course of ACR 20 response for Study III is shown in Figure 1.
In Study III, 85% of patients with ACR 20 responses at week 24 maintained the response at 52 weeks. The time course of ACR 20 response for Study I and Study II were similar.

**Figure 1: Study III ACR 20 Responses over 52 Weeks**




In Study IV, 53% of patients treated with HUMIRA 40 mg every other week plus standard of care had an ACR 20 response at week 24 compared to 35% on placebo plus standard of care (p<0.001). No unique adverse reactions related to the combination of HUMIRA and other DMARDs were observed.



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In all four studies, HUMIRA showed significantly greater improvement than placebo in the disability index of Health Assessment Questionnaire (HAQ) from baseline to the end of study, and significantly greater improvement than placebo in the health-outcomes as assessed by The Short Form Health Survey (SF 36). Improvement was seen in both the Physical Component Summary (PCS) and the Mental Component Summary (MCS).

### Radiographic Response

In Study III, structural joint damage was assessed radiographically and expressed as change in Total Sharp Score (TSS) and its components, the erosion score and Joint Space Narrowing (JSN) score, at month 12 compared to baseline. At baseline, the median TSS was approximately 55 in the placebo and 40 mg every other week groups. The results are shown in Table 3. HUMIRA/MTX treated patients demonstrated less radiographic progression than patients receiving MTX alone.

**Table 3: Radiographic Mean Changes Over 12 Months in Study III**

| | Placebo/MTX | HUMIRA/MTX 40 mg every other week | Placebo/MTX-HUMIRA/MTX (95% Confidence Interval*) | P-value** |
|---|---|---|---|---|
| Total Sharp score | 2.7 | 0.1 | 2.6 (1.4, 3.8) | <0.001 |
| Erosion score | 1.6 | 0.0 | 1.6 (0.9, 2.2) | <0.001 |
| JSN score | 1.0 | 0.1 | 0.9 (0.3, 1.4) | 0.002 |

*95% confidence intervals for the differences in change scores between MTX and HUMIRA.
**Based on rank analysis

## INDICATIONS AND USAGE

HUMIRA is indicated for reducing signs and symptoms and inhibiting the progression of structural damage in adult patients with moderately to severely active rheumatoid arthritis who have had an inadequate response to one or more DMARDs. HUMIRA can be used alone or in combination with MTX or other DMARDs.

## CONTRAINDICATIONS

HUMIRA should not be administered to patients with known hypersensitivity to HUMIRA or any of its components.



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## WARNINGS

**SERIOUS INFECTIONS AND SEPSIS, INCLUDING FATALITIES, HAVE BEEN REPORTED WITH THE USE OF TNF BLOCKING AGENTS INCLUDING HUMIRA. MANY OF THE SERIOUS INFECTIONS HAVE OCCURRED IN PATIENTS ON CONCOMITANT IMMUNOSUPPRESSIVE THERAPY THAT, IN ADDITION TO THEIR RHEUMATOID ARTHRITIS, COULD PREDISPOSE THEM TO INFECTIONS. TUBERCULOSIS AND INVASIVE OPPORTUNISTIC FUNGAL INFECTIONS HAVE BEEN OBSERVED IN PATIENTS TREATED WITH TNF BLOCKING AGENTS INCLUDING HUMIRA.**

**TREATMENT WITH HUMIRA SHOULD NOT BE INITIATED IN PATIENTS WITH ACTIVE INFECTIONS INCLUDING CHRONIC OR LOCALIZED INFECTIONS. PATIENTS WHO DEVELOP A NEW INFECTION WHILE UNDERGOING TREATMENT WITH HUMIRA SHOULD BE MONITORED CLOSELY. ADMINISTRATION OF HUMIRA SHOULD BE DISCONTINUED IF A PATIENT DEVELOPS A SERIOUS INFECTION. PHYSICIANS SHOULD EXERCISE CAUTION WHEN CONSIDERING THE USE OF HUMIRA IN PATIENTS WITH A HISTORY OF RECURRENT INFECTION OR UNDERLYING CONDITIONS WHICH MAY PREDISPOSE THEM TO INFECTIONS, OR PATIENTS WHO HAVE RESIDED IN REGIONS WHERE TUBERCULOSIS AND HISTOPLASMOSIS ARE ENDEMIC (see PRECAUTIONS - Tuberculosis and ADVERSE REACTIONS - Infections). THE BENEFITS AND RISKS OF HUMIRA TREATMENT SHOULD BE CAREFULLY CONSIDERED BEFORE INITIATION OF HUMIRA THERAPY.**

### Neurologic Events

Use of TNF blocking agents, including HUMIRA, has been associated with rare cases of exacerbation of clinical symptoms and/or radiographic evidence of demyelinating disease. Prescribers should exercise caution in considering the use of HUMIRA in patients with preexisting or recent-onset central nervous system demyelinating disorders.

### Malignancies

Lymphomas have been observed in patients treated with TNF blocking agents including HUMIRA. In clinical trials, patients treated with HUMIRA had a higher incidence of lymphoma than the expected rate in the general population (see **ADVERSE REACTIONS-Malignancies**). While patients with rheumatoid arthritis, particularly those with highly active disease, may be at a higher risk (up to several fold) for the development of lymphoma, the role of TNF blockers in the development of malignancy is not known[4,5].

## PRECAUTIONS



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## General

Allergic reactions have been observed in approximately 1% of patients receiving HUMIRA. If an anaphylactic reaction or other serious allergic reaction occurs, administration of HUMIRA should be discontinued immediately and appropriate therapy initiated.

## Information to Patients

The first injection should be performed under the supervision of a qualified health care professional. If a patient or caregiver is to administer HUMIRA, he/she should be instructed in injection techniques and their ability to inject subcutaneously should be assessed to ensure the proper administration of HUMIRA (see **HUMIRA, PATIENT INFORMATION LEAFLET**). A puncture-resistant container for disposal of needles and syringes should be used. Patients or caregivers should be instructed in the technique as well as proper syringe and needle disposal, and be cautioned against reuse of these items.

## Tuberculosis

As observed with other TNF blocking agents, tuberculosis associated with the administration of HUMIRA in clinical trials has been reported (see **WARNINGS**). While cases were observed at all doses, the incidence of tuberculosis reactivations was particularly increased at doses of HUMIRA that were higher than the recommended dose. All patients recovered after standard antimicrobial therapy. No deaths due to tuberculosis occurred during the clinical trials.

Before initiation of therapy with HUMIRA, patients should be evaluated for active or latent tuberculosis infection with a tuberculin skin test. If latent infection is diagnosed, appropriate prophylaxis in accordance with the Centers for Disease Control and Prevention guidelines[6] should be instituted. Patients should be instructed to seek medical advice if signs/symptoms (e.g., persistent cough, wasting/weight loss, low grade fever) suggestive of a tuberculosis infection occur.

## Immunosuppression

The possibility exists for TNF blocking agents, including HUMIRA, to affect host defenses against infections and malignancies since TNF mediates inflammation and modulates cellular immune responses. In a study of 64 patients with rheumatoid arthritis treated with HUMIRA, there was no evidence of depression of delayed-type hypersensitivity, depression of immunoglobulin levels, or change in enumeration of effector T- and B-cells and NK-cells, monocyte/macrophages, and neutrophils. The impact of treatment with HUMIRA on the development and course of malignancies, as well as active and/or chronic infections is not fully understood (see **WARNINGS, ADVERSE REACTIONS, Infections and Malignancies**). The safety and efficacy of HUMIRA in patients with immunosuppression have not been evaluated.



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### Immunizations

No data are available on the effects of vaccination in patients receiving HUMIRA. Live vaccines should not be given concurrently with HUMIRA. No data are available on the secondary transmission of infection by live vaccines in patients receiving HUMIRA.

### Autoimmunity

Treatment with HUMIRA may result in the formation of autoantibodies and, rarely, in the development of a lupus-like syndrome. If a patient develops symptoms suggestive of a lupus-like syndrome following treatment with HUMIRA, treatment should be discontinued (see **ADVERSE REACTIONS, Autoantibodies**).

### Drug Interactions

HUMIRA has been studied in rheumatoid arthritis patients taking concomitant MTX (see **CLINICAL PHARMACOLOGY: Drug Interactions**). The data do not suggest the need for dose adjustment of either HUMIRA or MTX.

### Carcinogenesis, Mutagenesis, and Impairment of Fertility

Long-term animal studies of HUMIRA have not been conducted to evaluate the carcinogenic potential or its effect on fertility. No clastogenic or mutagenic effects of HUMIRA were observed in the *in vivo* mouse micronucleus test or the *Salmonella-Escherichia coli* (Ames) assay, respectively.

### Pregnancy

Pregnancy Category B - An embryo-fetal perinatal developmental toxicity study has been performed in cynomolgus monkeys at dosages up to 100 mg/kg (266 times human AUC when given 40 mg subcutaneous with MTX every week or 373 times human AUC when given 40 mg subcutaneous without MTX) and has revealed no evidence of harm to the fetuses due to adalimumab. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction and developmental studies are not always predictive of human response, HUMIRA should be used during pregnancy only if clearly needed.

### Nursing Mothers

It is not known whether adalimumab is excreted in human milk or absorbed systemically after ingestion. Because many drugs and immunoglobulins are excreted in human milk, and because of the potential for serious adverse reactions in nursing infants from HUMIRA, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.



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### Pediatric Use

Safety and effectiveness of HUMIRA in pediatric patients have not been established.

### Geriatric Use

A total of 519 patients 65 years of age and older, including 107 patients 75 years and older, received HUMIRA in clinical studies. No overall difference in effectiveness was observed between these subjects and younger subjects. The frequency of serious infection and malignancy among HUMIRA treated subjects over age 65 was higher than for those under age 65. Because there is a higher incidence of infections and malignancies in the elderly population in general, caution should be used when treating the elderly.

## ADVERSE REACTIONS

### General

The most serious adverse reactions were (see **WARNINGS**):

- Serious Infections
- Neurologic Events
- Malignancies

The most common adverse reaction with HUMIRA was injection site reactions. In placebo-controlled trials, 20% of patients treated with HUMIRA developed injection site reactions (erythema and/or itching, hemorrhage, pain or swelling), compared to 14% of patients receiving placebo. Most injection site reactions were described as mild and generally did not necessitate drug discontinuation.

The proportion of patients who discontinued treatment due to adverse events during the double-blind, placebo-controlled portion of Studies I, II, III and IV was 7% for patients taking HUMIRA and 4% for placebo-treated patients. The most common adverse events leading to discontinuation of HUMIRA were clinical flare reaction (0.7%), rash (0.3%) and pneumonia (0.3%).

Because clinical trials are conducted under widely varying and controlled conditions, adverse reaction rates observed in clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not predict the rates observed in a broader patient population in clinical practice.

### Infections

In placebo-controlled trials, the rate of infection was 1 per patient year in the HUMIRA treated patients and 0.9 per patient year in the placebo-treated patients. The infections consisted primarily of upper respiratory tract infections, bronchitis and urinary tract infections. Most patients continued on HUMIRA after the infection resolved. The incidence of serious infections was 0.04 per patient year in HUMIRA treated patients and 0.02 per patient year in placebo-treated patients. Serious infections observed included



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pneumonia, septic arthritis, prosthetic and post-surgical infections, erysipelas, cellulitis, diverticulitis, and pyelonephritis (see **WARNINGS**).

Thirteen cases of tuberculosis, including miliary, lymphatic, peritoneal, and pulmonary were reported in clinical trials. Most of the cases of tuberculosis occurred within the first eight months after initiation of therapy and may reflect recrudescence of latent disease. Six cases of invasive opportunistic infections caused by histoplasma, aspergillus, and nocardia were also reported in clinical trials (see **WARNINGS**).

### Malignancies

Among 2468 rheumatoid arthritis patients treated in clinical trials with HUMIRA for a median of 24 months, 48 malignancies of various types were observed, including 10 patients with lymphoma. The Standardized Incidence Ratio (SIR) (ratio of observed rate to age-adjusted expected frequency in the general population) for malignancies was 1.0 (95% CI, 0.7, 1.3) and for lymphomas was 5.4 (95% CI, 2.6, 10.0). An increase of up to several fold in the rate of lymphomas has been reported in the rheumatoid arthritis patient population[4], and may be further increased in patients with more severe disease activity[5] (see **WARNINGS-Malignancies).** The other malignancies observed during use of HUMIRA were breast, colon-rectum, uterine-cervical, prostate, melanoma, gallbladder-bile ducts, and other carcinomas.

### Autoantibodies

In the controlled trials, 12% of patients treated with HUMIRA and 7% of placebo-treated patients that had negative baseline ANA titers developed positive titers at week 24. One patient out of 2334 treated with HUMIRA developed clinical signs suggestive of new-onset lupus-like syndrome. The patient improved following discontinuation of therapy. No patients developed lupus nephritis or central nervous system symptoms. The impact of long-term treatment with HUMIRA on the development of autoimmune diseases is unknown.

### Immunogenicity

Patients in Studies I, II, and III were tested at multiple time points for antibodies to adalimumab during the 6 to 12 month period. Approximately 5% (58 of 1,062) of adult rheumatoid arthritis patients receiving HUMIRA developed low-titer antibodies to adalimumab at least once during treatment, which were neutralizing *in vitro*. Patients treated with concomitant MTX had a lower rate of antibody development than patients on HUMIRA monotherapy (1% versus 12%). No apparent correlation of antibody development to adverse events was observed. With monotherapy, patients receiving every other week dosing may develop antibodies more frequently than those receiving weekly dosing. In patients receiving the recommended dosage of 40 mg every other week as monotherapy, the ACR 20 response was lower among antibody-positive patients than among antibody-negative patients. The long-term immunogenicity of HUMIRA is unknown.



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The data reflect the percentage of patients whose test results were considered positive for antibodies to adalimumab in an ELISA assay, and are highly dependent on the sensitivity and specificity of the assay. Additionally the observed incidence of antibody positivity in an assay may be influenced by several factors including sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to adalimumab with the incidence of antibodies to other products may be misleading.

## Other Adverse Reactions

The data described below reflect exposure to HUMIRA in 2334 patients, including 2073 exposed for 6 months, 1497 exposed for greater than one year and 1380 in adequate and well-controlled studies (Studies I, II, III, and IV). HUMIRA was studied primarily in placebo-controlled trials and in long-term follow up studies for up to 36 months duration. The population had a mean age of 54 years, 77% were female, 91% were Caucasian and had moderately to severely active rheumatoid arthritis. Most patients received 40 mg HUMIRA every other week.

Table 4 summarizes events reported at a rate of at least 5% in patients treated with HUMIRA 40 mg every other week compared to placebo and with an incidence higher than placebo. Adverse event rates in patients treated with HUMIRA 40 mg weekly were similar to rates in patients treated with HUMIRA 40 mg every other week.

**Table 4: Adverse Events Reported by ≥5% of Patients Treated with HUMIRA During Placebo-Controlled Period of Rheumatoid Arthritis Studies**

| | HUMIRA 40 mg subcutaneous Every Other Week (N=705) | Placebo (N=690) |
|---|---|---|
| Adverse Event (Preferred Term) | Percentage | Percentage |
| Respiratory | | |
| Upper respiratory infection | 17 | 13 |
| Sinusitis | 11 | 9 |
| Flu syndrome | 7 | 6 |
| Gastrointestinal | | |
| Nausea | 9 | 8 |
| Abdominal pain | 7 | 4 |
| Laboratory Tests* | | |
| Laboratory test abnormal | 8 | 7 |
| Hypercholesterolemia | 6 | 4 |
| Hyperlipidemia | 7 | 5 |
| Hematuria | 5 | 4 |
| Alkaline phosphatase increased | 5 | 3 |



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| | | |
|---|---|---|
| Other | | |
| Injection site pain | 12 | 12 |
| Headache | 12 | 8 |
| Rash | 12 | 6 |
| Accidental injury | 10 | 8 |
| Injection site reaction** | 8 | 1 |
| Back pain | 6 | 4 |
| Urinary tract infection | 8 | 5 |
| Hypertension | 5 | 3 |

* Laboratory test abnormalities were reported as adverse events in European trials

** Does not include erythema and/or itching, hemorrhage, pain or swelling

Other Adverse Events

Other infrequent serious adverse events occurring at an incidence of less than 5% in patients treated with HUMIRA were:

**Body As A Whole**: Fever, infection, pain in extremity, pelvic pain, sepsis, surgery, thorax pain, tuberculosis reactivated

**Cardiovascular System**: Arrhythmia, atrial fibrillation, cardiovascular disorder, chest pain, congestive heart failure, coronary artery disorder, heart arrest, hypertensive encephalopathy, myocardial infarct, palpitation, pericardial effusion, pericarditis, syncope, tachycardia, vascular disorder

**Collagen Disorder**: Lupus erythematosus syndrome

**Digestive System**: Cholecystitis, cholelithiasis, esophagitis, gastroenteritis, gastrointestinal disorder, gastrointestinal hemorrhage, hepatic necrosis, vomiting

**Endocrine System**: Parathyroid disorder

**Hemic And Lymphatic System**: Agranulocytosis, granulocytopenia, leukopenia, lymphoma like reaction, pancytopenia, polycythemia

**Metabolic And Nutritional Disorders**: Dehydration, healing abnormal, ketosis, paraproteinemia, peripheral edema

**Musculo—Skeletal System**: Arthritis, bone disorder, bone fracture (not spontaneous), bone necrosis, joint disorder, muscle cramps, myasthenia, pyogenic arthritis, synovitis, tendon disorder

**Neoplasia**: Adenoma, carcinomas such as breast, gastrointestinal, skin, urogenital, and others; lymphoma and melanoma.



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**Nervous System**: Confusion, multiple sclerosis, paresthesia, subdural hematoma, tremor

**Respiratory System**: Asthma, bronchospasm, dyspnea, lung disorder, lung function decreased, pleural effusion, pneumonia

**Skin And Appendages**: Cellulitis, erysipelas, herpes zoster

**Special Senses**: Cataract

**Thrombosis**: Thrombosis leg

**Urogenital System**: Cystitis, kidney calculus, menstrual disorder, pyelonephritis

## OVERDOSAGE

The maximum tolerated dose of HUMIRA has not been established in humans. Multiple doses up to 10 mg/kg have been administered to patients in clinical trials without evidence of dose-limiting toxicities. In case of overdosage, it is recommended that the patient be monitored for any signs or symptoms of adverse reactions or effects and appropriate symptomatic treatment instituted immediately.

## DOSAGE AND ADMINISTRATION

The recommended dose of HUMIRA for adult patients with rheumatoid arthritis is 40 mg administered every other week as a subcutaneous injection. MTX, glucocorticoids, salicylates, nonsteroidal anti-inflammatory drugs (NSAIDs), analgesics or other DMARDs may be continued during treatment with HUMIRA. Some patients not taking concomitant MTX may derive additional benefit from increasing the dosing frequency of HUMIRA to 40 mg every week.

HUMIRA is intended for use under the guidance and supervision of a physician. Patients may self-inject HUMIRA if their physician determines that it is appropriate and with medical follow-up, as necessary, after proper training in injection technique.

The solution in the syringe and in the vial should be carefully inspected visually for particulate matter and discoloration prior to subcutaneous administration. If particulates and discolorations are noted, the product should not be used. HUMIRA does not contain preservatives; therefore, unused portions of drug remaining from the syringe or vial should be discarded. NOTE: The needle cover of the syringe contains dry rubber (latex), which should not be handled by persons sensitive to this substance.

Patients using the pre-filled syringes should be instructed to inject the full amount in the syringe (0.8 mL), which provides 40 mg of HUMIRA. For patients and institutions using vials, 0.8 mL of solution providing 40 mg of HUMIRA should be withdrawn from the



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vial and administered according to the directions provided in the Patient Information Leaflet.

Injection sites should be rotated and injections should never be given into areas where the skin is tender, bruised, red or hard (see **PATIENT INFORMATION LEAFLET**).

**Instructions For Activating the Needle Stick Device:** Cartons for institutional use contain a syringe and needle with a needle protection device (see **HOW SUPPLIED**). To activate the needle stick protection device after injection, hold the syringe in one hand and, with the other hand, slide the outer protective shield over the exposed needle until it locks into place.

### Storage and Stability

Do not use beyond the expiration date on the container. HUMIRA must be refrigerated at 2-8° C (36-46° F). DO NOT FREEZE. Protect the vial or/and pre-filled syringe from exposure to light. Store in original carton until time of administration.

## HOW SUPPLIED

HUMIRA™ (adalimumab) is supplied in glass vials and syringes as a preservative-free, sterile solution for subcutaneous administration. The following packaging configurations are available:

### Patient Use Syringe Carton

HUMIRA is dispensed in a carton containing two alcohol preps and two dose trays. Each dose tray consists of a single-use, 1 mL pre-filled glass syringe with a fixed 27 gauge ½ inch needle, providing 40 mg (0.8 mL) of HUMIRA. **The NDC number is 0074-3799-02.**

### Patient Use Vial Carton

HUMIRA is dispensed in a carton containing four alcohol preps and two trays. Each dose tray consists of a single-use, 2 mL glass vial providing 40 mg (0.8 mL) of HUMIRA and one sterile 1 mL syringe with a fixed 25 gauge ⅝ inch needle. **The NDC number is 0074-3797-02.**

### Institutional Use Syringe Carton

Each carton contains two alcohol preps and one tray. Each dose tray consists of a single use, 1 mL pre-filled glass syringe with a fixed 27 gauge ½ inch needle (with a needle stick protection device) providing 40 mg (0.8 mL) HUMIRA. **The NDC number is 0074-3799-01.**

### Institutional Use Vial Carton



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Each carton contains two alcohol preps and one tray. Each dose tray consists of a 2 mL glass vial providing 40 mg (0.8 mL) of HUMIRA, and one sterile syringe with a fixed 27 gauge ½ inch needle (with needle stick protection device). **The NDC number is 0074-3797-01.**

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INTERNATIONAL CONFERENCE ON HARMONISATION OF TECHNICAL REQUIREMENTS FOR REGISTRATION OF PHARMACEUTICALS FOR HUMAN USE

# ICH HARMONISED TRIPARTITE GUIDELINE

# SPECIFICATIONS: TEST PROCEDURES AND ACCEPTANCE CRITERIA FOR BIOTECHNOLOGICAL/BIOLOGICAL PRODUCTS

# Q6B

Current *Step 4* version

dated 10 March 1999

*This Guideline has been developed by the appropriate ICH Expert Working Group and has been subject to consultation by the regulatory parties, in accordance with the ICH Process. At Step 4 of the Process the final draft is recommended for adoption to the regulatory bodies of the European Union, Japan and USA.*



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**Q6B**
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**Current *Step 4* version**

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# SPECIFICATIONS: TEST PROCEDURES AND ACCEPTANCE CRITERIA FOR BIOTECHNOLOGICAL/BIOLOGICAL PRODUCTS

**ICH Harmonised Tripartite Guideline**

Having reached *Step 4* of the ICH Process at the ICH Steering Committee meeting on 10 March 1999, this guideline is recommended for adoption to the three regulatory parties to ICH

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# SPECIFICATIONS: TEST PROCEDURES AND ACCEPTANCE CRITERIA FOR BIOTECHNOLOGICAL/BIOLOGICAL PRODUCTS

## 1. INTRODUCTION

### 1.1 Objective

This guidance document provides general principles on the setting and justification, to the extent possible, of a uniform set of international specifications for biotechnological and biological products to support new marketing applications.

### 1.2 Background

A specification is defined as a list of tests, references to analytical procedures, and appropriate acceptance criteria which are numerical limits, ranges, or other criteria for the tests described. It establishes the set of criteria to which a drug substance, drug product or materials at other stages of its manufacture should conform to be considered acceptable for its intended use. "Conformance to specification" means that the drug substance and drug product, when tested according to the listed analytical procedures, will meet the acceptance criteria. Specifications are critical quality standards that are proposed and justified by the manufacturer and approved by regulatory authorities as conditions of approval.

Specifications are one part of a total control strategy designed to ensure product quality and consistency. Other parts of this strategy include thorough product characterization during development, upon which many of the specifications are based, adherence to Good Manufacturing Practices, a validated manufacturing process, raw materials testing, in-process testing, stability testing, etc.

Specifications are chosen to confirm the quality of the drug substance and drug product rather than to establish full characterization and should focus on those molecular and biological characteristics found to be useful in ensuring the safety and efficacy of the product.

### 1.3 Scope

The principles adopted and explained in this document apply to proteins and polypeptides, their derivatives, and products of which they are components (e.g., conjugates). These proteins and polypeptides are produced from recombinant or non-recombinant cell-culture expression systems and can be highly purified and characterized using an appropriate set of analytical procedures.

The principles outlined in this document may also apply to other product types such as proteins and polypeptides isolated from tissues and body fluids. To determine applicability, manufacturers should consult with the appropriate regulatory authorities.

This document does not cover antibiotics, synthetic peptides and polypeptides, heparins, vitamins, cell metabolites, DNA products, allergenic extracts, conventional vaccines, cells, whole blood, and cellular blood components. A separate ICH Guideline, "Specifications: Test Procedures and Acceptance Criteria for New Drugs Substances and New Drug Products: Chemical Substances" addresses specifications, and other criteria for chemical substances.



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This document does not recommend specific test procedures or specific acceptance criteria nor does it apply to the regulation of preclinical and/or clinical research material.

## 2. PRINCIPLES FOR CONSIDERATION IN SETTING SPECIFICATIONS

### 2.1 Characterization

Characterization of a biotechnological or biological product (which includes the determination of physicochemical properties, biological activity, immunochemical properties, purity and impurities) by appropriate techniques is necessary to allow relevant specifications to be established. Acceptance criteria should be established and justified based on data obtained from lots used in preclinical and/or clinical studies, data from lots used for demonstration of manufacturing consistency and data from stability studies, and relevant development data.

Extensive characterization is performed in the development phase and, where necessary, following significant process changes. At the time of submission, the product should have been compared with an appropriate reference standard, if available. When feasible and relevant, it should be compared with its natural counterpart. Also, at the time of submission, the manufacturer should have established appropriately characterized in-house reference materials which will serve for biological and physicochemical testing of production lots. New analytical technology and modifications to existing technology are continually being developed and should be utilized when appropriate.

#### *2.1.1 Physicochemical properties*

A physicochemical characterization program will generally include a determination of the composition, physical properties, and primary structure of the desired product. In some cases, information regarding higher-order structure of the desired product (the fidelity of which is generally inferred by its biological activity) may be obtained by appropriate physicochemical methodologies.

An inherent degree of structural heterogeneity occurs in proteins due to the biosynthetic processes used by living organisms to produce them; therefore, the desired product can be a mixture of anticipated post-translationally modified forms (e.g., glycoforms). These forms may be active and their presence may have no deleterious effect on the safety and efficacy of the product (section 2.1.4). The manufacturer should define the pattern of heterogeneity of the desired product and demonstrate consistency with that of the lots used in preclinical and clinical studies. If a consistent pattern of product heterogeneity is demonstrated, an evaluation of the activity, efficacy and safety (including immunogenicity) of individual forms may not be necessary.

Heterogeneity can also be produced during manufacture and/or storage of the drug substance or drug product. Since the heterogeneity of these products defines their quality, the degree and profile of this heterogeneity should be characterized, to assure lot-to-lot consistency. When these variants of the desired product have properties comparable to those of the desired product with respect to activity, efficacy and safety, they are considered product-related substances. When process changes and degradation products result in heterogeneity patterns which differ from those observed in the material used during preclinical and clinical development, the significance of these alterations should be evaluated.



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Analytical methods to elucidate physicochemical properties are listed in Appendix 6.1. New analytical technology and modifications to existing technology are continually being developed and should be utilized when appropriate.

For the purpose of lot release (section 4), an appropriate subset of these methods should be selected and justified.

### *2.1.2 Biological activity*

Assessment of the biological properties constitutes an equally essential step in establishing a complete characterization profile. An important property is the biological activity that describes the specific ability or capacity of a product to achieve a defined biological effect.

A valid biological assay to measure the biological activity should be provided by the manufacturer. Examples of procedures used to measure biological activity include:

- Animal-based biological assays, which measure an organism's biological response to the product;
- Cell culture-based biological assays, which measure biochemical or physiological response at the cellular level;
- Biochemical assays, which measure biological activities such as enzymatic reaction rates or biological responses induced by immunological interactions.

Other procedures such as ligand and receptor binding assays, may be acceptable.

Potency (expressed in units) is the quantitative measure of biological activity based on the attribute of the product which is linked to the relevant biological properties, whereas, quantity (expressed in mass) is a physicochemical measure of protein content. Mimicking the biological activity in the clinical situation is not always necessary. A correlation between the expected clinical response and the activity in the biological assay should be established in pharmacodynamic or clinical studies.

The results of biological assays should be expressed in units of activity calibrated against an international or national reference standard, when available and appropriate for the assay utilized. Where no such reference standard exists, a characterized in-house reference material should be established and assay results of production lots reported as in-house units.

Often, for complex molecules, the physicochemical information may be extensive but unable to confirm the higher-order structure which, however, can be inferred from the biological activity. In such cases, a biological assay, with wider confidence limits, may be acceptable when combined with a specific quantitative measure. Importantly, a biological assay to measure the biological activity of the product may be replaced by physicochemical tests only in those instances where:

- sufficient physicochemical information about the drug, including higher-order structure, can be thoroughly established by such physicochemical methods, and relevant correlation to biologic activity demonstrated; and
- there exists a well-established manufacturing history.

Where physicochemical tests alone are used to quantitate the biological activity (based on appropriate correlation), results should be expressed in mass.



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For the purpose of lot release (section 4), the choice of relevant quantitative assay (biological and/or physicochemical) should be justified by the manufacturer.

### *2.1.3 Immunochemical properties*

When an antibody is the desired product, its immunological properties should be fully characterized. Binding assays of the antibody to purified antigens and defined regions of antigens should be performed, as feasible, to determine affinity, avidity and immunoreactivity (including cross-reactivity). In addition, the target molecule bearing the relevant epitope should be biochemically defined and the epitope itself defined, when feasible.

For some drug substances or drug products, the protein molecule may need to be examined using immunochemical procedures (e.g., ELISA, Western-blot) utilizing antibodies which recognize different epitopes of the protein molecule. Immunochemical properties of a protein may serve to establish its identity, homogeneity or purity, or serve to quantify it.

If immunochemical properties constitute lot release criteria, all relevant information pertaining to the antibody should be made available.

### *2.1.4 Purity, impurities and contaminants*

- **Purity**

The determination of absolute, as well as relative purity, presents considerable analytical challenges, and the results are highly method-dependent. Historically, the relative purity of a biological product has been expressed in terms of specific activity (units of biological activity per mg of product) which is also highly method-dependent. Consequently, the purity of the drug substance and drug product is assessed by a combination of analytical procedures.

Due to the unique biosynthetic production process and molecular characteristics of biotechnological and biological products, the drug substance can include several molecular entities or variants. When these molecular entities are derived from anticipated post-translational modification, they are part of the desired product. When variants of the desired product are formed during the manufacturing process and/or storage and have properties comparable to the desired product, they are considered product-related substances and not impurities (section 2.1.1).

Individual and/or collective acceptance criteria for product-related substances should be set, as appropriate.

For the purpose of lot release, (section 4), an appropriate subset of methods should be selected and justified for determination of purity.

- **Impurities**

In addition to evaluating the purity of the drug substance and drug product, which may be composed of the desired product and multiple product-related substances, the manufacturer should also assess impurities which may be present. Impurities may be either process or product-related. They can be of known structure, partially characterized, or unidentified. When adequate quantities of impurities can be generated, these materials should be characterized to the extent possible and, where possible, their biological activities should be evaluated.

Process-related impurities encompass those that are derived from the manufacturing process, i.e., cell substrates (e.g., host cell proteins, host cell DNA), cell culture (e.g.,



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inducers, antibiotics, or media components), or downstream processing (see "Appendix", section 6.2.1). Product-related impurities (e.g., precursors, certain degradation products) are molecular variants arising during manufacture and/or storage, which do not have properties comparable to those of the desired product with respect to activity, efficacy, and safety.

Further, the acceptance criteria for impurities should be based on data obtained from lots used in preclinical and clinical studies and manufacturing consistency lots.

Individual and/or collective acceptance criteria for impurities (product-related and process-related) should be set, as appropriate. Under certain circumstances, acceptance criteria for selected impurities may not be necessary (section 2.3).

Examples of analytical procedures which may be employed to test for the presence of impurities are listed in Appendix 6.2. New analytical technology and modifications to existing technology are continually being developed and should be utilized when appropriate.

For the purpose of lot release (section 4), an appropriate subset of these methods should be selected and justified.

- **Contaminants**

Contaminants in a product include all adventitiously introduced materials not intended to be part of the manufacturing process, such as chemical and biochemical materials (e.g., microbial proteases), and/or microbial species. Contaminants should be strictly avoided and/or suitably controlled with appropriate in-process acceptance criteria or action limits for drug substance or drug product specifications (section 2.3). For the special case of adventitious viral or mycoplasma contamination, the concept of action limits is not applicable, and the strategies proposed in ICH Harmonised Tripartite Guidelines "Quality of Biotechnological/Biological Products: Viral Safety Evaluation of Biotechnology Derived Products Derived from Cell Lines of Human or Animal Origin" and "Quality of Biotechnological/Biological Products: Derivation and Characterization of Cell Substrates Used for Production of Biotechnological/Biological Products" should be considered.

#### *2.1.5 Quantity*

Quantity, usually measured as protein content, is critical for a biotechnological and biological product and should be determined using an appropriate assay, usually physicochemical in nature. In some cases, it may be demonstrated that the quantity values obtained may be directly related to those found using the biological assay. When this correlation exists, it may be appropriate to use measurement of quantity rather than the measurement of biological activity in manufacturing processes, such as filling.

### 2.2 Analytical Considerations

#### *2.2.1 Reference standards and reference materials*

For drug applications for new molecular entities, it is unlikely that an international or national standard will be available. At the time of submission, the manufacturer should have established an appropriately characterized in-house primary reference material, prepared from lot(s) representative of production and clinical materials. In-house working reference material(s) used in the testing of production lots should be calibrated against this primary reference material. Where an international or national standard is available and appropriate, reference materials should be



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calibrated against it. While it is desirable to use the same reference material for both biological assays and physicochemical testing, in some cases, a separate reference material may be necessary. Also, distinct reference materials for product-related substances, product-related impurities and process-related impurities, may need to be established. When appropriate, a description of the manufacture and/or purification of reference materials should be included in the application. Documentation of the characterization, storage conditions and formulation supportive of reference material(s) stability should also be provided.

### *2.2.2 Validation of analytical procedures*

At the time the application is submitted to the regulatory authorities, applicants should have validated the analytical procedures used in the specifications in accordance with the ICH Harmonised Tripartite Guidelines "Validation of Analytical Procedures: Definitions and Terminology" and "Validation of Analytical Procedures: Methodology", except where there are specific issues for unique tests used for analyzing biotechnological and biological products.

## 2.3 Process Controls

### *2.3.1 Process-related considerations*

Adequate design of a process and knowledge of its capability are part of the strategy used to develop a manufacturing process which is controlled and reproducible, yielding a drug substance or drug product that meets specifications. In this respect, limits are justified based on critical information gained from the entire process spanning the period from early development through commercial scale production.

For certain impurities, testing of either the drug substance or the drug product may not be necessary and may not need to be included in the specifications if efficient control or removal to acceptable levels is demonstrated by suitable studies. This testing can include verification at commercial scale in accordance with regional regulations. It is recognized that only limited data may be available at the time of submission of an application. This concept may, therefore, sometimes be implemented after marketing authorization, in accordance with regional regulations.

### *2.3.2 In-process acceptance criteria and action limits*

In-process tests are performed at critical decision making steps and at other steps where data serve to confirm consistency of the process during the production of either the drug substance or the drug product. The results of in-process testing may be recorded as action limits or reported as acceptance criteria. Performing such testing may eliminate the need for testing of the drug substance or drug product (section 2.3.1). In-process testing for adventitious agents at the end of cell culture is an example of testing for which acceptance criteria should be established.

The use of internal action limits by the manufacturer to assess the consistency of the process at less critical steps is also important. Data obtained during development and validation runs should provide the basis for provisional action limits to be set for the manufacturing process. These limits, which are the responsibility of the manufacturer, may be used to initiate investigation or further action. They should be further refined as additional manufacturing experience and data are obtained after product approval.



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### *2.3.3 Raw materials and excipient specifications*

The quality of the raw materials used in the production of the drug substance (or drug product) should meet standards, appropriate for their intended use. Biological raw materials or reagents may require careful evaluation to establish the presence or absence of deleterious endogenous or adventitious agents. Procedures which make use of affinity chromatography (for example, employing monoclonal antibodies), should be accompanied by appropriate measures to ensure that such process-related impurities or potential contaminants arising from their production and use do not compromise the quality and safety of the drug substance or drug product. Appropriate information pertaining to the antibody should be made available.

The quality of the excipients used in the drug product formulation (and in some cases, in the drug substance), as well as the container/closure systems, should meet pharmacopoeial standards, where available and appropriate. Otherwise, suitable acceptance criteria should be established for the non-pharmacopoeial excipients.

## 2.4 Pharmacopoeial Specifications

Pharmacopoeias contain important requirements pertaining to certain analytical procedures and acceptance criteria which, where relevant, are part of the evaluation of either the drug substance or drug product. Such monographs, applicable to biotechnological and biological products, generally include, but are not limited to tests for sterility, endotoxins, microbial limits, volume in container, uniformity of dosage units and particulate matter. With respect to the use of pharmacopoeial methods and acceptance criteria, the value of this guidance is linked to the extent of harmonisation of the analytical procedures of the pharmacopoeias. The pharmacopoeias are committed to developing identical or methodologically equivalent test procedures and acceptance criteria.

## 2.5 Release Limits vs. Shelf-life Limits

The concept of release limits vs. shelf-life limits may be applied where justified. This concept pertains to the establishment of limits which are tighter for the release than for the shelf-life of the drug substance or drug product. Examples where this may be applicable include potency and degradation products. In some regions, the concept of release limits may only be applicable to in-house limits and not to the regulatory shelf-life limits.

## 2.6 Statistical Concepts

Appropriate statistical analysis should be applied, when necessary, to quantitative data reported. The methods of analysis, including justification and rationale, should be described fully. These descriptions should be sufficiently clear to permit independent calculation of the results presented.

# 3. JUSTIFICATION OF THE SPECIFICATION

The setting of specifications for drug substance and drug product is part of an overall control strategy which includes control of raw materials and excipients, in-process testing, process evaluation or validation, adherence to Good Manufacturing Practices, stability testing, and testing for consistency of lots. When combined in total, these elements provide assurance that the appropriate quality of the product will be maintained. Since specifications are chosen to confirm the quality rather than to characterize the product, the manufacturer should provide the rationale and justification for including and/or excluding testing for specific quality attributes. The



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following points should be taken into consideration when establishing scientifically justifiable specifications.

- *Specifications are linked to a manufacturing process.*

Specifications should be based on data obtained from lots used to demonstrate manufacturing consistency. Linking specifications to a manufacturing process is important, especially for product-related substances, product-related impurities and process-related impurities. Process changes and degradation products produced during storage may result in heterogeneity patterns which differ from those observed in the material used during preclinical and clinical development. The significance of these alterations should be evaluated.

- *Specifications should account for the stability of drug substance and drug product.*

Degradation of drug substance and drug product, which may occur during storage, should be considered when establishing specifications. Due to the inherent complexity of these products, there is no single stability-indicating assay or parameter that profiles the stability characteristics. Consequently, the manufacturer should propose a stability-indicating profile. The result of this stability-indicating profile will then provide assurance that changes in the quality of the product will be detected. The determination of which tests should be included will be product-specific. The manufacturer is referred to the ICH Harmonised Tripartite Guideline: "Stability Testing of Biotechnological/Biological Products".

- *Specifications are linked to preclinical and clinical studies.*

Specifications should be based on data obtained for lots used in pre-clinical and clinical studies. The quality of the material made at commercial scale should be representative of the lots used in preclinical and clinical studies.

- *Specifications are linked to analytical procedures.*

Critical quality attributes may include items such as potency, the nature and quantity of product-related substances, product-related impurities, and process-related impurities. Such attributes can be assessed by multiple analytical procedures, each yielding different results. In the course of product development, it is not unusual for the analytical technology to evolve in parallel with the product. Therefore, it is important to confirm that data generated during development correlate with those generated at the time the marketing application is filed.

## 4. SPECIFICATIONS

Selection of tests to be included in the specifications is product specific. The rationale used to establish the acceptable range of acceptance criteria should be described. Acceptance criteria should be established and justified based on data obtained from lots used in preclinical and/or clinical studies, data from lots used for demonstration of manufacturing consistency, and data from stability studies, and relevant development data.

In some cases, testing at production stages rather than at the drug substance or drug product stages may be appropriate and acceptable. In such circumstances, test results should be considered as in-process acceptance criteria and included in the specification of drug substance or drug product in accordance with the requirements of the regional regulatory authorities.



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## 4.1 Drug Substance Specification

Generally, the following tests and acceptance criteria are considered applicable to all drug substances (for analytical procedures see section 2.2.2). Pharmacopoeial tests (e.g., endotoxin detection) should be performed on the drug substance, where appropriate. Additional drug substance specific acceptance criteria may also be necessary.

### *4.1.1 Appearance and description*

A qualitative statement describing the physical state (e.g., solid, liquid) and color of a drug substance should be provided.

### *4.1.2 Identity*

The identity test(s) should be highly specific for the drug substance and should be based on unique aspects of its molecular structure and/or other specific properties. More than one test (physicochemical, biological and/or immunochemical) may be necessary to establish identity. The identity test(s) can be qualitative in nature. Some of the methods typically used for characterization of the product as described in section 2.1 and in Appendix 6.1 may be employed and/or modified as appropriate for the purpose of establishing identity.

### *4.1.3 Purity and impurities*

The absolute purity of biotechnological and biological products is difficult to determine and the results are method-dependent (section 2.1.4.). Consequently, the purity of the drug substance is usually estimated by a combination of methods. The choice and optimization of analytical procedures should focus on the separation of the desired product from product-related substances and from impurities.

The impurities observed in these products are classified as process-related and product-related:

- Process-related impurities (section 2.1.4) in the drug substance may include cell culture media, host cell proteins, DNA, monoclonal antibodies or chromatographic media used in purification, solvents and buffer components. These impurities should be minimized by the use of appropriate well-controlled manufacturing processes.
- Product-related impurities (section 2.1.4) in the drug substance are molecular variants with properties different from those of the desired product formed during manufacture and/or storage.

For the impurities, the choice and optimization of analytical procedures should focus on the separation of the desired product and product-related substances from impurities. Individual and/or collective acceptance criteria for impurities should be set, as appropriate. Under certain circumstances, acceptance criteria for selected impurities may not be required (section 2.3).

### *4.1.4 Potency*

A relevant, validated potency assay (section 2.1.2) should be part of the specifications for a biotechnological or biological drug substance and/or drug product. When an appropriate potency assay is used for the drug product (section 4.2.4), an alternative method (physicochemical and/or biological) may suffice for quantitative assessment at the drug substance stage. In some cases, the measurement of specific activity may provide additional useful information.



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#### *4.1.5 Quantity*

The quantity of the drug substance, usually based on protein content (mass), should be determined using an appropriate assay. The quantity determination may be independent of a reference standard or material. In cases where product manufacture is based upon potency, there may be no need for an alternate determination of quantity.

### 4.2 Drug Product Specification

Generally, the following tests and acceptance criteria are considered applicable to all drug products. Each section (4.2.1 - 4.2.5) is cross-referenced to respective sections (4.1.1 - 4.1.5) under Drug Substance. Pharmacopoeial requirements apply to the relevant dosage forms. Typical tests found in the pharmacopoeia include, but are not limited to sterility, endotoxin, microbial limits, volume in container, particulate matter, uniformity of dosage units, and moisture content for lyophilized drug products. If appropriate, testing for uniformity of dosage units may be performed as in-process controls and corresponding acceptance criteria set.

#### *4.2.1 Appearance and description*

A qualitative statement describing the physical state (e.g., solid, liquid), color, and clarity of the drug product should be provided.

#### *4.2.2 Identity*

The identity test(s) should be highly specific for the drug product and should be based on unique aspects of its molecular structure and for other specific properties. The identity test(s) can be qualitative in nature. While it is recognized that in most cases, a single test is adequate, more than one test (physicochemical, biological and/or immunochemical) may be necessary to establish identity for some products. Some of the methods typically used for characterization of the product as described in section 2.1 and in Appendix 6.1 may be employed and/or modified as appropriate for the purpose of establishing identity.

#### *4.2.3 Purity and impurities*

Impurities may be generated or increased during manufacture and/or storage of the drug product. These may be either the same as those occurring in the drug substance itself, process-related, or degradation products which form specifically in the drug product during formulation or during storage. If impurities are qualitatively and quantitatively (i.e., relative amounts and/or concentrations) the same as in the drug substance, testing is not necessary. If impurities are known to be introduced or formed during the production and/or storage of the drug product, the levels of these impurities should be determined and acceptance criteria established.

Acceptance criteria and analytical procedures should be developed and justified, based upon previous experience with the drug product, to measure changes in the drug substance during the manufacture and/or storage of the drug product.

The choice and optimization of analytical procedures should focus on the separation of the desired product and product-related substances from impurities including degradation products, and from excipients.

#### *4.2.4 Potency*

A relevant, validated potency assay (section 2.1.2) should be part of the specifications for a biotechnological and biological drug substance and/or drug product. When an



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appropriate potency assay is used for the drug substance, an alternative method (physicochemical and/or biological) may suffice for quantitative assessment of the drug product. However, the rationale for such a choice should be provided.

#### *4.2.5 Quantity*

The quantity of the drug substance in the drug product, usually based on protein content (mass), should be determined using an appropriate assay. In cases where product manufacture is based upon potency, there may be no need for an alternate determination of quantity.

#### *4.2.6 General tests*

Physical description and the measurement of other quality attributes is often important for the evaluation of the drug product functions. Examples of such tests include pH and osmolarity.

#### *4.2.7 Additional testing for unique dosage forms*

It should be recognized that certain unique dosage forms may need additional tests other than those mentioned above.

## 5. GLOSSARY

**Acceptance Criteria**

Numerical limits, ranges, or other suitable measures for acceptance of the results of analytical procedures which the drug substance or drug product or materials at other stages of their manufacture should meet.

**Action Limit**

An internal (in-house) value used to assess the consistency of the process at less critical steps.

**Biological Activity**

The specific ability or capacity of the product to achieve a defined biological effect. Potency is the quantitative measure of the biological activity.

**Contaminants**

Any adventitiously introduced materials (e.g., chemical, biochemical, or microbial species) not intended to be part of the manufacturing process of the drug substance or drug product.

**Degradation Products**

Molecular variants resulting from changes in the desired product or product-related substances brought about over time and/or by the action of, e.g., light, temperature, pH, water, or by reaction with an excipient and/or the immediate container/closure system. Such changes may occur as a result of manufacture and/or storage (e.g., deamidation, oxidation, aggregation, proteolysis). Degradation products may be either product-related substances, or product-related impurities.

**Desired Product**

(1) The protein which has the expected structure, or (2) the protein which is expected from the DNA sequence and anticipated post-translational modification (including



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glycoforms), and from the intended downstream modification to produce an active biological molecule.

**Drug Product (Dosage Form; Finished Product)**

A pharmaceutical product type that contains a drug substance, generally, in association with excipients.

**Drug Substance (Bulk Material)**

The material which is subsequently formulated with excipients to produce the drug product. It can be composed of the desired product, product-related substances, and product- and process-related impurities. It may also contain excipients including other components such as buffers.

**Excipient**

An ingredient added intentionally to the drug substance which should not have pharmacological properties in the quantity used.

**Impurity**

Any component present in the drug substance or drug product which is not the desired product, a product-related substance, or excipient including buffer components. It may be either process- or product-related.

**In-house Primary Reference Material**

An appropriately characterized material prepared by the manufacturer from a representative lot(s) for the purpose of biological assay and physicochemical testing of subsequent lots, and against which in-house working reference material is calibrated.

**In-house Working Reference Material**

A material prepared similarly to the primary reference material that is established solely to assess and control subsequent lots for the individual attribute in question. It is always calibrated against the in-house primary reference material.

**Potency**

The measure of the biological activity using a suitably quantitative biological assay (also called potency assay or bioassay), based on the attribute of the product which is linked to the relevant biological properties.

**Process-Related Impurities**

Impurities that are derived from the manufacturing process. They may be derived from cell substrates (e.g., host cell proteins, host cell DNA), cell culture (e.g., inducers, antibiotics, or media components), or downstream processing (e.g., processing reagents or column leachables).

**Product-Related Impurities**

Molecular variants of the desired product (e.g., precursors, certain degradation products arising during manufacture and/or storage) which do not have properties comparable to those of the desired product with respect to activity, efficacy, and safety.



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**Product-Related Substances**

Molecular variants of the desired product formed during manufacture and/or storage which are active and have no deleterious effect on the safety and efficacy of the drug product. These variants possess properties comparable to the desired product and are not considered impurities.

**Reference Standards**

Refer to international or national standards.

**Specification**

A specification is defined as a list of tests, references to analytical procedures, and appropriate acceptance criteria which are numerical limits, ranges, or other criteria for the tests described. It establishes the set of criteria to which a drug substance, drug product or materials at other stages of its manufacture should conform to be considered acceptable for its intended use. "Conformance to specification" means that the drug substance and drug product, when tested according to the listed analytical procedures, will meet the acceptance criteria. Specifications are critical quality standards that are proposed and justified by the manufacturer and approved by regulatory authorities as conditions of approval.

## 6. APPENDICES

### 6.1 Appendix for Physicochemical Characterization

This appendix provides examples of technical approaches which might be considered for structural characterization and confirmation, and evaluation of physicochemical properties of the desired product, drug substance and/or drug product. The specific technical approach employed will vary from product to product and alternative approaches, other than those included in this appendix, will be appropriate in many cases. New analytical technology and modifications to existing technology are continuously being developed and should be utilized when appropriate.

#### *6.1.1 Structural characterization and confirmation*

a) Amino acid sequence

The amino acid sequence of the desired product should be determined to the extent possible using approaches such as those described in items b) through e) and then compared with the sequence of the amino acids deduced from the gene sequence of the desired product.

b) Amino acid composition

The overall amino acid composition is determined using various hydrolytic and analytical procedures, and compared with the amino acid composition deduced from the gene sequence for the desired product, or the natural counterpart, if considered necessary. In many cases amino acid composition analysis provides some useful structural information for peptides and small proteins, but such data are generally less definitive for large proteins. Quantitative amino acid analysis data can also be used to determine protein content in many cases.



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c) Terminal amino acid sequence

Terminal amino acid analysis is performed to identify the nature and homogeneity of the amino- and carboxy-terminal amino acids. If the desired product is found to be heterogeneous with respect to the terminal amino acids, the relative amounts of the variant forms should be determined using an appropriate analytical procedure. The sequence of these terminal amino acids should be compared with the terminal amino acid sequence deduced from the gene sequence of the desired product.

d) Peptide map

Selective fragmentation of the product into discrete peptides is performed using suitable enzymes or chemicals and the resulting peptide fragments are analyzed by HPLC or other appropriate analytical procedure. The peptide fragments should be identified to the extent possible using techniques such as amino acid compositional analysis, N-terminal sequencing, or mass spectrometry. Peptide mapping of the drug substance or drug product using an appropriately validated procedure is a method that is frequently used to confirm desired product structure for lot release purposes.

e) Sulfhydryl group(s) and disulfide bridges

If, based on the gene sequence for the desired product, cysteine residues are expected, the number and positions of any free sulfhydryl groups and/or disulfide bridges should be determined, to the extent possible. Peptide mapping (under reducing and non-reducing conditions), mass spectrometry, or other appropriate techniques may be useful for this evaluation.

f) Carbohydrate structure

For glycoproteins, the carbohydrate content (neutral sugars, amino sugars, and sialic acids) is determined. In addition, the structure of the carbohydrate chains, the oligosaccharide pattern (antennary profile) and the glycosylation site(s) of the polypeptide chain is analyzed, to the extent possible.

### *6.1.2 Physicochemical properties*

a) Molecular weight or size

Molecular weight (or size) is determined using size exclusion chromatography, SDS-polyacrylamide gel electrophoresis (under reducing and/or non-reducing conditions), mass spectrometry, and other appropriate techniques.

b) Isoform pattern

This is determined by isoelectric focusing or other appropriate techniques.

c) Extinction coefficient (or molar absorptivity)

In many cases it will be desirable to determine the extinction coefficient (or molar absorptivity) for the desired product at a particular UV/visible wavelength (e.g., 280 nm). The extinction coefficient is determined using UV/visible spectrophotometry on a solution of the product having a known protein content as determined by techniques such as amino acid compositional analysis, or nitrogen determination, etc. If UV absorption is used to measure protein content, the extinction coefficient for the particular product should be used.



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d) Electrophoretic patterns

Electrophoretic patterns and data on identity, homogeneity and purity can be obtained by polyacrylamide gel electrophoresis, isoelectric focusing, SDS-polyacrylamide gel electrophoresis, Western-blot, capillary electrophoresis, or other suitable procedures.

e) Liquid chromatographic patterns

Chromatographic patterns and data on the identity, homogeneity, and purity can be obtained by size exclusion chromatography, reverse-phase liquid chromatography, ion-exchange liquid chromatography, affinity chromatography or other suitable procedures.

f) Spectroscopic profiles

The ultraviolet and visible absorption spectra are determined as appropriate. The higher-order structure of the product is examined using procedures such as circular dichroism, nuclear magnetic resonance (NMR), or other suitable techniques, as appropriate.

## 6.2 Appendix for Impurities

This appendix lists potential impurities, their sources and examples of relevant analytical approaches for detection. Specific impurities and technical approaches employed, as in the case of physicochemical characterization, will vary from product to product and alternative approaches, other than those listed in this appendix will be appropriate in many cases. New analytical technology and modifications to existing technology are continuously being developed, and should be applied when appropriate.

### *6.2.1 Process-related impurities and contaminants*

These are derived from the manufacturing process (section 2.1.4) and are classified into three major categories: cell substrate-derived, cell culture-derived and downstream-derived.

a) Cell substrate-derived impurities include, but are not limited to, proteins derived from the host organism, nucleic acid (host cell genomic, vector, or total DNA). For host cell proteins, a sensitive assay e.g., immunoassay, capable of detecting a wide range of protein impurities is generally utilized. In the case of an immunoassay, a polyclonal antibody used in the test is generated by immunization with a preparation of a production cell minus the product-coding gene, fusion partners, or other appropriate cell lines. The level of DNA from the host cells can be detected by direct analysis on the product (such as hybridization techniques). Clearance studies, which could include spiking experiments at the laboratory scale, to demonstrate the removal of cell substrate-derived impurities such as nucleic acids and host cell proteins may sometimes be used to eliminate the need for establishing acceptance criteria for these impurities.

b) Cell culture-derived impurities include, but are not limited to, inducers antibiotics, serum, and other media components.

c) Downstream-derived impurities include, but are not limited to, enzymes, chemical and biochemical processing reagents (e.g., cyanogen bromide, guanidine, oxidizing and reducing agents), inorganic salts (e.g., heavy metals,



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arsenic, non metallic ion), solvents, carriers, ligands (e.g., monoclonal antibodies), and other leachables.

For intentionally introduced, endogenous and adventitious viruses, the ability of the manufacturing process to remove and/or inactivate viruses should be demonstrated as described in ICH Harmonised Tripartite Guideline "Viral Safety Evaluation of Biotechnology Products Derived From Cell Lines of Human or Animal Origin"

### *6.2.2 Product-related impurities including degradation products*

The following represents the most frequently encountered molecular variants of the desired product and lists relevant technology for their assessment. Such variants may need considerable effort in isolation and characterization in order to identify the type of modification(s). Degradation products arising during manufacture and/or storage in significant amounts should be tested for and monitored against appropriately established acceptance criteria.

a) Truncated forms: Hydrolytic enzymes or chemicals may catalyze the cleavage of peptide bonds. These may be detected by HPLC or SDS-PAGE. Peptide mapping may be useful, depending on the property of the variant.

b) Other modified forms: Deamidated, isomerized, mismatched S-S linked, oxidized or altered conjugated forms (e.g., glycosylation, phosphorylation) may be detected and characterized by chromatographic, electrophoretic and/or other relevant analytical methods (e.g., HPLC, capillary electrophoresis, mass spectroscopy, circular dichroism).

c) Aggregates: The category of aggregates includes dimers and higher multiples of the desired product. These are generally resolved from the desired product and product-related substances, and quantitated by appropriate analytical procedures (e.g., size exclusion chromatography, capillary electrophoresis).

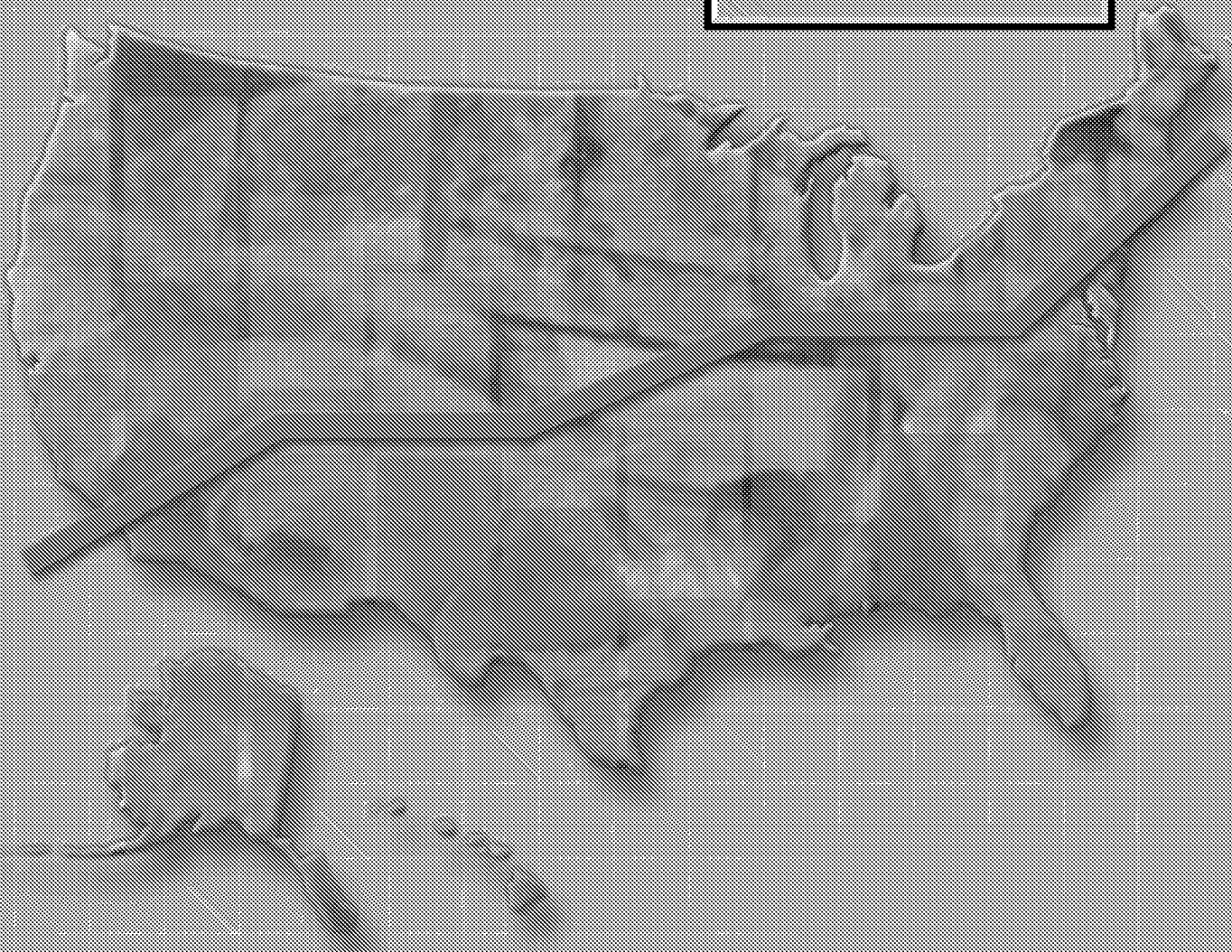


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# Health, United States, 2005

## with Chartbook on Trends in the Health of Americans

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# Health, United States, 2005

## With Chartbook on Trends in the Health of Americans

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

Hyattsville, Maryland
October 2005



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# Preface

*Health, United States, 2005* is the 29th report on the health status of the Nation and is submitted by the Secretary of the Department of Health and Human Services to the President and Congress of the United States in compliance with Section 308 of the Public Health Service Act. This report was compiled by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). The National Committee on Vital and Health Statistics served in a review capacity.

The *Health, United States* series presents national trends in health statistics. Each report includes an executive summary, highlights, a chartbook, trend tables, extensive appendixes, and an index.

## Chartbook

The fourth *Chartbook on Trends in the Health of Americans* updates and expands information from previous chartbooks and introduces this year's special feature on adults 55–64 years of age, a rapidly growing segment of the adult population. The economic and health status of this age group is of interest as the majority of its members are poised to enter retirement and to become eligible for Medicare. The chartbook assesses the Nation's health by presenting trends and current information on selected determinants and measures of health status and utilization of health care. Determinants of health considered in the chartbook include demographic factors, poverty, health insurance coverage, and health behaviors and risk factors, including obesity, cigarette smoking, and physical activity. Additional risk factors this year include teen seat belt use, drinking and driving, and multiple cardiovascular risk factors for adults. Measures of health status include prevalence of asthma attacks in children, headache and lower back pain in adults, limitation of activity due to chronic health conditions, and several measures of mortality. A new section on health care utilization includes use of mammography and Pap tests, visits to physician offices and outpatient departments, injury-related visits by children to emergency departments, and insertion of cardiac stents—an increasingly common hospital procedure for treatment of coronary artery disease, particularly for older persons. Many measures are shown separately for persons of different ages because of the strong effect of age on health. Selected figures also highlight differences in determinants and measures of health status and utilization of health care by such characteristics as sex, race, Hispanic origin, education, and poverty status.

## Trend Tables

The chartbook section is followed by 156 trend tables organized around four major subject areas: health status and determinants, health care utilization, health care resources, and health care expenditures. A major criterion used in selecting the trend tables is availability of comparable national data over a period of several years. The tables present data for selected years to highlight major trends in health statistics. Earlier editions of *Health, United States* may present data for additional years that are not included in the current printed report. Where possible, these additional years of data are available in Excel spreadsheet files on the *Health, United States* Web site. Tables with additional data years are listed in Appendix III.

## Racial and Ethnic Data

Many tables in *Health, United States* present data according to race and Hispanic origin consistent with Department-wide emphasis on expanding racial and ethnic detail when presenting health data. Trend data on race and ethnicity are presented in the greatest detail possible after taking into account the quality of data, the amount of missing data, and the number of observations. New standards for Federal data on race and ethnicity are described in Appendix II under *Race*.

## Education and Income Data

Many tables in *Health, United States* present data according to socioeconomic status, using education and poverty level as proxy measures. Poverty level is based on family income data and number of persons in the household. Data are presented in the greatest detail possible after taking into account the quality of data, the amount of missing data, and the number of observations. Due to the complexity and sensitivity of collecting education and income information, only a few national data systems obtain data on education and income, including the National Health Interview Survey (NHIS), the National Health and Nutrition Examination Survey, and the National Survey of Family Growth. Education and



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income are obtained directly from survey respondents, and nonresponse rates, especially for income data, are particularly high. NCHS imputes missing family income data for the NHIS starting with data year 1990, and tables with NHIS data shown in *Health, United States* utilize the imputed poverty data. Education and income information are not generally available from records-based data collection systems including the National Health Care Surveys (see Appendix I). State vital statistics systems currently report mother's education on the birth certificate and, based on information from an informant, decedent's education on the death certificate. See Appendix II, *Education; Family income; Poverty level.*

## Changes in This Edition

Each volume of *Health, United States* is prepared to maximize its usefulness as a standard reference source while maintaining its continuing relevance. Comparability is fostered by including similar trend tables in each volume. Timeliness is maintained by (1) adding new tables each year to reflect emerging topics in public health and (2) improving the content of ongoing tables. *Health, United States, 2005* includes eight new trend tables on multiple births (table 5) based on birth certificate data; prevalence of respiratory conditions (table 56), headache and low back pain (table 57), hearing and vision limitations (table 59), leisure-time physical activity (table 72), and adult vaccinations (table 76), all based on National Health Interview Survey data; the nutritional status of the U.S. population based on National Health and Nutrition Examination Survey data (table 71); and factors that affect growth in personal health care expenditures (table 121) based on data from the Centers for Medicare & Medicaid Services.

## Appendixes

Appendix I describes each data source used in the report and provides references for further information about the sources. Data sources are listed alphabetically within two broad categories: (1) Government Sources and (2) Private and Global Sources.

Appendix II is an alphabetical listing of terms used in the report. It also presents standard populations used for age adjustment (tables I, II, and III); ICD codes for causes of death shown in *Health, United States* from the Sixth through Tenth Revisions and the years when the Revisions were in effect (tables IV and V); comparability ratios between ICD–9 and ICD–10 for selected causes (table VI); ICD–9–CM codes for external cause-of-injury, diagnostic, and procedure categories (tables VII, IX, and X); industry codes according to the 2002 North American Industry Classification System (table VIII); National Drug Code (NDC) Therapeutic Class recodes of generic analgesic drugs (table XI); and sample tabulations of NHIS data comparing the 1977 and 1997 Standards for Federal data on race and Hispanic origin (tables XII and XIII).

Appendix III lists tables for which additional years of trend data are available electronically in Excel spreadsheet files on the *Health, United States* Web site and CD-ROM, described below under Electronic Access.

## Index

The Index to Trend Tables and Chartbook Figures is a useful tool for locating data by topic. Tables are cross-referenced by such topics as Child and adolescent health; Elderly population age 65 years and over; Women's health; Men's health; State data; American Indian, Asian, Black, and Hispanic origin populations; Education; Poverty status; Disability; and Metropolitan and nonmetropolitan data.

## Electronic Access

*Health, United States* may be accessed in its entirety on the World Wide Web at www.cdc.gov/nchs/hus.htm. From the *Health, United States* Web site, one may also register for the *Health, United States* electronic mailing list to receive announcements about release dates and notices of updates to tables.

*Health, United States, 2005*, the chartbook, and each of the trend tables are available as Acrobat .pdf files on the Web. Chartbook figures are available as downloadable PowerPoint® slides. Trend tables and chartbook data tables are available as downloadable Excel spreadsheet files. Trend tables listed in Appendix III include additional years of data not shown in the printed report or .pdf files. Both .pdf and spreadsheet files for selected tables will be updated on the Web if more current data become available near the time when the printed report is released. Readers who register with the electronic mailing list will be notified of these table updates. Previous editions of *Health, United States* and chartbooks, starting with



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the 1993 edition, also may be accessed from the *Health, United States* Web site.

*Health, United States* is also available on CD-ROM, where it can be viewed, searched, printed, and saved using Adobe Acrobat software on the CD-ROM.

## Copies of the Report

Copies of *Health, United States, 2005,* and the CD-ROM can be purchased from the Government Printing Office (GPO) through links to GPO on the National Center for Health Statistics Web site, Publications and Information Products page.

## Questions?

For answers to questions about this report, contact:

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# Executive Summary and Highlights



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# Executive Summary

*Health, United States, 2005*, is the 29th annual report on the health status of the Nation prepared by the Secretary of the Department of Health and Human Services for the President and Congress. In a chartbook and 156 detailed tables, it provides an annual picture of health for the entire Nation. Trends are presented in health status and health care utilization, resources, and expenditures.

For those entrusted with safeguarding the Nation's health, monitoring the health of the American people is an essential step in making sound health policy and setting priorities for research and programs. Measures of the population's health provide essential information for assessing how the Nation's resources should be directed to improve the health of the population. Examination of emerging trends identifies diseases, conditions, and risk factors that warrant study and intervention. *Health, United States* presents trends and current information on measures and determinants of the Nation's health. It also identifies differences in health and health care among people of differing races and ethnicities, genders, education and income levels, and geographic locations, and it shows whether these differences are narrowing or increasing. Given the increasing diversity of the Nation and the continuing changes in the health care infrastructure, this is a challenging task, but it is a critically important undertaking.

## Overall Health of the Nation

The health of the Nation continues to improve overall, in part because of the significant resources devoted to public health programs, research, health care, and health education. Over the past century many diseases have been controlled or their morbidity and mortality substantially reduced. Notable achievements in public health have included the control of infectious diseases such as typhoid and cholera through decontamination of water; implementation of widespread vaccination programs to eradicate or contain polio, diphtheria, pertussis, and measles; fluoridation of water to drastically reduce the prevalence of dental caries; and improvements in motor vehicle safety through vehicle redesign and efforts to increase use of seatbelts and motorcycle helmets (1). A sharp decline in deaths from cardiovascular disease is a major public health achievement that resulted in large part from public education campaigns emphasizing a healthy lifestyle and increased use of cholesterol and hypertension-lowering medications (2). Yet even as progress is made in improving both the quantity and quality of life, increased longevity is accompanied by increased prevalence of chronic conditions and their associated pain and disability. In recent years, progress in some arenas---declines in infant and cause-specific mortality, morbidity from chronic conditions, reduction in prevalence of risk factors including smoking and lack of exercise—has not been as rapid as in earlier years or trends have been moving in the wrong direction. It is equally important to keep in mind that these improvements have not been equally distributed by income, race, ethnicity, education, and geography.

### Health Status and Its Determinants

Life expectancy in the United States continues to show a long-term upward trend, although the most dramatic increases were in the early part of the 20th century. In 2003 American men could expect to live 3 years longer, and women more than 1 year longer, than they did in 1990. Infant mortality and mortality from heart disease, stroke, and cancer continued to decline in recent years (figures 26, 27, 29, and tables 22, 27, and 29). In 2002 the infant mortality rate in the United States increased for the first time since 1958; preliminary data indicate a small, but not statistically significant, decline in 2003 (3,4).

Childhood infectious diseases such as mumps and measles have all but disappeared (table 51), but the prevalence of many chronic diseases is increasing in part associated with increased longevity and aging of the population (figure 1 and table 1). In 1999–2002, more than 9 percent of persons 20 years of age and over and about one-fifth of adults 60 years and over had diabetes, including those with diabetes previously diagnosed by a physician and those with undiagnosed diabetes determined by results of a fasting blood sugar test (table 55). A substantial proportion of the population also experiences discomfort from conditions such as arthritis, headache, and back pain, which can affect quality of life. In 2003, 15 percent of adults suffered with severe headache or migraine during the past 3 months (figure 17 and table 57). Nearly twice as many adults reported low back pain (figure 17 and table 57).

Of particular concern in recent years has been the increase in overweight and obesity, which are risk factors for many chronic diseases and disabilities including heart disease,



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hypertension, and back pain. The rising number of children and adolescents who are overweight, and the high percentage of Americans who are not physically active (figures 13–15 and tables 72–74) raise additional concerns about Americans' future health (5).

Decreased cigarette smoking among adults is a prime example of a trend that has contributed to overall declines in mortality. However, the rapid drop in cigarette smoking in the two decades following the first Surgeon General's Report in 1964 has slowed in recent years. About 24 percent of men and 19 percent of women were current smokers in 2003 (figure 10 and table 63).

Prevalence of risky behaviors has also improved over time, including the percent of high school students in grades 9–12 who rode with a driver who had been drinking alcohol. This statistic decreased from 40 percent to 30 percent between 1991 and 2003, yet further reductions are certainly necessary (figure 12) (6).

## Health Care Utilization and Resources

People use health care services for many reasons: to treat illnesses, injuries, and health conditions; to prevent or delay future health care problems; to reduce pain and increase quality of life; and to obtain information about their health status and prognoses. The study of trends in health care utilization provides important information on these phenomena and spotlights areas that warrant further study. Utilization trends may also be used to project future health care needs and expenditures, as well as training and supply needs.

Admissions to hospitals and length of stay declined substantially in the 1980s and 1990s, but these declines appear to be leveling off (tables 97–99). The diagnoses recorded on inpatient hospital stays are changing, as are the procedures performed on inpatients (table 100). Hospitalizations for procedures that can be performed on an outpatient basis, such as lens extractions and knee arthroscopies, have all but disappeared from inpatient settings. Instead, inpatient care is becoming more intensive and complex, with more procedures such as insertions of cardiac stents and hip replacements being performed, particularly on older persons (figure 25 and table 100). In addition to changes in the location of services, the types of services being provided have changed. In particular, the number of drugs prescribed or administered during visits to physicians and hospital outpatient departments is increasing (table 92).

Americans are increasingly using many types of preventive or early-detection health services. Since the late 1980s the percentages of older adults who had received pneumococcal and influenza vaccine have increased sharply but remain below desired levels (table 76). The percentage of children 19–35 months of age vaccinated for many childhood infectious diseases is at a high level (81 percent), and the percentage of children receiving varicella (chickenpox) vaccine has increased sharply since it was first recommended in 1996 (table 77). Rates of Pap smears and mammograms have increased since 1987 when national data first became regularly available (figures 21, 22, and tables 86 and 87).

As the nature of health care changes, so do the supply of health providers and the sites where services are provided. Services that historically were provided in inpatient settings are increasingly offered in outpatient settings, and the number of physical therapy providers, comprehensive outpatient rehabilitation facilities, and ambulatory surgical centers certified by the Centers for Medicare & Medicaid Services has increased since the 1980s (table 117). As a result of this shifting in the sites of care, the supply of some other providers or service sites has declined, such as the number of inpatient mental health organizations and the associated number of beds (table 113).

## Expenditures and Health Insurance

The United States spends more on health per capita than any other country, and health spending continues to increase rapidly. Much of this spending is for care that controls or reduces the impact of chronic diseases and conditions affecting an aging population. Prescription drugs and cardiac operations are two notable examples. In 2003 national health care expenditures in the United States totaled $1.7 trillion, a 7.7 percent increase from 2002 (table 119). Since 1995 the average annual rate of increase for prescription drug expenditures was higher than for any other type of health expenditure (table 122), indicating the growing importance of prescription drugs. The source of payment for personal health care varies according to the type of care provided. In 2003, government sources were the primary payers of hospital and nursing home care, paying for about three-fifths of these types of services, while private health insurance paid for



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almost one-half of physician services and prescription drugs (table 123).

Access to health care is determined by many factors, including the supply of providers and the ability to use and pay for available care. The percent of the population under 65 years of age with no health insurance coverage fluctuated about 16–18 percent between 1994 and 2003 (figure 6 and table 134). The percent of the population with private health insurance decreased between 1999 and 2003 (figure 6 and table 132). This decrease was offset by an increase in Medicaid coverage (table 133), resulting in little change in the percentage uninsured. Employer-sponsored health insurance in particular has been declining in recent years. Between 2001 and 2003 the proportion of the population under 65 years of age with health insurance obtained through the workplace (a current or former employer or union) declined from 67 to 63 percent (table 132).

## Disparities in Risk Factors, Access, and Utilization

Efforts to improve Americans' health in the 21st century will be shaped by important changes in demographics. Ours is a Nation that is growing older and becoming more racially and ethnically diverse. In 2004 nearly one-third of adults and about two-fifths of children were identified as black, Hispanic, Asian, or American Indian or Alaska Native. Fourteen percent of Americans in 2004 identified themselves as Hispanic, 12 percent as black, and 4 percent as Asian (figure 3).

*Health, United States, 2005*, identifies major disparities in health and health care that exist by socioeconomic status, race, ethnicity, and insurance status. Persons living in poverty are considerably more likely to be in fair or poor health and to have disabling conditions, and less likely to have used many types of health care. In 2003 adults living in poverty were almost twice as likely to report having trouble seeing—even with eyeglasses or contact lenses—as higher income persons (table 59), and were also almost twice as likely to report having had an asthma attack in the past year (table 56). Non-Hispanic black children 3–10 years of age had higher asthma attack prevalence rates than non-Hispanic white or Hispanic children, and this disparity has been increasing in recent years (figure 16).

Large disparities in infant mortality rates remain among racial and ethnic groups (figure 28 and table 19). The gap in life expectancy between the black and white populations has narrowed, but persists (table 27). Disparities in risk factors, access to health care, and morbidity also remain. Hispanic and American Indian persons under 65 years are more likely to be uninsured than those in other racial and ethnic groups (table 134). Obesity, a major risk factor for many chronic diseases, varies by race and ethnicity (tables 73 and 74). In 2003 the rate of recent mammogram screening for white and black women was similar but rates for Asian and Hispanic women remained at a lower level (figure 21 and table 86).

Many aspects of the health of the Nation have improved, but the health of some racial and ethnic groups has improved less than others. The large differences in health status by race and Hispanic origin documented in this report may be explained by factors including socioeconomic status, health practices, psychosocial stress and resources, environmental exposures, discrimination, and access to health care (7). Socioeconomic and cultural differences among racial and ethnic groups in the United States will likely continue to influence future patterns of disease, disability, and health care use.

## Special Feature: Adults 55–64 Years of Age

The population group age 55–64 years is projected to be the fastest growing segment of the adult population over the next decade. In 2004 there were about 29 million persons in this age group. The 55–64 age group is projected to increase by 11 million persons over the 2004–2014 period (figure 30), to 40 million persons by 2014. "Baby boomers" are those born during the post-World War II period, between 1946 and 1964. In 2004 the oldest baby boomers were 55–58 years of age, and just beginning to enter the 55–64 year age group. Many more boomers will age into the group in the next 10 years. In future decades the population age 65 years and over will increase dramatically—yet the population age 55–64 years will not decline because more boomers will replace the ones that age into older age groups. Focusing on this age group may provide insight into program and policy interventions that could improve access and quality of care for Americans age 55–64 years as well as highlight implications for the Medicare program as this large group ages into Medicare and Social Security. This year's *Chartbook on Trends in the Health of Americans* includes a Special Feature focusing on health care use and expenditures for adults age 55–64 years of age, and



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determinants of care including employment status, income, health insurance, and risk factors.

People age 55–64 years often have more frequent and more severe health problems than younger people. The prevalence of diabetes, hypertension, heart disease, and other chronic diseases increases with age (tables 55 and 69). There is also evidence that prevalence of some risk factors associated with heart disease—hypertension and obesity—has been increasing among this group while the prevalence of elevated cholesterol has declined (figure 34). Between 1988–94 and 1999–2002, the percent with at least one of these heart disease risk factors increased for men age 55–64 years from 64 to 72 percent and remained steady for women at 73–75 percent. Utilization of prescription drugs for these conditions has increased substantially. Between 1995–96 and 2002–03 the rate of cholesterol-lowering drugs prescribed during physician and hospital outpatient department visits among men 55–64 years of age almost tripled and among women increased more than three-fold (figure 36). Increasing drug utilization overall also has economic implications. The average annual expenses for all prescription drugs and out-of-pocket expenses for drugs increased substantially between 1997 and 2002 for this group (2002 dollars; figure 37).

Americans age 55–64 years are more likely to have health insurance coverage than younger adults age 18–54 (table 134). However as they grow older and begin to develop health problems, they do not have the guarantee of health insurance coverage that Medicare offers to almost all older adults age 65 years and over. Those still employed may delay retirement plans and continue to work in order to maintain health insurance coverage for themselves or their spouses until they reach age 65. In 2002–03 more than one-half of adults 55–64 years of age were employed with 17 percent retired and 12 percent unemployed due to disability (data table for figure 31).

Uninsured 55–64 year-olds may be at risk for high out-of-pocket expenditures, or of delaying or not receiving needed nonurgent care. Persons 55–64 years of age without health insurance were considerably less likely to have health care visits in the past year than persons with private insurance. About one-half of the uninsured 55–64 year-olds saw a general physician (family medicine practitioner, internist, or general practitioner) at least once in the past year compared with 80 percent of those with private insurance (figure 35). When the uninsured 55–64 year-olds do become eligible for Medicare, they may use more health care resources as a result of health care that was delayed at earlier ages (8).

Many Americans age 55–64 years are relatively well off; however certain subgroups including unmarried persons, women, and minorities are at a greater risk of living in poverty, lacking health insurance, and being disabled (data tables for figures 31–33). Among both men and women 55–64 years of age, non-Hispanic black and Hispanic adults were about twice as likely to be living in poverty as non-Hispanic white adults in 2003. Levels of disability reported as a reason for unemployment were also higher among non-Hispanic black men and particularly among non-Hispanic black women age 55–64 years than among other racial and ethnic groups (figure 31). Those without health insurance or adequate income are particularly vulnerable to the financial and physical burdens of disease and disability.

To improve the health of all Americans and to enable policymakers to chart future trends, target resources most effectively, and set program and policy priorities, it is critical that the Nation keep collecting and disseminating reliable and accurate information about all components of health, including current health status, the determinants of health, resources, and outcomes. The following highlights from *Health, United States, 2005 With Chartbook on Trends in the Health of Americans* summarize the latest findings gathered from across the public and private health care sectors to help the Department of Health and Human Services, the President, and Congress in carrying out this essential mission.

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# Highlights

*Health, United States, 2005, is the 29th report on the health status of the Nation. In a chartbook and 156 trend tables, it presents current and historic information on the health of the U.S. population. The trend tables are organized around four major subject areas: health status and determinants, health care utilization, health care resources, and health care expenditures and payors. The 2005 Chartbook on Trends in the Health of Americans focuses on selected determinants and measures of health and includes a special feature on adults 55–64 years of age, a rapidly growing segment of the adult population. The economic and health status of this age group is of interest as it is poised to enter retirement and to become eligible for Medicare. Highlights of the featured topic, adults age 55–64 years, follow other major findings from the report.*

## Health Status and Determinants

### Population characteristics

*Demographic changes in the U.S. population will shape future efforts to improve health and health care. Two major changes are the increasing racial and ethnic diversity of the Nation and the growth of the older population.*

From 1950 to 2004 the proportion of the **population age 75 years and over** rose from 3 to 6 percent. It is projected that by 2050, 12 percent, or about one in eight Americans, will be 75 years of age or over (figure 2).

The **racial and ethnic composition** of the Nation has changed over time. The Hispanic population and the Asian population have grown more rapidly than other racial and ethnic groups in recent decades. In 2004, 14 percent of the U.S. population identified themselves as Hispanic and 4 percent as Asian (figure 3).

In 2003, 12.5 percent of Americans were living in **poverty**, up from 12.1 percent in 2002 and 11.7 percent in 2001. In 2003 more than 60 percent of black and Hispanic children under 18 years of age and more than one-half of the black and Hispanic population age 65 years and over were poor or near poor (figures 4 and 5 and table 2).

### Fertility

*Birth rates for teens continued their steady decline while birth rates for women 25–44 years of age increased in 2003.*

The **birth rate for teenagers** declined for the 12th consecutive year in 2003, to 41.6 births per 1,000 women age 15–19 years, the lowest rate in more than six decades. The birth rate for 15–17 year olds in 2003 was 42 percent lower than the recent peak in 1991, and the birth rate for older teens 18–19 years of age was 25 percent lower than in 1991 (table 3).

In 2003 the **fertility rate** for Hispanic women (96.9 births per 1,000 Hispanic women 15–44 years) was 66 percent higher than for non-Hispanic white women (58.5 per 1,000) (table 3).

In 2003 the **birth rate for unmarried women** increased to almost 45 births per 1,000 unmarried women age 15–44 years. The birth rate for unmarried black women was essentially unchanged at 66.3 per 1,000 in 2003, and the birth rate for unmarried Hispanic women increased for the fifth year in a row to 92.2 per 1,000 (table 10).

The rate of **triplet and higher order births** at 187.4 per 100,000 live births in 2003 has been relatively stable since 1998, but was over 400 percent higher than the rate in 1980. The increase in multiple births was most marked among women 30 years of age and over (table 5).

### Health Behaviors and Risk Factors

*Health behaviors and risk factors have a significant effect on health outcomes. Cigarette smoking increases the risk of lung cancer, heart disease, emphysema, and other respiratory diseases. Overweight and obesity increase the risk of death and disease as well as the severity of disease. Regular physical activity lessens the risk of disease and enhances mental and physical functioning. Heavy and chronic use of alcohol and use of illicit drugs increase the risk of disease and injuries.*

The percent of **adults who smoke cigarettes** continues to decline. Between 1990 and 2003, the percent of men who smoked declined from 28 to 24 percent and the percent of women who smoked declined from 23 to 19 percent (figure 10).

Between 1997 and 2003 the percent of **high school students who reported smoking cigarettes** in the past



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month declined from 36 percent to 22 percent, reversing an upward trend that began in the early 1990s. Despite these declines, 26 percent of high school seniors were current smokers in 2003 and 13 percent smoked cigarettes on 20 or more days in the past month (figures 10 and 11).

**Cigarette smoking during pregnancy** is a risk factor for poor birth outcomes such as low birthweight and infant death. In 2003 the proportion of mothers who smoked cigarettes during pregnancy declined to less than 11 percent, down from 20 percent in 1989. The smoking rate during pregnancy for mothers age 18–19 years (17 percent) remained higher than that for older mothers (figure 10 and table 12).

**Low birthweight** is associated with elevated risk of death and disability in infants. In 2003 the low birthweight rate (less than 2,500 grams, or 5.5 pounds, at birth) increased to 7.9 percent, up from 7.0 percent in 1990 (table 13).

In 2003, 22 percent of male high school students rarely or never **used a seat belt** compared with 15 percent of female high school students. The percent of high school students in grades 9–12 who **rode with a driver who had been drinking alcohol** decreased from 40 percent to 30 percent between 1991 and 2003 (figure 12).

In 2003, 67 percent of **high school students** reported **regular physical activity**. Seventy-three percent of male high school students and 60 percent of female high school students reported regular physical activity. Only 50 percent of non-Hispanic black female students were physically active on a regular basis (figure 13).

In 2003, one-third of **adults** 18 years of age and over engaged in **regular leisure-time physical activity**. Nonpoor adults were more likely to engage in regular leisure-time physical activity (37 percent) than near poor or poor persons (23–25 percent). About one-half of poor and near poor adults were inactive compared with less than one-third of nonpoor adults (percents are age adjusted) (figure 14 and table 72).

Between 1971–74 and 1999–2000, the average energy intake in **kilocalories** (Kcals) increased 7 percent among men 20–74 years of age and almost 22 percent among women 20–74 years. For both men and women, the percent of Kcals from fat decreased while the percent of Kcals from carbohydrates increased (table 71).

The prevalence of **overweight and obesity among adults** 20–74 years of age increased from 47 percent in 1976–80 to 65 percent in 1999–2002. During this period the prevalence of obesity among adults 20–74 years of age doubled from 15 to 31 percent (percents are age adjusted) (figure 15 and table 73).

Between 1976–80 and 1999–2002 the prevalence of **overweight among children** 6–11 years of age more than doubled from 7 to 16 percent and the prevalence of overweight among **adolescents** 12–19 years of age more than tripled from 5 to 16 percent (figure 15 and table 74).

In 2003 among current drinkers age 18 years and over, 40 percent of men and 20 percent of women reported drinking **five or more alcoholic drinks** on at least 1 day in the past year (age adjusted). This level of alcohol consumption was most common among young adults 18–24 years of age. Nearly 60 percent of young men and 42 percent of young women consumed five or more alcoholic drinks in a day (table 68).

In 2003 the prevalence of **illicit drug use** within the past month among youths 12–17 years of age was 11 percent. The percent of youths and young adults reporting illicit drug use increased with age, from 4 percent among 12–13 year olds to 19 percent among those age 16–17 years and 20 percent among those 18–25 years (table 66).

## Morbidity

*Summary measures of morbidity presented in this report include limitation of activity due to chronic health conditions, limitations in activities of daily living, and self-assessed (or family member-assessed) health status. Additional measures of morbidity include the incidence and prevalence of specific diseases, vision and hearing trouble, injury-related emergency department use, and suicide attempts.*

In 2003 the percent of persons reporting their **health status** as fair or poor was more than three times as high for persons living below the poverty level as for those with family income more than twice the poverty level (20 percent and 6 percent, age adjusted). Levels of fair or poor health were nearly twice as high among Hispanic persons and non-Hispanic black persons as among non-Hispanic white persons (table 60).

In 2003 **limitation of activity** due to chronic health conditions was reported for 7 percent of **children** under the age of 18 years. Among preschool children (under 5 years) the conditions most often mentioned were speech problems, asthma, and mental retardation or other developmental



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problems. Among school-age children (5–17 years), learning disabilities and Attention Deficit Hyperactivity Disorder (ADHD) were frequently mentioned (figure 18 and table 58).

Arthritis and other musculoskeletal conditions were the leading cause of **activity limitation** among **working-age adults** 18–64 years of age in 2002–03. Mental illness was the second most frequently mentioned condition causing activity limitation among adults 18–44 years of age and the third most frequently mentioned among adults 45–54 years (figure 19).

Among **persons age 65 years and over**, arthritis, and heart disease and other circulatory conditions were the two most frequently reported causes of **activity limitation** in 2002–03. The next most commonly reported cause of activity limitation was diabetes for those 65–84 years and vision problems and senility for those 85 years and over (figure 20).

In 2003, 9 percent of the adult population reported trouble seeing even with contact lenses or glasses and 3 percent were deaf or reported a lot of trouble hearing. **Vision and hearing trouble** increase with age. Twenty-one percent of persons age 75 years and over had trouble seeing and 15 percent were deaf or had a lot of trouble hearing (table 59).

In 2003, 15 percent of adults age 18 years and over reported **severe headache or migraine** during the past 3-month period. Severe headaches and migraines were more common among women than men (21 percent compared with 9 percent, age adjusted) and declined with age from 25 percent among women age 18–44 years to 7 percent among women age 75 years and over (figure 17 and table 57).

In 2003, 28 percent of adults age 18 years and over reported **low back pain** lasting a day or more in the last 3-month period. Women had higher prevalence of low back pain than men (figure 17 and table 57).

In 2003 **tuberculosis** incidence declined for the 11th consecutive year to 5.2 cases per 100,000 population, down from 10.3 in 1990 and 12.3 in 1980 (table 51).

New **pediatric AIDS cases** have declined steadily since 1994 when U.S. Public Health Service guidelines recommended testing and treatment of pregnant women and neonates to reduce perinatal HIV transmission. The vast majority of pediatric AIDS cases occur through perinatal exposure. In 2003, an estimated 59 new AIDS cases occurred among children under the age of 13 years, compared with an estimated 187 cases in 1999 (table 52).

Incidence rates for **all cancers combined** declined in the 1990s for males but not for females. Between 1990 and 2001 age-adjusted cancer incidence rates declined on average nearly 1 percent or more per year for black males, non-Hispanic white males, American Indian or Alaska Native males, and Asian or Pacific Islander males. Among non-Hispanic white females cancer incidence increased on average 0.4 percent per year between 1990 and 2001, a significant increase (table 53).

The most frequently diagnosed **cancer sites in males** are prostate, followed by lung and bronchus, and colon and rectum. Cancer incidence at these sites is higher for black males than for males of other racial and ethnic groups. In 2001 age-adjusted cancer incidence rates for black males exceeded those for white males by 50 percent for prostate, 49 percent for lung and bronchus, and 16 percent for colon and rectum (table 53).

**Breast cancer** is the most frequently diagnosed cancer among females. Breast cancer incidence is higher for non-Hispanic white females than for females in other racial and ethnic groups. In 2001 age-adjusted breast cancer incidence rates for non-Hispanic white females exceeded those for black females by 33 percent, for Asian or Pacific Islander females by 52 percent, and for Hispanic females by 74 percent (table 53).

In 1999–2002, 9.3 percent of adults 20 years of age and over had **diabetes**. Thirty percent of adults with diabetes were undiagnosed in 1999–2002, similar to the percent in 1988–94 (table 55).

In 2003, about 3 percent of **adults** age 18 years and over and 6 percent of **children** age 3–17 years had an **asthma attack** during the past 12-month period (figure 16 and table 56).

In 2003 among **adults** age 18 years and over, 14 percent reported being diagnosed with **sinusitis** and 9 percent with **hay fever**. Women were more likely than men to report these diagnoses (table 56).

Between 1993 and 2003 the percent of high school students who reported attempting suicide (8–9 percent) and whose **suicide attempts** required medical attention (just under 3 percent) remained fairly constant. Girls were more likely than boys to consider or attempt suicide. However, in 2002



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adolescent boys (15–19 years of age) were five times as likely to die from suicide as were adolescent girls, in part reflecting their choice of more lethal methods, such as firearms (tables 46 and 62).

The prevalence of **serious psychological distress** was 3 percent in 2002–03 among civilian noninstitutionalized adults 18 years of age and over. Four percent of persons age 45–54 years had serious psychological distress, more than younger and older age groups. Persons living below the poverty line were more than four times as likely as those above 200 percent of poverty to have serious psychological distress (9 percent compared with 2 percent, age adjusted) (table 61).

Poor children are more likely to have **untreated dental caries** than children in families with incomes above the poverty level. In 1999–2002, 33 percent of poor children 6–17 years of age had untreated dental caries compared with 13 percent of children in families with incomes at least twice the poverty level (table 85).

Between 1988–94 and 1999–2002, approximately one-quarter (24–28 percent) of adults 18–64 years of age had **untreated dental caries**, down from nearly one-half (48 percent) of adults in 1971–74 (table 85).

## Mortality Trends

*Life expectancy and infant mortality rates are often used to gauge the overall health of a population. Life expectancy shows a long-term upward trend and infant mortality shows a long-term downward trend.*

In 2003 **life expectancy** at birth for the total population reached a record high of 77.6 years (preliminary data), up from 75.4 years in 1990 (table 27).

In 2003 the preliminary **infant mortality** rate was 6.9 infant deaths per 1,000 live births, similar to the rate in 2002 (7.0 per 1,000). In 2002 the infant mortality rate increased for the first time in more than 40 years. The rise in infant mortality in 2002 was concentrated among neonatal deaths occurring in the first week of life, due largely to an increase in the number of infants born weighing less than 750 grams (1 pound 10 1/2 ounces) (figure 27 and table 22).

Between 1950 and 2003 the age-adjusted **death rate for the total population** declined 43 percent to 831 deaths per 100,000 population (preliminary data). This reduction was driven largely by declines in mortality from heart disease, stroke, and unintentional injury (figure 29 and table 29).

Mortality from **heart disease**, the leading cause of death, declined almost 4 percent in 2003 (preliminary data), continuing a long-term downward trend. The 2003 age-adjusted death rate for heart disease was 60 percent lower than the rate in 1950 (figure 29 and tables 29 and 31).

Mortality from **cancer**, the second leading cause of death, decreased more than 2 percent in 2003 (preliminary data), continuing the decline that began in 1990. Overall cancer age-adjusted death rates rose from 1960 to 1990 and then reversed direction (figure 29 and tables 29 and 31).

Mortality from **stroke**, the third leading cause of death, declined almost 5 percent in 2003 (preliminary data). Between 1950 and 2003, the age-adjusted death rate for stroke declined 70 percent (figure 29 and tables 29 and 31).

In 2003 mortality from **chronic lower respiratory diseases** (CLRD), the fourth leading cause of death, decreased almost 5 percent from its peak in 1999 (preliminary data). Age-adjusted death rates for CLRD generally rose between 1980 and 1999, mainly as a result of steadily increasing death rates for females, most noticeably for females age 55 years and over (figure 29 and tables 29, 31, and 41).

Mortality from **unintentional injuries**, the fifth leading cause of death, decreased more than 2 percent in 2003 (preliminary data). Age-adjusted death rates for unintentional injuries generally declined from 1950 until 1992 and then increased slightly (figure 29 and tables 29 and 31).

## Disparities in Mortality

*As overall death rates have declined, racial and ethnic disparities in mortality persist, but the gap in life expectancy between the black and white populations has narrowed. Disparities in mortality also persist among persons of different education levels.*

Large disparities in **infant mortality** rates among **racial and ethnic groups** continue. In 2002 infant mortality rates were highest for infants of non-Hispanic black mothers (13.9 deaths per 1,000 live births), Hawaiian mothers (9.6 per 1,000), American Indian mothers (8.6 per 1,000), and Puerto Rican mothers (8.2 per 1,000); and lowest for infants of mothers of Chinese origin (3.0 per 1,000 live births) and Cuban mothers (3.7 per 1,000) (table 19).



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**Infant mortality** increases as **mother's level of education** decreases among infants of mothers 20 years of age and over. In 2002 the mortality rate for infants of mothers with less than 12 years of education was 58 percent higher than for infants of mothers with 13 or more years of education. This disparity was more marked among non-Hispanic white infants, for whom mortality among infants of mothers with less than a high school education was more than twice that for infants of mothers with more than a high school education (table 20).

Between 1990 and 2003 **life expectancy at birth** increased 3.0 years for **males** and 1.3 years for **females** (preliminary data). The gap in life expectancy between males and females narrowed from 7.0 years in 1990 to 5.3 years in 2003 (figure 26 and table 27).

Between 1990 and 2003 **mortality from lung cancer** declined for **men** and increased for **women.** Although these trends reduced the sex differential for this cause of death, the age-adjusted death rate for lung cancer was still 74 percent higher for men than for women in 2003 (preliminary data) (table 39).

Since 1990 mortality from **chronic lower respiratory diseases** remained relatively stable for **men** while it increased for **women**. These trends reduced the gap between the sexes for this cause of death. In 1990 the age-adjusted death rate for males was more than 100 percent higher than for females. In 2003 (preliminary data) the difference between the rates had been reduced to 38 percent (table 41).

Between 1990 and 2003 **life expectancy at birth** increased more for the **black** than for the **white population**, thereby narrowing the gap in life expectancy between these two racial groups. In 1990 life expectancy at birth for the white population was 7.0 years longer than for the black population. By 2003 the difference had narrowed to 5.2 years, based on preliminary data (table 27).

Overall mortality was 30 percent higher for **black Americans** than for white Americans in 2003 (preliminary data) compared with 37 percent higher in 1990. In 2003 age-adjusted death rates for the black population exceeded those for the white population by 43 percent for **stroke**, 31 percent for **heart disease**, 23 percent for **cancer**, and almost 750 percent for **HIV disease** (table 29).

The **5-year survival rate** for black females diagnosed in 1992–2000 with breast cancer was 14 percentage points lower than the 5-year survival rate for white females (74 percent compared with 88 percent) (table 54).

In 2003 **breast cancer mortality** for black females was 37 percent higher than for white females (preliminary data), compared with less than 15 percent higher in 1990 (based on age-adjusted death rates) (table 40).

**Homicide rates among young black males** 15–24 years of age and **young Hispanic males** were about 50 percent lower in 2002 than in 1992 and 1993 when homicide rates peaked for these groups. Despite these downward trends, homicide was still the leading cause of death for young black males and the second leading cause for young Hispanic males in 2002, and their homicide rates remained substantially higher than for young non-Hispanic white males (table 45).

**HIV disease mortality** peaked in 1995 and then fell sharply with the advent of new drug therapies. However, the decline in HIV disease mortality has slowed in recent years. Between 1999 and 2003 (preliminary data), age-adjusted death rates for HIV disease declined about 4 percent per year on average for males and were unchanged for females (table 42).

In 2002 the death rate for **motor vehicle-related injury for young American Indian males** 15–24 years of age was almost 40 percent higher and the suicide rate was almost 60 percent higher than the rates for those causes for young white males. Death rates for the American Indian population are known to be underestimated (tables 44 and 46).

In 2002 death rates for **stroke for Asian males** 45–54 and 55–64 years of age were about 15 percent higher than for white males of those ages. Since 1990, stroke mortality for Asian males and females 45–74 years of age has generally exceeded that for white males and females of those ages. Death rates for the Asian population are known to be underestimated (table 37).

**Death rates** vary by **educational attainment**. In 2002 the age-adjusted death rate for persons 25–64 years of age with fewer than 12 years of education was 2.7 times the rate for persons with at least one year of college (table 34).

## Occupational Health

*Improvements in workplace safety constitute a major public health achievement in the twentieth century. Despite important improvements in workplace safety practices, preventable injuries and deaths continue to occur.*



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In 2003 approximately 2.3 million **workplace injuries and illnesses** in the private sector involved days away from work, job transfer, or restricted duties at work for a rate of 2.6 cases per 100 full-time workers. Transportation and warehousing reported the highest injury and illness rate, 5.4 cases per 100. The next highest rates were reported by the manufacturing (3.8 per 100) and construction industries (3.6 per 100) (table 50).

In 2003, 5,043 **occupational injury deaths** occurred in the private sector or 4.7 fatal occupational injuries per 100,000 employed private sector workers. Natural resources and mining had the highest fatality rate (55.7 per 100,000). Natural resources industries include agriculture, forestry, fishing, and hunting. The next highest fatality rates were for the construction (14.3 per 100,000) and trade, transportation, and utilities industries (5.6 per 100,000) (table 49).

A total of 2,715 **pneumoconiosis deaths**, for which pneumoconiosis was either the underlying or nonunderlying cause of death, occurred in 2002, compared with 4,151 deaths in 1980. Pneumoconiosis is primarily associated with workplace exposures to dusts, including asbestos and dust in coal mines (table 48).

## Health Care Utilization and Health Care Resources

*Major changes continue to occur in the delivery of health care in the United States, driven in part by changes in payment policies intended to rein in rising costs and by advances in technology that have allowed more complex treatments to be performed on an outpatient basis. Use of hospital inpatient services overall has decreased, yet inpatient care is becoming more complex with more cardiac procedures performed, especially on older persons. New types of health care providers including ambulatory surgery centers and end-stage renal disease facilities have emerged that provide services previously available only in hospitals.*

In 2000–2003 the most common **external causes of injury for visits to hospital emergency departments** for children and adolescents were falls, being struck by or against a person or object, and motor vehicle traffic-related injuries (figure 23).

In 2002–03 the percent of **hospital emergency department injury visits** due to falls for adults increased with age from 10–13 percent of visits for persons 18–44 years to 19 percent for persons 45–64 years and 41 percent for persons 65 years of age and over (table 89).

In 2002–03 visit rates to **physician offices and hospital outpatient departments** among persons 18–44 years of age were twice as high for women as for men, largely due to medical care associated with female reproduction. This gender difference narrowed among middle-age adults and disappeared among persons 65 years of age and over (figure 24).

In 2003 the **hospital emergency department** visit rate for black persons was almost twice the rate for white persons (71 visits compared with 38 visits per 100 persons, age adjusted). Adults 75 years and over had a higher rate of visits to the hospital emergency department than other age groups (64 visits per 100 persons) (table 88).

In 2003, 63 percent of all **surgical operations** in community hospitals were performed on outpatients, up from 51 percent in 1990 and 16 percent in 1980 (table 101).

The long-term decline in **hospital discharge rates** and **average length of stay** appears to be over. In 2003 the hospital discharge rate was 120 discharges per 1,000 population, 5 percent higher than in 2000. In 2003 average length of stay was 4.8 days, compared with 4.9 days in 2000–2002 (data are age adjusted) (table 97).

Between 1992–93 and 2002–03 **hospital stays with at least one operation on vessels of the heart** performed on persons 75 years of age and over increased from 79 to 128 hospital stays per 10,000 persons (table 100).

Between 1996–97 and 2002–03 the rate of coronary stent insertion for adults age 45 years and over more than doubled from 22 to 49 per 10,000 population. Among adults age 75 years and over, hospitalizations that included this procedure more than tripled from 23 to 73 per 10,000 population (figure 25).

Between 1992–93 and 2002–03 **hospital stays with at least one diagnostic radiology procedure** performed on persons 18 years of age and over decreased substantially from 78 to 35 hospital stays per 10,000 persons (rates are age adjusted) (table 100).

Between 1995 and 2003 the number of **allopathic medicine graduates** was nearly 16,000 per year, and osteopathic medicine graduates increased from 1,800 to 2,600 per year (table 109).



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Between 1990 and 2003 the number of **community hospital beds** declined from about 927,000 to 813,000. In 2003 community hospital occupancy increased to 66 percent from a low of 63 percent in 1995 (table 112).

Between 1990 and 2002, the overall number of **inpatient mental health beds** in the United States declined by 22 percent. In VA medical centers the number of mental health beds declined by 55 percent, in State and county mental hospitals and private psychiatric hospitals the decline was more than 40 percent, and in psychiatric units of non-Federal general hospitals the decline was 25 percent (table 113).

In 2003 there were 6,900 Medicare-certified **home health agencies**, down from 10,800 in 1997. During this period, the number of Medicare-certified **hospices** remained stable at about 2,300 (table 117).

In 2003 there were nearly 1.8 million **nursing home beds** in facilities certified for use by Medicare and Medicaid beneficiaries. Between 1995 and 2003 nursing home bed occupancy in those facilities was relatively stable, estimated at 83 percent in 2003 (table 116).

## Preventive Health Care

*Preventive health services help reduce morbidity and mortality from disease. Use of several different types of preventive services has been increasing, but disparities persist in use of preventive health care by race, ethnicity, and family income.*

The percent of mothers receiving **prenatal care** in the first trimester of pregnancy has continued to edge upward from 76 percent in 1990 to 84 percent in 2003. Although increases occurred for all racial and ethnic groups, in 2003 the percent of mothers with early prenatal care still varied substantially, from 71 percent for American Indian mothers to 92 percent for mothers of Cuban origin (table 7).

In 2003, 81 percent of children 19–35 months of age received the **combined vaccination** series of four doses of DTaP (diphtheria-tetanus-acellular pertussis) vaccine, three doses of polio vaccine, one dose of MMR (measles-mumps-rubella vaccine), and three doses of Hib (Haemophilus influenzae type b) vaccine. Children living below the poverty threshold were less likely to have received the combined vaccination series than were children living at or above poverty (76 percent compared with 83 percent) (table 77).

In 2003, 66 percent of noninstitutionalized adults 65 years of age and over reported an **influenza vaccination** within the past year, approximately the same percent since 1999 and more than double the percent in 1989. In 2002 and 2003 the percent of older adults ever having received a **pneumococcal vaccine** was 56 percent, up sharply from 14 percent in 1989 (table 76).

In 2003, 70 percent of women age 40 years and over had a **mammogram** within the past 2 years. Poor women living below the poverty threshold were less likely to have a recent mammogram (55 percent) than were women in families with incomes at least twice the poverty threshold (74 percent) (figure 21 and table 86).

In 2003, 79 percent of women age 18 years and over reported a **Pap smear** within the past 3 years. Among women 25–44 years of age, Pap smear use was lowest for women with less than a high school education (72 percent) and highest for women with at least some college education (91 percent) (figure 22 and table 87).

## Access to Care

*People need ready access to care both for preventive care and for prompt treatment of illness and injuries. Health insurance coverage is a major determinant of access to care. Other indicators of access include having a usual source of health care and having a recent contact with a provider of health care.*

Between 1994 and 2003, the percent of the **population under 65 years of age with no health insurance coverage** (public or private) ranged between 16.1 and 17.5 percent. Among the under 65 population, the poor and near poor (those with family incomes less than 200 percent of poverty) were much more likely than the nonpoor to be uninsured (figures 6 and 7).

The likelihood of being uninsured varies substantially among the **States**. In 2001–03 the average percent of the population with **no health insurance coverage** ranged from 8 percent in Minnesota to 25 percent in Texas (table 156).

In 2003, 10 percent of **children** under 18 years of age had **no health insurance coverage**. Between 2000 and 2003 among children in families with income just above the poverty level (1–1.5 times poverty), the percent uninsured dropped from 25 to 16 percent. However, children in low-income



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families remain substantially more likely than children in higher-income families to lack coverage (table 134).

Persons of **Hispanic origin and American Indians** under 65 years of age are more likely to have **no health insurance coverage** than are those in other racial and ethnic groups. In 2003 among the Hispanic-origin population, persons of Mexican origin were the most likely to lack health insurance coverage (38 percent). Non-Hispanic white persons were the least likely to lack coverage (12 percent) (figure 7 and table 134).

In 2003 **uninsured persons** under 65 years of age were about 3 times as likely as insured persons to have had **no health care visits** within the past 12 months (38 percent compared with 13 percent, age adjusted) (table 75).

In 2002–03, 12 percent of **children** under 18 years of age had **no health care visit** to a doctor or clinic within the past 12 months. Uninsured children were more than 3 times as likely as insured children to lack a recent visit (32 percent compared with 10 percent) (table 79).

Six percent of **children** under 18 years of age had **no usual source of health care** in 2002–03. Uninsured children were nearly 10 times as likely as insured children to lack a usual source of care (29 percent compared with 3 percent) (table 80).

Twenty-seven percent of young **children** under 6 years of age had an **emergency department (ED) visit** within the past 12 months in 2003. Young children living below the poverty level were more likely than those in families with income more than twice poverty to have had an ED visit within the past 12 months (34 percent compared with 24 percent) (table 81).

Seventeen percent of **working-age adults** 18–64 years of age had **no usual source of health care** in 2002–03. Working-age males were nearly twice as likely as working-age females to lack a usual source of care (22 percent compared with 12 percent, age adjusted) (table 82).

In 2003, 75 percent of **children** 2–17 years of age had a **dental visit** in the past year. Children living below or near the poverty level were less likely than children living in families with income more than twice poverty to have had a recent dental visit (66–67 percent compared with 81 percent) (table 84).

**Use of hospital inpatient care** is greater among the poor than among the nonpoor whose family income is at least twice the poverty level. In 2003 among persons under 65 years of age, the hospital discharge rate for the poor was nearly twice the rate for nonpoor (150 and 82 per 1,000 population, age adjusted) (table 96).

## Health Care Expenditures and Payors

*After double-digit annual growth in national health expenditures in the 1980s, the rate of growth slowed during the 1990s. In the current decade the rate of growth edged up again and continued to accelerate until 2002. The rate of growth was slower in 2003 than in the previous year. The United States continues to spend more on health than any other industrialized country. Major payors for health care include public programs such as Medicare and Medicaid, and private health insurers such as health maintenance organizations and other managed care entities.*

In 2003 **national health care expenditures** in the United States totaled $1.7 trillion, a 7.7 percent increase compared with about 9 percent per year increases in 2001 and 2002. In the mid-1990s annual growth had slowed somewhat, following an average annual growth rate of 11 percent during the 1980s (table 119).

The United States spends a larger **share of the gross domestic product (GDP) on health** than does any other major industrialized country. In 2002 the United States devoted 15 percent of the GDP to health compared with 11 percent each in Switzerland and Germany and nearly 10 percent in Iceland, France, Canada, Norway, and Greece, countries with the next highest shares (table 118).

In 2003 national health expenditures grew 7.7 percent, compared with 4.9 percent growth in the gross domestic product (GDP). **Health expenditures as a percent of the GDP** increased to 15.3 percent in 2003, up from 14.9 percent in 2002 (figure 8 and table 119).

In 2004, the increase in the medical care component of the **Consumer Price Index** (CPI) was 4.4 percent, continuing to outpace overall inflation (2.7 percent). The CPI for hospital services showed the greatest price increase (6.0 percent) compared with other components of medical care (table 120).



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## Expenditures by Type of Care and Source of Funds

*In recent years expenditures for prescription drugs have grown at a faster rate than any other type of health expenditure. Hospital care, however, continues to account for the largest share of health care spending.*

**Expenditures for hospital care** accounted for 31 percent of all national health expenditures in 2003. Physician services accounted for 22 percent of the total in 2003, prescription drugs for 11 percent, and nursing home care for 7 percent (table 122).

Between 2000 and 2003 **community hospital expenses** increased at an average annual rate of 8 percent compared with a 5-percent increase between 1995 and 2000 (table 129).

Between 1995 and 2003 the average annual rate of increase for **prescription drug expenditures** was 14 percent, higher than for any other health expenditure (table 122).

**Prescription drug expenditures** increased 11 percent in 2003 and 15–16 percent in 2001 and 2002. Prescription drugs posted a 3-percent increase in the Consumer Price Index in 2003 and 2004 and a 5-percent price increase in 2001 and 2002 (tables 120 and 122).

In 2003, 46 percent of **prescription drug expenditures** were paid by private health insurance (up from 24 percent in 1990), 30 percent by out-of-pocket payments (down from 59 percent in 1990), and 19 percent by Medicaid. Although Medicare is the Federal program that funds health care for persons age 65 years and over, and older Americans are the highest per capita consumers of prescription drugs, Medicare paid less than 2 percent of prescription drug expenses in 2003 (table 123).

In 2002, 91 percent of persons age 65 years and over in the civilian noninstitutionalized population had a **prescribed medicine expense** compared with 61 percent of younger people. Women 65 years of age and over averaged $920 out-of-pocket for prescribed medicine compared with $674 for men in 2002. Among those under 65 years of age, out-of-pocket expenses averaged $265 for women and $212 for men in 2002 (table 124).

In 2002, 96 percent of **persons age 65 years and over** in the civilian noninstitutionalized population reported **medical expenses** that averaged about $7,800 per person with expense. Seventeen percent of expenses were paid out-of-pocket, 14 percent by private insurance, and 66 percent by public programs (mainly Medicare and Medicaid) (tables 124 and 125).

The burden of **out-of-pocket expenses** for health care varies considerably by age. In 2002 about two-fifths of those 65 years of age and over with health care expenses paid $1,000 or more out-of-pocket, compared with one-quarter of those 45–64 years of age, and less than one-ninth of adults 18–44 years of age (table 126).

In 2003, 33 percent of **personal health care expenditures** were paid by the Federal Government and 11 percent by State and local government; private health insurance paid 36 percent and consumers paid 16 percent out-of-pocket (figure 9 and table 123).

In 2003 the major **sources of funds for hospital care** were Medicare (30 percent) and private health insurance (34 percent). **Physician services** were also primarily funded by private health insurance (one-half) and Medicare (one-fifth). In contrast, **nursing home care** was financed primarily by Medicaid (almost one-half) and out-of-pocket payments (more than one-quarter). The Medicare share of nursing home expenditures has risen from 3 percent in 1990 to 12 percent in 2003 (table 123).

## Publicly Funded Health Programs

*The two major publicly funded health programs are Medicare and Medicaid. Medicare is funded through the Federal Government and covers the health care of persons 65 years of age and over and disabled persons. Medicaid is jointly funded by the Federal and State Governments to provide health care for certain groups of low-income persons. In recent years, Medicaid has expanded to cover a greater proportion of the low-income adult population—and the State Children's Health Insurance Program (SCHIP) now covers many low-income children. Medicaid benefits and eligibility vary by State.*

In 2004 the **Medicare** program had 42 million enrollees and expenditures of $309 billion (table 139).

In 2004 **hospital insurance** (HI) accounted for 55 percent of **Medicare** expenditures. Expenditures for home health agency care continued to hover around 3 percent of HI expenditures, down from 14 percent in 1995. Expenditures for hospice care nearly doubled from 2 to 4 percent of HI expenditures between 2000 and 2004 (table 139).



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In 2004 **supplementary medical insurance** (SMI) or Part B of Medicare accounted for 45 percent of **Medicare** expenditures. It typically covers outpatient health expenses including physician fees. Fourteen percent of SMI expenditures in 2004 were payments to managed care organizations, down from 20–22 percent in 1999–2000. Nearly 40 percent of the $138 billion SMI expenditures in 2004 went to physicians under the physician fee schedule (table 139).

Of the 35 million **Medicare enrollees in the fee-for-service program** in 2002, 11 percent were 85 years of age and over and 16 percent were disability beneficiaries under 65 years of age. Among fee-for-service Medicare enrollees age 65 years and over, payments ranged from an average of $4,600 per year for enrollees age 65–74 years to $9,000 for those 85 years and over (table 140).

In 2001, 80 percent of Medicare beneficiaries were non-Hispanic white, 9 percent were non-Hispanic black, and 7 percent were Hispanic. One-fifth of Hispanic beneficiaries and one-quarter of non-Hispanic black beneficiaries were persons under 65 years of age entitled to **Medicare through disability**, compared with 12 percent of non-Hispanic white beneficiaries (table 141).

In 2002 **Medicare payments per fee-for-service enrollee** varied by State from less than $4,500 in Hawaii and South Dakota to $7,200 or more in New Jersey, the District of Columbia, Louisiana, Maryland, and New York (table 153).

In 2001 **Medicaid** paid vendors $186 billion on behalf of 46 million recipients (table 142).

In 2003 **Medicaid enrollment** increased to 12.3 percent of the noninstitutionalized population under 65 years of age, up from 9.5 percent in 2000. In 2003 among children under 18 years of age, 26 percent were covered by Medicaid or the State Children's Health Insurance Program, a 6 percentage point increase since 2000 (table 133).

In 2001 children under the age of 21 years accounted for 46 percent of **Medicaid recipients** but only 16 percent of expenditures. Aged, blind, and disabled persons accounted for nearly one-quarter of recipients and nearly 70 percent of expenditures (table 142).

In 2001, 20 percent of **Medicaid payments** went to nursing facilities, 14 percent to inpatient general hospitals, 16 percent to capitated payment services, and 13 percent to prescribed drugs (table 143).

In 2001 **Medicaid payments per recipient varied by State** from less than $3,000 in California, Tennessee, Georgia, and Washington to more than $7,000 in New York and New Hampshire. On average, payments were lower in the Southeast, Southwest, and Far West States than in the New England and Mideast States (table 154).

## Private Health Insurance

*Almost 70 percent of the population under 65 years of age has private health insurance, most of which is obtained through the workplace. In private industry, about 7 percent of employees' total compensation is devoted to health insurance. This share has increased in recent years. Most health insurance is now provided through some form of managed care organization, including health maintenance organizations (HMOs), preferred provider organizations (PPOs), and point-of-service plans (POSs). Less than one-quarter of all persons in the United States were enrolled in HMOs in 2004. HMO enrollment peaked in 1999 and has declined slowly since then.*

In 2002 and 2003 the proportion of the population under 65 years of age with **private health insurance** was 69 percent. Between 1995 and 2001 the proportion had fluctuated between 71 and 73 percent after declining from 77 percent in 1984 (figure 6 and table 132).

Between 2001 and 2003 the proportion of the population under 65 years of age with **health insurance obtained through the workplace** (a current or former employer or union) declined from 67 to 63 percent. This decline disproportionately affected the poor and near poor and Hispanic persons (table 132).

In 2005 **private employers** paid an estimated 6.8 percent of total compensation for health insurance, or $1.64 for each employee-hour worked. The corresponding estimates for State and local governments were 10.2 percent and $3.63, based on March 2005 reporting (table 128).

**Enrollment in HMOs** totaled 69 million persons or 23 percent of the U.S. population in 2004. HMO enrollment varied from 16–19 percent in the South and Midwest to 30–34 percent in the Northeast and West. HMO enrollment increased steadily through the 1990s but has declined since then. Between 1998 and 2004 the number of HMO plans decreased from 651 to 412 plans (table 137).



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## Special Feature: Adults 55–64 Years of Age

*The population 55–64 years of age is a rapidly growing segment of the adult population. As persons in this group age and begin to develop health problems, they do not have the guarantee of health insurance coverage that Medicare now offers to almost all older adults age 65 and over, and employer-sponsored post-retirement health insurance offers have been declining. While many Americans age 55–64 years are relatively well off both physically and financially, other Americans in this age group face a burden from chronic and debilitating diseases, poverty, lack of health insurance, and reduced access to health care.*

The **population 55–64 years of age** is a rapidly growing segment of the adult population. In 2004 this age group numbered about 29 million persons. Over the next 10-year period, the 55–64 age group will increase by 11 million persons to an estimated 40 million persons (figure 30).

In 2002–03 more than one-half of adults 55–64 years of age were **employed**. Non-Hispanic white men and Hispanic men were more likely to be working (about 65 percent) than non-Hispanic black men (57 percent). Among women, a little over one-half of non-Hispanic white women were working compared with 46 percent of non-Hispanic black women and 41 percent of Hispanic women (figure 31).

Non-Hispanic black adults age 55–64 years were more likely than other racial and ethnic groups to report being **unemployed because of disability**. In 2002–03, 22 percent of non-Hispanic black adults age 55–64 years were unemployed due to disability compared with 15 percent of Hispanic and 10 percent of non-Hispanic white adults in this age group (figure 31).

In 2003, more than one-fifth of adults 55–64 years of age had income below 200 percent of **poverty** compared with almost two-fifths of older persons (figures 5 and 32).

In 2002–03, 83 percent of **married** adults 55–64 years of age were covered by **private health insurance** compared with about 60 percent of widowed, separated, divorced, and single adults (figure 33).

Between 1988–94 and 1999–2002, the percent of men age 55–64 years who had one or more of the **cardiovascular risk factors** of obesity, high cholesterol, and hypertension increased from 64 to 72 percent (figure 34).

In 2002–03, persons age 55–64 years with private health insurance were about twice as likely to report **medical care visits** in the past 12 months to specialist physicians, eye doctors, and physical or occupational therapists compared with those without insurance. Those with private insurance were almost 50 percent more likely than the uninsured to report a recent visit to a general physician (family medicine practitioner, internist, or general practitioner) (figure 35).

Between 1995–96 and 2002–03 the rate of **cholesterol-lowering drugs** prescribed during physician and hospital outpatient department visits among men 55–64 years of age almost tripled from 20 to 57 drugs per 100 population and among women more than tripled from 15 to 49 drugs per 100 population (figure 36).

In 2002 the out-of-pocket **prescribed medicine expense** among adults 55–64 years of age was $425 compared with $286 in 1997 (2002 dollars). Women age 55–64 years had an average out-of-pocket prescribed medicine expense of $495 in 2002 compared with $351 for men in this age group (figure 37).



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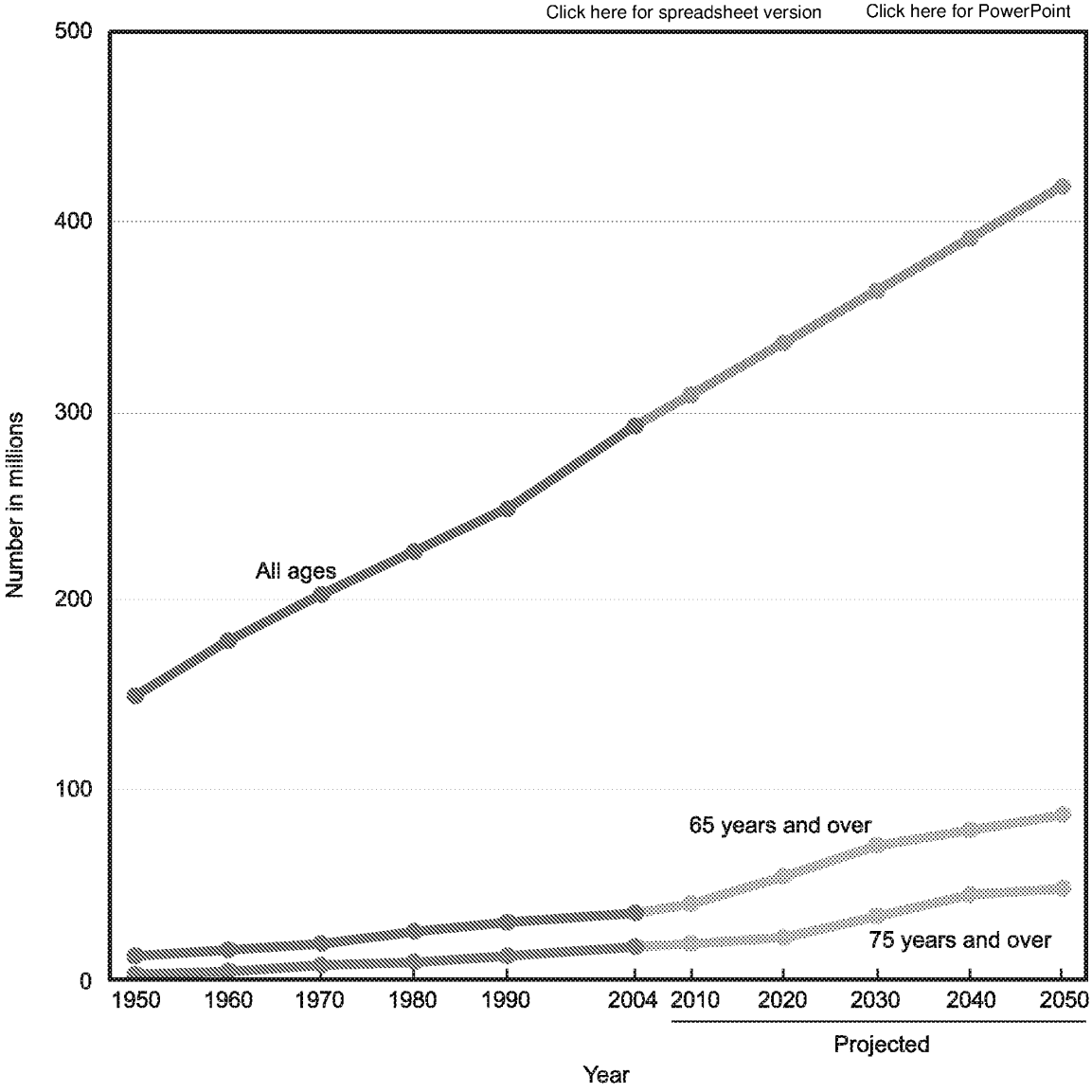
# Chartbook on Trends in the Health of Americans



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## Figure 1. Total population and older population: United States, 1950-2050

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NOTE: See Data Table for data points graphed and additional notes.

SOURCE. U.S. Census Bureau.



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## Age

From 1950 to 2004 the total resident population of the United States increased from 150 million to 294 million, representing an average annual growth rate of 1 percent (figure 1). During the same period, the population 65 years of age and over grew twice as rapidly and increased from 12 to 36 million persons. The population 75 years of age and over grew 2.9 times as quickly as the total population, increasing from 4 to 18 million persons. Projections indicate that the rate of population growth from now to 2050 will be slower for all age groups, and older age groups will continue to grow more than twice as rapidly as the total population.

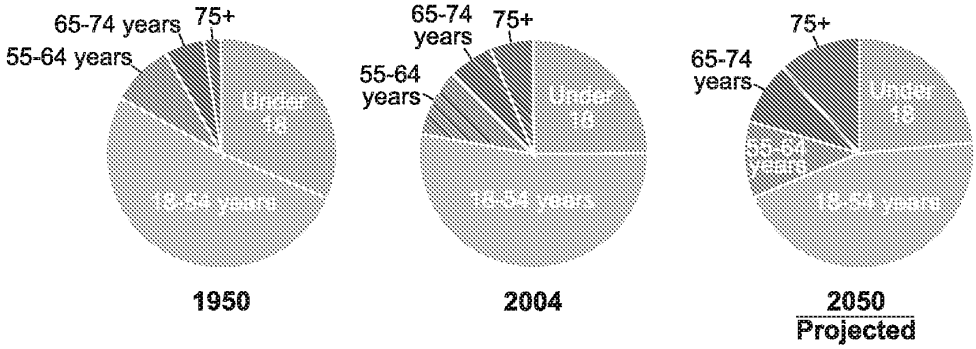
Between 1950 and 2004, the U.S. population grew older (figure 2). From 1950 to 2004 the population under 18 years of age fell from 31 to 25 percent of the total population, while persons 55–64 years increased from 9 to 10 percent of total persons, persons 65–74 years remained at about 6 percent, and persons 75 years and over increased from 3 to 6 percent of the total.

From 2004 to 2050 it is anticipated that the percent of the population 55 years and over will increase substantially. The population age 55–64 years of age, featured in this chartbook, is projected to be the fastest growing segment of the adult population during the next 10 years (figure 30). In future decades both the population age 55–64 and the population age 65 years and over will increase dramatically as the baby boomers, born in the post-World War II period of 1946 through 1964, age. By 2029, all of the baby boomers will be age 65 and over. Between 2004 and 2050 the population 65–74 years of age will increase from 6 to 9 percent of the total and the population 75 years and over will increase from 6 to 12 percent. By 2040 the population 75 years and over will exceed the population 65–74 years of age.

The aging of the population has important consequences for the health care system (1,2). As the older fraction of the population increases, more services will be required for the treatment and management of chronic and acute health conditions. Providing health care services needed by Americans of all ages will be a major challenge in the 21st century.

**Figure 2. Percent of population in five age groups: United States, 1950, 2004, and 2050**

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NOTE: See Data Table for data points graphed and additional notes.  SOURCE: U.S. Census Bureau.



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## Race and Ethnicity

Changes in the racial and ethnic composition of the population have important consequences for the Nation's health because many measures of disease and disability differ significantly by race and ethnicity (*Health, United States, 2005*, trend tables). One of the overarching goals of U.S. public health policy is elimination of racial and ethnic disparities in health.

Diversity has long been a characteristic of the U.S. population, but the racial and ethnic composition of the Nation has changed over time. In recent decades the percent of the population that is of Hispanic origin or Asian has more than doubled (figure 3). In 2004 nearly 30 percent of adults and almost 40 percent of children identified themselves as Hispanic, black, Asian, American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander.

In the 1980 and 1990 decennial censuses, Americans could choose only one racial category to describe their race (1). Beginning with the 2000 census the question on race was modified to allow the choice of more than one racial category. Although overall a small percent of persons of non-Hispanic origin selected two or more races in 2000, the percent of children described as being of more than one race was more than twice as high as the percent of adults. The number of American adults identifying themselves or their children as multiracial is expected to increase in the future (2).

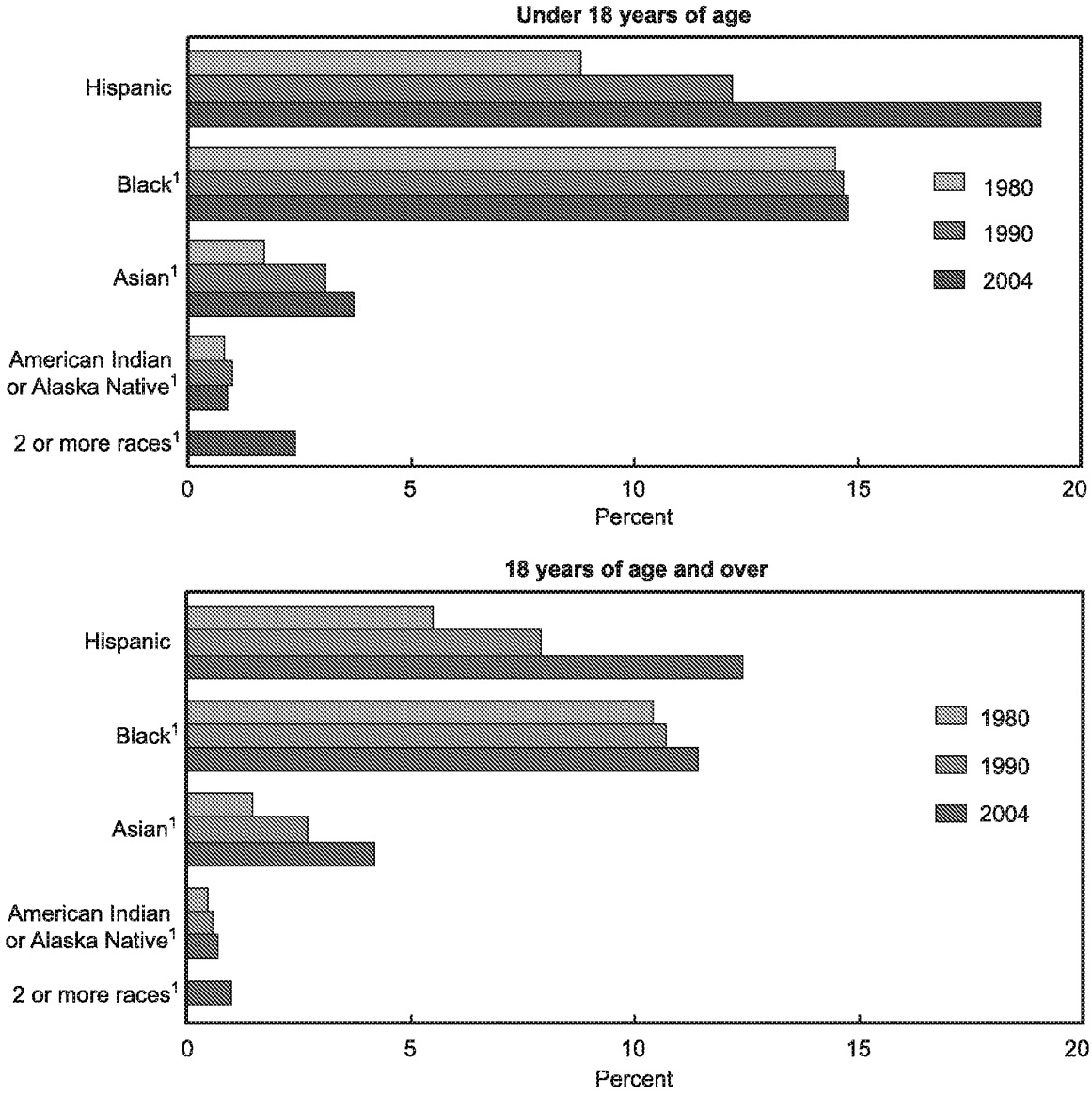
The percent of persons reporting two or more races varies considerably among racial groups. For example, the percent of persons reporting a specified race in combination with one or more additional racial groups was 1.4 percent for white persons and 37 percent for American Indians or Alaska Natives in 2000 (3).



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## Figure 3. Percent of population in selected race and Hispanic origin groups by age: United States, 1980-2004

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[1] Not Hispanic

NOTES: Persons of Hispanic origin may be of any race. Race data for 2004 are not directly comparable with data for 1980 and 1990. Individuals could report only one race in 1980 and 1990, and more than one race in 2004. Persons who selected only one race in 2004 are included in single-race categories; persons who selected more than one race in 2004 are shown as having 2 or more races and are not included in single-race categories. In 1980 and 1990 the category "Asian" includes Asian and Native Hawaiian or Other Pacific Islander; in 2004 this category includes only Asian. See Data Table for data points graphed and data for Native Hawaiian or Other Pacific Islander.

SOURCE: U.S. Census Bureau.



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# Poverty

Children and adults in families with incomes below or near the Federal poverty level have poorer health outcomes than those with higher incomes (see Appendix II, Poverty level for a definition of the Federal poverty level). Although, in some cases, illness can lead to poverty, more often poverty causes poor health by its connection with inadequate nutrition, substandard housing, exposure to environmental hazards, unhealthy lifestyles, and decreased access to and use of health care services (1).

In 2003 the overall percent of Americans living in poverty increased to 12.5 percent, up from 12.1 percent in 2002, 11.7 percent in 2001, and 11.3 percent in 2000. The increases in the poverty rate in 2001–03 were the first since 1993. Most of the increase in the poverty rate from 2000 to 2001 was accounted for by working-age adults who are less likely to receive income from government programs than are children and persons 65 years of age and over. In 2002 the poverty rate increased for all ages. Although the poverty rate increased overall in 2003, there was little effect on adults. A slight increase among working age adults was counterbalanced by a slight decrease among those age 65 and over.

Children under 18 years of age bore the brunt of the 2003 increase, which was added to an already high poverty rate for children (2). Starting in 1974 children became more likely than either working-age adults or older Americans to be living in poverty (figure 4). In 1974 poverty among children started increasing and remained at 20 percent or above from 1981 to 1997. Since then, the children's poverty rate gradually declined to 16.2 percent in 2000 but had increased to 17.6 percent by 2003. In 2003, 12.9 million children lived in poverty (data table for figure 5).

Prior to 1974 persons 65 years of age and over were more likely to live in poverty than people of other ages. With the availability of inflation-adjusted government social insurance programs, such as Social Security and Supplemental Security Income, the poverty rate of older Americans declined rapidly until 1974 and continued to decline gradually until the end of the 1990s to 9.7 percent in 1999 (3). From 2000 to 2002 the poverty rate among persons 65 years of age and over increased to 10.4, but in 2003 it decreased to 10.2 percent.

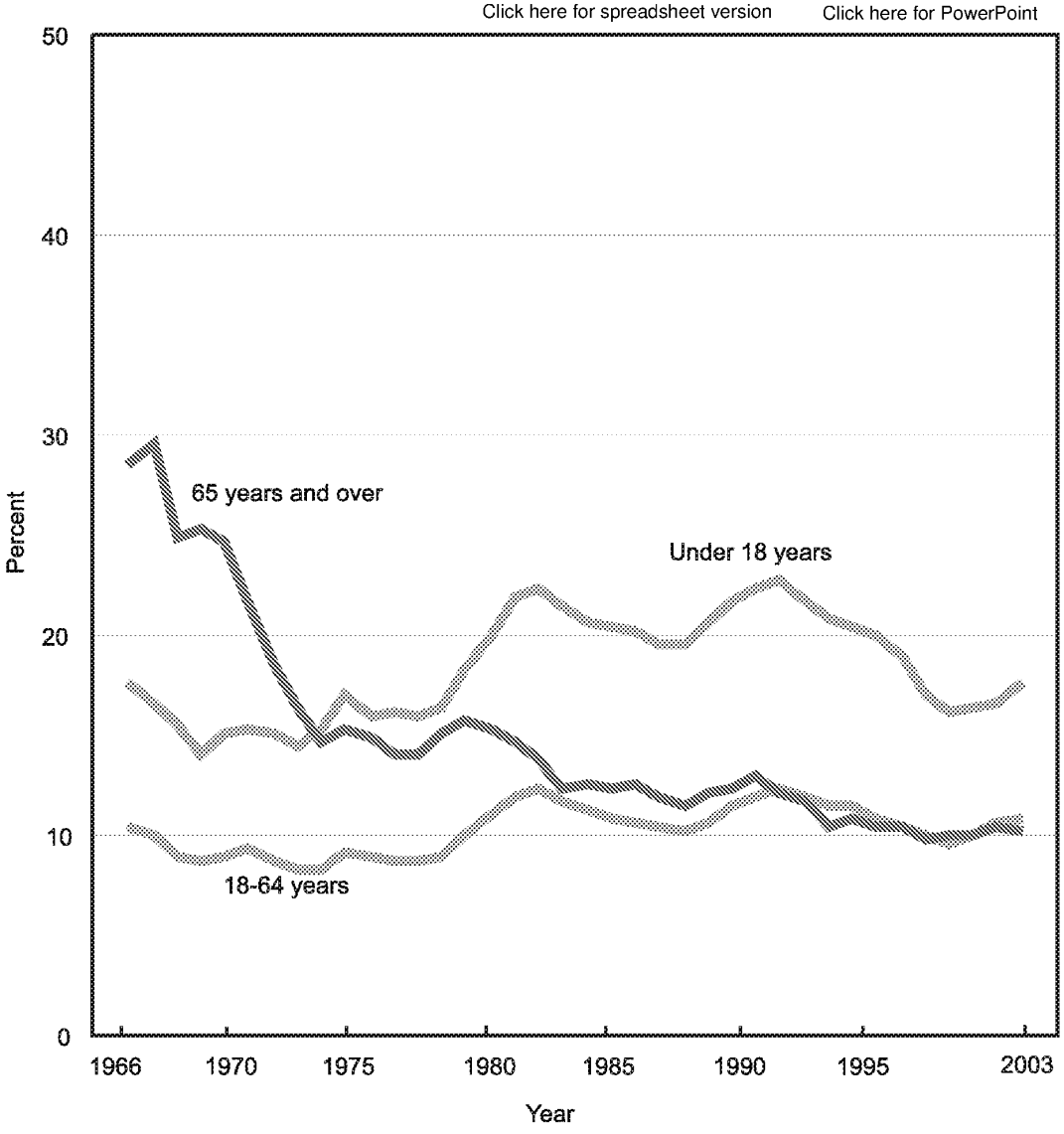


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## Figure 4. Poverty by age: United States, 1966-2003

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NOTES: Data shown are the percent of persons with family income below the poverty level. See Data Table for data points graphed and additional notes.

SOURCE: U.S. Census Bureau, Current Population Survey.



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## Poverty *(Continued)*

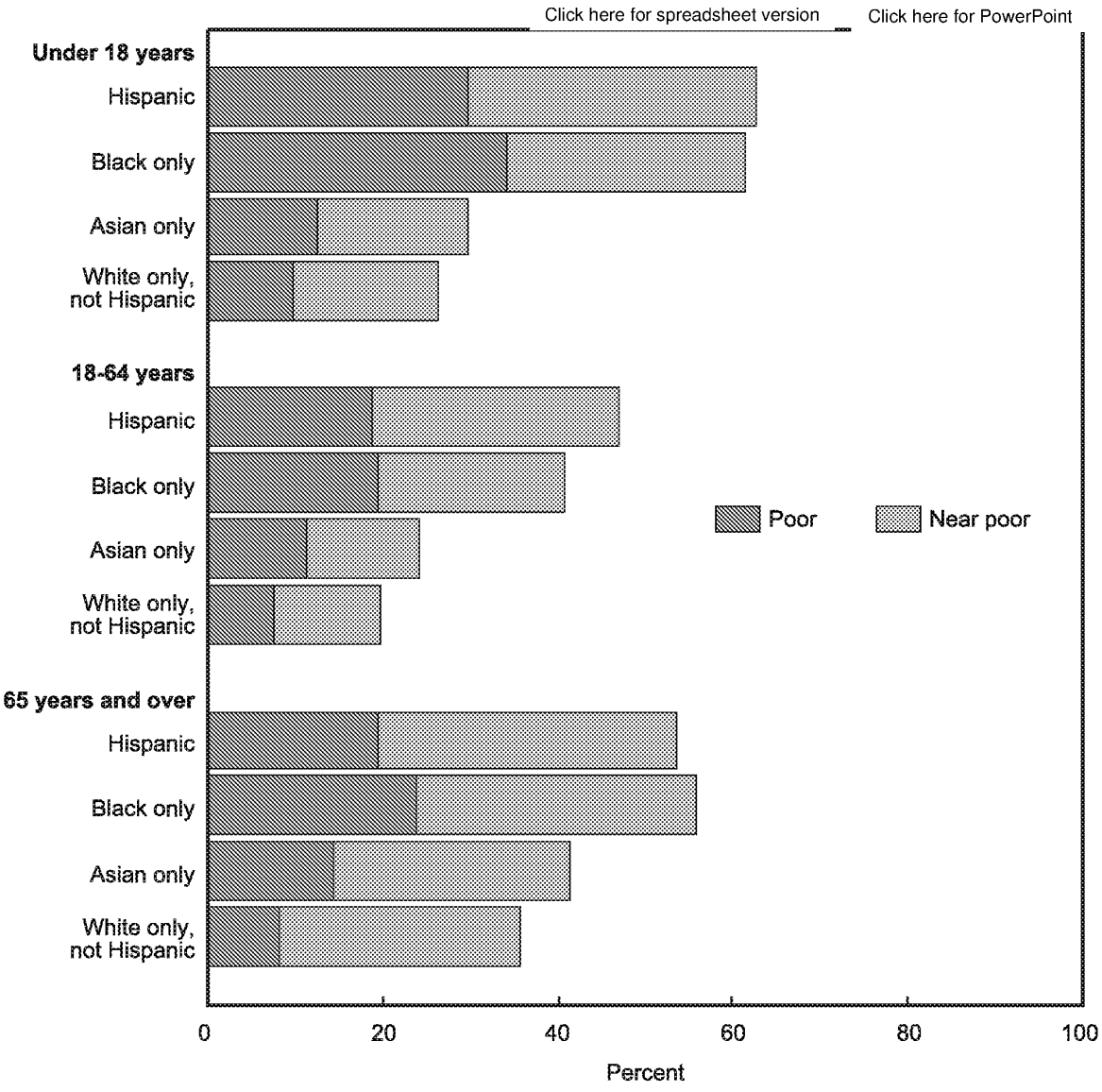
In 2003 the percent of persons living in poverty also continued to differ significantly by race and ethnicity (figure 5). At all ages, a higher percent of Hispanic and black persons than non-Hispanic white persons were poor. In 2003, 30–34 percent of Hispanic and black children were poor compared with 10–13 percent of Asian and non-Hispanic white children. The 2003 increase in the poverty rate among children from 16.7 to 17.6 percent had a larger impact on black and Hispanic children than on non-Hispanic white children. Similarly, among persons 65 years of age or over one-fifth of Hispanic and nearly one-quarter of black persons were poor, compared with eight percent of non-Hispanic white persons and 14 percent of Asians. In 2001–03, more than one in five American Indian and Alaska Native persons lived in poverty. Poverty estimates for American Indian and Alaska Native persons are based on 3 years of data combined for all age groups in order to produce an estimate (2).

In the first years of this century the burden of poverty appears to be increasing for those who are least able to bear it, namely those with already very high poverty rates (children, and black and Hispanic persons). The record pace of immigration combined with higher poverty levels among immigrants and the present upward trend in the poverty rate may lead to even higher poverty rates over the next few years (4).



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## Figure 5. Low income by age, race and Hispanic origin: United States, 2003




NOTES: Poor is defined as family income less than 100 percent of the poverty level and near poor as 100-199 percent of the poverty level. Persons of Hispanic origin may be of any race. Black and Asian races include persons of Hispanic and non-Hispanic origin. See Data Table for data points graphed and additional notes.

SOURCE: U.S. Census Bureau, Current Population Survey.



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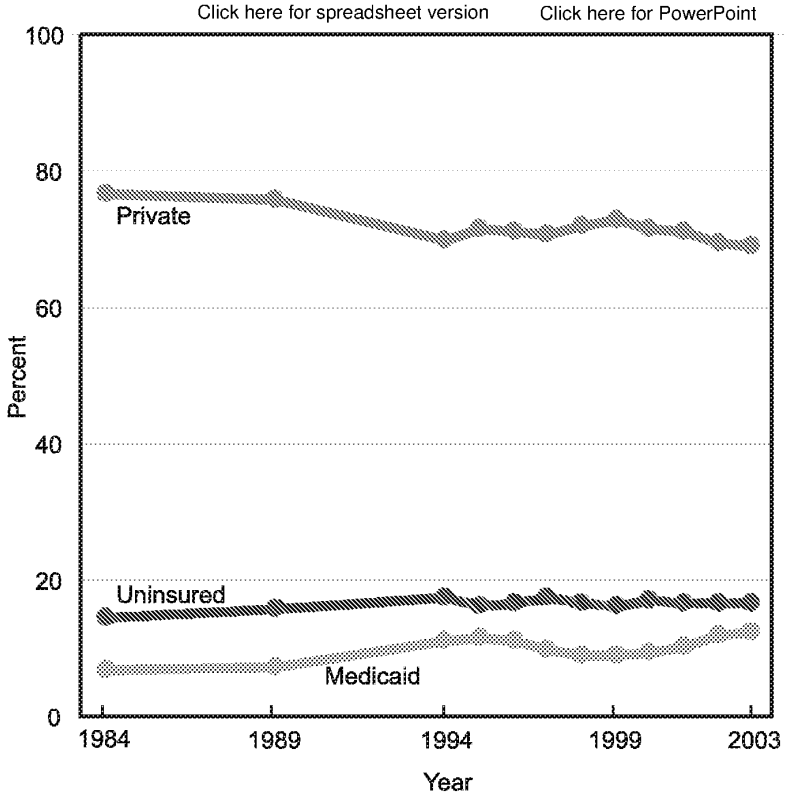
## Health Insurance

Health insurance coverage is an important determinant of access to health care (1). Uninsured children and adults under 65 years of age are substantially less likely to have a usual source of health care or a recent health care visit than their insured counterparts (*Health, United States, 2005,* tables 75, 79, 80, and 82). Uninsured persons are more likely to forego needed health care due to cost concerns (1,2). The major source of coverage for persons under 65 years of age is private employer-sponsored group health insurance. Private health insurance may also be purchased on an individual basis, but is generally more costly and provides less adequate coverage than group insurance. Public programs such as Medicaid and the State Children's Health Insurance Program provide coverage for many low-income children and adults.

Between 1984 and 1994 private coverage declined among persons under 65 years of age while Medicaid coverage and uninsurance increased. Since 1998 the percent of the nonelderly population with no health insurance coverage has been between 16–17 percent, Medicaid between 9–12 percent, and private coverage between 69–73 percent (figure 6). In 2002 and 2003 the percent with private health insurance decreased. This decrease was offset by an increase in the percent with Medicaid, resulting in little change in the percent uninsured.

In 2003, 17 percent of Americans under 65 years of age reported having no health insurance coverage. The percent of adults under 65 years of age without health insurance coverage decreases with age. In 2003 adults 18–24 years of age were most likely to lack coverage and those 55–64 years of age were least likely (figure 7). Persons with incomes below or near the poverty level were at least three times as likely to have no health insurance coverage as those with incomes twice the poverty level or higher. Hispanic persons and non-Hispanic black persons were more likely to lack health insurance than non-Hispanic white persons. Persons of Mexican origin were more likely to be uninsured than non-Hispanic black persons or other Hispanics. Access to health insurance coverage through employment is lowest for Hispanic persons (*Health, United States, 2005,* table 132). The growing number of Hispanic immigrants of which Mexicans are the largest group (31 percent of all United States immigrants in 2004 were from Mexico) may be expected to further reduce the percent of the population with health insurance through employment and increase the percent with no coverage (3).

**Figure 6. Health insurance coverage among persons under 65 years of age: United States, 1984-2003**



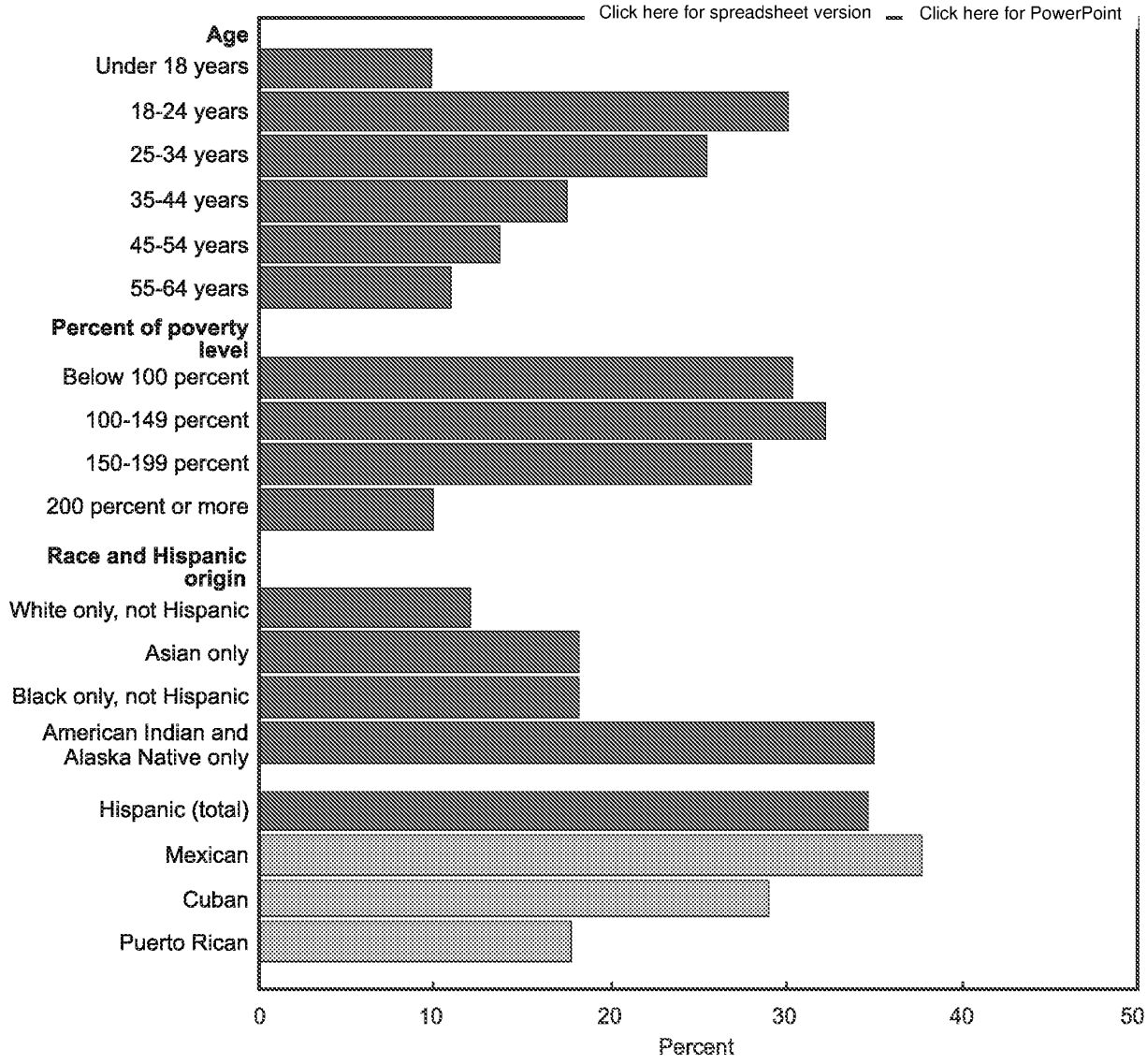

NOTE: See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Figure 7. No health insurance coverage among persons under 65 years of age by selected characteristics: United States, 2003




NOTES: Persons of Hispanic origin may be of any race. Asian and American Indian and Alaska Native races include persons of Hispanic and non-Hispanic origin. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Health Care Expenditures

In 2003 the United States spent 15 percent of its Gross Domestic Product (GDP) on health care, a greater share than any other developed country for which data are collected by the Office of Economic Cooperation and Development (figure 8, *Health, United States, 2005*, table 118). After almost a decade of stability from 1992 to 2000, a period of robust economic growth, the share of GDP devoted to health increased sharply from 2000 to 2003, although the 7.7 percent rate of spending increased more slowly in 2003 than in 2002.

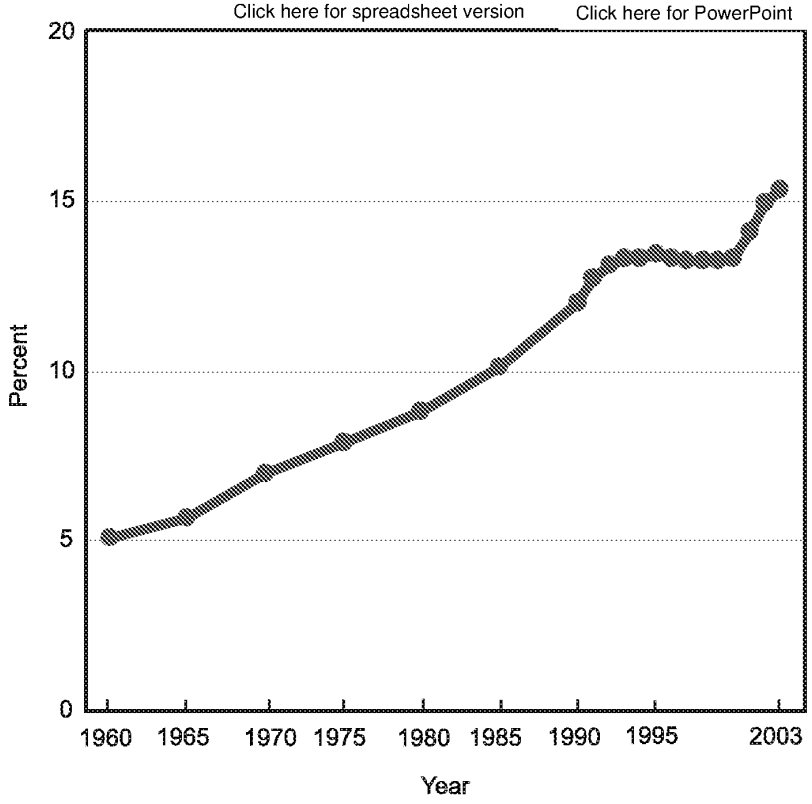
In 2003 the United States spent $1.7 trillion on health, an average of $5,671 per person (*Health, United States, 2005*, table 119). Personal health care expenditures include spending for therapeutic goods or services to treat or prevent a specific disease or condition in an individual and comprised 86 percent of national health expenditures in 2003. The remaining 14 percent was spent on administration, government public health activities, research, and construction (*Health, United States, 2005*, table 123) (1).

Overall, private health insurance paid for 36 percent of total personal health expenditures in 2003, the Federal Government 33 percent, State and local government 11 percent, and out-of-pocket payments paid for 16 percent (figure 9). Since 1980 the share of total expenditures paid out-of-pocket declined by 11 percentage points (*Health, United States, 2005*, table 123). This decline resulted from an expansion of benefits in both private health insurance plans and in government programs.

In 2003, more than one-third of personal health care expenditures were for hospital care, one-quarter for physician care, one-eighth for prescription drugs, 8 percent for nursing home care, and the remaining one-fifth for "other" personal health care including visits to non-physician medical providers, medical supplies, and other health services (figure 9). Since 1980 the share of total personal health care expenditures devoted to hospital care has decreased from 47 percent to 36 percent and the prescription drug expenditure share has doubled, reflecting the shift in health care from inpatient to ambulatory care settings and the increasing contribution of prescription drugs to health care (*Health, United States, 2005*, table 123).

**Figure 8. National health expenditures as a percent of Gross Domestic Product: United States, 1960-2003**

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NOTE: See Data Table for data points graphed and additional notes.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group.



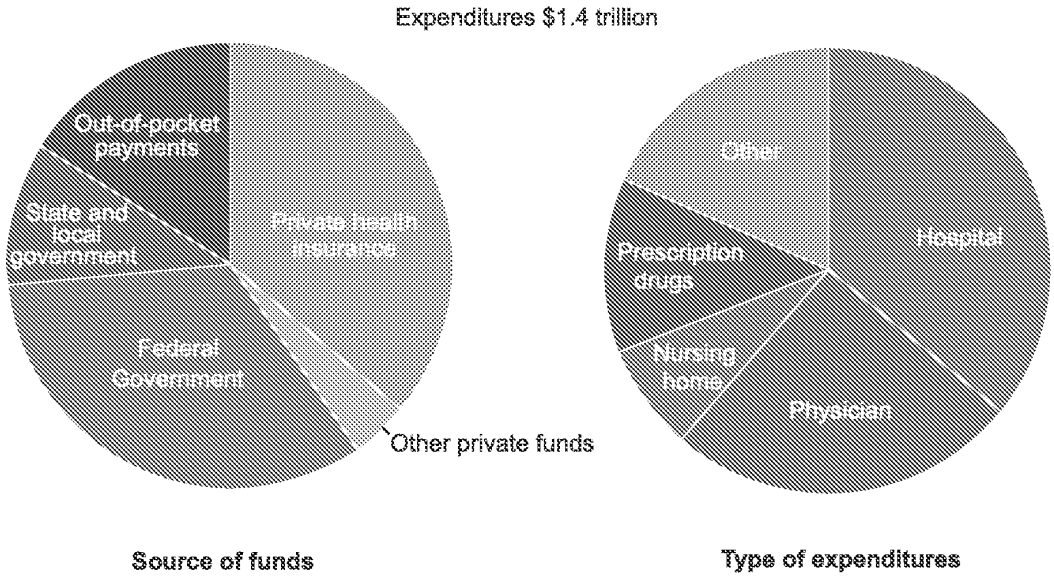
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## Health Care Expenditures
*(Continued)*

The source of payment for personal health care varies according to type of care provided. In 2003, government sources were the primary payers of hospital and nursing home care, paying for about three-fifths of these types of services (data table for figure 9). Thirty percent of hospital expenditures were paid by Medicare (the Federal health program for persons 65 years of age and over and the disabled) and 17 percent by Medicaid (the joint Federal and State program for the poor). Nearly one-half of nursing home care was paid by Medicaid, while Medicare paid for only a small part (12 percent in 2003) of nursing home care, primarily short-stays and rehabilitative services. Private health insurance paid for almost one-half of physician services and prescription drugs.

In 2003, 30 percent of expenditures for prescription drugs were paid by recipients out-of-pocket compared with more than twice that percent in 1980 (69 percent) (*Health, United States, 2005*, table 123). Out-of-pocket expenditures for physician services declined to 10 percent in 2003, from 30 percent in 1980. Declines in out-of-pocket expenditures for nursing home services since 1980 have been accompanied by a concurrent increase in government (primarily Medicaid) and private health insurance expenditures through 2003. However, the inflation in health care costs over recent years means that consumers may still have significant out-of-pocket expenditures for their health care. This is the case especially for older persons with worse health and higher total expenditures and persons with large prescription drug expenses, since drug expenses are less likely to be covered by health insurance than hospital and physician expenses. In 2002, more than 40 percent of noninstitutionalized adults 65 years of age and over with medical expenses spent at least $1,000 out-of-pocket (*Health, United States, 2005*, table 126).

**Figure 9. Personal health care expenditures according to source of funds and type of expenditures: United States, 2003** Click here for spreadsheet version Click here for PowerPoint




NOTE: See Data Table for data points graphed and additional notes.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Accounts.



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# Tobacco Use

Smoking is associated with a significantly increased risk of heart disease, stroke, lung and other types of cancer, and chronic lung diseases (1). Decreasing cigarette smoking among adolescents and adults is a major public health objective for the Nation. Preventing smoking among teenagers and young adults is critical because smoking usually begins in adolescence (2). Smoking during pregnancy contributes to elevated risk of miscarriage, premature delivery, and having a low birthweight infant (3).

Cigarette smoking among adult men and women declined substantially following the first Surgeon General's Report on smoking in 1964 (figure 10). Since 1990 the percent of adults who smoke has continued to decline but at a slower rate than previously. During the 1990s declines in the percent of adults 18 years and over who smoke were the result of increasing rates of never smoking. In contrast, the percent of former smokers remained relatively stable during that time (4). By 2003, 24 percent of men and 19 percent of women were smokers, down from one-half of men and one-third of women in 1965. Cigarette smoking by adults continues to be strongly associated with educational attainment. Adults with less than a high school education were almost three times as likely to smoke as those with a bachelor's degree or more education (*Health, United States, 2005*, table 64).

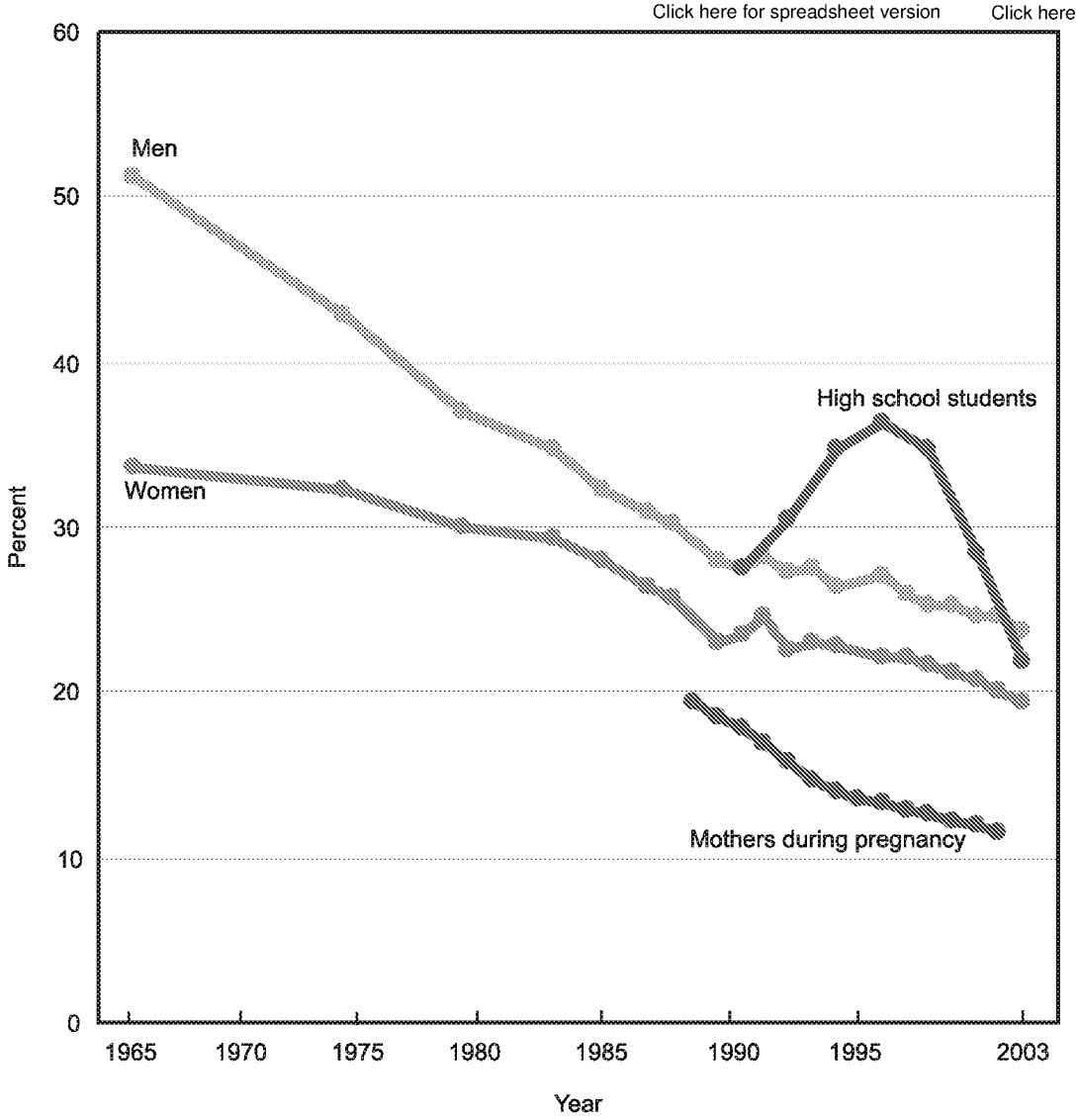
Among mothers with a live birth, the percent reporting smoking cigarettes during pregnancy declined between 1989 and 2002 (3,5). Eleven percent of mothers with a live birth in 2002 reported smoking cigarettes during pregnancy. Maternal smoking has declined for all racial and ethnic groups, but differences among these groups persist (*Health, United States, 2005*, table 12 includes 2003 data for 47 States and the District of Columbia). In 2002 the percent of mothers reporting tobacco use during pregnancy was highest for American Indian or Alaska Native mothers (20 percent), non-Hispanic white mothers (15 percent), and Hawaiian mothers (14 percent).



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## Figure 10. Cigarette smoking among men, women, high school students, and mothers during pregnancy: United States, 1965-2003

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NOTES: Percents for men and women are age adjusted. See Data Table for data points graphed, standard errors, and additional notes. Cigarette smoking is defined as: (for men and women 18 years of age and over) at least 100 cigarettes in lifetime and now smoke every day or some days; (for students in grades 9-12) 1 or more cigarettes in the 30 days preceding the survey; and (for mothers with a live birth) during pregnancy.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey (data for men and women); National Vital Statistics System (data for mothers during pregnancy); National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey (data for high school students).



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## Tobacco use *(Continued)*

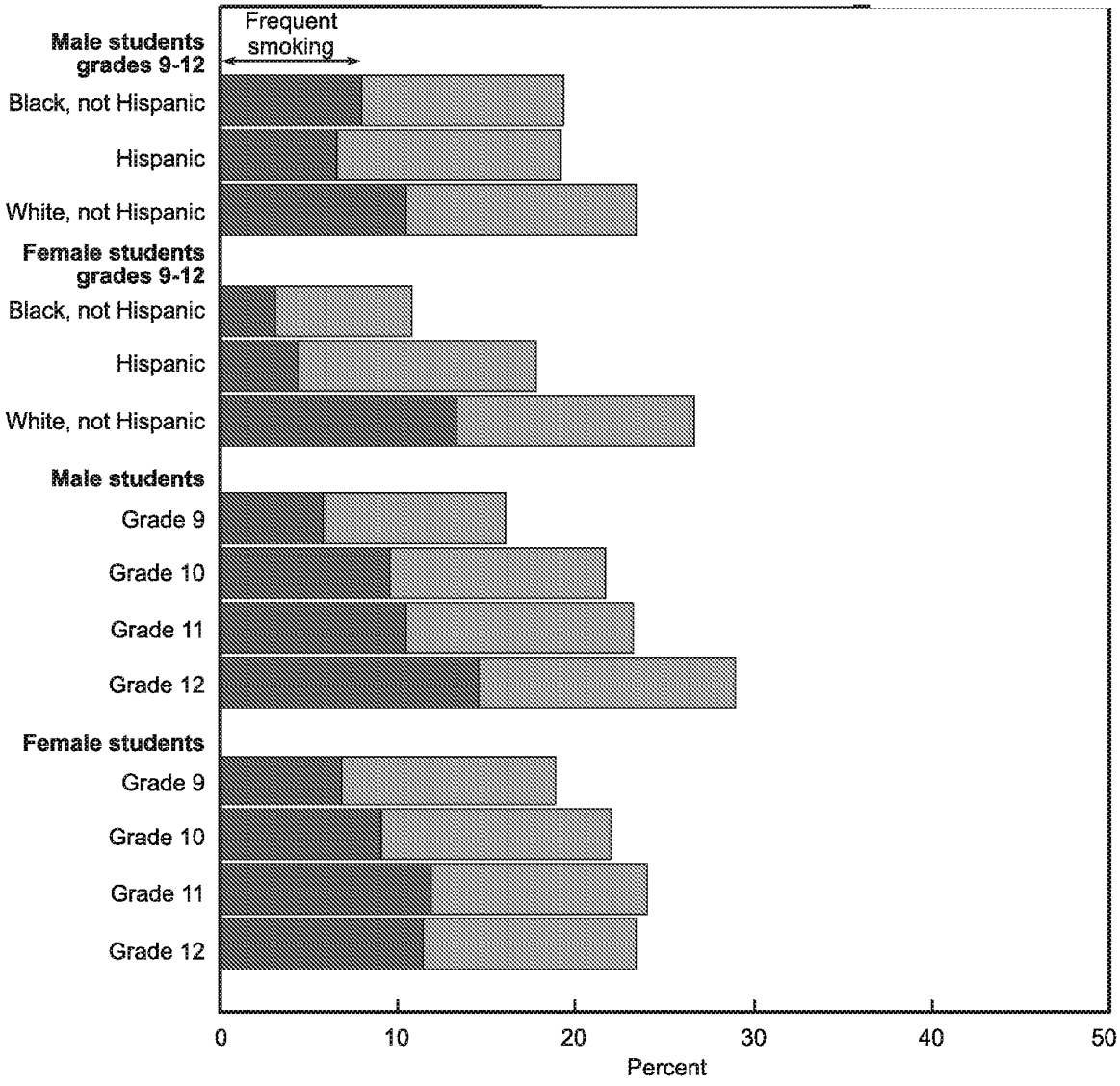
Antismoking efforts have entailed a two-prong approach: encouraging young persons not to begin smoking and helping current smokers to quit smoking. Cigarette smoking among high school students in grades 9–12 decreased between 1997 and 2003 after increasing in the early 1990s (figure 10). In 2003, 22 percent of high school students reported smoking cigarettes on one or more days of the 30 days preceding the survey and 10 percent reported smoking frequently that is, on 20 days or more in the 30 days preceding the survey (data table for figure 11). Cigarette smoking and frequent cigarette smoking for high school girls were more prevalent among non-Hispanic white girls than among Hispanic or non-Hispanic black girls (figure 11). Among high school boys, current and frequent cigarette smoking were generally similar by race and ethnicity. Cigarette smoking—and especially frequent cigarette smoking—was more common in upper grades than lower grades. By grade 12, 29 percent of boys and 23 percent of girls were current smokers with about one-half of them smoking on a frequent basis. Many high school students who were frequent smokers have already become nicotine dependent (6). In 2003 almost 7 percent of students had used smokeless tobacco (e.g., chewing tobacco, snuff, or dip), and 15 percent of students had smoked cigars on one or more days of the 30 days preceding the survey (7).



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## Figure 11. Current and frequent cigarette smoking among high school students by sex, race and Hispanic origin, and grade level: United States, 2003

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NOTES: Current cigarette smoking is defined as having smoked cigarettes on 1 or more days of the 30 days preceding the survey; frequent cigarette smoking is defined as having smoked cigarettes on 20 or more of the 30 days preceding the survey. See Data Table for data points graphed and standard errors.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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## Teenagers and Cars

Between 1970 and 2002 death rates for motor vehicle-related injuries for teenagers and young adults 15–24 years of age decreased by 40 percent. Yet, teenagers and young adults have among the highest death rates for motor vehicle-related injuries of any age group; one-third of deaths for 15–24 year-olds were the result of motor vehicle-related injuries in 2002 (*Health, United States, 2005*, table 44 and (1)). Research has shown that seatbelts, when properly used reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate to critical injury by 50 percent (2). In States with strong seatbelt laws teenage seatbelt use is consistently higher (3). Alcohol use and cars are a deadly combination. In 2003 one-fifth of young drivers 16–20 years of age involved in fatal motor vehicle traffic-related crashes were intoxicated (4). In 2002 three-quarters of young drivers who had been drinking and were killed in a crash were not wearing seatbelts (5).

Between 1991 and 2003 the percent of high school students in grades 9–12 who never or rarely wore seatbelts while riding in a car driven by someone else decreased from 26 percent to 18 percent (data table for figure 12). Although the percent not wearing a seatbelt declined for both male and female students, 22 percent of male high school students compared with 15 percent of female high school students rarely or never used a seatbelt in 2003 (figure 12).

Among high school students, riding with a driver who had been drinking was more common than lack of seatbelt use or drinking and driving. The percent of high school students in grades 9–12 who rode with a driver who had been drinking alcohol decreased from 40 percent to 30 percent between 1991 and 2003. In 2003 male and female high school students were equally as likely to ride with a driver who had been drinking.

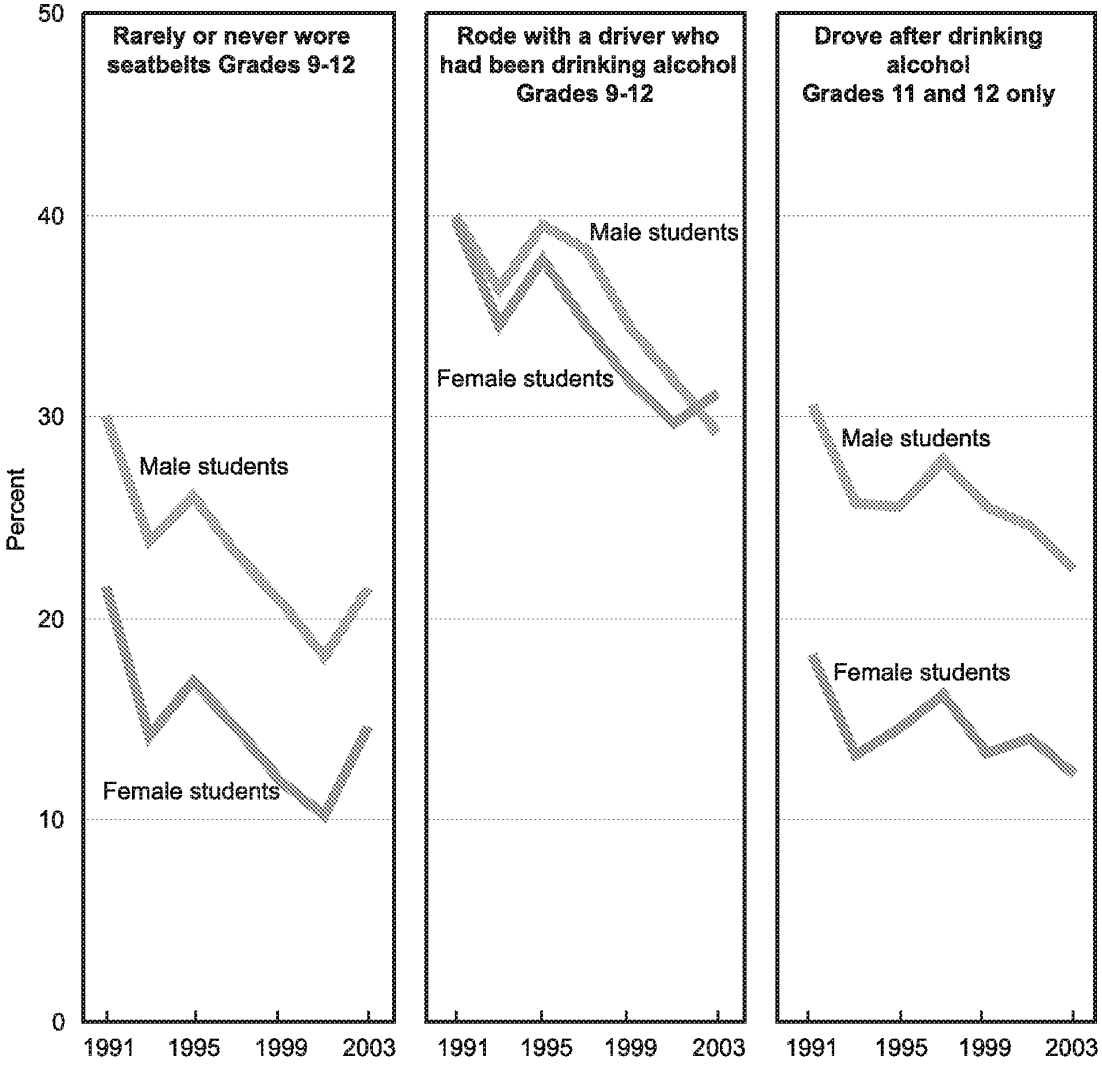
The percent of 11–12th grade high school students who drove after drinking alcohol declined from almost 25 percent to 18 percent between 1991 and 2003. Although the percent drinking and driving declined for both males and females, in 2003 male students in grades 11–12 were nearly twice as likely as female students to drink and drive (22 percent compared with 12 percent).



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## Figure 12. Seatbelt use and drinking and driving among high school students by sex: United States, 1991-2003

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NOTE: See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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# Physical Activity

Most diseases result from a complex interaction between inherited risk factors and environmental risk factors such as diet, lifestyle, and social factors (1). Adopting a healthy lifestyle, which includes being physically active, eating nutritiously, and avoiding tobacco, can prevent or help to control many diseases. Benefits of regular physical activity include a reduced risk of premature mortality and reduced risks of coronary heart disease, diabetes, colon cancer, hypertension, and osteoporosis. Regular physical activity also improves symptoms associated with musculoskeletal conditions and mental health conditions such as depression and anxiety. In addition physical activity can enhance physical functioning and aid in weight control (2). Physical activity, along with a healthy diet, plays an important role in the prevention of overweight and obesity. Monitoring levels of regular physical activity is of particular concern due to the increasing prevalence of overweight and obesity in the United States.

Although vigorous physical activity produces the greatest cardiovascular benefits, moderate amounts of physical activity are also associated with lower levels of mortality. Among older persons, even small amounts of physical activity may improve cardiovascular functioning (3). National recommendations for physical activity encourage all Americans to engage in regular physical activity and reduce sedentary activities to promote health, psychological well-being, and a healthy body weight. Current 2005 recommendations are for adolescents to engage in at least 60 minutes of physical activity and for adults to engage in at least 30 minutes of moderate physical activity on most days of the week. Additional recommendations target older age groups and weight loss or weight maintenance goals (4).

Physical activity for high school students includes physical education classes, sports teams, and other forms of activity. Between 1999 and 2003 the percent of high school students nationwide who participated in regular physical activity declined slightly from 70 percent to 67 percent (see figure 13 data table for definition of regular physical activity). Male students are more likely than female students to be physically active. In 2003, 73 percent of male high school students and 60 percent of female high school students reported regular physical activity. Among female non-Hispanic black students, only 50 percent were active (figure 13). The percent participating in regular physical activity declines with advancing grade in school. In 2003, 72 percent of 9th graders compared with 60 percent of 12th graders engaged in regular physical activity. The decline in regular physical activity with advancing age is explained in part by patterns of enrollment in high school physical education (PE) classes. In 2003, 71 percent of 9th graders were enrolled in PE classes compared with 40 percent of 12th graders (5). Nationwide, only 28 percent of high school students attended daily PE classes in 2003 while 38 percent of high school students watched at least 3 hours of television on an average school day.

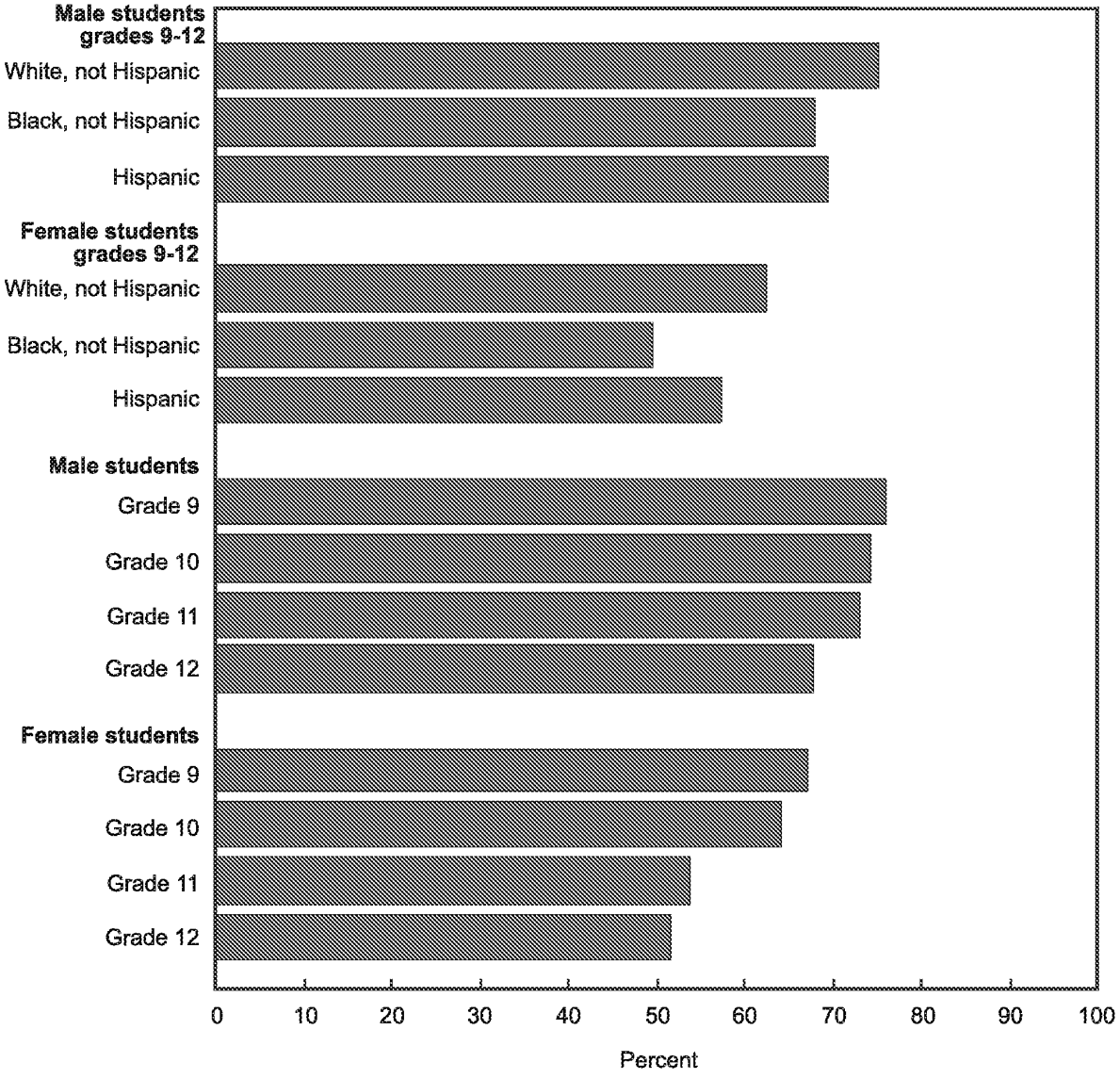
School is one place where teenagers can participate in organized exercise and sports activities and learn the benefits of physical activity to health. Childhood and adolescence may be pivotal times for developing the habit of regular physical activity and preventing sedentary behavior among adults. Positive experiences with physical activity at a young age help lay the basis for being regularly active throughout life (2).



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## Figure 13. High school students engaging in regular physical activity by sex, race and Hispanic origin, and grade: United States, 2003

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NOTES: Regular physical activity is at least 20 minutes of vigorous activity on 3 or more days or 30 minutes of moderate activity on 5 or more days during the past 7 days. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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## Physical Activity *(Continued)*

The trend in leisure-time physical activity among adult men and women has remained stable in recent years (*Health, United States, 2005,* table 72). In 2003, 3 in 10 adults engaged in regular leisure-time activity (see figure 14 data table for definition of leisure-time activity continuum), 3 in 10 had some leisure-time activity, and nearly 4 in 10 adults were inactive in their leisure time. Men were more likely than women to have regular leisure-time activity. While regular leisure-time activity decreases substantially with age from its peak of 42 percent among young adults 18–24 years of age, significant portions of older adults maintain an active lifestyle. More than one-quarter of noninstitutionalized adults 65–74 years of age and nearly one-fifth of adults 75 years of age and over reported regular leisure-time physical activity.

Leisure-time physical activity patterns also vary by poverty status, with adults living below or near poverty less likely to have regular leisure-time physical activity and more likely to be inactive (figure 14). In 2003 about one-half of adults who were poor or near poor were inactive in leisure time compared with about one-third of adults living in families with income more than twice poverty. Conversely, about one-quarter of adults living in or near poverty had regular leisure-time physical activity compared with more than one-third of adults living in families with higher incomes (percents are age adjusted).

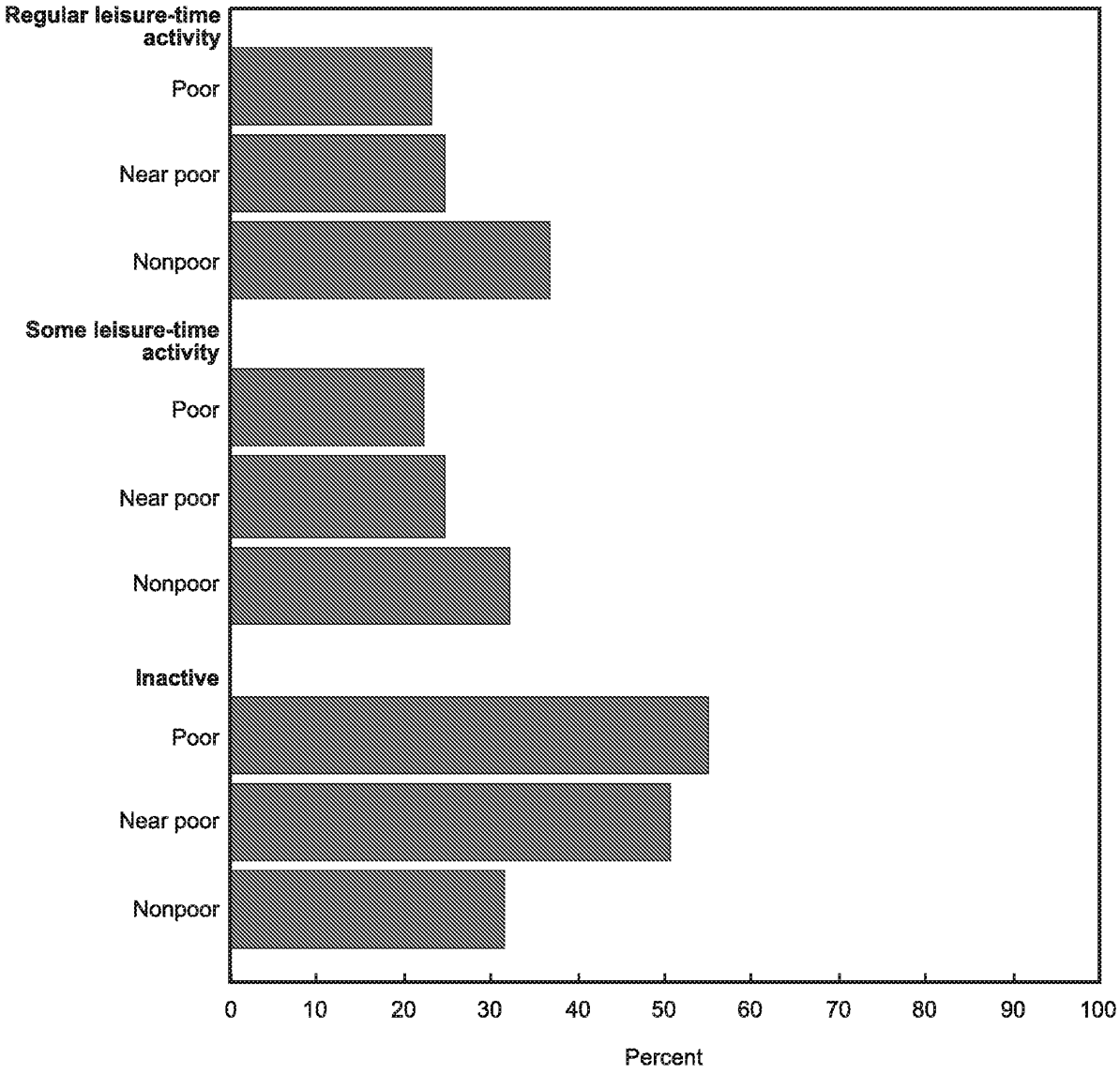
Leisure time presents one opportunity for engaging in sufficient physical activity to maintain good health. Other opportunities include physical activity associated with occupation or transportation (for example, walking or biking to work and school). Adults who are inactive in leisure time may compensate for it by being physically active at work. However, an analysis of type of work among adults who are inactive in leisure time showed that only a small proportion—about 1 in 5 adults—reported a category of employment that involved physical activity (6).



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## Figure 14. Leisure-time physical activity among adults 18 years of age and over by poverty status: United States, 2003

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NOTES: Data are for the civilian noninstitutionalized population and are age adjusted. Inactive adults reported no sessions of light/moderate or vigorous leisure-time physical activity of at least 10 minutes duration. Adults with some leisure-time physical activity were not inactive but did not meet the requirements for regular activity. Adults with regular leisure-time activity reported at least 20 minutes of vigorous activity 3 times per week or 30 minutes of light/moderate activity 5 times per week. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Overweight and Obesity

Epidemiologic and actuarial studies have shown that surplus body weight is associated with excess morbidity and mortality (1). Among adults, overweight and obesity elevate the risk of heart disease, diabetes, and some types of cancer. Overweight and obesity are also factors that increase the severity of disease associated with hypertension, arthritis, and other musculoskeletal problems (2). Obesity also has serious health consequences among younger persons. Among children and adolescents, obesity increases the risk of high cholesterol, hypertension, and diabetes (3). Diet, physical activity, genetic factors, environment, and health conditions all contribute to overweight in children and adults. The potential health benefits from reduction in the prevalence of overweight and obesity are of significant public health importance.

National Health and Nutrition Examination Surveys (NHANES) collect data from physical exams in a mobile examination center. Results from a series of NHANES indicate that the prevalence of overweight and obesity changed little between the early 1960s and 1976–80 (figure 15). Findings from the 1988–94 and 1999–2002 surveys, however, showed substantial increases in overweight and obesity among adults. The upward trend in overweight since 1980 reflects primarily an increase in the percent of adults 20–74 years of age who are obese. In 1999–2002, 65 percent of adults were overweight with 31 percent obese.

The percent of children (6–11 years of age) and adolescents (12–19 years of age) who are overweight has also risen. Among children and adolescents, the percent overweight has increased since 1976–80. In 1999–2002 about 16 percent of children and adolescents were overweight. The prevalence of overweight among adolescents varies by race and ethnicity. In 1999–2002, 14 percent of non-Hispanic white adolescents, 21 percent of non-Hispanic black adolescents, and 23 percent of Mexican-origin adolescents were overweight (4).

The prevalence of obesity varies among adults by sex, race, and ethnicity (*Health, United States, 2005,* table 73). In 1999–2002, 28 percent of men and 34 percent of women 20–74 years of age were obese. The prevalence of obesity among women differed significantly by racial and ethnic group. In 1999–2002 one-half of non-Hispanic black women were obese compared with nearly one-third of non-Hispanic white women. In contrast, the prevalence of obesity among men differed little by race and ethnicity (28–29 percent).

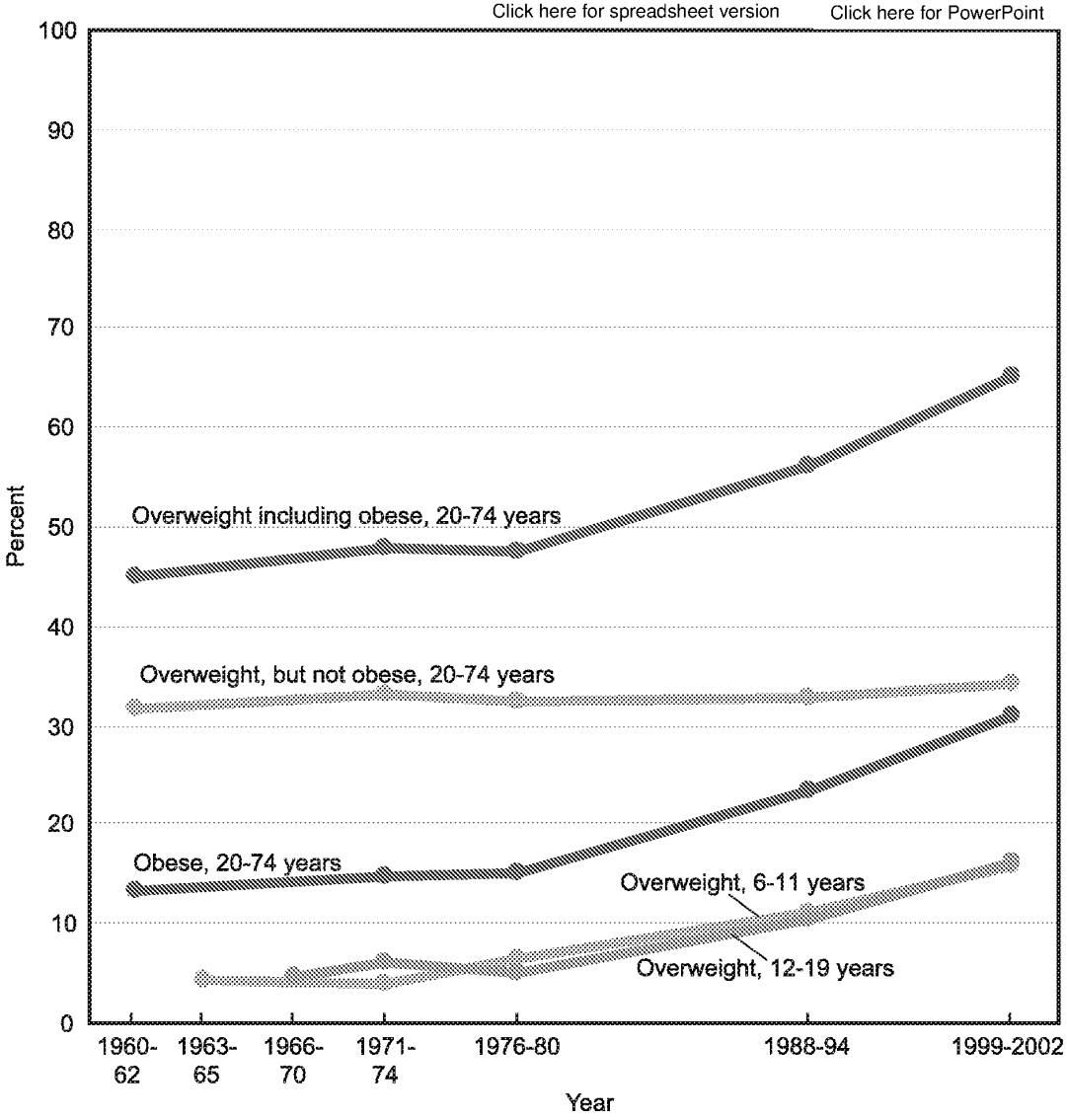
The rise in overweight and obesity is reflected in the average weight of adult men and women in the United States (5). Adult men and women are roughly an inch taller than they were in 1960–62, but are nearly 25 pounds heavier on average. The average weight of men age 20–74 years increased from 166 pounds in 1960–62 to 191 pounds in 1999–2002 and the average weight of women increased from 140 pounds to 164 pounds during the same period.



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## Figure 15. Overweight and obesity by age: United States, 1960-2002

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NOTES: Percents for adults are age adjusted. For adults: overweight including obese is defined as a body mass index (BMI) greater than or equal to 25, overweight but not obese as a BMI greater than or equal to 25 but less than 30, and obese as a BMI greater than or equal to 30. For children: overweight is defined as a BMI at or above the sex- and age-specific 95th percentile BMI cut points from the 2000 CDC Growth Charts: United States. Obese is not defined for children. See Data Table for data points graphed, standard errors, and additional notes.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Examination Survey and National Health and Nutrition Examination Survey.



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# Asthma in Children Age 3–17

Asthma is a chronic lung disease that affects breathing. It is characterized by episodes of inflammation and narrowing of small airways in response to "triggers," which include allergens, infections, exercise, or exposure to respiratory irritants, such as tobacco smoke and pollutants. These attacks or episodes may involve shortness of breath, cough, wheezing, chest pain or tightness, mucus production, or a combination of these symptoms (1,2).

Asthma is a leading cause of childhood illness and disability although childhood deaths from asthma are rare (1,3). Attacks can cause considerable discomfort and anxiety in both children and their families, and may limit athletic and other activities. Children under the age of 3 years may experience wheezing, which can later develop into asthma, but in the majority of cases the wheezing is associated with diminished airway function at birth or other respiratory diseases (4). Therefore, a definitive diagnosis of asthma is difficult to make in children less than 3 years of age.

In 2002–03, about 6 percent of children 3–17 years of age, more than 3.6 million children, had an asthma attack within the past year (5). Racial and ethnic disparities in prevalence of and health care utilization for the disease have been documented and have persisted over time (6). Non-Hispanic black children 3–10 years of age have higher asthma attack prevalence rates than either non-Hispanic white or Hispanic children, and this disparity has been increasing in recent years (figure 16). In 2002–03 attack prevalence rates among children age 3–10 years were 9 percent for non-Hispanic black children, compared with about 5 percent for Hispanic and non-Hispanic white children. Additional years of data will be required to see if this gap continues to increase over time. In 2002–03 the race and ethnic differentials in asthma attack prevalence were smaller in older children age 11–17 years.

In 2003 there were approximately 132,000 hospital discharges for children age 3–17 years with a first-listed diagnosis of asthma, 475,000 emergency department visits, and 4.6 million visits to office-based physicians and hospital outpatient clinics with a first-listed diagnosis of asthma (7,8,9). Nearly 70 percent of asthma hospitalizations among children age 3–17 years were for young children 3–10 years of age, although this age group comprised about one-half of all children age 3–17 years (7,10).

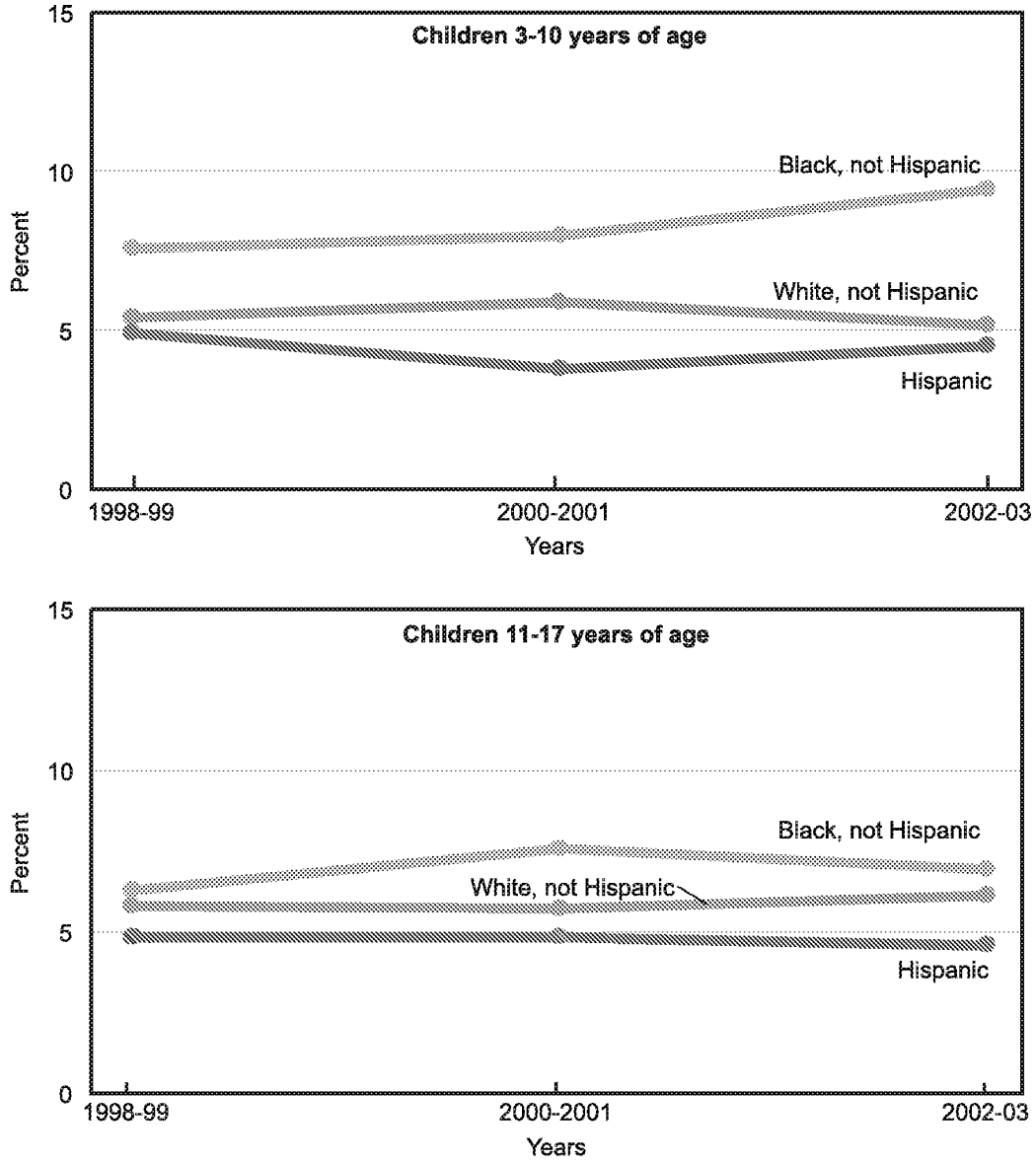
Despite an increased number of asthma medications that help prevent the onset of attacks, new clinical practice guidelines, and intervention programs designed to improve asthma management among children, asthma attack prevalence rates among young black children are rising. Poor black children are at the highest risk of asthma-associated morbidity (6). Poor outcomes associated with asthma attacks can generally be prevented if families and children are properly educated and have access to quality health care (3). Disparities by race and poverty status in attack rates may be due to social, cultural, or environmental differences between races that disproportionally affect poor families' ability to effectively identify and manage children's asthma (6).



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## Figure 16. Asthma attack among children by age, race and Hispanic origin: United States, 1998-2003

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NOTES: Asthma attack in past 12 months. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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# Headache and Low Back Pain

Headache and low back pain are two common sources of pain and constitute a significant public health concern. They interfere with an individual's ability to work, enjoy social activities, and negatively affect quality of life (1). These conditions have considerable medical and economic consequences for society by placing a large burden on the health care system in terms of diagnosis, treatment, and medication management. In addition there are substantial indirect costs associated with reduced productivity. Americans spend at least $50 billion a year on low back pain, the most common cause of job-related disability and a leading contributor to missed work (2). The cost to American employers due to missed work and reduced productivity associated with migraine headaches is estimated at $13 billion per year (3).

Headache can be classified into three major types: tension, migraine, and cluster (3,4). Tension headache, the most common form of headache, is of mild to moderate intensity and occurs on both sides of the head. Migraine is described as an intense pulsing or throbbing pain in one area of the head often accompanied by extreme sensitivity to light and sound, nausea, and vomiting. Cluster, so named because of the characteristic grouping or clustering of headache, is one of the least common types of headache. With typical cluster headache, the pain is almost always one-sided and usually localized in the eye region.

Low back pain is the second most common neurological ailment in the United States—only headache (when all types and severity levels are considered) is more common (2). Low back pain may reflect nerve or muscle irritation or bone lesions. Most low back pain follows injury or trauma to the back, but pain may also be caused by degenerative conditions such as arthritis or disc disease, osteoporosis, or other causes. Obesity, smoking, weight gain during pregnancy, stress, poor physical condition, posture inappropriate for the activity being performed, and poor sleeping position can also contribute to low back pain.

In the National Health Interview Survey, the presence of pain is measured by asking adult respondents 18 years of age and over about "severe headache or migraine," "low back pain," and other selected types of pain during the past 3 months. Respondents are instructed to report pain that lasted a whole day or more and not to include minor aches or pains. Respondents who reported both severe headache or migraine and low back pain were counted separately for each condition. Comparable national data on pain have been available since 1997 (see Appendix I, National Health Interview Survey). Between 1997 and 2003 the percent of adults 18 years of age and over reporting severe headache or migraine and low back pain remained relatively stable (*Health, United States, 2005*, table 57).

In 2003, 15 percent of adults suffered with severe headache or migraine during the past 3 months (figure 17 and data table for figure 17). Severe headache or migraine was more than twice as common among women as men (21 percent compared with 9 percent). The presence of severe headache or migraine diminished with age; rates among men and women 65 years of age and over were less than one-half the level reported among younger men and women.

In 2003, 27 percent of adults reported low back pain—nearly double the level of adults with severe headache or migraine (figure 17 and data table for figure 17). Low back pain was slightly more common among women than men (30 percent compared with 25 percent). In contrast to the pattern for severe headache or migraine, which diminished with age for men and women, the prevalence of low back pain increased with age. Among men low back pain peaked in the 45–64 year age group and then decreased at older ages while for women the prevalence of low back pain was similar for middle-aged and older women.

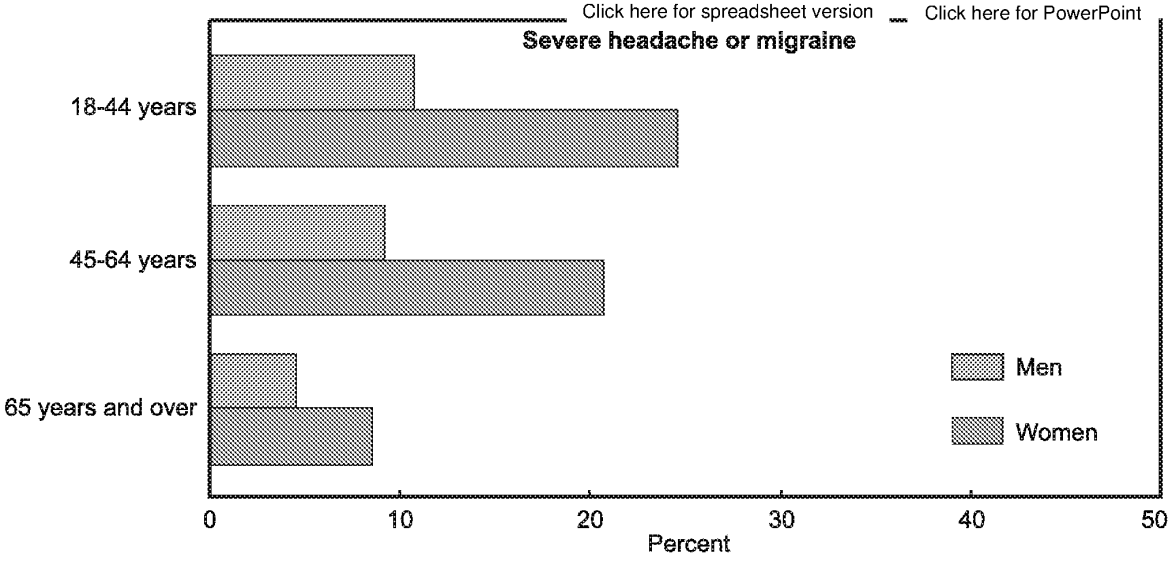
Diagnosis, treatment, and medication management of headache and low back pain have considerable impact on the ambulatory health care system (5,6). In 2003 adults 18 years of age and over made 3.5 million visits to physician offices and hospital outpatient departments with a patient's stated reason for visit (up to three reasons were recorded) of headache or migraine, and 3.6 million visits with a reason for visit of back pain (which includes low back pain) (7). Visit rates were higher for women than for men; more than twice as high for headache or migraine and for back pain. Ambulatory care visits for headache or migraine and back pain reflect only a portion of total health care costs for these conditions as they include care only for persons who access the health care system. Additional medical costs are born by persons who self-treat these conditions with over-the-counter drugs or utilize complementary and alternative medicine (CAM) therapies (8).

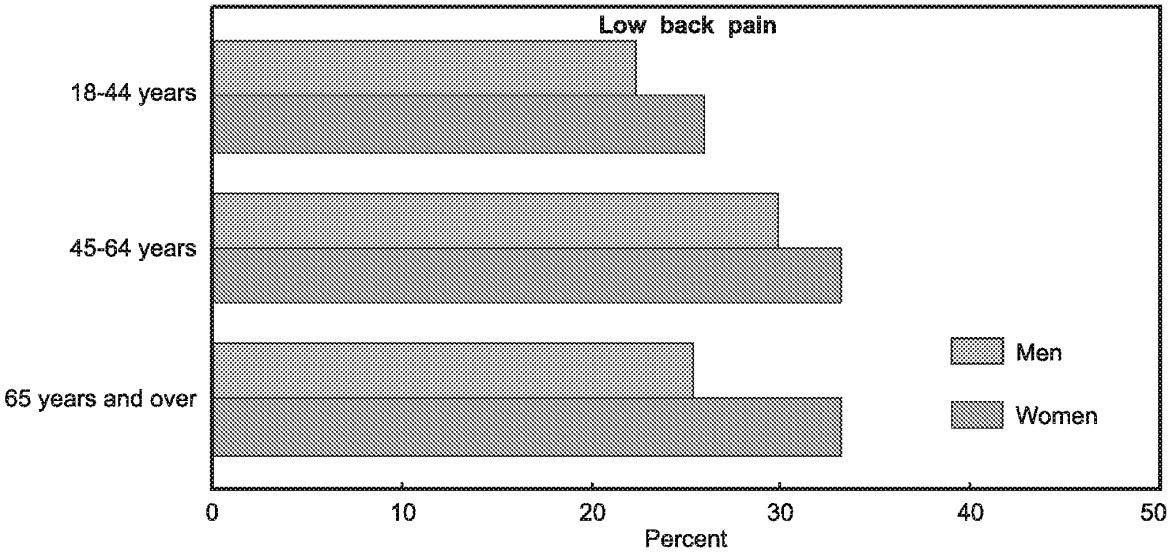


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## Figure 17. Adults 18 years of age and over with severe headache or migraine or low back pain in the past 3 months by age and sex: United States, 2003

Click here for spreadsheet version Click here for PowerPoint




NOTE: See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Children

Limitation of activity due to chronic physical, mental, or emotional conditions is a broad measure of health and functioning that gauges a child's ability to undertake major age-appropriate activities. Play is the primary activity for preschool children, whereas schoolwork is the primary activity for children 5 years of age and over.

The National Health Interview Survey identifies children with activity limitation through questions about specific limitations in play, self-care, walking, memory, and other activities and through a question about current use of special education or early intervention services. A child is classified as having an activity limitation due to a chronic condition if at least one of the conditions causing limitations is a chronic physical, mental, or emotional problem. Estimates of the number of children with an activity limitation may differ depending on the type of disabilities included and the methods used to identify them (1).

Comparable national data on activity limitation have been available since 1997 (see Appendix I, National Health Interview Survey). Between 1997 and 2003, 6–7 percent of children were reported to have limitation of activity (*Health, United States, 2005*, table 58). The percent of children with limitation of activity varies by age and sex. In 2002–03 the percent of children with activity limitation was significantly higher among school-age children than among preschoolers, primarily due to the number of school-age children identified solely by participation in special education. About three-quarters of school-age children with an activity limitation were identified as having a limitation solely by participation in special education. Limitation of activity occurred more often among boys than among girls (2). Physiological, maturational, behavioral, and social differences between boys and girls have been suggested as explanations for the higher prevalence of activity limitation in boys (3).

In 2002–03 the leading chronic health conditions causing activity limitation in children differed by age (figure 18). Among preschool children, the chronic conditions most often mentioned were speech problems, asthma, and mental retardation or other developmental problems. Among school-age children, learning disability and Attention Deficit Hyperactivity Disorder (ADHD) were among the most frequently mentioned causes of activity limitation.

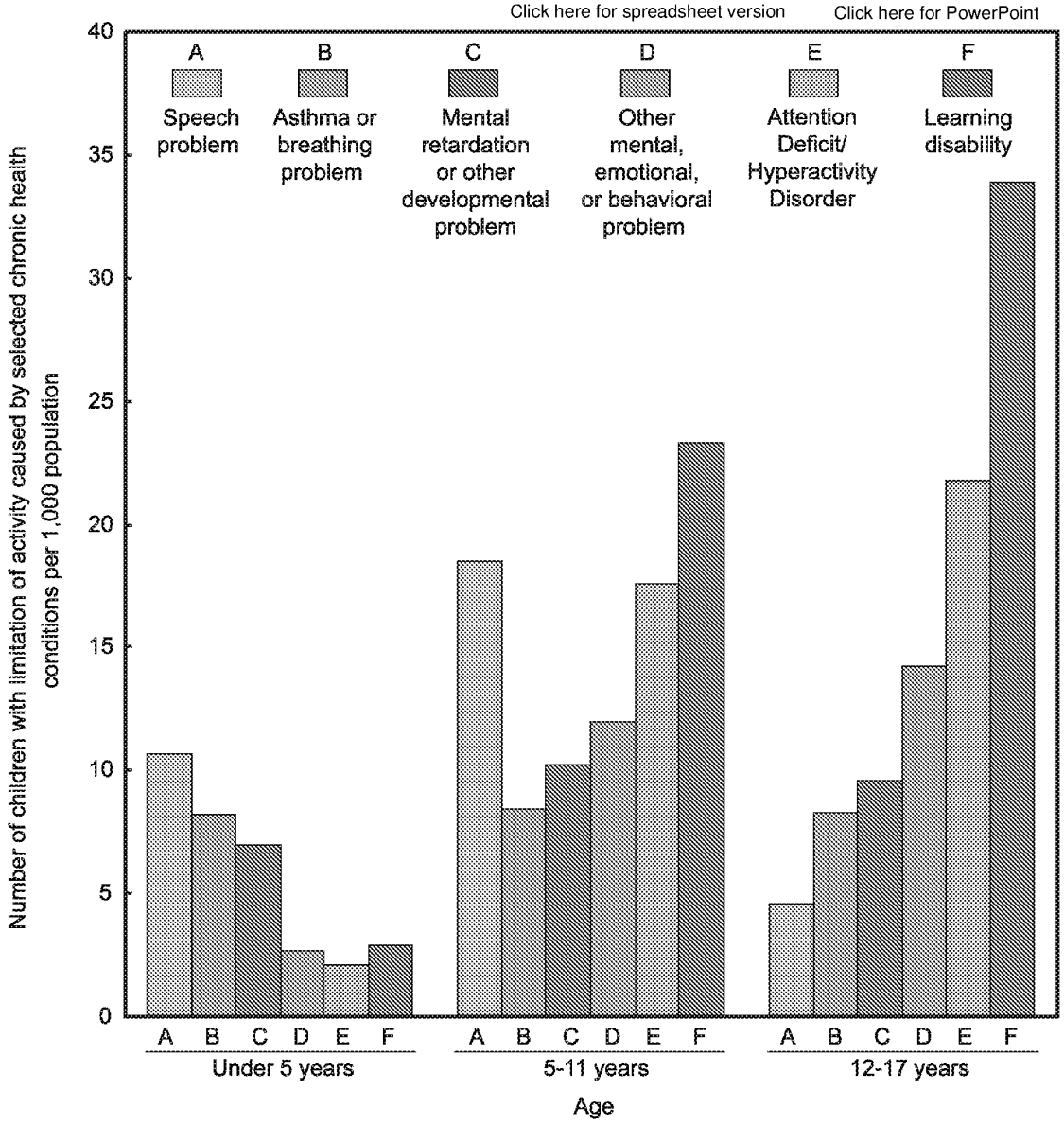
Approximately 20 percent of school-age children with an activity limitation had more than one condition causing activity limitation. Among school-age children, the most common combinations of causal conditions were learning disability and ADHD; learning disability and speech problems; and ADHD and other mental, emotional, or behavioral problems (2).



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## Figure 18. Selected chronic health conditions causing limitation of activity among children by age: United States, 2002-03

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NOTES: Children with more than one chronic health condition causing activity limitation are counted in each category. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Working-Age and Older Adults

Chronic physical, mental, or emotional conditions can cause limitations in one's ability to function and carry out normal activities, such as working, keeping house, raising children, or even functioning independently. Limitation of activity increases with age and the impact of activity limitations may vary by age (1). For working-age adults 18–64 years, the most significant effect of limitations may be on their ability to work or keep house. For older adults 65 years of age and over, the impact of activity limitations on quality of life and independence may be the chief concerns. Limitations in activity are more common among older persons due to their greater likelihood of having disabling chronic conditions. However, examination of trends in conditions causing limitation of activity in younger populations provides important information on their current and projected health care needs and associated costs (2).

In the National Health Interview Survey, limitation of activity in adults is defined as limitations in handling personal care needs (activities of daily living), routine needs (instrumental activities of daily living), having a job outside the home, walking, remembering, and other activities. Comparable national data on activity limitation have been available since 1997 (see Appendix I, National Health Interview Survey). Between 1997 and 2003 the percent of noninstitutionalized working-age adults reporting any activity limitation caused by a chronic health condition remained relatively stable (*Health, United States, 2005*, table 58). In 2003, 6 percent of younger adults 18–44 years of age reported activity limitation, in contrast to 21 percent of adults 55–64 years of age.

Health surveys that measure limitation of activity have typically asked about chronic conditions causing these restrictions. Health conditions usually refer to broad categories of disease and impairment rather than medical diagnoses and reflect the understanding the general public has of factors causing disability or limitation of activity (3). In figure 19, persons who reported more than one chronic health condition as the cause of their activity limitation were counted in each category. Among working-age adults, arthritis and other musculoskeletal conditions were the most frequently mentioned chronic conditions causing limitation of activity in 2002–03. Among persons 45–64 years of age, heart and other circulatory conditions were the second most common cause of activity limitation. Other common conditions causing activity limitation included mental illness and diabetes.

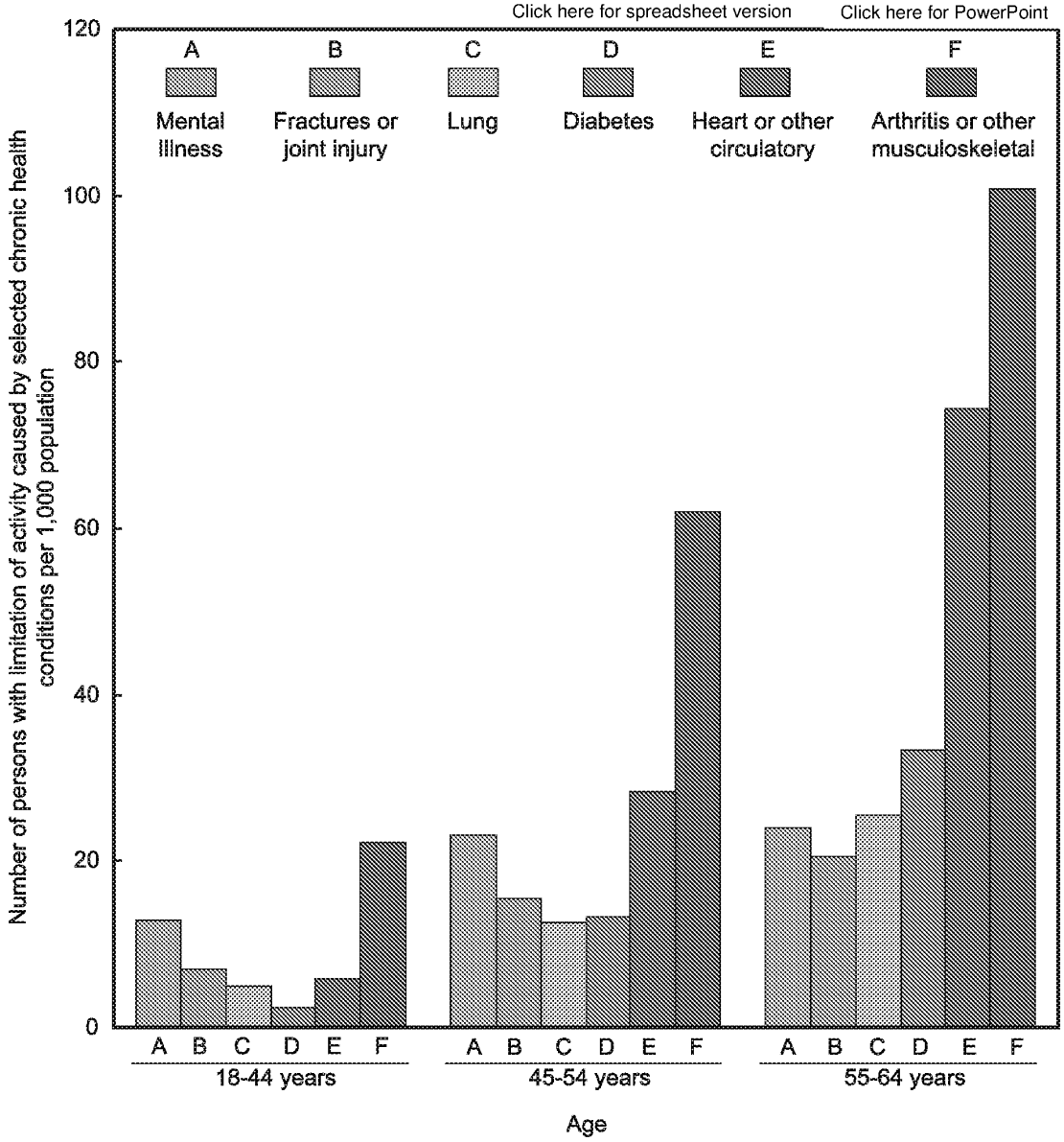
For younger working adults 18–44 years of age, mental illness was the second leading cause of activity limitation and fractures and joint injury were the third most common causes of activity limitation.



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## Figure 19. Selected chronic health conditions causing limitation of activity among working-age adults by age: United States, 2002-03

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NOTES: Data are for the civilian noninstitutionalized population. Persons may report more than one chronic health condition as the cause of their activity limitation. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Working-Age and Older Adults

*(Continued)*

In 2003 more than one-third of noninstitutionalized adults 65 years of age and over living in the community reported limitation of activity (*Health, United States, 2005*, table 58). The percent with limitation of activity was more than twice as high among the oldest adults 85 years of age and over compared with adults 65–74 years of age (64 percent compared with 26 percent) (4).

For both older and working-age adults, the most common chronic conditions causing activity limitation were similar, though the rates were higher among older adults. Arthritis and other musculoskeletal conditions were the most frequently mentioned chronic conditions causing any limitation of activity among noninstitutionalized older persons in 2002–03 (figure 20). Heart disease and other circulatory conditions, including stroke, were the second most commonly reported conditions. For the oldest age group, adults 85 years and over, senility (which likely encompasses Alzheimer's disease and other types of dementia), vision, and hearing were commonly reported causes of limitation in activity.

Needing help with personal care needs such as eating, bathing, dressing, or getting around inside the home, known as activities of daily living or ADLs, is a more severe type of limitation (see related *Health, United States, 2005*, table 58). The percent of adults 65 years of age and over who reported needing help with ADLs increased with age from 3 percent of persons 65–74 years to 10 percent of persons 75 years and over. Among older adults, the percent reporting ADL limitations was higher among Hispanic and non-Hispanic black than non-Hispanic white elders. ADL limitations were more common among those living in institutions. Over 90 percent of institutionalized Medicare beneficiaries were limited in ADLs (5).

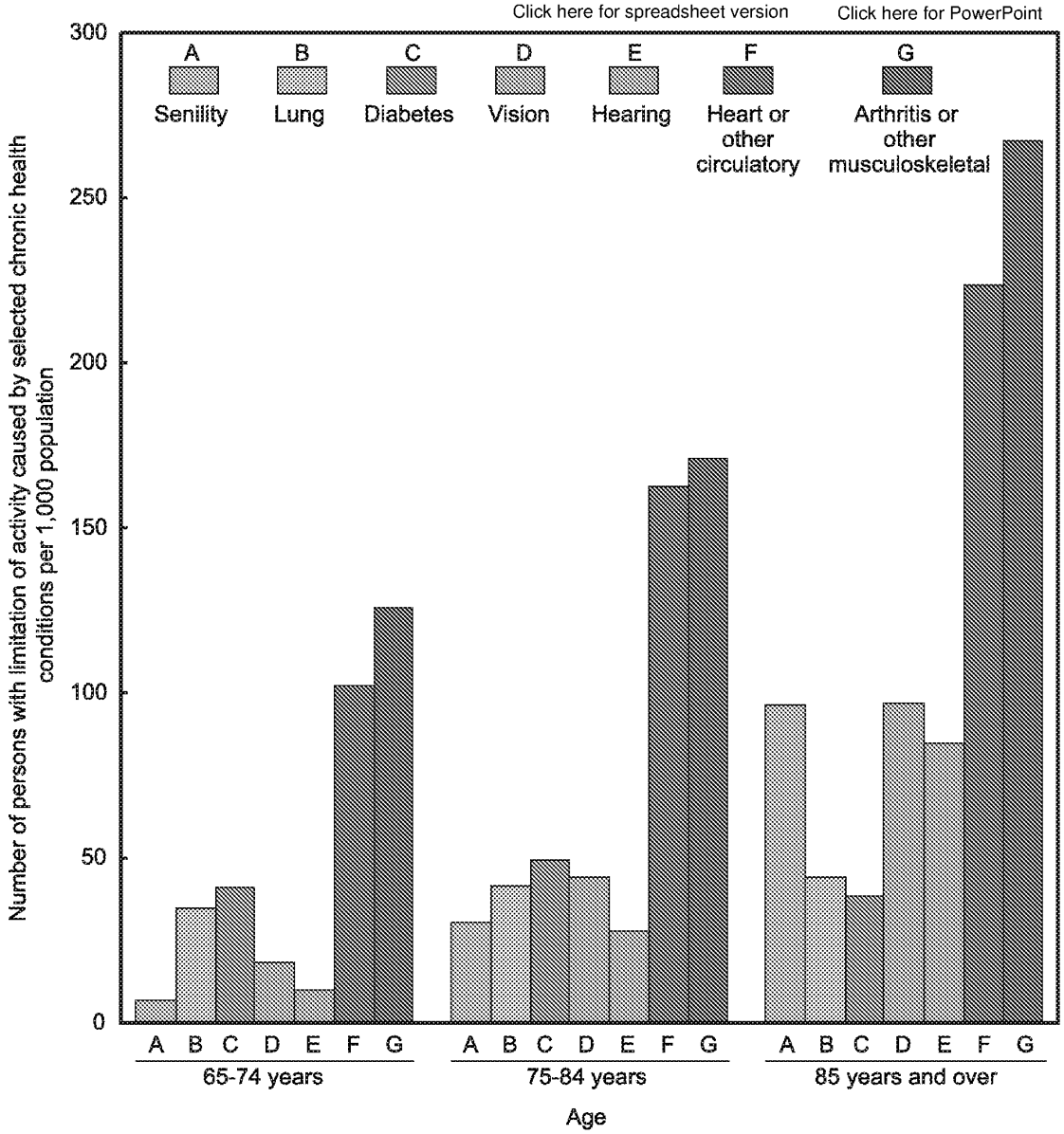
Twelve percent of noninstitutionalized older persons reported limitations in instrumental activities of daily living (IADLs) in 2003. IADLs are activities related to independent living and include preparing meals, managing money, shopping for groceries, performing housework, and using a telephone. Like other types of activity limitation, limitations in IADLs increase with age. Seven percent of those age 65–74 reported IADL limitations, compared with 18 percent of those 75 years and over (*Health, United States, 2005*, table 58). Among those 65 years of age and over, IADL limitation was higher for women than men, higher for the poor than the nonpoor, and higher for non-Hispanic black than non-Hispanic white adults.



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## Figure 20. Selected chronic health conditions causing limitation of activity among older adults by age: United States, 2002-03

Click here for spreadsheet version  Click here for PowerPoint




NOTES: Data are for the civilian noninstitutionalized population. Persons may report more than one chronic health condition as the cause of their activity limitation. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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# Mammography

Breast cancer is the most common type of newly diagnosed cancer among women and the second leading cause of cancer deaths for women. In 2002 approximately 204,000 women in the United States were diagnosed with breast cancer and nearly 42,000 women died from the disease (1,2). Rates of newly diagnosed breast cancer, breast cancer survival rates, and death rates vary among race and ethnic groups (*Health, United States, 2005*, tables 40, 53, 54). Breast cancer incidence and death rates are higher among white and black women than among Asian and Hispanic women. Although breast cancer survival rates have been improving, race differentials in survival persist. Between 1974–79 and 1992–2000, the 5-year relative survival rate for white women increased from 75 to 88 percent and for black women, from 63 to 74 percent. Death rates from breast cancer have been declining since the early 1990s but the percentage decrease in mortality has been substantially greater among white women than among black women.

Regular mammography screening has been shown to be effective in reducing breast cancer mortality. In 2002 the U.S. Department of Health and Human Services released its updated recommendation from the U.S. Preventive Services Task Force (USPSTF) that called for screening mammography, with or without clinical breast examination, every 1 to 2 years for women age 40 years and over. The USPSTF, with concurrence from the National Cancer Institute, lowered the recommended age for initiating routine screening from 50 to 40 years of age, but found that the strongest evidence of the mortality benefit for women undergoing mammography screening was among women age 50–69 years (3).

Between 1999 and 2003, 70 percent of women age 40 years and over had a recent mammogram within the past 2 years, more than double the percent in 1987 (age-adjusted, *Health, United States, 2005*, table 86). During the period 1987–99, the percent of women with a recent mammogram increased substantially for most race and ethnic groups, except for Asian women, for whom mammography rates have been relatively stable since 1993 (figure 21). In the early 1990s, compared with other racial and ethnic groups, non-Hispanic white women had the highest recent mammography rates. Starting in 1993, recent mammography rates for non-Hispanic black and white women have been similar and generally higher than for other race and ethnic groups. In 2003 mammography rates for non-Hispanic white and black women (71 percent) were higher than rates for Asian and Hispanic women (58 and 65 percent).

Barriers to mammography for Asian and Hispanic women may include language and acculturation, cultural beliefs, and health system barriers such as lack of insurance and no usual source of regular medical care. Several studies report lower rates of screening mammography among Spanish-speaking Hispanic patients compared with English-proficient Hispanics and non-Hispanics (4,5). With the growing number of recent immigrants in the United States, including large numbers of Asian and Hispanic immigrants, identification of potential barriers to mammography screening is critical to improving screening rates in these populations.

Disparities in mammography screening among underserved women with low income or less education also continue to exist. In 2003 poor women remained less likely than women with higher incomes to have a recent mammogram (55 percent compared with 74 percent, data table for figure 21). Women age 40 years and over with no high school diploma or GED also remained much less likely than women with at least some college education to have a recent mammogram (58 percent compared with 75 percent).

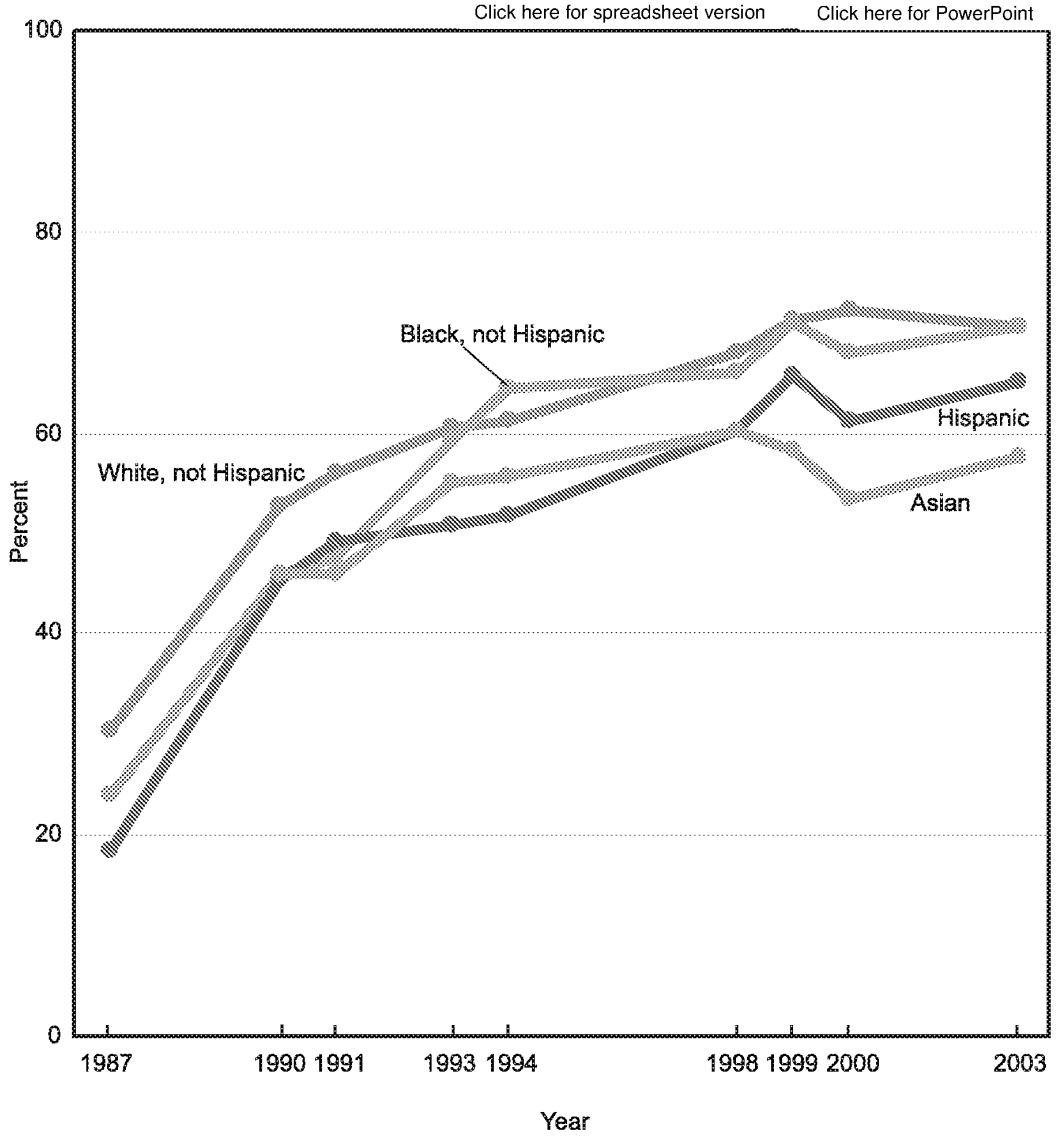
Reducing death rates from breast cancer is contingent on increasing mammography screening rates to detect the disease at an early stage and providing access to followup treatment for women who are diagnosed with breast cancer (6). Many public and private initiatives, including the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) help low income, uninsured, and underserved women obtain access to both screening and followup care (7). The Breast Cancer Treatment and Prevention Act, passed in 2000, also helps to make treatment more available to women screened by the NBCCEDP and allowed States the option of providing Medicaid coverage to low-income women enrolled in NBCCEDP who have a diagnosis of breast cancer, cervical cancer, or a related precancerous condition. Other efforts to increase mammogram usage include mammography coverage for Medicaid and Medicare enrollees, endorsement of screening by professional associations and health plan guidelines, and inclusion as a quality of care measure.



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## Figure 21. Use of mammography within the past 2 years for women 40 years of age and over by race and Hispanic origin: United States, 1987-2003

Click here for spreadsheet version Click here for PowerPoint




NOTES: Persons of Hispanic origin may be of any race. Asian race includes persons of both Hispanic and non-Hispanic origin. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Pap Smear

A Pap smear is a microscopic examination of cells scraped from the cervix that is used to detect cancerous or precancerous conditions of the cervix and other medical conditions. If detected, precancerous conditions can be treated before they become malignant. Between 1975 and 2001 use of the Pap smear is credited with cutting the age adjusted cervical cancer incidence in half, from 14.8 to 7.9 cases per 100,000 women; and with reducing the age adjusted cervical cancer death rate from 5.6 to 2.7 deaths per 100,000 women (1). In 2002 cervical cancer was the reported cause of death for 4,000 women in the United States (2). The U.S. Preventive Services Task Force, the American Cancer Society, and the American College of Obstetricians and Gynecologists all recommend regular Pap smear screening for cervical cancer, although recommendations vary as to the frequency, timing, risk factors, and age of women to be screened (3–5).

Between 1987 and 2003 the percent of women 18 years of age and over with a Pap smear within the past 3 years increased from 74 percent to 79 percent, with increases occurring among women of all race and ethnic groups (figure 22). However, Pap smear screening rates vary considerably by race and ethnicity. In 2003 non-Hispanic black women had the highest rate of screening, 84 percent. Both non-Hispanic black and non-Hispanic white women were considerably more likely to report having a recent Pap smear than Asian and Hispanic women in 2003. Screening rates for both Asian and Hispanic women increased between 1987 and 1993, but have remained fairly stable through 2003. Pap smear screening rates remained lower for Asian and Hispanic women than for non-Hispanic black and non-Hispanic white women.

Several studies have examined barriers to cervical cancer screening for Hispanic and Asian women. Demographic and socioeconomic variables were found to be important predictors of Pap smear screening for Hispanic and Asian women, as they are for the general U.S. population (6). In addition, language and acculturation has been shown to predict Pap smear utilization among Hispanic and Asian women, with more recent immigrants and those with English language barriers, fatalistic views on cancer, and culturally-based embarrassment reporting less frequent receipt of Pap smear (7–9).

Incidence rates of cervical cancer were highest for Hispanic women and rates for black women were also higher than the average for all women (10). Despite their high Pap smear screening rates, black women had the highest death rates from cervical cancer in 1997–2001, 5.6 deaths per 100,000 women. Hispanic women also had cervical cancer death rates higher than that of non-Hispanic white and Asian women. In contrast, both the incidence rate of cervical cancer and the death rate for Asian women—who had the lowest screening level—were in line with the average rates for women of all races and ethnicities combined. The reasons for the higher death rates among black women despite their high screening rates are not fully understood. This higher mortality among black women may be in part due to diagnosis at more advanced cancer stages and lower socioeconomic status (11).

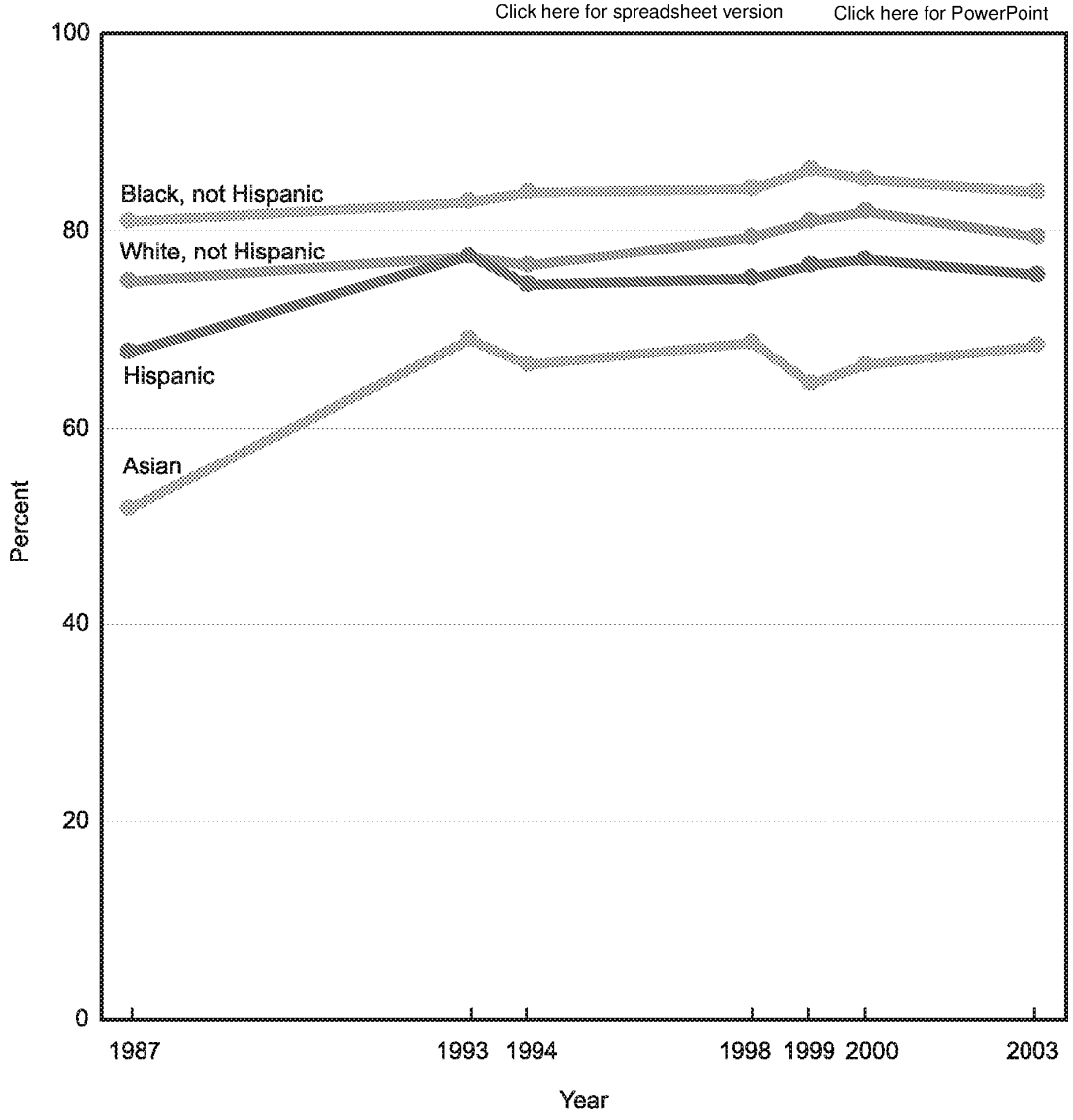
For women in whom precancerous lesions have been detected through Pap smears, the likelihood of survival is nearly 100 percent with appropriate evaluation, treatment, and followup (12). The National Breast and Cervical Cancer Early Detection Program (NBCCEDP) and other initiatives help low income, uninsured, and underserved women to obtain access to both screening and followup care for cervical cancer.



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## Figure 22. Use of Pap smear within the past 3 years for women 18 years of age and over by race and Hispanic origin: United States, 1987-2003

Click here for spreadsheet version Click here for PowerPoint




NOTES: Persons of Hispanic origin may be of any race. Asian race includes persons of both Hispanic and non-Hispanic origin. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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# Injury-Related Emergency Department Visits Among Children and Adolescents

Injuries are a substantial and preventable public health concern. Injury-attributable medical expenditures cost as much as $117 billion in 2000 (1). Whereas the most severe injuries can result in death, nonfatal injuries cause substantial pain and disability. Injuries account for a significant proportion of deaths among young persons. In 2002 injuries accounted for about 45 percent of deaths for children 1–9 years, 50 percent at 10–14 years, and 78 percent of deaths for persons age 15–19 years (2,3). In 2003 there were nearly 20 million visits with a first-listed diagnosis of injury to hospital emergency departments (EDs), hospital outpatient departments (OPDs), and physician offices for children and young adults less than 20 years of age (4). Forty-six percent of visits to these three sites for injury care were made in physicians' offices, an additional 46 percent in EDs, and 8 percent to OPDs.

EDs are often the initial site of care for serious injuries. Many injury-related visits to physician offices and OPDs are for care and observation following treatment of an initial injury. Over 60 percent of ED injury visits by persons of all ages resulted in a referral to another physician or hospital outpatient clinic (5). A larger proportion of ED visits by children and adolescents are for injuries than ED visits by middle-age and older adults. In 2003 almost 30 percent of ED visits by children and adolescents under 20 years of age were for injury diagnoses compared with 19 percent of ED visits for persons 45 years and over (4).

The National Hospital Ambulatory Medical Care Survey collects information on injury-related visits from medical records of hospital EDs. For injury-related visits two important pieces of information are coded from the medical record—the medical diagnosis and the external cause of injury. The external cause of injury, which is defined as the classification of environmental events, circumstances, and conditions that were the cause of injury, provides important public health information in terms of injury prevention. For example, an injury diagnosis might be contusions or fracture, and the external cause of injury might be cut or a fall.

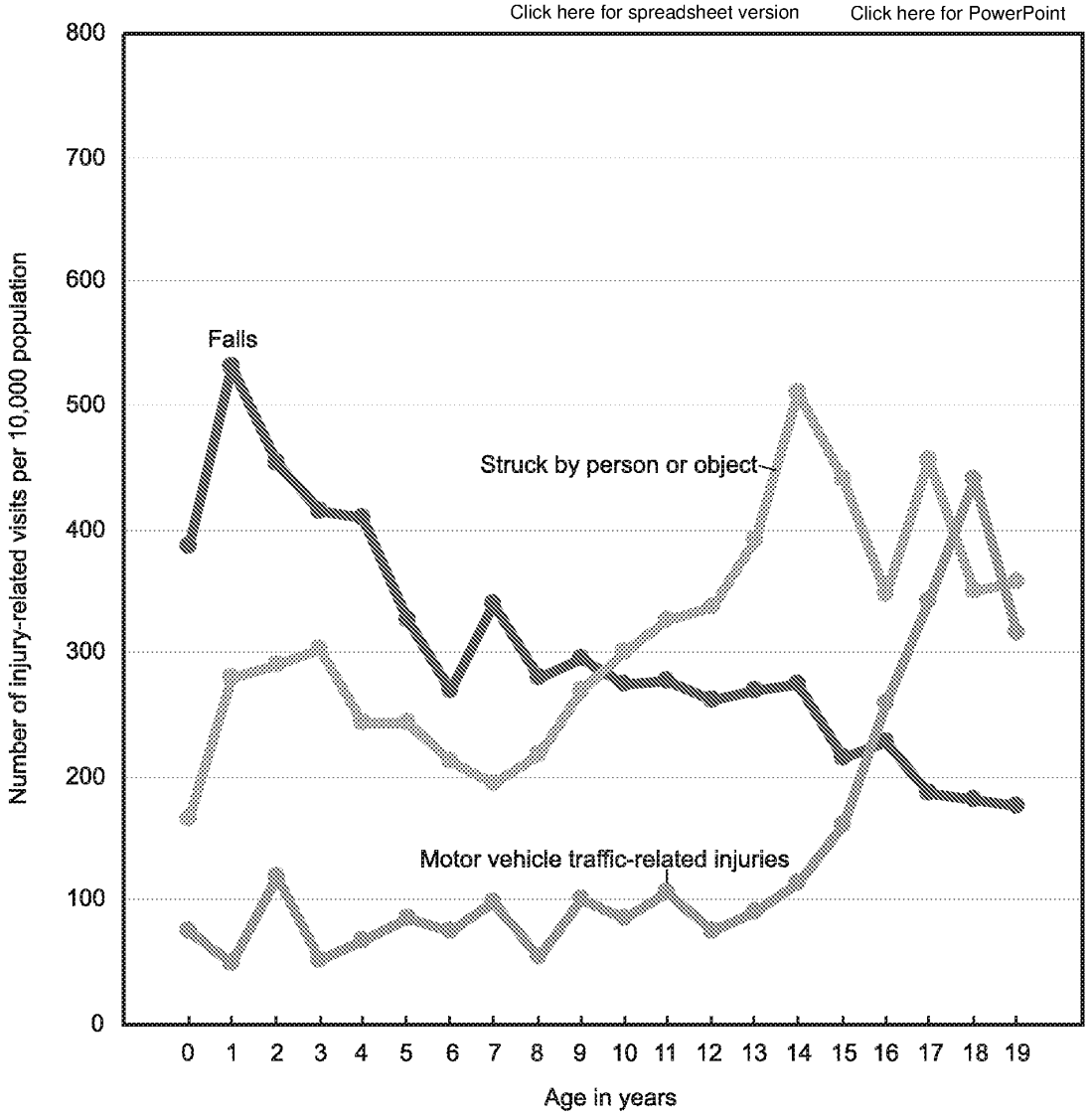
In 2000–2003 the most common external causes of injury for visits to EDs for children and adolescents under 20 years of age were falls, being struck by or against a person or object, motor vehicle traffic-related injuries, and cuts. The likelihood of ED visits for these four external causes of injury varied considerably by age (figure 23 and data table for figure 23). Young children under 10 years of age were more likely to have ED visits from falls than from other causes (figure 23). Falls were the most common cause of ED injury visits among infants under 1 year of age with visit rates peaking in the toddler years. Children 10 years of age and over were more likely to have ED injury visits due to being struck by or against an object or person, often occurring during sports activities. Sports and recreation are the most common activities associated with pediatric injury-related ED visits in the United States (6). Visit rates for motor vehicle traffic-related injuries rise rapidly as teenagers begin to reach driving age, with motor vehicle traffic-related injury visit rates peaking at age 18. Most injury visits in the ED are classified as unintentional rather than intentional. However, it is noteworthy that with increasing age among teenagers, the proportion of visits coded to intentional 'struck by or against' increases from 23 percent at age 15 years to 30 percent at age 19 years (4).



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## Figure 23. Injury-related visits to hospital emergency departments among children under 20 years of age by first-listed external cause and age: United States, average annual 2000-2003

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NOTES: External cause of injury is the classification of environmental events, circumstances, and conditions that were the cause of injury. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey.



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## Visits to Physician Offices and Hospital Outpatient Departments

Americans of all ages visit physician offices and hospital outpatient departments (OPDs) to receive preventive and screening services, diagnosis and treatment of health conditions, medical counseling, and other types of ambulatory health care. In 2002–03 there were, on average, 1 billion visits per year to physician offices and OPDs (data table for figure 24). Many OPD clinics provide preventive services and primary care very similar to the services received in private physicians' offices. About 8 percent of these visits were made in OPDs overall, but OPDs were more frequently used sites of care for certain population groups. Visit rates to OPDs were nearly twice as high for black persons as for white persons (*Health, United States, 2005*, table 88). Physician expenditures are a major component of all personal health care expenditures and their price tag continues to increase (*Health, United States, 2005*, table 119).

Data from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey, which are abstracted from medical records, provide a snapshot of care from office-based physicians and hospital outpatient departments. Visit rates to physician offices and hospital OPDs have increased since the mid-1990s. Between 1996–97 and 2002–03 the average number of ambulatory care visits for persons of all ages rose from 3.1 to 3.6 visits per person (data table for figure 24). This increase was driven by rising visit rates among men 65 years of age and over and women 45 years of age and over (figure 24).

Gender differences in visits to physician offices and hospital OPDs vary by age. The largest gender difference in visit rates occurs among adults 18–44 years of age. In this age group visit rates for women were twice as high as for men, largely due to care associated with female reproduction. This gender difference continues to narrow among middle-age adults and disappears among the oldest age group. In 2002–03 among adults 45–54 years of age visit rates for women were 45 percent higher than for men, 35 percent higher among adults 55–64 years, 10 percent higher among adults 65–74 years, and visit rates were similar among men and women 75 years of age and over.

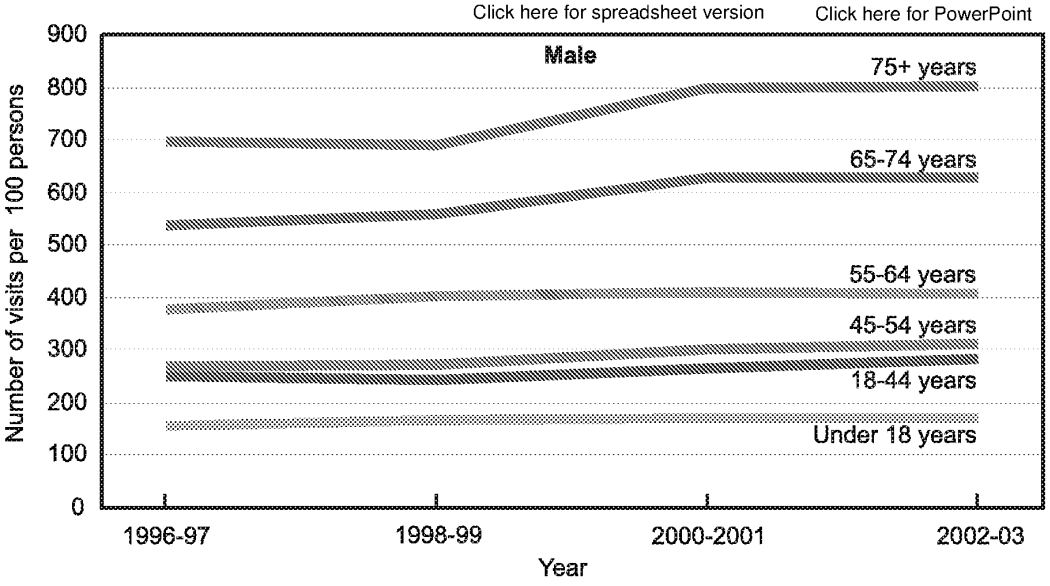
Clinical advances; new medications and increased use of existing medications; rising burden of risk factors such as overweight and obesity; and increasing prevalence of chronic diseases such as asthma, diabetes, and hypertension contribute to rising visit rates (1–5). Medical advances such as identifying the benefits of lower cholesterol, blood pressure, and blood sugar levels lead to more visits for screening and treatment including drug monitoring. Contributing to the rise in visit rates is the increased use of both prescription and over-the-counter drugs. Drugs are becoming a more frequently utilized therapy for reducing morbidity and mortality and improving the quality of life of Americans. Almost two-thirds (62 percent) of visits to physician offices and hospital OPDs in 2001–02 had at least one drug associated with the visit; among adults 65 years of age and over nearly 20 percent of visits had 5 or more drugs associated with the visit (6). The prevalence of many chronic conditions and diseases increases with age, and as the baby boom generation continues to age its impact on the ambulatory care system will be felt more strongly (*Health, United States, 2005*, figures 30–37).

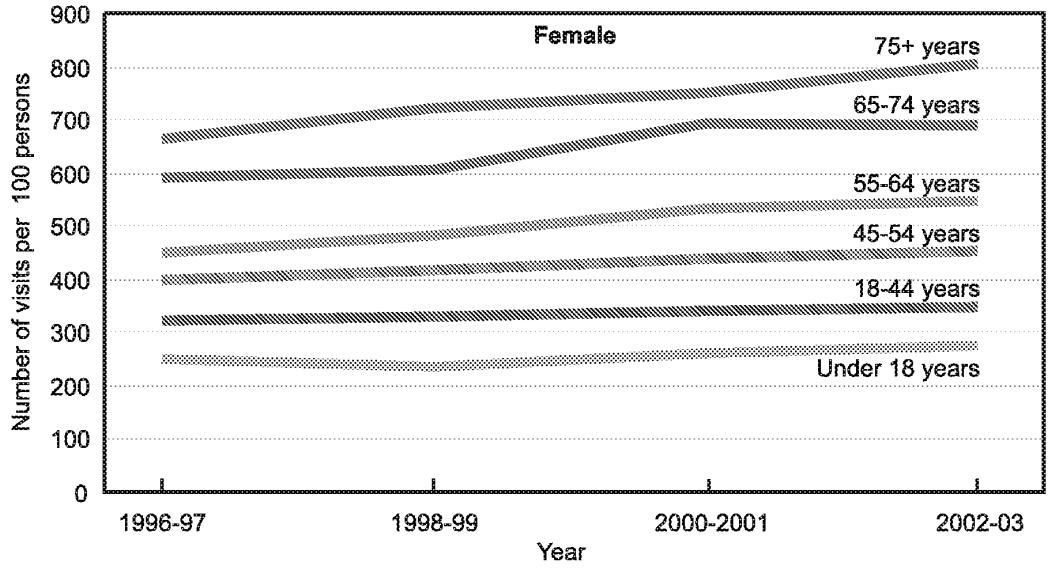


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## Figure 24. Visits to physician offices and hospital outpatient departments by sex and age: United States, 1996-2003

Click here for spreadsheet version  Click here for PowerPoint




NOTE: See Data Table for data points graphed, standard errors, and additional notes.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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# Hospital Procedures: Cardiac Stents

Heart disease is the leading cause of morbidity and mortality in the United States. Blockages to the coronary arteries (coronary artery disease) are a major cause of heart disease and heart attacks and their associated disability and mortality. Technological advances in treatment of blocked arteries include the introduction of coronary artery bypass graft (CABG) surgery (also called cardiac revascularization) in the late 1960s, percutaneous transluminal coronary angioplasty (PTCA, also called balloon angioplasty), introduced in the late 1970s and now often called percutaneous coronary intervention (PCI). Both procedures are preceded by cardiac catheterization, which measures the location and extent of coronary artery blockage. Whether CABG, PTCA, or some other alternative procedure is used depends on various factors such as where the blockage is, how many blockages there are, and the extent of the blockage (1,2).

The code for coronary artery stenting was introduced in 1996. Stenting is performed in combination with the PTCA procedure. A stent is a wire mesh tube used to prop open an artery that has recently been cleared using angioplasty. Since the mid-1990s angioplasty has increasingly been used with the insertion of stents because of lower rates of renarrowing of opened arteries (restenosis) (2). According to the American Heart Association, 70–90 percent of percutaneous transluminal coronary angioplasty (PTCA) procedures involve the placement of a stent (3).

Among adults 45 years of age and over, there were more than half a million hospital discharges with at least one coronary stent insertion procedure performed in 2002–03 (data table for figure 25). Between 1996–97 and 2002–03 the rate of coronary stent insertion procedure for adults age 45 years and over more than doubled from 22 to 49 per 10,000 population (data table for figure 25). Among adults age 75 years and over, the rate of hospitalizations that included this procedure more than tripled from 23 per 10,000 population in 1996–97 to 73 in 2002–03 (figure 25). For persons 45–64 years the rate of stent procedures per population stabilized after 1999, but for persons 65 years and over the rate continued to rise, in part because PTCA and stenting are considerably less invasive than CABG and can be performed on older persons who are likely to have other medical conditions that preclude more extensive open-heart CABG surgery (4,5). In contrast to rising rates of stent insertions, rates for CABG procedures declined among adults 45–64 years of age and remained stable for adults 75 years and over (*Health, United States, 2005,* table 100).

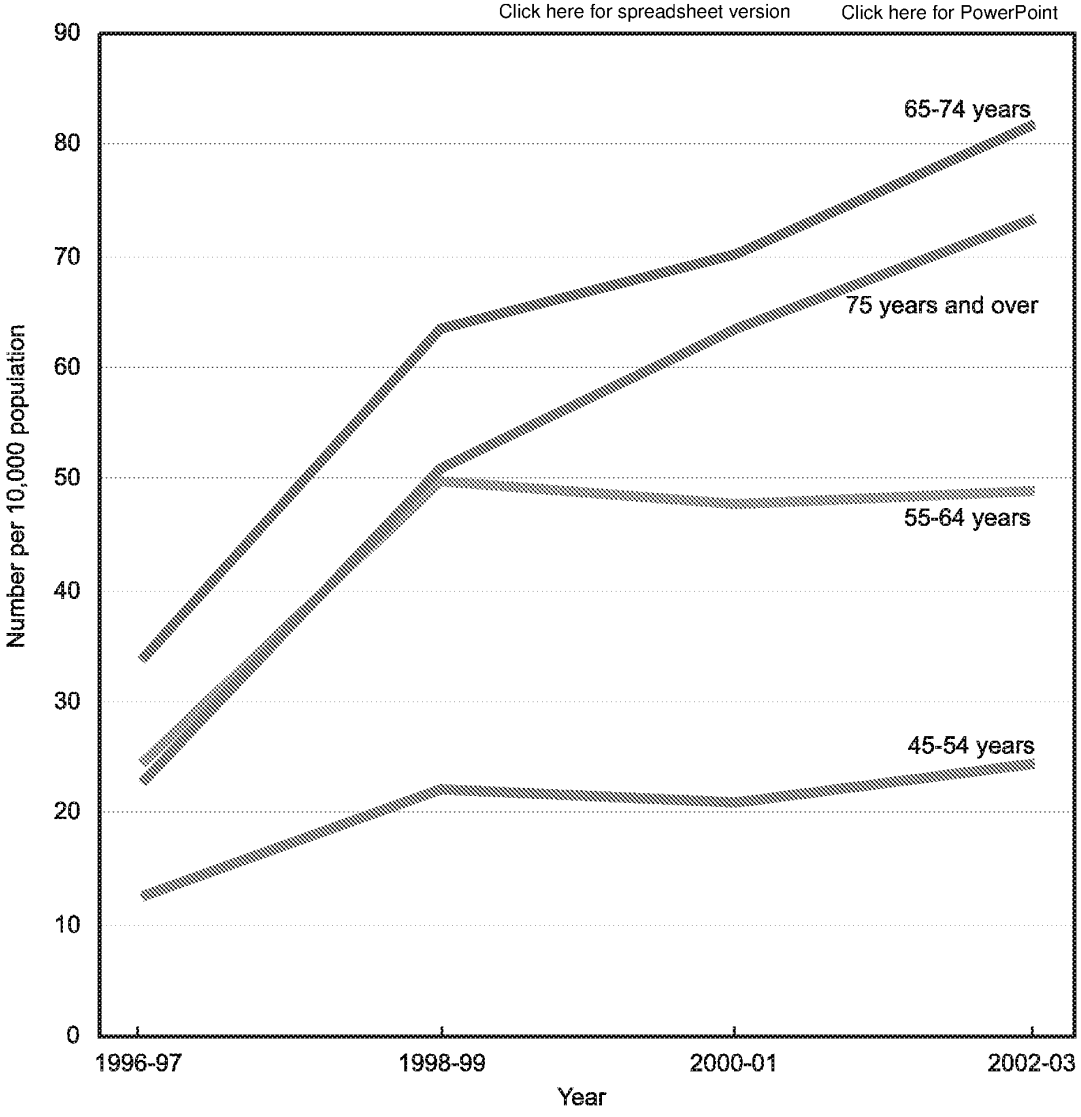
Together, medical innovations such as CABG, PTCA, the intracoronary stent, and other procedures developed during the last 30 years have contributed to improved survival for heart attack patients. It is estimated that around 70 percent of survival improvement in heart attack mortality is a result of these technological changes (2). New drug-eluting stents show promise of reducing restenosis and subsequent heart attacks still further (6).



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## Figure 25. Hospital inpatient procedures for insertion of coronary artery stent(s) among adults 45 years of age and over by age: United States, 1996-2003

Click here for spreadsheet version  Click here for PowerPoint




NOTES: Up to four procedures were coded for each hospital stay. Stent procedures were "any-listed" procedures. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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# Life Expectancy

Life expectancy is a measure often used to gauge the overall health of a population. As a summary measure of mortality, life expectancy represents the average number of years of life that could be expected if current death rates were to remain constant. Shifts in life expectancy are often used to describe trends in mortality. Life expectancy at birth is strongly influenced by infant and child mortality. Life expectancy later in life reflects death rates at or above a given age and is independent of the effect of mortality at younger ages (1).

From the turn of the 20th century through 2002, life expectancy at birth increased from 48 to 75 years for men and from 51 to 80 years for women (figure 26). Improvements in nutrition, housing, hygiene, and medical care contributed to decreases in death rates throughout the lifespan. Prevention and control of infectious diseases had a profound impact on life expectancy in the first half of the 20th century (2).

Life expectancy at age 65 has also increased since the beginning of the 20th century. Among men, life expectancy at age 65 rose from 12 to 17 years and among women from 12 to 20 years. In contrast to life expectancy at birth, which increased sharply early in the century, life expectancy at age 65 improved primarily after 1950. Improved access to health care, advances in medicine, healthier lifestyles, and better health before age 65 are factors underlying decreased death rates among older Americans (3).

While the overall trend in life expectancy for the United States was upward throughout the 20th century, the gain in years of life expectancy for women generally exceeded that for men until the 1970s, widening the gap in life expectancy between men and women. The increasing gap during those years is attributed to increases in male mortality due to ischemic heart disease and lung cancer, both of which rose largely as the result of men's early and widespread adoption of cigarette smoking (4). After the 1970s the gain in life expectancy for men exceeded that for women, and the gender gap in life expectancy began to narrow. Between 1990 and 2002 the total gain in life expectancy for women was 1.1 year compared with 2.7 years for men, reflecting proportionately greater decreases in heart disease and cancer mortality for men than for women and proportionately larger increases in chronic lower respiratory disease mortality among women (4).

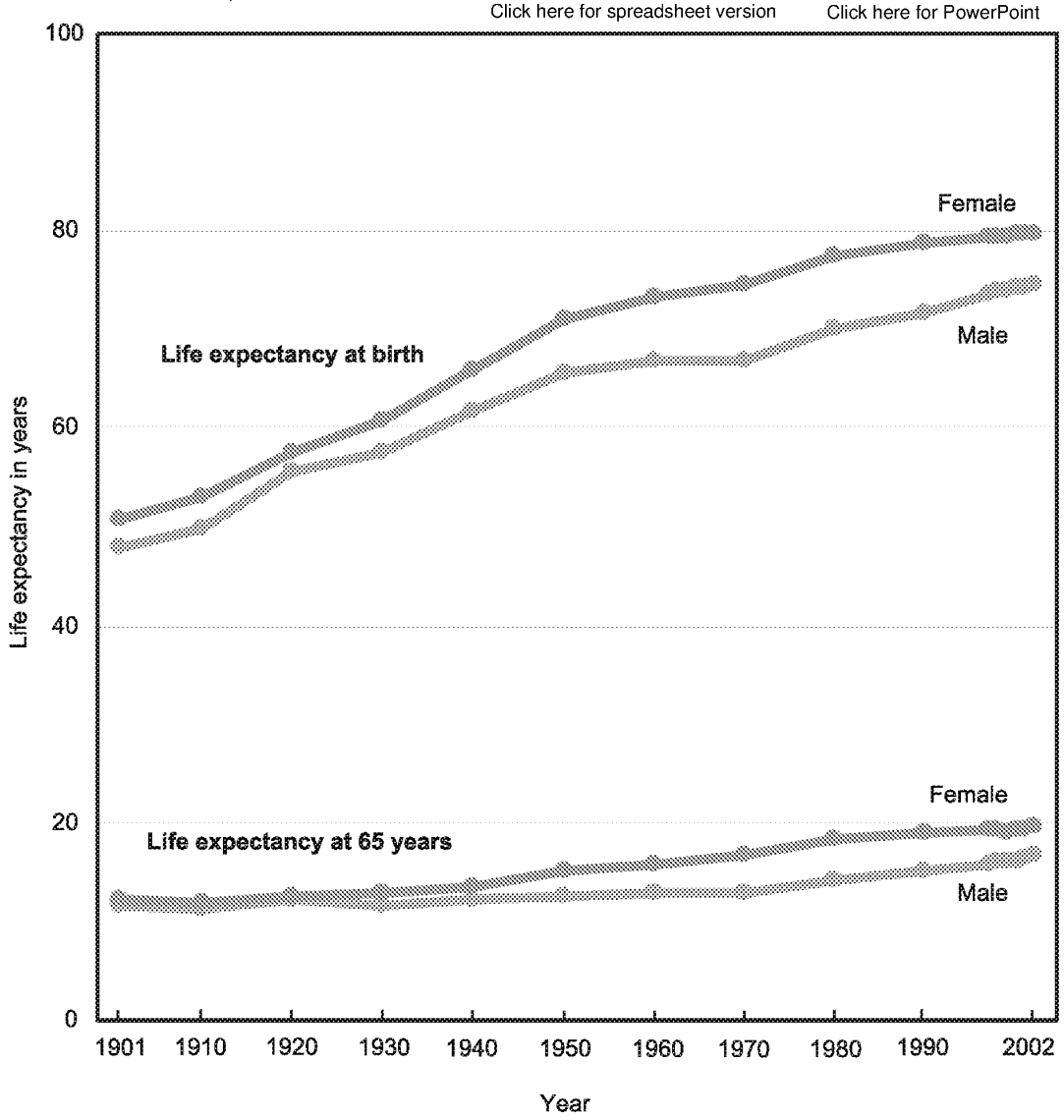
Longer life expectancies at birth in many other developed countries suggest the possibility of improving longevity in the United States (*Health, United States, 2005*, table 26). Decreasing death rates of less advantaged groups could raise life expectancy in the United States (*Health, United States, 2005*, table 27).



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## Figure 26. Life expectancy at birth and at 65 years of age by sex: United States, 1901-2002

Click here for spreadsheet version  Click here for PowerPoint




NOTE: See Data Table for data points graphed and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.



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# Infant Mortality

Infant mortality, the risk of death during the first year of life, is related to the underlying health of the mother, public health practices, socioeconomic conditions, and availability and use of appropriate health care for infants and pregnant women. Disorders related to short gestation and low birthweight and congenital malformations are the leading causes of death during the neonatal period (less than 28 days of life). Sudden Infant Death Syndrome (SIDS) and congenital malformations rank as the leading causes of infant deaths during the postneonatal period (28 days through 11 months of life) (1).

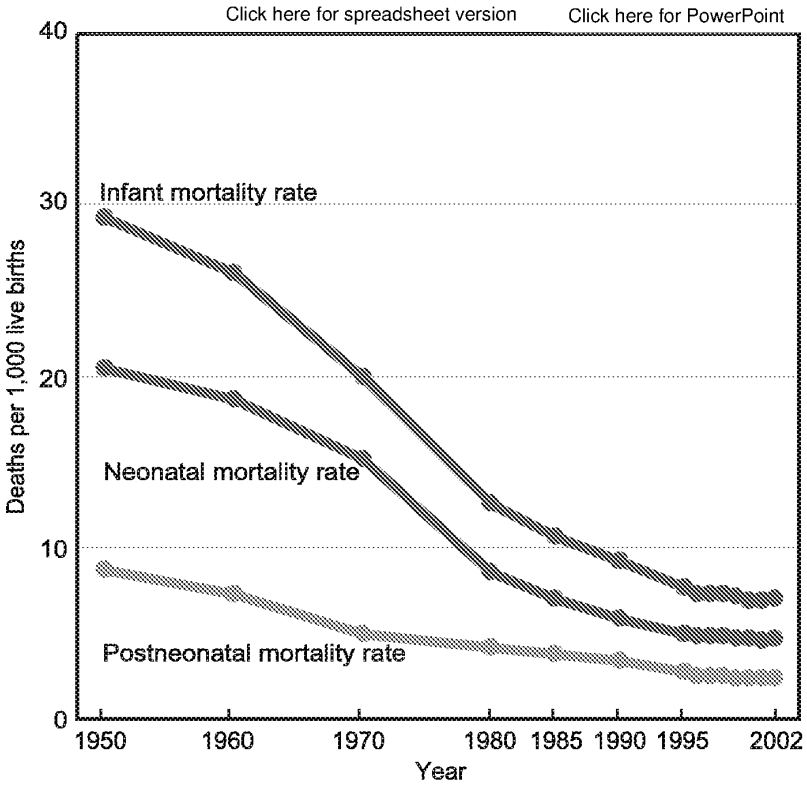
Between 1950 and 2001 the infant mortality rate declined by almost 77 percent (figure 27 and *Health, United States, 2005*, table 22). In 2002 the infant mortality rate increased to 7.0 infant deaths per 1,000 live births up from 6.8 in 2001 (2,3). This was the first year since 1958 that the rate had not declined or remained unchanged. The rise in infant mortality in 2002 was concentrated among neonatal deaths occurring in the first week of life. A special analysis of the 2002 linked birth/infant death data set found that the increase in infant mortality was due to an increase in the number of infants born weighing less than 750 grams (1 lb 10 1/2 oz), the majority of whom die during the first year of life (4).

Preliminary 2003 data indicated a small, but nonsignificant, decline in the infant mortality rate (5). More information on infant mortality patterns in 2003 will be available when the final mortality data and the linked birth/infant death data set for 2003 are available.

Declines in infant mortality over the past five decades have been linked to improved access to health care, advances in neonatal medicine, and public health education campaigns such as the "Back to Sleep" campaign to curb fatalities caused by SIDS (6).

Infant mortality rates have declined for all racial and ethnic groups, but large disparities remain (*Health, United States, 2005*, table 19). During 2000–2002 the infant mortality rate was highest for infants of non-Hispanic black mothers (figure 28). Infant mortality rates were also high among infants of American Indian or Alaska Native mothers, Puerto Rican mothers, and Hawaiian mothers. Infants of mothers of Chinese origin had the lowest infant mortality rates.

**Figure 27. Infant, neonatal, and postneonatal mortality rates: United States, 1950-2002**




NOTES: Infant is defined as under 1 year of age, neonatal as under 28 days of age, and postneonatal as between 28 days and 1 year of age. See Data Table for data points graphed and additional notes.

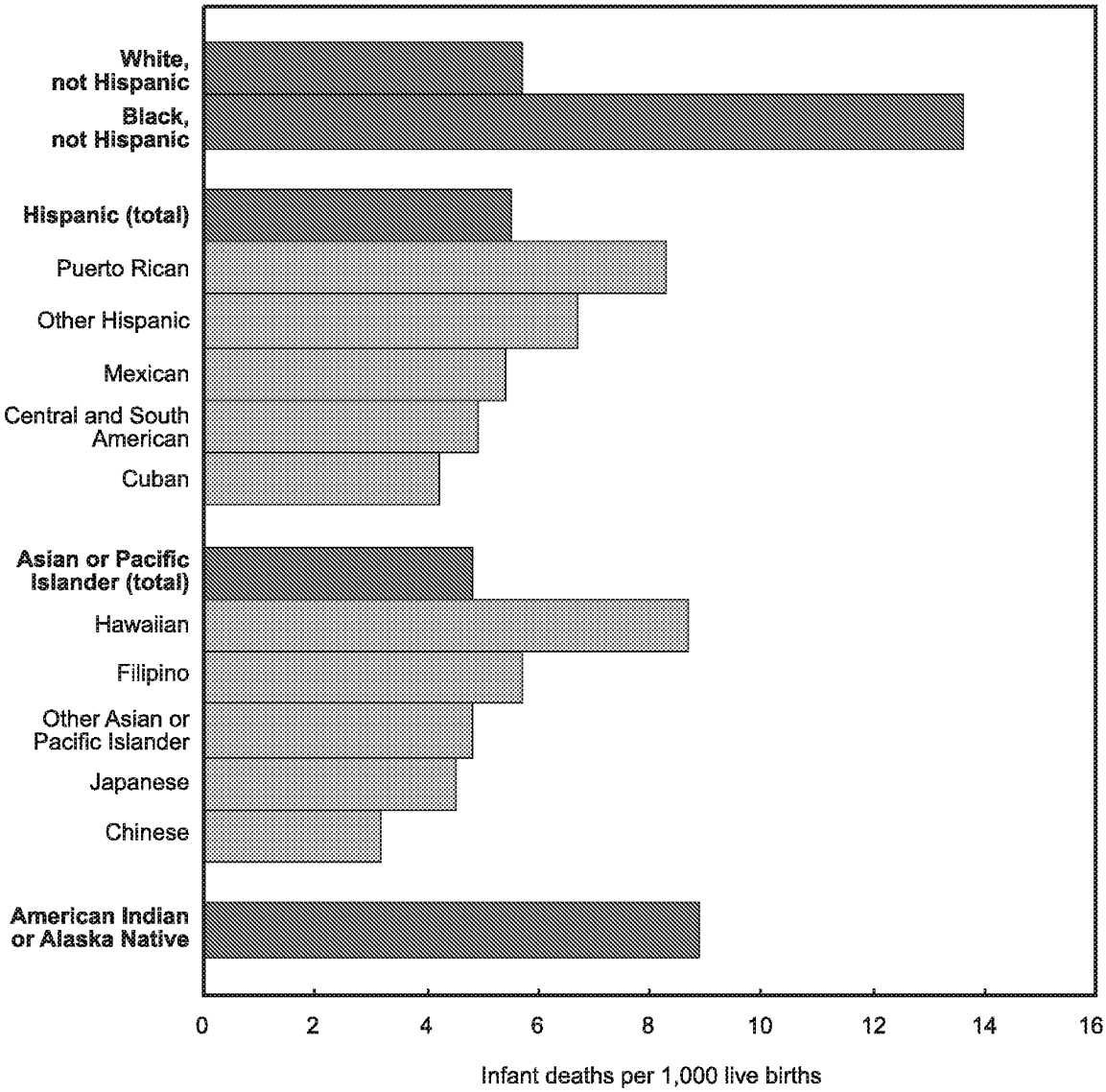
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.



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## Figure 28. Infant mortality rates by detailed race and Hispanic origin of mother: United States, 2000-2002

Click here for spreadsheet version  Click here for PowerPoint




NOTES: Infant is defined as under 1 year of age. Persons of Hispanic origin may be of any race. Asian or Pacific Islander and American Indian or Alaska Native races include persons of Hispanic and non-Hispanic origin. See Data Table for data points graphed and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Linked Birth/Infant Death Data Sets.

## Leading Causes of Death for All Ages

In 2002 a total of 2.4 million deaths were reported in the United States (*Health, United States, 2005*, table 31). The overall age-adjusted death rate was 42 percent lower in 2002 than it was in 1950. The reduction in overall mortality during the last half of the twentieth century was driven mostly by declines in mortality for such leading causes of death as heart disease, stroke, and unintentional injuries (figure 29).

Throughout the second half of the twentieth century, heart disease was the leading cause of death and stroke was the third leading cause. In 2002 the age-adjusted death rate for heart disease was 59 percent lower than the rate in 1950. The age-adjusted death rate for stroke declined 69 percent since 1950 (*Health, United States, 2005*, tables 36 and 37). Heart disease and stroke mortality are associated with risk factors such as high blood cholesterol, high blood pressure, smoking, and dietary factors. Other important factors include socioeconomic status, obesity, and physical inactivity. Factors contributing to the decline in heart disease and stroke mortality include better control of risk factors, improved access to early detection, and better treatment and care, including new drugs and expanded uses for existing drugs (1).

Cancer was the second leading cause of death throughout the period. Overall age-adjusted death rates for cancer rose between 1960 and 1990 and then reversed direction. Between 1990 and 2002 overall death rates for cancer declined more than 10 percent. In the 1980s cancer death rates for females increased faster and in the 1990s declined more slowly than rates for males, reducing the disparity in cancer death rates. Rates for males were 63 percent higher than rates for females in 1980 and 46 percent higher in 2002. The trend in the overall cancer death rate reflects the trend in the death rate for lung cancer (*Health, United States, 2005*, tables 38 and 39). Since 1970 the death rate for lung cancer for the total population has been higher than the death rate for any other cancer site. Lung cancer is strongly associated with smoking.

Chronic lower respiratory diseases (CLRD) was the fourth leading cause of death in 2002. The age-adjusted death rate for CLRD in 2002 was 54 percent higher than the rate in 1980. The upward trajectory for CLRD death rates is a result of steadily increasing death rates for females, which increased 150 percent between 1980 and 2002, whereas death rates for males increased only 7 percent. The increasing trend for females is most noticeable for females age 55 years and over (*Health, United States, 2005*, table 41). CLRD is strongly associated with smoking.

The fifth leading cause of death in 2002 was unintentional injuries. Age-adjusted death rates for unintentional injuries declined during the period 1950–92 (*Health, United States, 2005*, table 29). Since 1992, however, unintentional injury mortality has gradually increased. Despite recent increases, the death rate for unintentional injuries in 2002 was still 53 percent lower than the rate in 1950. The risk of death due to unintentional injuries is greater for males than females and the risk varies with age. For males age 15–64 years in 2002, the risk of death due to unintentional injuries was 2–3 times the risk for females of those ages. For ages under 15 years and ages 65 years and over, the gender disparity was smaller. The risk of death due to unintentional injuries increased steeply after age 64 years for both males and females (2).

Although overall unintentional injury mortality has increased slightly since the early 1990s, the trend in motor vehicle-related injury mortality, which accounts for approximately one-half of all unintentional injury mortality, has been generally downward since the 1970s (*Health, United States, 2005*, table 44). The decline in death rates for motor vehicle-related injuries is a result of safer vehicles and highways; behavioral changes such as increased use of safety belts, child safety seats, and motorcycle helmets; and decreased drinking and driving (3).

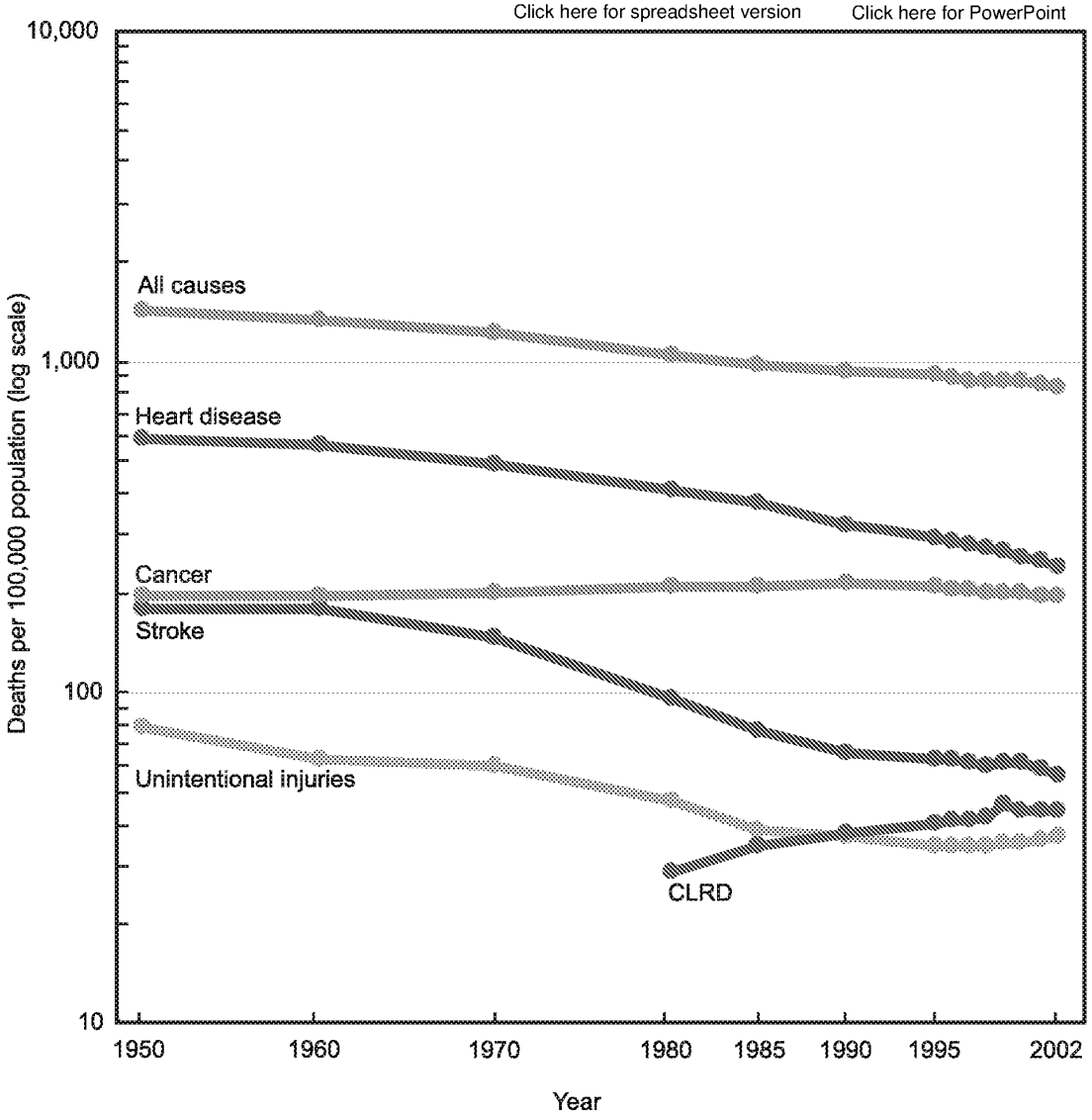
Death rates generally increase with age for chronic diseases such as heart disease, cancer, stroke, and CLRD, as well as for unintentional injuries. Age-adjusted death rates for black persons exceed those for white persons of the same gender for heart disease, stroke, and cancer. Socioeconomic factors are strongly associated with risk of death. Adult males and females with a high school education or less had death rates more than twice as high as the rates for those with more than a high school education in 2002 (*Health, United States, 2005*, table 34).



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## Figure 29. Death rates for leading causes of death for all ages: United States, 1950-2002

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NOTES: Rates are age adjusted. Causes of death shown are the five leading causes of death for all ages in 2002. CLRD is chronic lower respiratory diseases. Starting in 1999 data were coded according to ICD-10. See Data Table for data points graphed and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.



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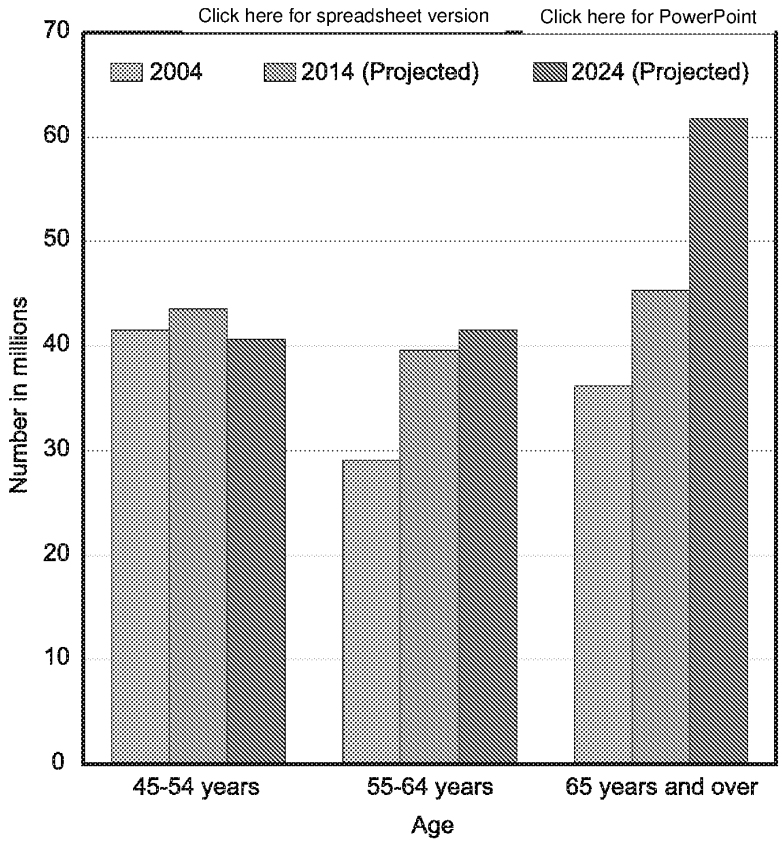
## Introduction

As they approach age 65, many Americans eagerly anticipate the day when they can have more leisure time. This "preretirement age" population, defined in this Special Feature as all adults 55–64 years of age, is projected to be the fastest growing segment of the adult population during the next 10 year period. In 2004 there were about 29 million persons in this age group. The 55–64 age group is projected to increase by 11 million persons over the 2004–14 period, to 40 million persons by 2014 (figure 30). Persons born during the explosive rise in population following World War II, between 1946 and 1964, are referred to as "baby boomers." In 2004 the oldest baby boomers were 55–58 years of age and are just beginning to enter the preretirement age group, with many more boomers aging into the 55–64 age group in the next 10 year period. In future decades the population age 65 years and over will increase dramatically—yet the population age 55–64 will not decline for the next few decades—because more boomers will replace the ones that age into older age groups. By 2029, the youngest of the baby boomers will have reached age 65.

Adults age 55–64 have more frequent and more severe health problems than younger people. The prevalence of diabetes, hypertension, heart disease, and other chronic diseases increase with age (*Health,United States, 2005*, tables 55, 69, 70). In addition, hypertension and obesity have been increasing over time for this age group. Between 1988–94 and 1999–2002 hypertension prevalence rose from 42 to 50 percent and obesity increased from 31 to 39 percent among adults 55–64 years (1).

Between 1997 and 2003 the percent of adults 55–64 years of age who had at least one health care visit in the past year rose from 85 to 89 percent and the percent with 4 or more visits rose from 43 to 50 percent (*Health,United States, 2005*, table 75). Strengthened efforts to identify and modify risk factors for chronic diseases may contribute to this greater use of health care services. This increased vigilance in screening and modifying risk factors is intended to reduce morbidity and improve quality of life. All Americans, including those age 55–64 years, are targeted for identification and intervention of heart disease risk factors (e.g., high serum cholesterol, high blood sugar, overweight, and high blood pressure) and cancer screening (2–5). Clinical guidelines have also increased the number of candidates for hypertension-lowering therapy and blood sugar control. Rates of office visits with prescribed cholesterol-lowering and blood glucose regulating drugs have increased dramatically in recent years (figure 36).

**Figure 30. Aging of the population 45 years of age and over: United States, 2004, 2014, and 2024**




NOTE: See Data Table for data points graphed and additional notes.

SOURCE: U.S. Census Bureau.



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Health insurance coverage is an important determinant of access to health services and is of particular importance for people with chronic conditions that require ongoing care. Whereas Americans age 55–64 years are more likely to be insured than other working-age adults under age 65, preretirement age adults do not have the guarantee of health insurance coverage that Medicare offers to almost all older adults age 65 and over (*Health, United States, 2005*, table 134). The 11 percent of 55–64 year olds who have no health insurance may find it difficult to buy insurance in the private market (data table for figure 33). Private nongroup health insurance is generally considerably more expensive than employer-sponsored health insurance, and preexisting health conditions often increase premiums in the nongroup market (6).

Uninsured persons may postpone or not receive care that could have prevented or delayed the progression of various diseases and conditions. Those uninsured due to disability or the inability to work because of a health condition are at particular risk of not obtaining needed services or of incurring high out-of-pocket expenditures. When they do become eligible for Medicare they may use more health care resources as a result of deferring health care that was needed at earlier ages (7).

The changing health insurance market is also affecting people age 55–64 who currently have health insurance. Among employed persons age 55–64 years with health care coverage, the need for health insurance can affect the timing of their retirement. Planned retirement may be postponed to maintain individual or dependent health insurance coverage. Many employers that continue to offer retirees health benefits have reduced benefits, particularly prescription drug coverage, and many have shifted costs they previously paid to their retirees through expenditure caps and various increases in cost-sharing provisions such as increased premiums, copayments and deductibles (8,9). Future cuts in retiree health insurance benefits have implications both for currently employed 55–64 year olds, as well as for the growing number of aging baby boomers entering that age group.

While many Americans age 55–64 are in good health and relatively well off financially, minorities, primarily African Americans, American Indians, and persons of Hispanic origin, are more likely than non-Hispanic white Americans to have chronic health problems, live in poverty, lack insurance coverage, and be unable to work because of a disability (figures 31–33) (10,11). The percent of the population that is black or Hispanic is increasing. If current racial and ethnic disparities do not narrow, this trend could indicate even higher prevalence of obesity, diabetes, hypertension, and other diseases more common in minorities and a corresponding higher burden on the health care system.

This special feature focuses on the health care use and its determinants for the population age 55–64 years including their employment status, income, health insurance, heart disease risk factors, and health care utilization and expenses. Focusing on this age group may provide insight into program and policy interventions that could both improve access and quality of care for Americans age 55–64 years as well as to highlight implications for the Medicare system as this large age group looms at its doorstep.



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## Employment Status

In 2002–03, 58 percent of adults 55–64 years of age were employed (data table for figure 31) compared with nearly 80 percent of younger adults 35–54 years of age (1). Adults 55–64 years of age who were not working were either retired, unemployed due to disability, keeping house, looking for work, or not working for some other reason. Employment, or past employment, is a determinant of access to health care both in terms of supplying income to pay for care and also because employer-sponsored health insurance is frequently offered to employees. Persons who are not working because of a disability often have considerable medical expenditures and thus have a greater need for health insurance than less disabled persons.

Men 55–64 years of age were more likely to be working at a job or business for pay than women (figure 31). Data from the National Health Interview Survey show that about two-thirds of men 55–64 years of age were working for pay in 2002–03 compared with about one-half of women in that age group (data table for figure 31). Although men were more likely than women to be working, the percent of women 55–64 years in the labor force has increased substantially over the past 20 years. Between 1982 and 2002 the percent of women 55–64 years who were employed increased 32 percent, whereas the percent of men 55–64 years who were employed decreased slightly (2). In 2002–03 there was no difference between men and women in the percent who were retired (17 percent) or who said they were unemployed due to disability (12 percent) when asked the reason they had not been working for pay at a job or business the previous week. Women were more likely to be taking care of house or family than were men.

In 2002–03 employment status differed by race and ethnicity. Non-Hispanic white men and Hispanic men were more likely to be working (about 65 percent) than non-Hispanic black men (57 percent). Among women, a little over one-half of non-Hispanic white women were working compared with 46 percent of non-Hispanic black women and 41 percent of Hispanic women. Hispanic women in this age group were more likely to be taking care of home or family than non-Hispanic women. Hispanic men and women were less likely to be retired than non-Hispanic adults 55–64 years.

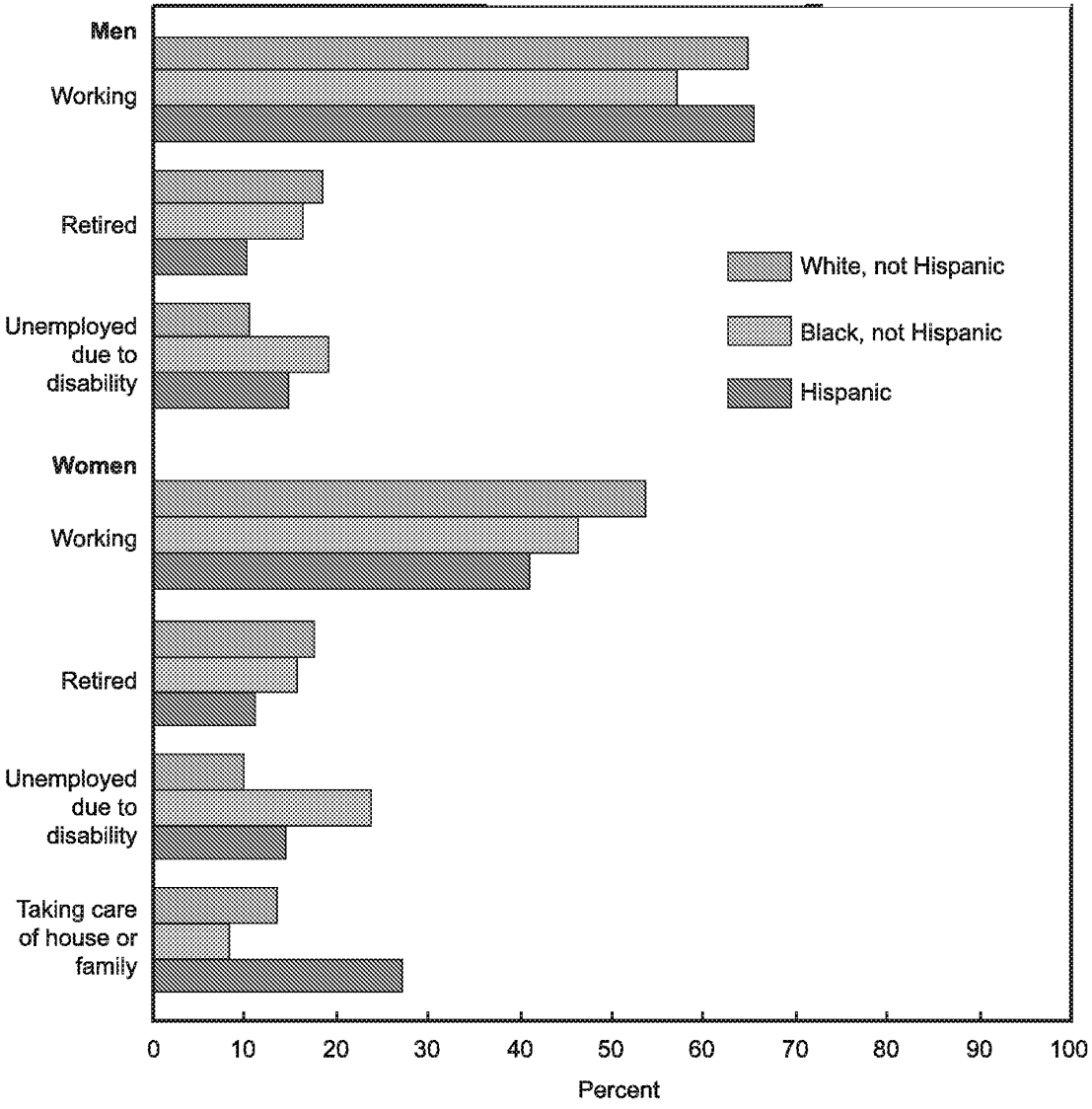
Unemployment due to disability was higher for non-Hispanic black men and women age 55–64 years than for other racial and ethnic groups. In 2002–03, about one-fifth of non-Hispanic black men and one-quarter of non-Hispanic black women were unemployed due to a disability compared with 15 percent of Hispanic adults and 10 percent of non-Hispanic white adults. This self-reported higher prevalence of unemployment because of disability among black adults is confirmed by data on Medicare enrollment for the disabled, which includes those with end-stage renal disease. In 2001, 16 percent of the disabled Medicare enrollees age 45–64 years were black adults, higher than would be expected given that they represent 11 percent of the population in this age group (*Health, United States, 2005*, tables 1 and 141). African Americans have higher rates of enrollment in the Medicare End-Stage Renal Disease Program, which is in part explained by their higher prevalence of diabetes and hypertension, risk factors for kidney disease (3,4). Hispanic adults accounted for 11 percent of disabled Medicare beneficiaries age 45–64 years, though they represented only 8 percent of the population in this age group in 2001. Higher rates of unemployment due to disability for black and Hispanic adults may be explained in part by higher prevalence of heart, kidney, and other diseases (5). In addition, health problems are more often disabling for Hispanic and black workers because their jobs are more likely to be physically demanding than the jobs of white workers and less likely to be able to accommodate a disabled or partially disabled worker (6).



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## Figure 31. Employment status among adults 55-64 years of age by sex, race and Hispanic origin: United States, 2002-03

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NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Low Income

People with low income are more likely to be in poor health and have a higher prevalence of many serious chronic diseases than those with higher incomes (*Health, United States, 2005*, tables 56, 57, 60, 61, 85). Their worse health is a result of many factors including a higher prevalence of health risk factors, poor nutrition and housing, occupational and environmental hazards, and other social ills (1). Poor health may also contribute to poverty by reducing the ability to earn income. People living below or near the poverty level are also more likely to lack health insurance, which, combined with their low incomes reduces their access to health care (*Health, United States, 2005*, tables 75, 134, figure 7).

In general the preretirement age population 55–64 years has higher incomes than older persons age 65 and over. In 2003 more than one-fifth of the population age 55–64 had incomes below 200 percent of poverty, compared with almost two-fifths of older persons age 65 years and over. More older adults than preretirement age adults had incomes in the 100–199 percent of poverty range. The percent living below 100 percent of poverty, however, was similar for the two groups (about 10 percent) (2).

There is large variation in the poverty distribution by gender and race and Hispanic origin for the preretirement age population (figure 32). In 2003 women 55–64 years of age were more likely than men to be living in poverty (10 percent compared with 8 percent). Both non-Hispanic black and Hispanic men and women were about twice as likely to be living in or near poverty as non-Hispanic white adults. In addition, non-Hispanic black and Hispanic women were more likely to be poor than their male counterparts.

It is unclear how the poverty distribution for this age group will change in the future. The baby boom generation is better educated and wealthier than previous generations and it is likely that as they age they will maintain their economic advantage compared with current retirees (3,4). However, beginning in 2001 the poverty rate for the total population has been rising. In addition, because poverty rates differ by population subgroup, differential population growth and immigration rates may affect future disparities in income (5).

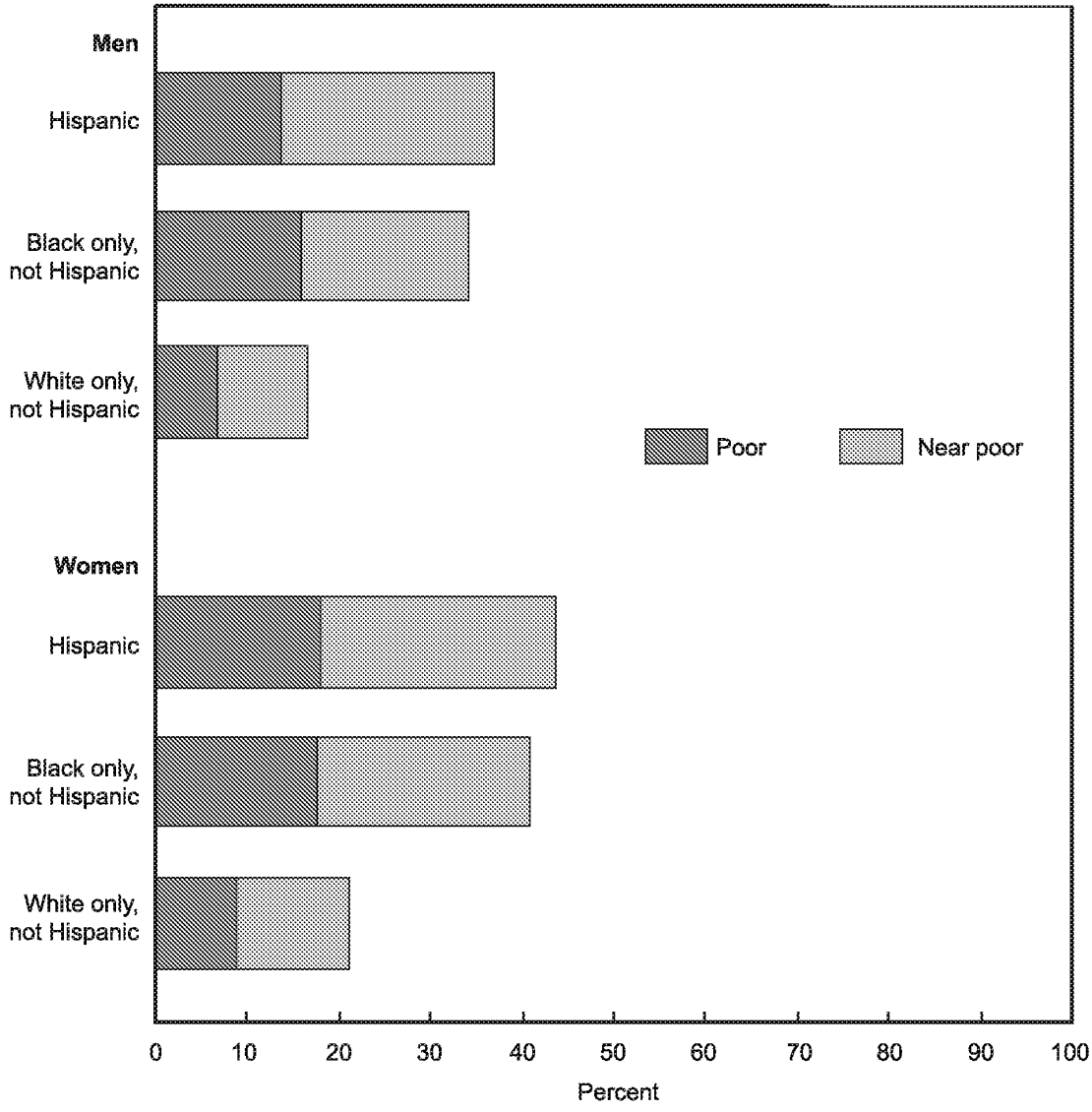
Income for persons age 55–64 is not likely to increase and will probably decrease upon retirement. Persons 55–64 currently living in poverty most often cannot expect future increases in their employment-based incomes (3,6). Employment prospects at this age for poor and near poor persons diminish and are most often limited to low income jobs with few fringe benefits (6).



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## Figure 32. Low income among adults 55-64 years of age by sex, race and Hispanic origin: United States, 2003

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NOTES: Poor is defined as family income less than 100 percent of the poverty level and near poor as 100-199 percent of the poverty level. See Data Table for data points graphed and additional notes.

SOURCE: U.S. Census Bureau, Current Population Survey.



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## Health Insurance Coverage

Adults 55–64 years of age are reaching a time of life when health problems are likely to become more frequent and more serious. Consequently, persons of this age group are likely to have greater health care needs, on average, than younger persons. Unless adults 55–64 years are disabled or suffer from certain serious chronic conditions, they are not eligible for Medicare, the Federal health program for the disabled and those 65 years of age and over. Some people in this group may have incomes low enough to qualify for Medicaid, the joint Federal and State program serving the poor, or may qualify for other coverage such as from the Department of Veterans Affairs, which is available for persons who have served in the military. However, most adults 55–64 years of age do not qualify for public health insurance coverage and are heavily reliant on private health insurance to finance their health care needs.

Employer-sponsored private health insurance is usually preferable to individually-purchased private health insurance both in terms of more generous benefits and the lower costs resulting from group plan underwriting rates and the financial contributions by employers to the health plan (1–3). Post-retirement health insurance offers by large private-sector firms have been declining (4). Among employers that are continuing to offer retirees health benefits, most have made changes to their benefit packages, including dropping retiree coverage for new employees and shifting costs onto others. Sixty-four percent of firms reported that they are very likely to increase retiree contributions to premiums, and 54 percent are very likely to increase cost sharing (5). This trend is likely to affect both currently employed 55–64 year olds as well as those who will enter the 55–64 year old age group in the future.

In 2002–03 among persons 55–64 years there was a strong relationship between marital status and health insurance regardless of gender. Married persons often have two opportunities to obtain health insurance—through their own employment or their spouse's. Among married preretirement age adults 83 percent were covered by private health insurance compared with about 60 percent of widowed, separated or divorced, and single adults (figure 33). Levels of public coverage were over 2 times as high for unmarried adults as married adults. Among those who were widowed, separated or divorced, or single the percent with no health insurance ranged from 16–18 percent compared with 9 percent for married adults.

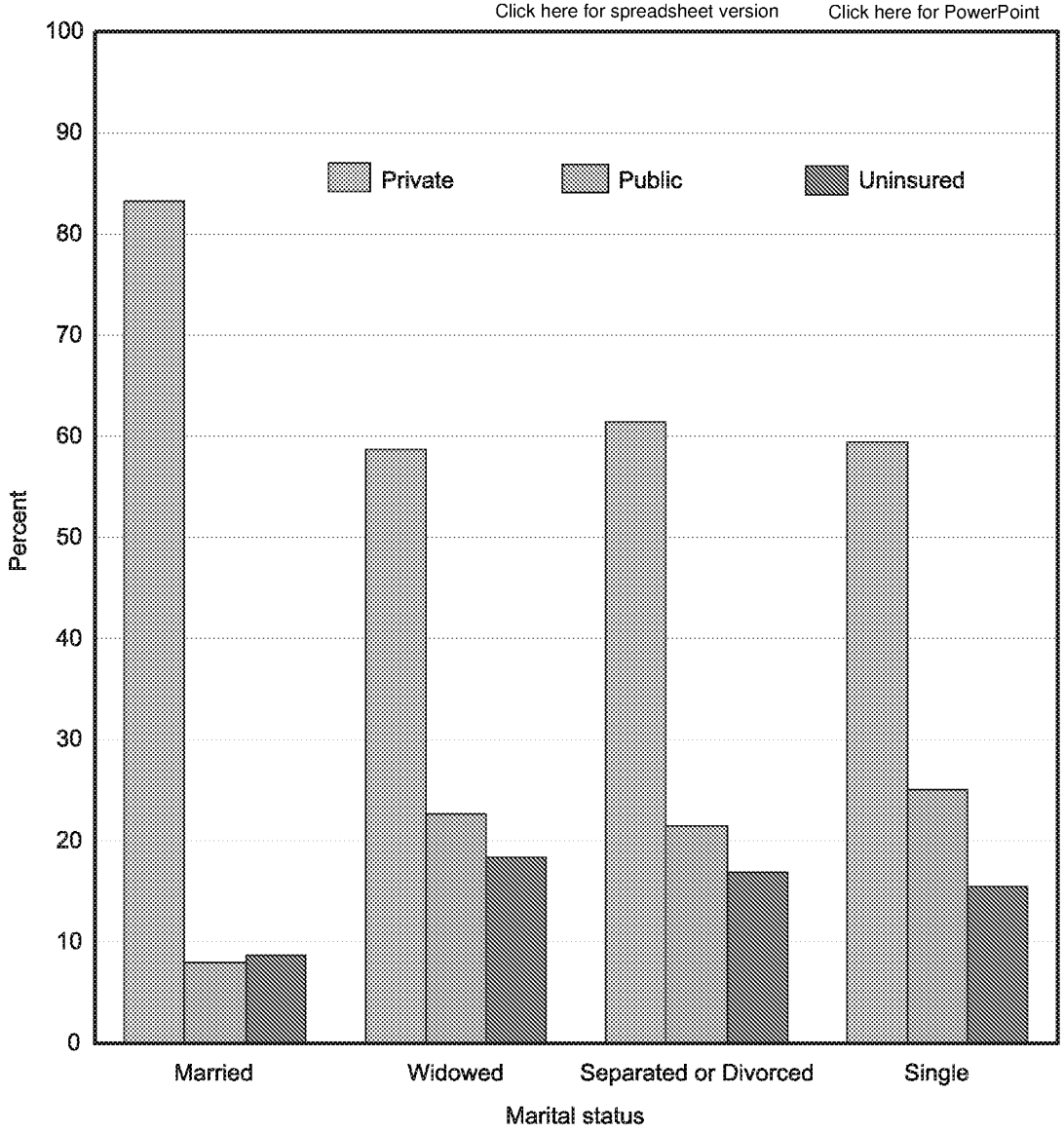
Although there was little difference between men and women in the relationship between health insurance coverage and marital status, there were significant differences in marital status for men and women. In 2002–03 preretirement age men were more likely to be married than women (79 percent compared with 66 percent). Women were more than 3 times as likely to be widowed as men (11 percent compared with 3 percent), reflecting both the greater longevity of women and the tendency for women to be a few years younger than their husbands. Women were also more likely to be separated or divorced than men (19 percent compared with 14 percent). These differences were even more pronounced by sex and race and Hispanic origin. Forty-one percent of non-Hispanic black women were currently married compared with 80 percent of non-Hispanic white men (6). Because being married is associated with higher rates of health insurance, minority women, in particular, are more at risk for being uninsured than other groups, as well as more likely to live in poverty (figure 32).



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## Figure 33. Health insurance coverage among adults 55-64 years of age by marital status: United States, 2002-03

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NOTES: Public includes Medicare, Medicaid, SCHIP, Military, and other State and government sponsored health plans. Uninsured adults are not covered by private or public coverage. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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## Cardiovascular Risk Factors

Hypertension, obesity, and high cholesterol are all independent risk factors for the leading causes of death in the United States—heart disease and stroke (1,2). Hypertension is also a major risk factor for congestive heart failure and kidney failure. Being obese is associated with increased risk of morbidity and mortality (3). High cholesterol increases the likelihood of developing heart disease and raises the risk of heart attacks among those with heart disease (4).

Previous research has found that the prevalence rates for obesity, hypertension, and cholesterol abnormalities are higher at older ages and that having each of these three risk factors substantially increases the risk for cardiovascular morbidity (2,5). People with multiple risk factors are at higher jeopardy for coronary heart disease and stroke than those with a single risk factor and the likelihood of heart disease and stroke increases as the number of risk factors increases.

The National Health and Nutrition Examination Survey (NHANES) collects information on hypertension, high cholesterol, and obesity through in-person household interviews, and physical exams and blood work conducted in a mobile examination center. Hypertension is defined as having either elevated blood pressure (systolic pressure of at least 140 mmHg or diastolic pressure of at least 90 mmHg) or taking antihypertensive medication. High serum cholesterol is defined as having total serum cholesterol greater than or equal to 240 mg/dL. Obesity is defined as having a body mass index greater than or equal to 30 (see Appendix II, Body mass index).

The percent of adults 55–64 years of age who have hypertension increased from 42 to 50 percent between 1988–94 and 1999–2002 (data table for figure 34). During the same time period, obesity increased from 31 to 39 percent of adults in this age group. In contrast, the percent of Americans age 55–64 with elevated cholesterol decreased between 1988–94 and 1999–2002, in part due to growing awareness about the risks of high cholesterol and the increased use of cholesterol-lowering medications.

Between 1988–94 and 1999–2002 the percent of adults 55–64 years of age with one or more of the three cardiovascular risk factors examined remained level at about 70 percent (data table for figure 34). However, the pattern differed for men and women (figure 34). In 1988–94 women 55–64 years of age were more likely than men to have one or more risk factor for cardiovascular disease (73 percent compared with 64 percent). By 1999–2002 the percent of men with one or more risk factors had risen to the level for women.

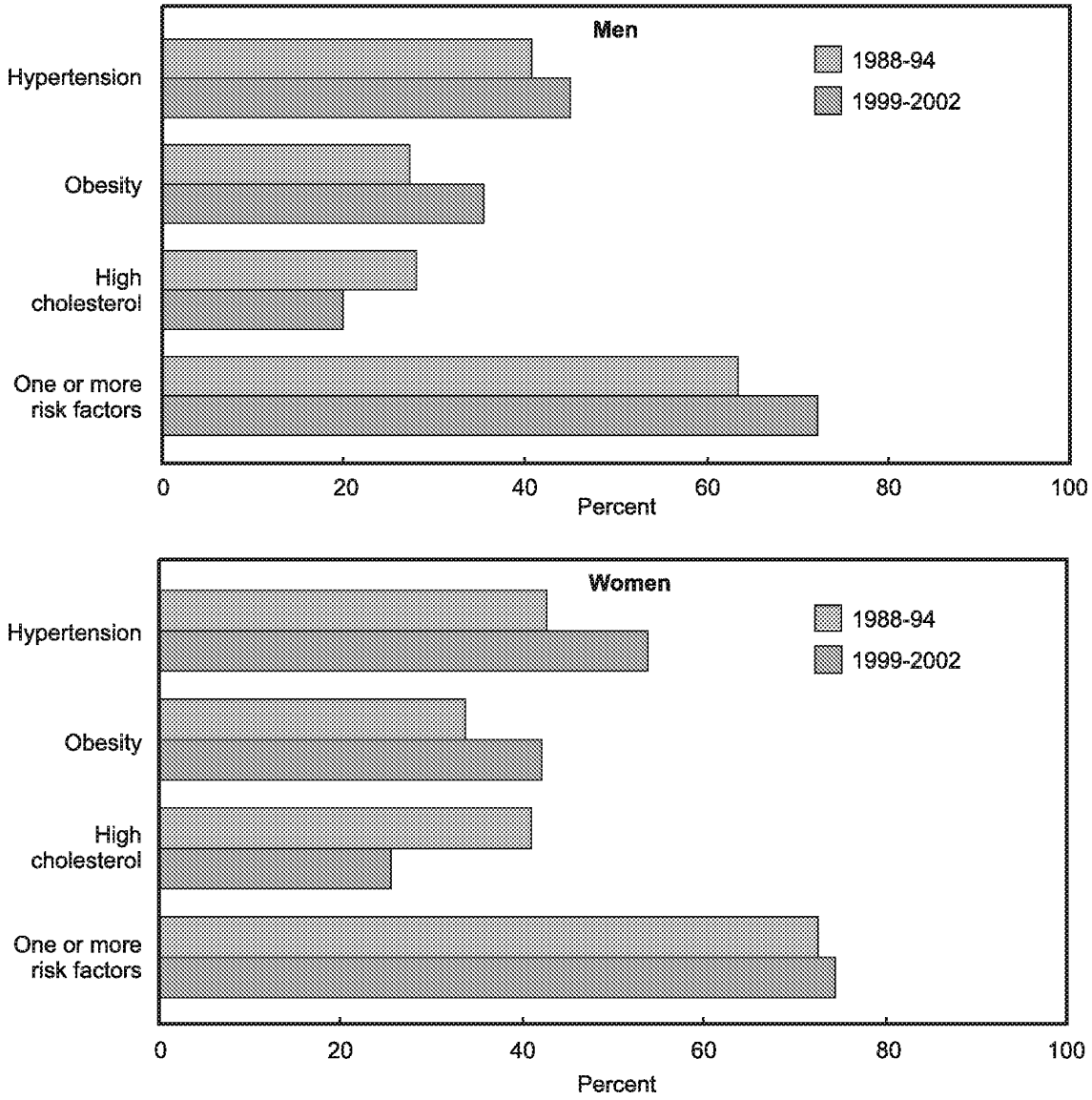
In 1999–2002 women in this age group were more likely than men to have elevated cholesterol and hypertension and the more serious condition of combinations of two or three cardiovascular risk factors. In 1999–2002, 39 percent of women and 24 percent of men age 55–64 years had two or three of these risk factors (data table for figure 34). Almost one-half of non-Hispanic black adults had two or three of the risk factors, compared with just under one-third of non-Hispanic white and Mexican adults (6).



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## Figure 34. Cardiovascular risk factors (hypertension, obesity, and high cholesterol) among adults 55-64 years of age by sex: United States, 1988-94 and 1999-2002

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NOTES: Hypertension is defined as either having elevated blood pressure (systolic pressure of at least 140 mmHg or diastolic pressure of at least 90 mmHg) or taking antihypertensive medication. Obesity is defined as a body mass index (BMI) greater than or equal to 30. High serum cholesterol is defined as having measured total serum cholesterol greater than or equal to 240 mg/dL (6.20 mmol/L).

See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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## Use of Health Care Services

People seek care from health professionals to receive preventive and screening services, diagnosis and treatment, counseling, and other health care services. Visits run the continuum from emergency and critical care to services designed to maintain quality of life and functioning. Visits to health professionals are influenced by factors in addition to medical need. Health insurance coverage, ability to pay for services not covered by health insurance, capability to travel to the services, availability of services, and compliance with health care professionals' recommendations to obtain tests or treatment all influence visit patterns (1). These factors vary by race and Hispanic origin, sex, and marital status (figures 31–33). In 2002–03, nearly 90 percent of the population 55–64 years of age had at least one visit to a health care provider such as a primary care physician, specialist physician, therapist, eye doctor, or mental health professional in the past 12-month period (2).

Persons age 55–64 years who have Medicare coverage are eligible primarily through being permanently disabled or having end-stage renal disease. Persons in this age group who have Medicaid coverage also qualify primarily through medical need as well as poverty status (see Appendix II, Medicare and Medicaid). Because of these eligibility criteria, persons age 55–64 years with public coverage have worse health status than the general population age 55–64. A greater percent of persons 55–64 years of age with public coverage reported at least one visit to a general physician, specialist physician, physical or other therapist, or mental health professional than those with private coverage or the uninsured, in part reflecting the higher disease burden in this group (figure 33).

Uninsured persons 55–64 years of age were considerably less likely to have ambulatory health care visits from many types of health care providers in the past year than persons with private insurance. About one-half of the uninsured saw a general physician compared with more than three-quarters of those with private insurance. The percent with a visit to an eye doctor was similar for those with public and private insurance coverage but lower for those without insurance. The uninsured were about one-half as likely to report visits to specialist physicians, eye doctors, and physical or other therapists compared with those with private insurance.

Uninsured persons age 55–64 were about as likely as those with private coverage to report being told by a health care professional that they have one of several common chronic conditions, including arthritis, hypertension, diabetes, heart disease, and serious psychological distress (2). Because the uninsured are less likely to obtain medical care, prevalence rates of diagnosed conditions may be underestimated for many conditions such as hypertension and diabetes that are difficult to diagnose without medical tests.

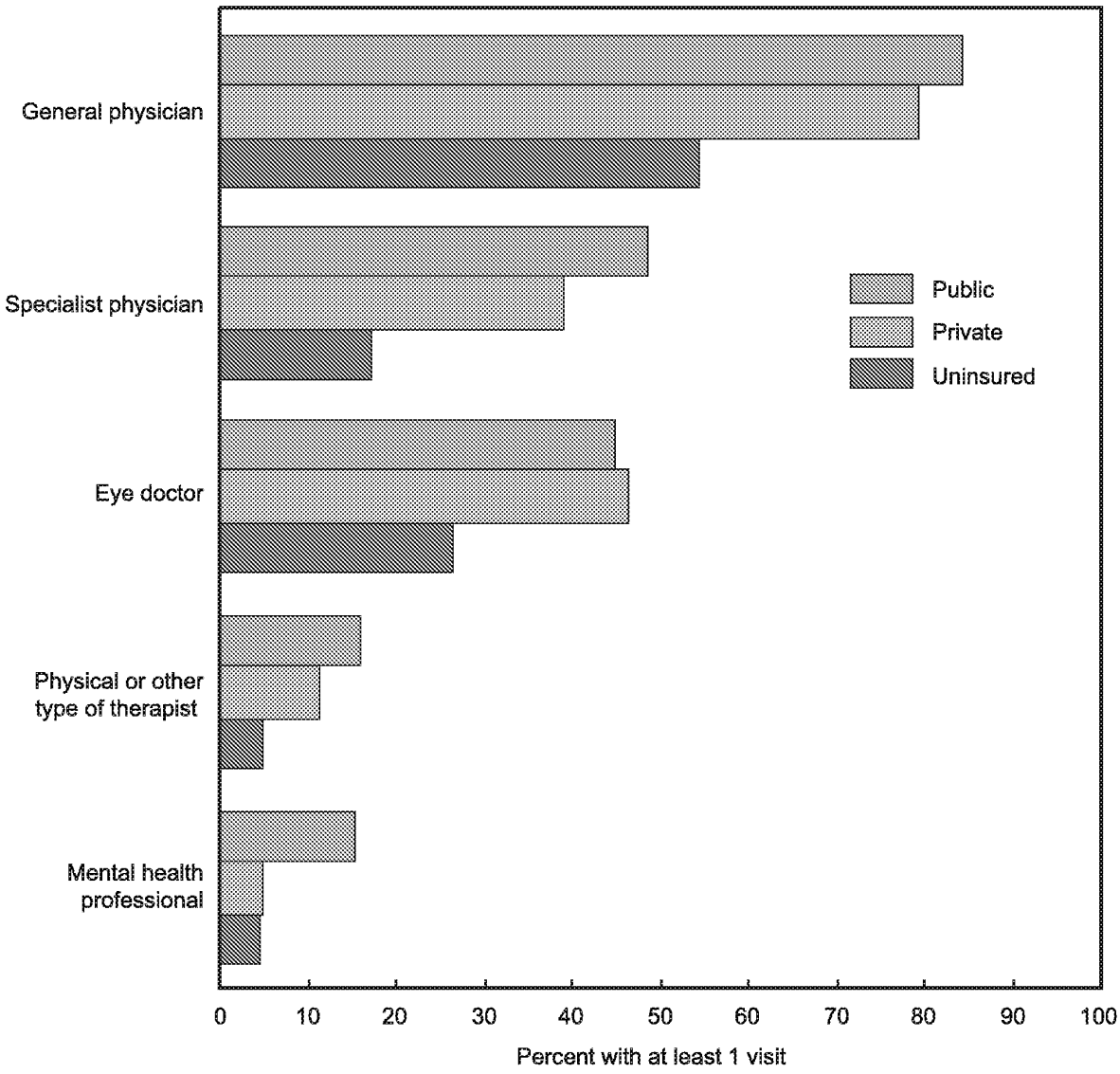
There is evidence that lack of health insurance among midlife adults discourages routine care that may delay or reduce the future impact of chronic conditions (3,4). Previously uninsured persons may increase their use of clinical services once they reach age 65 and became eligible for Medicare (5). "Catch-up" use of Medicare services by newly-eligible participants has implications for future Medicare expenditures.



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**Figure 35. Visits to health professionals in the past 12 months among adults 55-64 years of age by health insurance status: United States, 2002-03**

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NOTES: Respondents were asked if they had seen or talked to selected types of health professionals within the past 12 months. Physical or other type of therapist includes visits to an audiologist or physical, speech, respiratory, or occupational therapist. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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# Blood Glucose Regulators and Cholesterol-Lowering Drugs Prescribed During Medical Visits

Drugs—both prescription and over the counter—are becoming a more frequently utilized therapy for reducing morbidity and mortality and improving the quality of life of Americans (1). Prevalence of many chronic conditions and diseases increases with age, with concurrent use of medications designed to help control or prevent complications associated with those conditions. In 1999–2002, 73 percent of adults 55–64 years of age reported taking at least one prescription drug during the past month compared with 62 percent in 1988–94 (2).

Factors contributing to the increase in utilization of medications include the growth of third-party insurance coverage for drugs; the availability of effective new drugs; marketing to physicians and increasingly directly to consumers; and more aggressive clinical guidelines recommending increased use of medications for conditions such as high cholesterol, high blood pressure, chronic asthma, and diabetes (3,4). A greater emphasis on screening for common conditions and beginning medication therapy before permanent damage to body systems occurs has also contributed to greater use of drug therapy.

Data on drugs associated with medical visits are available from the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS Outpatient Department Component). These surveys abstract information from medical records of physician office and hospital outpatient department visits, including information on the number and type of prescription and over-the-counter drugs, immunizations, allergy injections, and anesthetics that were prescribed during the in-person visit. Until 2002, up to six medications could be recorded on the visit record. Beginning in 2003, up to eight medications may be recorded. A visit with drugs is defined as a visit where at least one drug was prescribed, ordered, supplied, administered, or continued. Drug rates are presented as drugs per 100 population, which is calculated as the number of drugs recorded during visits for the 2-year period divided by the sum of the population estimates for both years, times 100. If more than one drug in a selected drug class was recorded on the visit record, then that drug class was counted multiple times. Data from NAMCS and NHAMCS provide information on overall medication prescribing patterns in addition to documenting the burden and complexity that medication management presents to the health care system and to consumers.

The prevalence of diagnosed diabetes among adults 55–64 years of age has been increasing (5). Diabetes is associated with numerous serious health complications, including amputations, heart disease, eye disease and blindness, and kidney disease (6,7). Improved glucose control decreases the risk of complications. Diabetes treatment may include dietary management, increased physical activity, oral medications, and insulin. New and better types of oral diabetes medications have been introduced over the past two decades. The rate of blood glucose regulators prescribed during physician and hospital outpatient department visits increased between 1995–96 and 2002–03, for both men and women (figure 36). In 2002–03 the rates of these drugs prescribed were similar for men and women age 55–64 at 45–48 drugs per 100 persons.

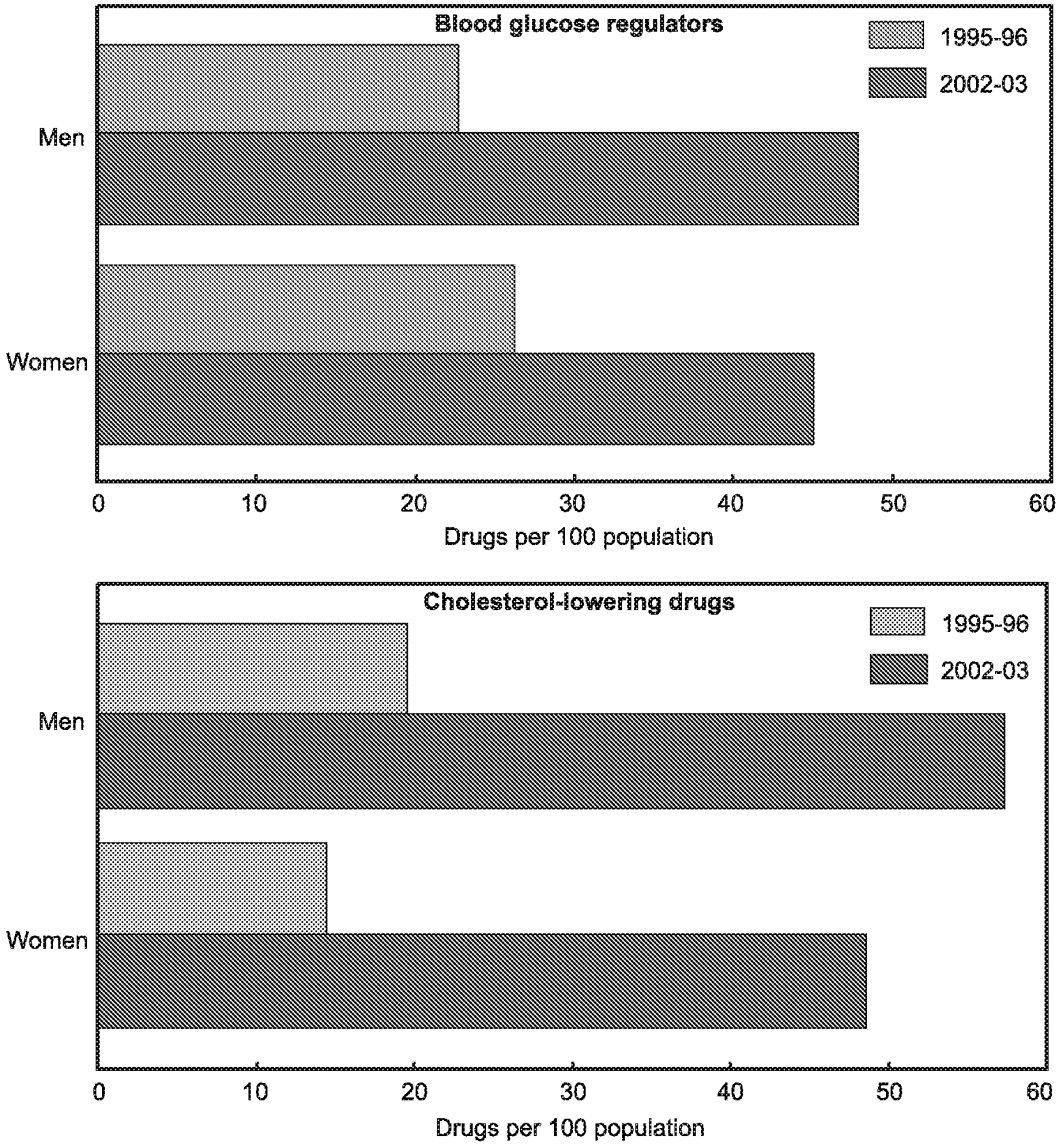
High cholesterol is a known risk factor for heart disease. Updated national guidelines and growing awareness about the risks of high cholesterol have contributed to greater diagnosis and treatment of elevated serum cholesterol (8). Cholesterol levels can be reduced by lifestyle modifications, including losing excess weight and increasing physical activity. If such modifications do not reduce cholesterol to target levels, then drug therapy may be warranted. Between 1995–96 and 2002–03 the rate of cholesterol-lowering drugs prescribed during medical visits among those 55–64 years of age more than doubled (data table for figure 36). By 2002–03 the rate of cholesterol-lowering drugs prescribed among men age 55–64 years had increased to 57 drugs per 100 men. Over the same time period, the rate of cholesterol-lowering drugs prescribed for women increased from 15 to 49 drugs per 100 women (figure 36).



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## Figure 36. Blood glucose regulators and cholesterol-lowering drugs prescribed during medical visits among adults 55-64 years of age by sex: United States, 1995-96 and 2002-03

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NOTES: Medical visits with drugs prescribed are in-person visits to physician office and hospital outpatient departments with at least one drug prescribed, ordered, supplied, administered, or continued during the visit. Drugs per 100 population are calculated as the number of drugs recorded during visits for the 2-year period divided by the sum of the population estimates for both years, times 100.

See Data Table for data points graphed, specific drugs included, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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## Total Health Care Expense and Prescribed Medicine Expense

As people age their health care needs increase, resulting in higher health care expenses for adults 55–64 years of age than for younger adults. These higher expenses are financed by third party payers (private health insurers, publicly-financed health programs and other miscellaneous sources), as well as by individuals through out-of-pocket payments. Between 1997 and 2002 the out-of-pocket portion of health care expenses in real (2002) dollars increased from 17 percent to 20 percent and rose on average from $753 to $971 per person per year (data table for figure 37). By contrast, the amount of health expenses per person paid by all other sources remained stable during the period. Increased average out-of-pocket payments for all health services may particularly burden poorer, sicker (especially chronically ill), and uninsured adults 55–64 years of age and may result in their foregoing needed services (1).

Drugs—both prescription and over the counter—are becoming a more frequently utilized therapy for reducing morbidity and mortality among adults 55–64 years of age (figure 36). Between 1997 and 2002 prescription drug expenses as a percent of total health care expenses increased from 14 to 23 percent (data table for figure 37). In 2002 average expenses for prescription drugs were about $1,100 per person, a 75-percent increase over 1997 (figure 37). Women had higher average prescribed medicine expenses per person per year than men in both time periods.

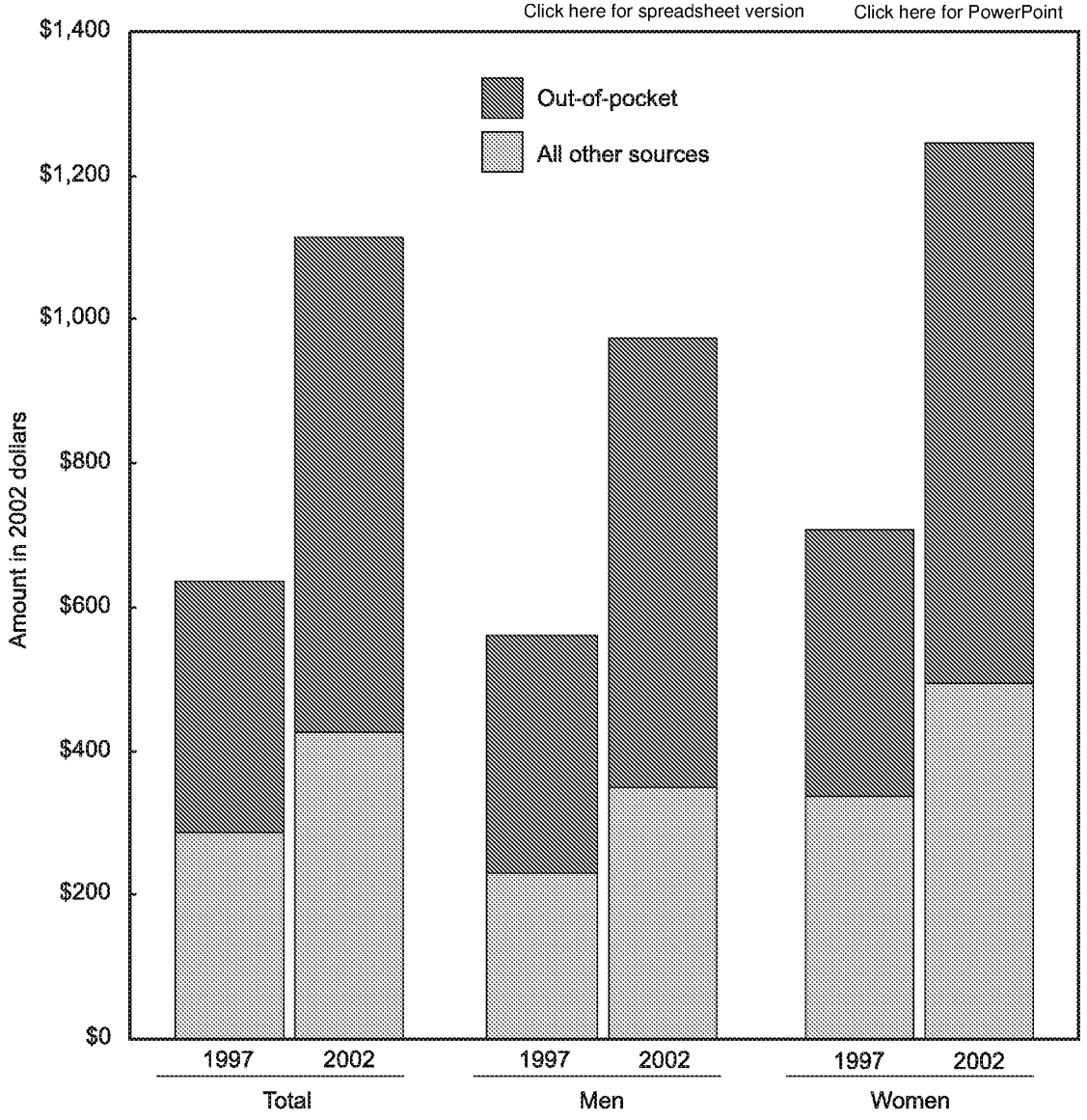
The percent of prescription drug expenses paid out-of-pocket declined from 1997 to 2002 (45 percent compared with 38 percent) indicating increased coverage of drug expenses by private health insurance and publicly-funded health programs. Despite expanded coverage of prescription drugs by third party payers, the use of more drugs and the use of more expensive drugs resulted in average out-of-pocket expenses for prescription drugs that were about 50 percent higher in 2002 than in 1997 (figure 37). In some cases high out-of-pocket costs may deter people from obtaining needed prescription drugs, which may result in deteriorating health status (1,2).



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## Figure 37. Total prescribed medicine expense per person per year among adults 55-64 years of age by source of payment and sex: United States, 1997 and 2002

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NOTE: See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends, Medical Expenditures Panel Survey.



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## Figure 36: Adults 55–64 Years of Age: Blood Glucose Regulators and Cholesterol-lowering Drugs Prescribed During Medical Visits

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## Figure 37: Adults 55–64 Years of Age: Total Health Expense and Prescribed Medicine Expense

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# Technical Notes

## Data Sources and Comparability

Data for *The Chartbook on Trends in the Health of Americans* come from numerous surveys and data systems and cover a broad range of years. Detailed descriptions of data sources are contained in Appendix I. Interpretation of trend data is affected by major changes such as periodic survey redesign, changes in data collection methodology, changes in wording and order of questions, interruptions or changes in timing of data collection, and changes in data coding systems. Comparability issues are discussed in the notes that accompany each figure and data table, and in the survey description in Appendix I. For example, the National Health Interview Survey was redesigned in 1997 to improve its efficiency and flexibility. The survey redesign affects comparisons before and after 1997 for many measures.

## Data Presentation

Many measures in *The Chartbook on Trends in the Health of Americans* are shown for persons of different age groups because of the strong effect age has on most health outcomes. Selected figures in the chartbook highlight current differences in health and health determinants by variables such as sex, race and Hispanic origin, and poverty. Some estimates are age adjusted using the age distribution of the 2000 standard population, and this is noted in the data tables that accompany each chart (see Appendix II, Age adjustment). For some charts data years are combined to increase sample size and reliability of the estimates. Time trends for some measures are not presented because of the relatively short amount of time that comparable national estimates are available.

### Graphic Presentation

Line charts for which only selected years of data are displayed have dot markers on the data years. Line charts for which data are displayed for every year in the trend are shown without the use of dot markers. Most trends are shown on a linear scale to emphasize absolute differences over time. The linear scale is the scale most frequently used and recognized, and it emphasizes the absolute changes between data points over time (1). The time trend for overall mortality measures is shown on a logarithmic (or log) scale to emphasize the rate of change and to enable measures with large differences in magnitude to be shown on the same chart. Log scales emphasize the relative or percentage change between data points. Readers are cautioned that one potential disadvantage to log scale is that the absolute magnitude of changes may appear less dramatic (2). When interpreting data on a log scale, the following points should be kept in mind:

1. A sloping straight line indicates a constant rate (not amount) of increase or decrease in the values,
2. A horizonial line indicates no change,
3. The slope of the line indicates the rate of increase or decrease, and
4. Parallel lines, regardless of their magnitude, depict similar rates of change (1).

### Tabular Presentation

Following the technical notes are data tables that present the data points graphed in each chart. Some data tables contain additional data that were not graphed because of space considerations. Standard errors for data points are provided for many measures. Additional information clarifying and qualifying the data are included in table notes and Appendix I and II references.

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**Data table for figure 1. Total population and older population: United States, 1950–2050**

| Year | All ages | 65 years and over | 75 years and over |
|---|---|---|---|
| | | Number | |
| 1950 | 150,216,110 | 12,256,850 | 3,852,395 |
| 1960 | 179,325,657 | 16,207,237 | 5,359,338 |
| 1970 | 203,211,926 | 20,065,502 | 7,630,046 |
| 1980 | 226,545,805 | 25,549,427 | 9,968,822 |
| 1990 | 248,709,873 | 31,078,895 | 13,033,400 |
| 2000 | 281,421,906 | 34,991,753 | 16,600,767 |
| 2004 | 293,622,764 | 36,221,951 | 17,777,261 |
| 2010 | 308,935,581 | 40,243,713 | 18,974,204 |
| 2020 | 335,804,546 | 54,631,891 | 22,852,732 |
| 2030 | 363,584,435 | 71,453,471 | 33,505,538 |
| 2040 | 391,945,658 | 80,049,634 | 44,579,726 |
| 2050 | 419,853,587 | 86,705,637 | 48,763,200 |

NOTES: Data are for the resident population. Data for 1950 exclude Alaska and Hawaii. Data for 2010–2050 are projected. See Appendix II, Population.

SOURCES: U.S. Census Bureau, 1980 Census of Population, General Population Characteristics, United States Summary (PC80–1-B1) [data for 1950–80]; 1990 Census of Population, General Population Characteristics, United States Summary (CP-1–1) [data for 1990]; Table 1. Annual estimates of the population by sex and five-year age groups for the United States: April 1, 2000 to July 1, 2003 (NC-EST2003–01) available at www.census.gov/popest/national/asrh/NC-EST2003/NC-EST2003-01.xls accessed on November 21, 2004 [data for Census 2000]; U.S. Census Bureau: Monthly Postcensal Resident Populations, from April 1, 2000 to July 1, 2004 by age, sex, race, and Hispanic origin available at www.census.gov/popest/national/asrh/2003_nat_res.html, July 1, 2004 file, accessed on December 21, 2004 [data for 2004]; U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin Detail File available at www.census.gov/ipc/www/usinterimproj accessed on December 21, 2004 [data for projections].

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**Data table for figure 2. Percent of population in five age groups: United States, 1950, 2000, 2004, and 2050**

| Year | All ages | Under 18 years | 18–54 years | 55–64 years | 65–74 years | 75 years and over |
|---|---|---|---|---|---|---|
| | | | Percent | | | |
| 1950 | 100.0 | 31.3 | 51.8 | 8.8 | 5.6 | 2.6 |
| 2000 | 100.0 | 25.7 | 53.3 | 8.6 | 6.5 | 5.9 |
| 2004 | 100.0 | 24.9 | 52.8 | 9.9 | 6.3 | 6.1 |
| 2050 | 100.0 | 23.5 | 45.0 | 10.9 | 9.0 | 11.6 |

NOTES: Data are for the resident population. Data for 1950 exclude Alaska and Hawaii. Data for 2050 are projected. See Appendix II, Population.

SOURCES: U.S. Census Bureau, 1980 Census of Population, General Population Characteristics, United States Summary (PC80–1-B1) [data for 1950]; Table 1. Annual estimates of the population by sex and five-year age groups for the United States: April 1, 2000 to July 1, 2003 (NC-EST2003–01) available at www.census.gov/popest/national/asrh/NC-EST2003/NC-EST2003-01.xls accessed on November 21, 2004 [data for Census 2000]; U.S. Census Bureau: Monthly Postcensal Resident Populations, from April 1, 2000 to July 1, 2004 by age, sex, race, and Hispanic origin available at www.census.gov/popest/national/asrh/2003_nat_res.html, July 1, 2004 file, accessed on December 21, 2004 [data for 2004]; U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin Detail File available at www.census.gov/ipc/www/usinterimproj accessed on December 21, 2004 [data for projections].



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**Data table for figure 3. Percent of population in selected race and Hispanic origin groups by age: United States, 1980–2004**

| Race and Hispanic origin | All ages | | | | Under 18 years | | | | 18 years and over | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1990 | 2000 | 2004 | 1980 | 1990 | 2000 | 2004 | 1980 | 1990 | 2000 | 2004 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Hispanic or Latino | 6.4 | 9.0 | 12.5 | 14.1 | 8.8 | 12.2 | 17.1 | 19.1 | 5.5 | 7.9 | 11.0 | 12.4 |
| Not Hispanic or Latino | | | | | | | | | | | | |
| White | 79.9 | 75.7 | 69.5 | 67.4 | 74.2 | 68.9 | 61.3 | 58.9 | 82.1 | 78.1 | 72.3 | 70.2 |
| Black or African American | 11.5 | 11.8 | 12.2 | 12.3 | 14.5 | 14.7 | 14.9 | 14.8 | 10.4 | 10.7 | 11.3 | 11.4 |
| Asian | 1.6 | 2.8 | 3.7 | 4.1 | 1.7 | 3.1 | 3.5 | 3.7 | 1.5 | 2.7 | 3.8 | 4.2 |
| American Indian or Alaska Native | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 1.0 | 1.0 | 0.9 | 0.5 | 0.6 | 0.7 | 0.7 |
| Native Hawaiian or Other Pacific Islander | . . . | . . . | 0.1 | 0.1 | . . . | . . . | 0.2 | 0.2 | . . . | . . . | 0.1 | 0.1 |
| 2 or more races | . . . | . . . | 1.2 | 1.3 | . . . | . . . | 2.2 | 2.4 | . . . | . . . | 0.9 | 1.0 |

. . . Category not applicable.

NOTES: Data are for the resident population. Persons of Hispanic origin may be of any race. Race data for 2000 and beyond are not directly comparable with data for 1980 and 1990. Individuals could report only one race in 1980 and 1990, and more than one race beginning in 2000. Persons who selected only one race in 2000 and beyond are shown in single-race categories; persons who selected more than one race in 2000 and beyond are shown as having 2 or more races and are not included in the single-race categories. In 1980 and 1990, the category "Asian" includes Asian and Native Hawaiian or Other Pacific Islander; in 2000 and beyond this category includes only Asian. See Appendix II, Hispanic origin; Race.

SOURCES: U.S. Census Bureau: U.S. population estimates, by age, sex, race, and Hispanic origin: 1980 to 1991. Current population reports, series P-25, no 1095. Washington. U.S. Government Printing Office, February 1993 [data for 1980, 1990]; U.S. Census Bureau: Monthly Postcensal Resident Populations, from July 1, 2000 to July 1, 2004 by age, sex, race, and Hispanic origin, www.census.gov/popest/national/asrh/2003_nat_res.html [data for April 1, 2000 and July 1, 2004] accessed on December 21, 2004.



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**Data table for figure 4. Poverty by age: United States, 1966–2003** Click here for spreadsheet version Click here for PowerPoint

| Year | All ages | Under 18 years | 18–64 years | 65 years and over |
|---|---|---|---|---|
| | Percent of persons with family income below the poverty level | | | |
| 1966 | 14.7 | 17.6 | 10.5 | 28.5 |
| 1967 | 14.2 | 16.6 | 10.0 | 29.5 |
| 1968 | 12.8 | 15.6 | 9.0 | 25.0 |
| 1969 | 12.1 | 14.0 | 8.7 | 25.3 |
| 1970 | 12.6 | 15.1 | 9.0 | 24.6 |
| 1971 | 12.5 | 15.3 | 9.3 | 21.6 |
| 1972 | 11.9 | 15.1 | 8.8 | 18.6 |
| 1973 | 11.1 | 14.4 | 8.3 | 16.3 |
| 1974 | 11.2 | 15.4 | 8.3 | 14.6 |
| 1975 | 12.3 | 17.1 | 9.2 | 15.3 |
| 1976 | 11.8 | 16.0 | 9.0 | 15.0 |
| 1977 | 11.6 | 16.2 | 8.8 | 14.1 |
| 1978 | 11.4 | 15.9 | 8.7 | 14.0 |
| 1979 | 11.7 | 16.4 | 8.9 | 15.2 |
| 1980 | 13.0 | 18.3 | 10.1 | 15.7 |
| 1981 | 14.0 | 20.0 | 11.1 | 15.3 |
| 1982 | 15.0 | 21.9 | 12.0 | 14.6 |
| 1983 | 15.2 | 22.3 | 12.4 | 13.8 |
| 1984 | 14.4 | 21.5 | 11.7 | 12.4 |
| 1985 | 14.0 | 20.7 | 11.3 | 12.6 |
| 1986 | 13.6 | 20.5 | 10.8 | 12.4 |
| 1987 | 13.4 | 20.3 | 10.6 | 12.5 |
| 1988 | 13.0 | 19.5 | 10.5 | 12.0 |
| 1989 | 12.8 | 19.6 | 10.2 | 11.4 |
| 1990 | 13.5 | 20.6 | 10.7 | 12.2 |
| 1991 | 14.2 | 21.8 | 11.4 | 12.4 |
| 1992 | 14.8 | 22.3 | 11.9 | 12.9 |
| 1993 | 15.1 | 22.7 | 12.4 | 12.2 |
| 1994 | 14.5 | 21.8 | 11.9 | 11.7 |
| 1995 | 13.8 | 20.8 | 11.4 | 10.5 |
| 1996 | 13.7 | 20.5 | 11.4 | 10.8 |
| 1997 | 13.3 | 19.9 | 10.9 | 10.5 |
| 1998 | 12.7 | 18.9 | 10.5 | 10.5 |
| 1999 | 11.9 | 17.1 | 10.1 | 9.7 |
| 2000 | 11.3 | 16.2 | 9.6 | 9.9 |
| 2001 | 11.7 | 16.3 | 10.1 | 10.1 |
| 2002 | 12.1 | 16.7 | 10.6 | 10.4 |
| 2003 | 12.5 | 17.6 | 10.8 | 10.2 |

NOTES: Data are for the civilian noninstitutionalized population. Starting in 1999 estimates of poverty have been calculated using Census 2000-based population weights. Starting in 2000 estimates are based on an expanded household sample. Implementation of these changes had no effect on the all ages poverty rate for 2000 and a 0.1–0.3 percent difference in the age-specific poverty rates for 2000. See Appendix II, Poverty level. See related *Health, United States, 2005*, table 8.

SOURCES: U.S. Census Bureau, Current population survey, March 1967–2004. U.S. Bureau of the Census. DeNavas-Walt C, Proctor B, and Mills R. Income, Poverty, and Health Insurance Coverage in the United States: 2003. Current population reports, series P-60, no 226. Washington: U.S. Government Printing Office. 2004.



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**Data table for figure 5. Low income by age, race and Hispanic origin: United States, 2003**

| *Age, race and Hispanic origin* | *Poor* | *Near poor* | *Poor* | *Near poor* |
|---|---|---|---|---|
| | Percent | | Number in millions | |
| All ages | | | | |
| All races and origins | 12.5 | 18.6 | 35.9 | 53.5 |
| Hispanic or Latino | 22.5 | 30.1 | 9.1 | 12.2 |
| Black or African American only | 24.4 | 24.0 | 8.8 | 8.6 |
| Asian only | 11.8 | 15.2 | 1.4 | 1.8 |
| White only, not Hispanic or Latino | 8.2 | 15.4 | 15.9 | 30.0 |
| Under 18 years | | | | |
| All races and origins | 17.6 | 21.5 | 12.9 | 15.7 |
| Hispanic or Latino | 29.7 | 32.9 | 4.1 | 4.5 |
| Black or African American only | 34.1 | 27.2 | 3.9 | 3.1 |
| Asian only | 12.5 | 17.2 | 0.3 | 0.5 |
| White only, not Hispanic or Latino | 9.8 | 16.6 | 4.2 | 7.2 |
| 18–64 years | | | | |
| All races and origins | 10.8 | 15.5 | 19.4 | 27.9 |
| Hispanic or Latino | 18.7 | 28.2 | 4.6 | 6.9 |
| Black or African American only | 19.4 | 21.2 | 4.2 | 4.6 |
| Asian only | 11.3 | 12.8 | 0.9 | 1.0 |
| White only, not Hispanic or Latino | 7.6 | 12.2 | 9.4 | 14.9 |
| 65 years and over | | | | |
| All races and origins | 10.2 | 28.5 | 3.6 | 9.9 |
| Hispanic or Latino | 19.5 | 34.0 | 0.4 | 0.7 |
| Black or African American only | 23.7 | 32.2 | 0.7 | 0.9 |
| Asian only | 14.3 | 27.2 | 0.2 | 0.3 |
| White only, not Hispanic or Latino | 8.0 | 27.8 | 2.3 | 7.9 |

NOTES: Data are for the civilian noninstitutionalized population. Poor is defined as family income less than 100 percent of the poverty level and near poor as 100–199 percent of the poverty level. Persons of Hispanic origin may be of any race. Black and Asian races include persons of both Hispanic and non-Hispanic origin. See related *Health, United States, 2005*, table 2. See Appendix II, Hispanic origin; Poverty; Race.

SOURCES: DeNavas-Walt C, Proctor B, and Mills R. Income, Poverty, and Health Insurance Coverage in the United States: 2003. Current population reports, series P-60 no 226. Washington: U.S. Government Printing Office. 2004; Age and sex of all people, family members, and unrelated individuals iterated by income-to-poverty ratio and race: 2003, available at ferret.bls.census.gov/macro/032004/pov/new01_000.htm accessed on October 29, 2004.



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**Data table for figure 6. Health insurance coverage among persons under 65 years of age: United States, 1984–2003**

| Year | Health insurance coverage | | | | | |
|---|---|---|---|---|---|---|
| | Private | | Medicaid | | Uninsured | |
| | Percent | SE | Percent | SE | Percent | SE |
| 1984 | 76.8 | 0.6 | 6.8 | 0.3 | 14.5 | 0.4 |
| 1989 | 75.9 | 0.4 | 7.2 | 0.2 | 15.6 | 0.3 |
| 1994 | 69.9 | 0.4 | 11.2 | 0.3 | 17.5 | 0.3 |
| 1995 | 71.3 | 0.4 | 11.5 | 0.2 | 16.1 | 0.2 |
| 1996 | 71.2 | 0.5 | 11.1 | 0.3 | 16.6 | 0.3 |
| 1997 | 70.7 | 0.4 | 9.7 | 0.2 | 17.5 | 0.2 |
| 1998 | 72.1 | 0.4 | 8.9 | 0.2 | 16.6 | 0.2 |
| 1999 | 72.8 | 0.3 | 9.1 | 0.2 | 16.1 | 0.2 |
| 2000 | 71.5 | 0.4 | 9.5 | 0.2 | 17.0 | 0.3 |
| 2001 | 71.2 | 0.4 | 10.4 | 0.2 | 16.4 | 0.3 |
| 2002 | 69.4 | 0.4 | 11.8 | 0.2 | 16.8 | 0.2 |
| 2003 | 68.9 | 0.4 | 12.3 | 0.2 | 16.5 | 0.3 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Medicaid includes other public assistance through 1996; includes State-sponsored health plans starting in 1997; and includes State Children's Health Insurance Program (SCHIP) starting in 1999. Uninsured persons are not covered by private insurance, Medicaid, SCHIP, public assistance (through 1996), State-sponsored or other government-sponsored health plans (starting in 1997), Medicare, or military plans. Persons with Indian Health Service only are considered uninsured. Percents do not add to 100 because the percent of persons with Medicare, military plans, and other government-sponsored plans is not shown and because persons with both private insurance and Medicaid appear in both categories. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. See Appendix II, Health insurance coverage. See related *Health, United States, 2005*, tables 132–134.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 7. No health insurance coverage among persons under 65 years of age by selected characteristics: United States, 2003**

| Characteristic | Percent | SE |
|---|---|---|
| Age | | |
| Under 65 years | 16.5 | 0.3 |
| Under 18 years | 9.8 | 0.3 |
| 18–24 years | 30.1 | 0.7 |
| 25–34 years | 25.4 | 0.5 |
| 35–44 years | 17.5 | 0.4 |
| 45–54 years | 13.6 | 0.4 |
| 55–64 years | 10.9 | 0.4 |
| Percent of poverty level | | |
| Below 100 percent | 31.1 | 0.8 |
| 100–149 percent | 31.9 | 1.0 |
| 150–199 percent | 27.6 | 1.0 |
| 200 percent or more | 10.0 | 0.2 |
| Race and Hispanic origin | | |
| White only, not Hispanic or Latino | 11.9 | 0.3 |
| Asian only | 18.2 | 1.3 |
| Black or African American only, not Hispanic or Latino | 18.1 | 0.6 |
| American Indian and Alaska Native only | 35.0 | 3.3 |
| Hispanic or Latino (total) | 34.7 | 0.7 |
| Mexican | 37.8 | 0.8 |
| Cuban | 29.1 | 2.7 |
| Puerto Rican | 17.7 | 1.5 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. Total for Hispanic includes groups not shown separately. Asian only and American Indian and Alaska Native only races include persons of Hispanic and non-Hispanic origin. Uninsured persons are not covered by private insurance, Medicaid, State Children's Health Insurance Program (SCHIP), State-sponsored or other government-sponsored health plans, Medicare, or military plans. Persons with Indian Health Service only are considered uninsured. Missing family income data were imputed for 33 percent of persons under 65 years of age in 2003. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See Appendix II, Family income; Health insurance coverage; Hispanic origin; Poverty; Race. See related *Health, United States, 2005*, table 134.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

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**Data table for figure 8. National health expenditures as a percent of Gross Domestic Product: United States, 1960–2003**

| Year | Percent |
|---|---|
| 1960 | 5.1 |
| 1965 | 5.7 |
| 1970 | 7.0 |
| 1975 | 7.9 |
| 1980 | 8.8 |
| 1985 | 10.1 |
| 1990 | 12.0 |
| 1991 | 12.7 |
| 1992 | 13.1 |
| 1993 | 13.3 |
| 1994 | 13.3 |
| 1995 | 13.4 |
| 1996 | 13.3 |
| 1997 | 13.2 |
| 1998 | 13.2 |
| 1999 | 13.2 |
| 2000 | 13.3 |
| 2001 | 14.1 |
| 2002 | 14.9 |
| 2003 | 15.3 |

NOTES: See related *Health, United States, 2005*, table 119. See Appendix I, National Health Accounts.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts.



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**Data table for figure 9. Personal health care expenditures according to source of funds and type of expenditures: United States, 2003**

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| *Personal health care expenditures and source of funds* | *Total* | *Type of expenditures* | | | | |
|---|---|---|---|---|---|---|
| | | *Hospital care* | *Physician services* | *Nursing home* | *Prescription drugs* | *Other* |
| | Amount in billions | | | | | |
| All personal health care expenditures | $1,440.8 | $515.9 | $369.7 | $110.8 | $179.2 | $265.1 |
| | Percent distribution | | | | | |
| All personal health care expenditures | 100.0 | 35.8 | 25.7 | 7.7 | 12.4 | 18.4 |
| Source of funds | Percent distribution | | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 16.0 | 3.2 | 10.2 | 27.9 | 29.7 | 34.9 |
| Private health insurance | 36.0 | 34.4 | 49.7 | 7.6 | 46.3 | 25.0 |
| Other private funds | 4.2 | 4.1 | 6.9 | 3.8 | 0.0 | 3.4 |
| Government | 43.8 | 58.3 | 33.3 | 60.7 | 24.1 | 36.7 |
| Medicaid | 17.2 | 16.9 | 7.1 | 46.1 | 18.8 | 19.1 |
| Medicare | 19.1 | 30.3 | 19.9 | 12.4 | 1.6 | 10.6 |
| Other government | 7.5 | 11.1 | 6.3 | 2.2 | 3.7 | 7.0 |
| Federal | 33.3 | 46.9 | 27.4 | 41.1 | 14.1 | 24.8 |
| State and local | 10.5 | 11.4 | 5.9 | 19.7 | 10.0 | 11.9 |

NOTES: Other expenditures include dental services, other professional services, home health care, nonprescription drugs and other medical nondurables, vision products and other medical durables, and other personal health care, not shown separately. See related *Health, United States, 2005*, tables 122–123. See Appendix I, National Health Accounts.

SOURCE: Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Accounts.



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**Data table for figure 10. Cigarette smoking among men, women, high school students, and mothers during pregnancy: United States, 1965–2003**

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| Year | Men | | Women | | High school students | | Mothers during pregnancy |
|---|---|---|---|---|---|---|---|
| | Percent | SE | Percent | SE | Percent | SE | Percent |
| 1965 | 51.2 | 0.3 | 33.7 | 0.3 | --- | --- | --- |
| 1974 | 42.8 | 0.5 | 32.2 | 0.4 | --- | --- | --- |
| 1979 | 37.0 | 0.5 | 30.1 | 0.5 | --- | --- | --- |
| 1983 | 34.8 | 0.6 | 29.4 | 0.4 | --- | --- | --- |
| 1985 | 32.2 | 0.5 | 27.9 | 0.4 | --- | --- | --- |
| 1987 | 30.9 | 0.4 | 26.5 | 0.4 | --- | --- | --- |
| 1988 | 30.3 | 0.4 | 25.7 | 0.3 | --- | --- | --- |
| 1989 | --- | --- | --- | --- | --- | --- | 19.5 |
| 1990 | 28.0 | 0.4 | 22.9 | 0.3 | --- | --- | 18.4 |
| 1991 | 27.6 | 0.4 | 23.5 | 0.3 | 27.5 | 1.4 | 17.8 |
| 1992 | 28.1 | 0.5 | 24.6 | 0.5 | --- | --- | 16.9 |
| 1993 | 27.3 | 0.6 | 22.6 | 0.4 | 30.5 | 1.0 | 15.8 |
| 1994 | 27.6 | 0.5 | 23.1 | 0.5 | --- | --- | 14.6 |
| 1995 | 26.5 | 0.6 | 22.7 | 0.5 | 34.8 | 1.2 | 13.9 |
| 1996 | --- | --- | --- | --- | --- | --- | 13.6 |
| 1997 | 27.1 | 0.4 | 22.2 | 0.4 | 36.4 | 1.1 | 13.2 |
| 1998 | 25.9 | 0.4 | 22.1 | 0.4 | --- | --- | 12.9 |
| 1999 | 25.2 | 0.5 | 21.6 | 0.4 | 34.8 | 1.3 | 12.6 |
| 2000 | 25.2 | 0.4 | 21.1 | 0.4 | --- | --- | 12.2 |
| 2001 | 24.6 | 0.4 | 20.7 | 0.4 | 28.5 | 1.0 | 12.0 |
| 2002 | 24.6 | 0.4 | 20.0 | 0.4 | --- | --- | 11.4 |
| 2003 | 23.7 | 0.4 | 19.4 | 0.4 | 21.9 | 1.1 | --- |

SE Standard error.
--- Data not available.

NOTES: Data for men and women are for the civilian noninstitutionalized population. Percents for men and women are age adjusted to the 2000 standard population using five age groups: 18–24 years, 25–34 years, 35–44 years, 45–64 years, and 65 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. Cigarette smoking is defined as follows: among men and women 18 years and over, those who ever smoked 100 cigarettes in their lifetime and now smoke every day or some days; among high school students in grades 9–12, those who smoked cigarettes on 1 or more of the 30 days preceding the survey; and among mothers with a live birth, those who smoked during pregnancy. Data from States that did not require the reporting of mother's tobacco use during pregnancy on the birth certificate are not included. Starting with *Health, United States, 2005*, estimates from the National Health Interview Survey for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 from the National Health Interview Survey were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. See Appendix II, Age adjustment; Tobacco use. See related *Health, United States, 2005*, tables 12 and 63–65.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey (data for men and women); National Vital Statistics System (data for mothers during pregnancy); National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey (data for high school students).



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**Data table for figure 11. Current and frequent cigarette smoking among high school students by sex, race and Hispanic origin, and grade level: United States, 2003**

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| Characteristic | All students | | | | Male students | | | | Female students | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Current smoker | | Frequent smoker | | Current smoker | | Frequent smoker | | Current smoker | | Frequent smoker | |
| | Percent | SE | Percent | SE | Percent | SE | Percent | SE | Percent | SE | Percent | SE |
| Race and Hispanic origin | | | | | | | | | | | | |
| All students, grades 9–12 | 21.9 | 1.1 | 9.7 | 0.7 | 21.8 | 1.1 | 9.6 | 0.8 | 21.9 | 1.4 | 9.7 | 0.9 |
| Hispanic or Latino | 18.4 | 1.2 | 5.5 | 0.7 | 19.1 | 1.8 | 6.6 | 1.2 | 17.7 | 1.1 | 4.4 | 0.7 |
| Not Hispanic or Latino: | | | | | | | | | | | | |
| White | 24.9 | 1.2 | 11.8 | 0.8 | 23.3 | 1.3 | 10.4 | 0.9 | 26.6 | 1.9 | 13.2 | 1.2 |
| Black or African American | 15.1 | 1.4 | 5.5 | 0.8 | 19.3 | 1.9 | 7.9 | 1.3 | 10.8 | 1.5 | 3.1 | 0.7 |
| Grade | | | | | | | | | | | | |
| Grade 9 | 17.4 | 1.2 | 6.3 | 0.8 | 16.0 | 1.2 | 5.7 | 1.0 | 18.9 | 1.9 | 6.9 | 1.3 |
| Grade 10 | 21.8 | 1.5 | 9.2 | 1.0 | 21.7 | 1.7 | 9.5 | 1.2 | 21.9 | 1.9 | 9.0 | 1.3 |
| Grade 11 | 23.6 | 1.6 | 11.2 | 1.3 | 23.2 | 1.8 | 10.5 | 1.3 | 24.0 | 2.0 | 11.8 | 1.9 |
| Grade 12 | 26.2 | 1.4 | 13.1 | 1.2 | 29.0 | 2.0 | 14.5 | 1.5 | 23.3 | 1.6 | 11.4 | 1.2 |

SE standard error.

NOTES: Current cigarette smoking is defined as having smoked cigarettes on 1 or more days of the 30 days preceding the survey; frequent cigarette smoking is defined as having smoked cigarettes on 20 or more of the 30 days preceding the survey. See Appendix II, Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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**Data table for figure 12. Seatbelt use and drinking and driving among high school students by sex: United States, 1991–2003**

| Year | All students | | Male students | | Female students | |
|---|---|---|---|---|---|---|
| | Percent | SE | Percent | SE | Percent | SE |
| | *Rarely or never wore a seatbelt (Grades 9–12)* | | | | | |
| 1991 | 25.9 | 2.7 | 30.0 | 3.0 | 21.6 | 2.6 |
| 1993 | 19.1 | 1.3 | 23.8 | 1.7 | 14.2 | 1.1 |
| 1995 | 21.7 | 1.7 | 26.1 | 2.1 | 16.9 | 1.8 |
| 1997 | 19.3 | 1.8 | 23.2 | 2.1 | 14.5 | 1.5 |
| 1999 | 16.4 | 1.4 | 20.8 | 1.5 | 11.9 | 1.5 |
| 2001 | 14.1 | 0.8 | 18.1 | 1.1 | 10.2 | 0.8 |
| 2003 | 18.2 | 2.1 | 21.5 | 2.2 | 14.6 | 2.2 |
| | *Rode with a driver who had been drinking alcohol (Grades 9–12)* | | | | | |
| 1991 | 39.9 | 1.1 | 40.0 | 1.2 | 39.8 | 1.2 |
| 1993 | 35.3 | 1.3 | 36.3 | 1.5 | 34.5 | 1.6 |
| 1995 | 38.8 | 1.9 | 39.5 | 2.2 | 37.8 | 2.2 |
| 1997 | 36.6 | 1.1 | 38.3 | 1.3 | 34.5 | 1.1 |
| 1999 | 33.1 | 1.1 | 34.4 | 1.3 | 31.7 | 1.4 |
| 2001 | 30.7 | 1.0 | 31.8 | 1.2 | 29.6 | 1.1 |
| 2003 | 30.2 | 1.1 | 29.2 | 1.3 | 31.1 | 1.0 |
| | *Drove after drinking alcohol (Grades 11 and 12 only)* | | | | | |
| 1991 | 24.6 | 1.5 | 30.6 | 2.2 | 18.2 | 1.0 |
| 1993 | 19.6 | 1.4 | 25.7 | 1.6 | 13.2 | 1.6 |
| 1995 | 20.1 | 1.8 | 25.5 | 2.3 | 14.5 | 1.9 |
| 1997 | 22.7 | 2.4 | 27.9 | 2.8 | 16.2 | 2.2 |
| 1999 | 19.5 | 1.3 | 25.5 | 1.4 | 13.3 | 1.7 |
| 2001 | 19.3 | 1.2 | 24.6 | 1.5 | 14.1 | 1.1 |
| 2003 | 17.5 | 1.0 | 22.4 | 1.5 | 12.3 | 1.0 |

SE Standard error.

NOTES: Students who rarely or never wore a seatbelt when riding in a car driven by someone else; students who during the past 30 days rode one or more times in a car or other vehicle driven by someone who had been drinking alcohol; and students who during the past 30 days drove a car or other vehicle one or more times when they had been drinking alcohol. See Appendix II, Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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**Data table for figure 13. High school students engaging in regular physical activity by sex, race and Hispanic origin, and grade: United States, 1999, 2001, and 2003**

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| Sex, race and Hispanic origin, and grade | 1999 | | 2001 | | 2003 | |
|---|---|---|---|---|---|---|
| | Percent | SE | Percent | SE | Percent | SE |
| All students, grades 9–12 | 69.5 | 0.9 | 68.8 | 0.7 | 66.6 | 1.1 |
| White, not Hispanic | 71.8 | 1.1 | 70.7 | 0.8 | 69.0 | 1.5 |
| Black, not Hispanic | 60.0 | 2.4 | 63.6 | 2.0 | 58.8 | 1.9 |
| Hispanic | 64.8 | 2.2 | 64.6 | 1.4 | 63.5 | 1.4 |
| Male students, grades 9–12 | 76.3 | 1.4 | 75.8 | 0.8 | 73.1 | 1.1 |
| White, not Hispanic | 78.1 | 1.9 | 77.1 | 0.9 | 75.2 | 1.3 |
| Black, not Hispanic | 68.0 | 4.2 | 74.6 | 1.4 | 68.2 | 2.0 |
| Hispanic | 75.6 | 2.4 | 72.3 | 1.6 | 69.7 | 2.0 |
| Female students, grades 9–12 | 62.7 | 1.2 | 62.1 | 1.2 | 59.9 | 1.5 |
| White, not Hispanic | 65.2 | 1.3 | 64.7 | 1.4 | 62.5 | 2.0 |
| Black, not Hispanic | 52.5 | 1.7 | 53.3 | 2.9 | 49.6 | 2.4 |
| Hispanic | 54.2 | 2.6 | 57.0 | 2.2 | 57.4 | 2.3 |
| All students: | | | | | | |
| Grade 9 | 77.2 | 2.1 | 75.7 | 1.4 | 71.9 | 1.5 |
| Grade 10 | 68.9 | 2.4 | 70.4 | 0.9 | 69.2 | 1.6 |
| Grade 11 | 62.5 | 1.3 | 65.6 | 1.2 | 63.5 | 1.4 |
| Grade 12 | 67.6 | 1.9 | 61.1 | 1.4 | 59.8 | 1.4 |
| Male students: | | | | | | |
| Grade 9 | 81.6 | 2.2 | 79.9 | 1.6 | 76.2 | 1.5 |
| Grade 10 | 76.3 | 1.9 | 76.4 | 1.1 | 74.4 | 1.8 |
| Grade 11 | 70.4 | 2.2 | 75.6 | 1.3 | 73.0 | 1.4 |
| Grade 12 | 75.5 | 1.9 | 70.5 | 2.2 | 67.9 | 1.7 |
| Female students: | | | | | | |
| Grade 9 | 72.8 | 3.0 | 71.9 | 1.9 | 67.3 | 2.1 |
| Grade 10 | 61.5 | 3.7 | 64.4 | 1.7 | 64.1 | 1.9 |
| Grade 11 | 54.4 | 2.0 | 55.8 | 1.6 | 53.8 | 1.9 |
| Grade 12 | 59.7 | 2.6 | 52.1 | 1.2 | 51.6 | 1.8 |

SE Standard error.

NOTES: Regular physical activity is defined as engaging in recommended amounts of moderate activity (does not cause sweating or hard breathing) for at least 30 minutes on 5 or more of the past 7 days; or vigorous activity (causes sweating and hard breathing) for at least 20 minutes on 3 or more of the past 7 days. The recommended amounts of physical activity for high school students are based on the Healthy People 2010 objectives 22–6 and 22–7 (U.S. Department of Health and Human Services. Healthy People 2010. 2nd ed. 2 vols. Washington: U.S. Government Printing Office, November 2000. Available at www.health.gov/healthypeople). See Appendix II, Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.



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**Data table for figure 14. Leisure-time physical activity among adults 18 years of age and over by poverty status: United States, 2003**

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| | *Leisure-time physical activity level* | | | | | |
|---|---|---|---|---|---|---|
| | *Inactive* | | *Some leisure-time activity* | | *Regular leisure-time activity* | |
| *Poverty level* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* |
| 18 years and over, age adjusted | 37.6 | 0.5 | 29.5 | 0.4 | 32.8 | 0.4 |
| 18 years and over, crude | 37.6 | 0.5 | 29.6 | 0.4 | 32.8 | 0.4 |
| 18 years and over, age adjusted | | | | | | |
| Poor | 55.1 | 1.2 | 22.0 | 0.8 | 22.9 | 1.0 |
| Near poor | 50.5 | 0.9 | 24.8 | 0.7 | 24.7 | 0.7 |
| Nonpoor | 31.4 | 0.5 | 32.0 | 0.4 | 36.7 | 0.5 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Data are age adjusted to the 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Adults were asked about the frequency and duration of vigorous and light/moderate physical activity during leisure time. Adults classified as inactive reported no sessions of light/moderate or vigorous leisure-time physical activity of at least 10 minutes duration; adults classified with some leisure-time physical activity reported at least one session of light/moderate or vigorous physical activity of at least 10 minutes duration but did not meet the definition of regular leisure-time activity; adults classified with regular leisure-time physical activity reported three or more sessions per week of vigorous activity of at least 20 minutes duration or five or more sessions per week of light/moderate activity lasting at least 30 minutes in duration. Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 36 percent of adults in 2003. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See Appendix II, Age adjustment; Family income; Physical activity, leisure-time; Poverty. See related *Health, United States, 2005*, table 72.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

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**Data table for figure 15. Overweight and obesity by age: United States, 1960–2002**

| | *Children 6–11 years* | | *Adolescents 12–19 years* | | *Adults 20–74 years* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Overweight* | | *Overweight* | | *Overweight including obese* | | *Overweight but not obese* | | *Obese* | |
| *Year* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* |
| 1960–62 | --- | --- | --- | --- | 44.8 | 1.0 | 31.5 | 0.5 | 13.3 | 0.6 |
| 1963–65 | 4.2 | 0.4 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1966–70 | --- | --- | 4.6 | 0.3 | --- | --- | --- | --- | --- | --- |
| 1971–74 | 4.0 | 0.5 | 6.1 | 0.6 | 47.7 | 0.7 | 33.1 | 0.6 | 14.6 | 0.5 |
| 1976–80 | 6.5 | 0.6 | 5.0 | 0.5 | 47.4 | 0.8 | 32.3 | 0.6 | 15.1 | 0.5 |
| 1988–94 | 11.3 | 1.0 | 10.5 | 0.9 | 56.0 | 0.9 | 32.7 | 0.6 | 23.3 | 0.7 |
| 1999–2002 | 15.8 | 1.1 | 16.1 | 0.8 | 65.2 | 0.8 | 34.1 | 0.8 | 31.1 | 1.0 |

SE Standard error.
--- Data not available.

NOTES: Data are for the civilian noninstitutionalized population. Percents for adults are age adjusted to the 2000 standard population using five age groups: 20–34 years, 35–44 years, 45–54 years, 55–64 years, and 65–74 years. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. For children: Overweight is defined as a body mass index (BMI) at or above the sex- and age-specific 95th percentile BMI cut points from the 2000 CDC Growth Charts: United States (See: www.cdc.gov/growthcharts/); obese is not defined for children. For adults: Overweight including obese is defined as a BMI greater than or equal to 25; overweight but not obese as a BMI greater than or equal to 25 but less than 30; and obese as a BMI greater than or equal to 30. Data for 1966–70 are for adolescents 12–17 years, not 12–19 years. Pregnant adolescents were excluded beginning in 1971–74. Pregnant women 20 years of age and over were excluded in all years. See Appendix II, Age adjustment; Body mass index (BMI). See related *Health, United States, 2005*, tables 73 and 74.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Examination Survey and National Health and Nutrition Examination Survey.



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**Data table for figure 16. Asthma attack among children by age, race and Hispanic origin: United States, 1998–2003**

| Race | 1998–99 | | 2000–2001 | | 2002–03 | |
|---|---|---|---|---|---|---|
| | Percent | SE | Percent | SE | Percent | SE |
| | | | Children 3–17 years | | | |
| Total | 5.6 | 0.2 | 5.9 | 0.2 | 5.9 | 0.2 |
| Race and Hispanic origin | | | | | | |
| Hispanic or Latino | 4.9 | 0.4 | 4.2 | 0.3 | 4.5 | 0.4 |
| Not Hispanic or Latino: | | | | | | |
| White only | 5.6 | 0.3 | 5.8 | 0.3 | 5.7 | 0.3 |
| Black or African American only | 7.0 | 0.5 | 7.8 | 0.5 | 8.2 | 0.6 |
| | | | Children 3–10 years | | | |
| Total | 5.6 | 0.3 | 5.9 | 0.3 | 5.8 | 0.3 |
| Race and Hispanic origin | | | | | | |
| Hispanic or Latino | 4.9 | 0.5 | 3.8 | 0.4 | 4.5 | 0.5 |
| Not Hispanic or Latino: | | | | | | |
| White only | 5.4 | 0.3 | 5.9 | 0.4 | 5.2 | 0.3 |
| Black or African American only | 7.6 | 0.8 | 8.0 | 0.7 | 9.4 | 0.9 |
| | | | Children 11–17 years | | | |
| Total | 5.7 | 0.3 | 5.9 | 0.3 | 6.1 | 0.3 |
| Race and Hispanic origin | | | | | | |
| Hispanic or Latino | 4.8 | 0.6 | 4.8 | 0.5 | 4.6 | 0.5 |
| Not Hispanic or Latino: | | | | | | |
| White only | 5.8 | 0.4 | 5.7 | 0.4 | 6.1 | 0.4 |
| Black or African American only | 6.3 | 0.7 | 7.6 | 0.8 | 6.9 | 0.7 |

SE Standard error.

NOTES: Respondents (generally the parent) were asked if they had ever been told by a doctor or other health professional that the child had asthma. For those who answered "yes," respondents were asked about episodes of asthma or asthma attacks in the past 12 months. Data are for the civilian noninstitutionalized population. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Total includes children of all races not shown separately. See Appendix II, Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 17. Adults 18 years of age and over with severe headache or migraine or low back pain in the past 3 months by age and sex: United States, 2003**

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| | *Severe headache or migraine* | | | | *Low back pain* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Both sexes* | | *Men* | | *Women* | | *Both sexes* | | *Men* | | *Women* | |
| | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* | *Percent* | *SE* |
| 18 years and over, crude | 15.2 | 0.3 | 9.4 | 0.3 | 20.5 | 0.4 | 27.5 | 0.3 | 25.2 | 0.5 | 29.6 | 0.4 |
| 18–44 years | 17.8 | 0.4 | 10.8 | 0.4 | 24.6 | 0.6 | 24.2 | 0.4 | 22.4 | 0.6 | 26.0 | 0.6 |
| 45–64 years | 15.1 | 0.4 | 9.2 | 0.5 | 20.7 | 0.6 | 31.5 | 0.6 | 29.8 | 0.8 | 33.2 | 0.8 |
| 65 years and over | 6.9 | 0.4 | 4.6 | 0.5 | 8.5 | 0.5 | 29.9 | 0.7 | 25.4 | 1.0 | 33.2 | 1.0 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Respondents were asked: "During the past 3 months, did you have a severe headache or migraine?" and "During the past 3 months, did you have low back pain?" Respondents were instructed to report pain that lasted a whole day or more and to not report fleeting or minor aches or pains. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See related *Health, United States, 2005*, table 57.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

**Data table for figure 18. Selected chronic health conditions causing limitation of activity among children by age: United States, 2002–03**

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| *Type of chronic health condition* | *Under 5 years* | | *5–11 years* | | *12–17 years* | |
|---|---|---|---|---|---|---|
| | *Rate* | *SE* | *Rate* | *SE* | *Rate* | *SE* |
| | Number of children with limitation of activity caused by selected chronic health conditions per 1,000 population | | | | | |
| Speech problem | 10.7 | 1.0 | 18.5 | 1.1 | 4.6 | 0.5 |
| Asthma or breathing problem | 8.2 | 0.9 | 8.4 | 0.7 | 8.3 | 0.8 |
| Mental retardation or other developmental problem | 7.0 | 0.8 | 10.2 | 0.8 | 9.6 | 0.8 |
| Other mental, emotional, or behavioral problem | 2.7 | 0.5 | 12.0 | 1.0 | 14.2 | 1.1 |
| Attention Deficit/Hyperactivity Disorder | 2.1 | 0.4 | 17.6 | 1.2 | 21.8 | 1.3 |
| Learning disability | 2.9 | 0.5 | 23.3 | 1.2 | 33.9 | 1.7 |

SE Standard error.

NOTES: Data are for noninstitutionalized children. Children with limitation of activity caused by chronic health conditions may be identified by enrollment in special programs (special education or early intervention services) or by reporting a limitation in their ability to perform activities usual for their age group because of a physical, mental, or emotional problem. Conditions refer to response categories in the National Health Interview Survey. The selected health conditions, regardless of duration, are classified as chronic in this analysis. Children who were reported to have more than one chronic health condition as the cause of their activity limitation were counted in each reported category. Starting in 2001 the condition list for children was expanded to include categories for Attention Deficit/Hyperactivity Disorder (ADD or ADHD) and learning disability. Thus, comparable data for this figure are not available prior to 2001. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See Appendix II, Condition; Limitation of activity. See related *Health, United States, 2005*, table 58.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 19. Selected chronic health conditions causing limitation of activity among working-age adults by age: United States, 2002–03**

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| Type of chronic health condition | 18–44 years | | 45–54 years | | 55–64 years | |
|---|---|---|---|---|---|---|
| | Rate | SE | Rate | SE | Rate | SE |
| | Number of persons with limitation of activity caused by selected chronic health conditions per 1,000 population | | | | | |
| Mental illness | 12.9 | 0.5 | 23.1 | 1.1 | 24.1 | 1.4 |
| Fractures or joint injury | 7.0 | 0.4 | 15.5 | 0.9 | 20.6 | 1.2 |
| Lung | 5.0 | 0.3 | 12.6 | 0.8 | 25.6 | 1.3 |
| Diabetes | 2.5 | 0.2 | 13.4 | 0.8 | 33.4 | 1.5 |
| Heart or other circulatory | 5.9 | 0.3 | 28.4 | 1.2 | 74.3 | 2.4 |
| Arthritis or other musculoskeletal | 22.2 | 0.7 | 61.9 | 1.8 | 100.7 | 2.6 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Conditions refer to response categories in the National Health Interview Survey; some conditions include several response categories. "Mental illness" includes depression, anxiety or emotional problem, and other mental conditions. "Heart or other circulatory" includes heart problem, stroke problem, hypertension or high blood pressure, and other circulatory system conditions. "Arthritis or other musculoskeletal" includes arthritis or rheumatism, back or neck problem, and other musculoskeletal system conditions. Persons may report more than one chronic health condition as the cause of their activity limitation. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See related *Health, United States, 2005*, table 58. See Appendix II, Condition; Limitation of activity.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

**Data table for figure 20. Selected chronic health conditions causing limitation of activity among older adults by age: United States, 2002–03**

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| Type of chronic health condition | 65–74 years | | 75–84 years | | 85 years and over | |
|---|---|---|---|---|---|---|
| | Rate | SE | Rate | SE | Rate | SE |
| | Number of persons with limitation of activity caused by selected chronic health conditions per 1,000 population | | | | | |
| Senility | 6.8 | 0.8 | 30.5 | 2.0 | 96.1 | 6.5 |
| Lung | 34.7 | 2.0 | 41.4 | 2.5 | 44.4 | 5.6 |
| Diabetes | 41.1 | 1.9 | 49.4 | 2.7 | 38.4 | 4.6 |
| Vision | 18.2 | 1.5 | 44.3 | 2.6 | 96.6 | 7.3 |
| Hearing | 10.0 | 1.1 | 27.8 | 2.0 | 84.9 | 6.8 |
| Heart or other circulatory | 101.9 | 3.3 | 162.6 | 5.1 | 223.5 | 10.2 |
| Arthritis or other musculoskeletal | 125.8 | 3.6 | 171.0 | 4.7 | 267.6 | 10.6 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Conditions refer to response categories in the National Health Interview Survey; some conditions include several response categories. "Vision" includes vision conditions or problems seeing and "hearing" includes hearing problems. "Heart or other circulatory" includes heart problem, stroke problem, hypertension or high blood pressure, and other circulatory system conditions. "Arthritis or other musculoskeletal" includes arthritis or rheumatism, back or neck problem, and other musculoskeletal system conditions. "Senility" is the term offered to respondents on a flashcard, but this category may include Alzheimer's disease or other types of dementia reported by the respondent. Persons may report more than one chronic health condition as the cause of their activity limitation. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See related *Health, United States, 2005*, table 58. See Appendix II, Condition; Limitation of activity.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 21. Use of mammography within the past 2 years for women 40 years of age and over by selected characteristics: United States, selected years 1987–2003**

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| Characteristic | Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1987 | 1990 | 1991 | 1993 | 1994 | 1998 | 1999 | 2000 | 2003 |
| | Percent of woman having a mammogram within the past 2 years | | | | | | | | |
| All women 40 years and over, crude | 28.7 | 51.4 | 54.6 | 59.7 | 60.9 | 66.9 | 70.3 | 70.4 | 69.7 |
| Race and Hispanic origin | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| Hispanic or Latino | 18.3 | 45.2 | 49.2 | 50.9 | 51.9 | 60.2 | 65.7 | 61.2 | 65.0 |
| Asian only | * | 46.0 | 45.9 | 55.1 | 55.8 | 60.2 | 58.3 | 53.5 | 57.6 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only | 30.3 | 52.7 | 56.0 | 60.6 | 61.3 | 68.0 | 71.1 | 72.2 | 70.5 |
| Black or African American only | 23.8 | 46.0 | 47.7 | 59.2 | 64.4 | 66.0 | 71.0 | 67.9 | 70.5 |
| Poverty status | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| Poor | 14.6 | 30.8 | 35.2 | 41.1 | 44.2 | 50.1 | 57.4 | 54.8 | 55.4 |
| Near poor | 20.9 | 39.1 | 44.4 | 47.5 | 48.6 | 56.1 | 59.5 | 58.1 | 60.8 |
| Nonpoor | 35.2 | 59.2 | 62.2 | 67.3 | 68.5 | 72.6 | 75.0 | 75.9 | 74.3 |
| Education | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| No high school diploma or GED | 17.8 | 36.4 | 40.0 | 46.4 | 48.2 | 54.5 | 56.7 | 57.7 | 58.1 |
| High school diploma or GED | 31.3 | 52.7 | 55.8 | 59.0 | 61.0 | 66.7 | 69.2 | 69.7 | 67.8 |
| Some college or more | 37.7 | 62.8 | 65.2 | 69.5 | 69.7 | 72.8 | 77.3 | 76.2 | 75.1 |
| | Standard error | | | | | | | | |
| All women 40 years and over, crude | 0.7 | 0.6 | 0.5 | 0.7 | 0.7 | 0.5 | 0.5 | 0.6 | 0.5 |
| Race and Hispanic origin | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| Hispanic or Latino | 2.3 | 2.4 | 2.4 | 3.2 | 3.4 | 1.7 | 1.8 | 1.7 | 1.6 |
| Asian only | * | 4.5 | 4.1 | 5.6 | 5.5 | 4.0 | 4.3 | 4.3 | 3.6 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only | 0.7 | 0.7 | 0.6 | 0.8 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 |
| Black or African American only | 2.0 | 1.5 | 1.5 | 2.1 | 1.9 | 1.6 | 1.5 | 1.5 | 1.5 |
| Poverty status | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| Poor | 1.3 | 1.1 | 1.3 | 1.8 | 2.0 | 1.6 | 1.9 | 1.7 | 1.6 |
| Near poor | 1.1 | 1.1 | 1.0 | 1.4 | 1.4 | 1.3 | 1.4 | 1.3 | 1.3 |
| Nonpoor | 1.0 | 0.7 | 0.7 | 0.8 | 0.9 | 0.6 | 0.6 | 0.6 | 0.6 |
| Education | | | | | | | | | |
| 40 years and over, crude: | | | | | | | | | |
| No high school diploma or GED | 0.9 | 1.1 | 0.9 | 1.4 | 1.6 | 1.2 | 1.2 | 1.2 | 1.3 |
| High school diploma or GED | 1.1 | 0.8 | 0.8 | 1.2 | 1.2 | 0.9 | 1.0 | 0.9 | 1.0 |
| Some college or more | 1.2 | 0.9 | 0.8 | 1.0 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 |

* Estimates are considered unreliable. Data not shown have a relative standard error greater than 30 percent.

NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. Asian only race includes persons of both Hispanic and non-Hispanic origin. Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Poverty status was unknown for 11 percent of women 40 years of age and over in 1987. Missing family income data were imputed for 19–23 percent of women 40 years of age and over in 1990–94 and 35–39 percent in 1998–2003. Education categories shown are for 1998 and subsequent years. In 1994 and earlier years the following categories based on number of years of school completed were used: less than 12 years, 12 years, and 13 years or more. Starting with *Health, United States 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. See related *Health, United States 2005*, table 66. See Appendix II, Education; Family income; Hispanic origin; Mammography; Poverty level; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 22. Use of Pap smears within the past 3 years for women 18 years of age and over by selected characteristics: United States, 1987–2003**

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| Characteristic | Year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1987 | 1993 | 1994 | 1998 | 1999 | 2000 | 2003 |
| | Percent of woman having a Pap smear within the past 3 years | | | | | | |
| All women age 18 years and over, crude | 74.4 | 77.7 | 76.8 | 79.1 | 80.8 | 81.2 | 79.0 |
| Race and Hispanic origin | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Hispanic or Latino | 67.6 | 77.2 | 74.4 | 75.2 | 76.3 | 77.0 | 75.4 |
| Asian only | 51.9 | 68.8 | 66.4 | 68.5 | 64.4 | 66.4 | 68.3 |
| Not Hispanic or Latino: | | | | | | | |
| White only | 74.7 | 77.3 | 76.5 | 79.3 | 81.0 | 81.8 | 79.3 |
| Black or African American only | 80.9 | 82.7 | 83.8 | 84.2 | 86.0 | 85.1 | 83.8 |
| Poverty status | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Poor | 64.3 | 70.3 | 68.8 | 69.8 | 73.6 | 72.0 | 70.5 |
| Near poor | 68.2 | 71.2 | 68.8 | 70.6 | 72.5 | 73.4 | 71.4 |
| Nonpoor | 80.0 | 82.1 | 81.9 | 83.5 | 84.3 | 85.0 | 83.0 |
| Education | | | | | | | |
| 25 years and over, crude: | | | | | | | |
| No high school diploma or GED | 57.1 | 61.9 | 60.9 | 65.0 | 66.1 | 69.9 | 64.9 |
| High school diploma or GED | 76.4 | 78.2 | 76.0 | 77.4 | 79.3 | 79.8 | 75.9 |
| Some college or more | 84.0 | 84.4 | 85.2 | 86.9 | 87.8 | 88.0 | 86.2 |
| | Standard error | | | | | | |
| All women age 18 years and over, crude | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| Race and Hispanic origin | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Hispanic or Latino | 2.0 | 1.9 | 1.8 | 1.0 | 1.0 | 1.1 | 1.1 |
| Asian only | 5.0 | 4.0 | 3.5 | 2.8 | 3.0 | 2.8 | 2.6 |
| Not Hispanic or Latino: | | | | | | | |
| White only | 0.5 | 0.5 | 0.6 | 0.4 | 0.5 | 0.4 | 0.5 |
| Black or African American only | 1.2 | 1.3 | 1.2 | 0.9 | 0.9 | 0.8 | 1.0 |
| Poverty status | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Poor | 1.4 | 1.4 | 1.3 | 1.1 | 1.1 | 1.1 | 1.1 |
| Near poor | 1.0 | 1.0 | 1.1 | 0.9 | 0.9 | 0.9 | 0.9 |
| Nonpoor | 0.6 | 0.5 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 |
| Education | | | | | | | |
| 25 years and over, crude: | | | | | | | |
| No high school diploma or GED | 1.1 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.0 |
| High school diploma or GED | 0.8 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 |
| Some college or more | 0.7 | 0.6 | 0.6 | 0.5 | 0.4 | 0.4 | 0.5 |

NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. Asian only race includes persons of both Hispanic and non-Hispanic origin. Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Poverty status was unknown for 9 percent of women 18 years of age and over in 1987. Missing family income data were imputed for 17–20 percent of women 18 years of age and over in 1990–94 and 31–36 percent in 1998–2003. Education categories shown are for 1998 and subsequent years. In years prior to 1998 the following categories based on number of years of school completed were used: less than 12 years, 12 years, and 13 years or more. Starting with *Health, United States 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000 were recalculated using 2000-based weights and may differ from previous editions of Health, United States. See related *Health, United States 2005*, table 87. See Appendix II, Education; Family income; Hispanic origin; Pap smear; Poverty level; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 23. Injury-related visits to hospital emergency departments among children under 20 years of age by first-listed external cause and age: United States, average annual 2000–2003**

| | *All injury-related visits* | *All causes* | *Falls* | *Struck by* | *Motor vehicle traffic-related injuries* | *Cut* |
|---|---|---|---|---|---|---|
| Both sexes | Injury-related visits per 10,000 population | | | | | |
| Under 1 year | 1,376.5 | 1,032.4 | 386.0 | 166.3 | 76.0 | * |
| 1 year old | 1,868.0 | 1,493.4 | 531.9 | 279.8 | 49.7 | 51.2 |
| 2 years old | 1,816.7 | 1,541.6 | 452.7 | 290.6 | 118.3 | 87.8 |
| 3 years old | 1,614.6 | 1,354.7 | 414.8 | 302.9 | 50.9 | 85.3 |
| 4 years old | 1,354.6 | 1,176.6 | 408.3 | 242.7 | 67.3 | 88.3 |
| 5 years old | 1,359.1 | 1,112.0 | 325.2 | 244.6 | 86.6 | 92.1 |
| 6 years old | 1,161.0 | 972.0 | 269.7 | 212.5 | 74.1 | 76.7 |
| 7 years old | 1,160.8 | 996.1 | 339.0 | 193.9 | 97.4 | 53.1 |
| 8 years old | 1,102.6 | 929.5 | 280.9 | 217.3 | 53.1 | 81.9 |
| 9 years old | 1,276.3 | 1,072.2 | 295.4 | 270.3 | 99.7 | 75.2 |
| 10 years old | 1,291.9 | 1,105.7 | 274.0 | 300.7 | 86.1 | 67.6 |
| 11 years old | 1,355.6 | 1,177.0 | 276.1 | 326.2 | 106.4 | 87.6 |
| 12 years old | 1,324.0 | 1,141.7 | 260.6 | 336.9 | 76.3 | 87.5 |
| 13 years old | 1,397.3 | 1,204.6 | 268.1 | 391.9 | 91.5 | 64.6 |
| 14 years old | 1,724.2 | 1,485.8 | 273.8 | 510.2 | 113.3 | 120.3 |
| 15 years old | 1,567.5 | 1,376.4 | 215.8 | 441.3 | 159.4 | 96.4 |
| 16 years old | 1,672.7 | 1,408.5 | 227.8 | 346.1 | 259.1 | 136.0 |
| 17 years old | 1,931.9 | 1,593.9 | 186.0 | 455.4 | 341.2 | 149.5 |
| 18 years old | 2,044.3 | 1,669.9 | 182.4 | 348.3 | 439.6 | 233.0 |
| 19 years old | 1,947.2 | 1,544.5 | 176.5 | 357.5 | 315.1 | 170.4 |
| Both sexes | Standard error | | | | | |
| Under 1 year | 105.7 | 96.0 | 56.9 | 31.3 | 13.9 | 10.5 |
| 1 year old | 109.6 | 97.9 | 52.9 | 35.6 | 11.9 | 13.4 |
| 2 years old | 94.5 | 81.7 | 42.3 | 32.6 | 21.3 | 16.8 |
| 3 years old | 92.7 | 75.9 | 37.7 | 35.2 | 11.1 | 17.5 |
| 4 years old | 85.1 | 79.6 | 41.7 | 32.2 | 15.2 | 20.4 |
| 5 years old | 84.3 | 74.2 | 35.1 | 27.8 | 23.2 | 18.3 |
| 6 years old | 80.0 | 71.2 | 29.1 | 30.3 | 15.6 | 15.7 |
| 7 years old | 71.2 | 64.3 | 38.5 | 23.7 | 18.9 | 11.8 |
| 8 years old | 66.8 | 60.5 | 30.9 | 27.0 | 11.9 | 20.3 |
| 9 years old | 79.4 | 74.1 | 38.0 | 38.5 | 21.2 | 15.4 |
| 10 years old | 76.2 | 73.6 | 29.8 | 33.9 | 19.5 | 13.8 |
| 11 years old | 74.5 | 68.5 | 30.3 | 33.4 | 18.1 | 16.6 |
| 12 years old | 84.2 | 77.9 | 24.8 | 33.9 | 16.4 | 15.6 |
| 13 years old | 74.2 | 67.4 | 35.3 | 34.2 | 16.1 | 11.7 |
| 14 years old | 101.9 | 94.1 | 34.7 | 51.0 | 24.7 | 18.9 |
| 15 years old | 83.8 | 77.5 | 23.6 | 44.7 | 21.6 | 18.2 |
| 16 years old | 77.4 | 71.8 | 30.6 | 36.1 | 27.7 | 22.8 |
| 17 years old | 91.5 | 86.3 | 25.8 | 47.1 | 35.4 | 23.3 |
| 18 years old | 104.2 | 90.9 | 28.2 | 34.9 | 42.4 | 29.3 |
| 19 years old | 91.4 | 78.0 | 24.5 | 34.5 | 32.4 | 23.1 |

* Relative standard error greater than 30 percent.

NOTES: Rates are for the civilian noninstitutionalized population. An emergency department visit was considered injury related if the checkbox for injury was indicated, the physician's diagnosis was injury related (*International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM) 800–999), an external cause of injury code was present (ICD–9–CM E800-E999), or the patient's reason for visit was injury related. External cause of injury is the classification of environmental events, circumstances, and conditions that were the cause of injury. Falls include E880-E886, E888, E957, E968.1, and E987 from the ICD–9–CM; struck by includes E916-E917, E960.0, E968.2, E973, and E975; motor vehicle traffic-related injury includes E810-E819, E958.5, E968.5, and E988.5; cut includes E920, E956, E966, E974, and E986. See *Appendix II, External cause of injury, Injury visit.*

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey.



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**Data table for figure 24. Visits to physician offices and hospital outpatient departments by sex and age: United States, 1996–2003**

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| | *1996–97* | *1998–99* | *2000–2001* | *2002–03* |
|---|---|---|---|---|
| Both sexes | | Visits in thousands | | |
| Total | 833,022 | 873,025 | 970,880 | 1,024,122 |
| Under 18 years | 178,143 | 172,228 | 189,609 | 202,841 |
| 18–44 years | 260,687 | 271,465 | 282,616 | 288,063 |
| 45–54 years | 109,646 | 121,157 | 142,323 | 154,672 |
| 55–64 years | 88,141 | 100,882 | 117,109 | 129,913 |
| 65–74 years | 103,035 | 104,393 | 120,115 | 119,510 |
| 75 years and over | 93,369 | 102,899 | 119,108 | 129,122 |
| Male | | | | |
| Total | 336,321 | 351,822 | 393,207 | 414,317 |
| Under 18 years | 91,607 | 88,935 | 97,771 | 105,322 |
| 18–44 years | 83,091 | 88,853 | 92,451 | 93,258 |
| 45–54 years | 42,877 | 46,526 | 56,115 | 61,388 |
| 55–64 years | 38,121 | 43,542 | 48,330 | 52,830 |
| 65–74 years | 43,711 | 45,039 | 51,408 | 51,657 |
| 75 years and over | 36,915 | 38,926 | 47,133 | 49,863 |
| Female | | | | |
| Total | 496,700 | 521,203 | 577,673 | 609,804 |
| Under 18 years | 86,536 | 83,293 | 91,838 | 97,520 |
| 18–44 years | 177,597 | 182,612 | 190,165 | 194,805 |
| 45–54 years | 66,769 | 74,630 | 86,208 | 93,284 |
| 55–64 years | 50,020 | 57,340 | 68,779 | 77,084 |
| 65–74 years | 59,325 | 59,354 | 68,708 | 67,853 |
| 75 years and over | 56,454 | 63,973 | 71,975 | 79,259 |

See footnotes at end of table.



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**Data table for figure 24. Visits to physician offices and hospital outpatient departments by sex and age: United States, 1996–2003—Continued**

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| | 1996–97 | | 1998–99 | | 2000–2001 | | 2002–03 | |
|---|---|---|---|---|---|---|---|---|
| | Rate | SE | Rate | SE | Rate | SE | Rate | SE |
| Both sexes | Number of visits per 100 persons | | | | | | | |
| Total | 313.7 | 8.5 | 322.7 | 9.7 | 348.6 | 10.4 | 360.2 | 9.4 |
| Under 18 years | 250.1 | 10.2 | 239.3 | 10.4 | 262.2 | 10.7 | 278.6 | 12.3 |
| 18–44 years | 240.6 | 7.7 | 250.2 | 9.1 | 257.9 | 10.4 | 261.5 | 8.3 |
| 45–54 years | 334.1 | 11.3 | 346.2 | 11.5 | 371.5 | 12.9 | 385.6 | 13.8 |
| 55–64 years | 414.7 | 13.6 | 444.6 | 15.3 | 473.8 | 17.0 | 479.5 | 15.7 |
| 65–74 years | 567.7 | 19.4 | 583.8 | 21.8 | 663.5 | 25.3 | 661.7 | 23.1 |
| 75 years and over | 676.4 | 25.1 | 708.4 | 31.3 | 770.1 | 31.5 | 804.1 | 28.5 |
| Male | | | | | | | | |
| Total | 259.4 | 7.7 | 266.8 | 8.5 | 289.8 | 8.8 | 298.6 | 8.7 |
| Under 18 years | 251.2 | 11.3 | 241.5 | 11.2 | 264.2 | 11.3 | 282.9 | 13.4 |
| 18–44 years | 155.1 | 6.0 | 166.3 | 6.7 | 171.0 | 8.0 | 171.0 | 6.6 |
| 45–54 years | 267.6 | 9.8 | 272.7 | 11.1 | 300.2 | 12.1 | 313.5 | 13.2 |
| 55–64 years | 376.4 | 14.2 | 402.3 | 16.8 | 408.4 | 17.2 | 406.4 | 15.3 |
| 65–74 years | 537.4 | 20.1 | 558.5 | 23.4 | 627.7 | 25.1 | 629.0 | 24.1 |
| 75 years and over | 698.2 | 29.2 | 689.4 | 34.1 | 798.4 | 32.2 | 803.7 | 32.6 |
| Female | | | | | | | | |
| Total | 365.3 | 9.8 | 375.8 | 11.8 | 404.6 | 12.7 | 419.0 | 11.1 |
| Under 18 years | 248.9 | 9.7 | 236.9 | 10.7 | 260.1 | 11.1 | 274.1 | 12.1 |
| 18–44 years | 324.4 | 10.7 | 331.7 | 13.7 | 342.6 | 14.4 | 350.2 | 12.3 |
| 45–54 years | 397.6 | 14.9 | 416.3 | 14.3 | 439.5 | 16.3 | 454.4 | 17.1 |
| 55–64 years | 449.6 | 16.4 | 483.1 | 17.2 | 533.9 | 20.8 | 547.0 | 19.8 |
| 65–74 years | 592.2 | 22.6 | 604.6 | 25.0 | 693.0 | 30.9 | 688.9 | 27.1 |
| 75 years and over | 662.9 | 25.5 | 720.4 | 32.7 | 752.6 | 34.9 | 804.3 | 30.2 |

SE Standard error.

NOTES: For 1996–99 data, population estimates are 1990-based postcensal estimates as of July 1 and are adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Census Bureau. For data years 2000 and beyond population estimates are based on the 2000 census. See Appendix I, Population Census and Population Estimates. See related *Health, United States, 2005,* table 88. Starting with *Health, United States, 2005,* data from 2001 and onwards use a revised weighting scheme. See Appendix I, National Ambulatory Medical Care Survey.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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**Data table for figure 25. Hospital inpatient procedures for insertion of coronary artery stent(s) among adults 45 years of age and over by age and sex: United States 1996–2003**

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| Sex and year | 45 years and over: Hospital discharges with any listed stent procedure, average annual | 45 years and over, crude: Rate | 45 years and over, crude: SE | 45–54 years: Rate | 45–54 years: SE | 55–64 years: Rate | 55–64 years: SE | 65–74 years: Rate | 65–74 years: SE | 75 years and over: Rate | 75 years and over: SE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | Number per 10,000 population | | | | | | | | | |
| All persons | | | | | | | | | | | |
| 1996–97 | 191 | 21.7 | 1.7 | 12.5 | 1.1 | 24.7 | 2.2 | 33.7 | 3.2 | 22.8 | 2.6 |
| 1998–99 | 388 | 42.1 | 3.5 | 22.2 | 2.2 | 49.8 | 4.9 | 63.4 | 5.3 | 50.9 | 4.8 |
| 2000–2001 | 436 | 44.2 | 3.2 | 21.1 | 1.6 | 47.7 | 3.5 | 70.3 | 5.6 | 63.4 | 6.2 |
| 2002–03 | 510 | 49.3 | 3.8 | 24.5 | 2.2 | 49.0 | 3.8 | 81.8 | 7.0 | 73.3 | 6.7 |
| Men | | | | | | | | | | | |
| 1996–97 | 131 | 32.5 | 2.5 | 19.9 | 1.7 | 39.9 | 4.0 | 48.5 | 5.0 | 32.1 | 3.6 |
| 1998–99 | 249 | 58.8 | 4.7 | 34.8 | 3.4 | 73.1 | 7.8 | 85.5 | 7.1 | 65.0 | 5.6 |
| 2000–2001 | 279 | 61.4 | 4.5 | 32.4 | 2.8 | 69.9 | 5.4 | 95.2 | 7.9 | 88.3 | 8.7 |
| 2002–03 | 336 | 70.3 | 5.3 | 39.2 | 3.7 | 71.3 | 5.3 | 113.9 | 10.2 | 106.7 | 11.3 |
| Women | | | | | | | | | | | |
| 1996–97 | 60 | 12.5 | 1.2 | 5.5 | 0.8 | 10.7 | 1.4 | 21.6 | 2.5 | 17.4 | 2.3 |
| 1998–99 | 140 | 28.0 | 2.6 | 10.0 | 1.5 | 28.5 | 3.0 | 45.2 | 4.6 | 42.4 | 5.1 |
| 2000–2001 | 157 | 29.5 | 2.3 | 10.3 | 1.1 | 27.2 | 2.2 | 49.8 | 4.3 | 48.8 | 5.3 |
| 2002–03 | 174 | 31.3 | 2.8 | 10.3 | 1.3 | 28.4 | 3.2 | 55.0 | 5.8 | 53.3 | 5.0 |

SE Standard error.

NOTES: Up to four procedures were coded for each non-Federal hospital stay. Data in this table are for any listed procedures, that is, if more than one stenting procedure is performed during the same hospital stay, it is counted only once. Effective with the 2003 National Hospital Discharge Survey, a new procedure code for the insertion of drug-eluting coronary artery stents is available. Procedure groupings and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD–9–CM). See Appendix II, table X.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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**Data table for figure 26. Life expectancy at birth and at 65 years of age by sex: United States, 1900–1902 through 2002**

| Year | At birth | | At 65 years | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| | Life expectancy in years | | | |
| 1900–1902 | 47.9 | 50.7 | 11.5 | 12.2 |
| 1909–11 | 49.9 | 53.2 | 11.2 | 12.0 |
| 1919–21 | 55.5 | 57.4 | 12.2 | 12.7 |
| 1929–31 | 57.7 | 60.9 | 11.7 | 12.8 |
| 1939–41 | 61.6 | 65.9 | 12.1 | 13.6 |
| 1949–51 | 65.5 | 71.0 | 12.7 | 15.0 |
| 1959–61 | 66.8 | 73.2 | 13.0 | 15.8 |
| 1969–71 | 67.0 | 74.6 | 13.0 | 16.8 |
| 1979–81 | 70.1 | 77.6 | 14.2 | 18.4 |
| 1989–91 | 71.8 | 78.8 | 15.1 | 19.0 |
| 1997 | 73.6 | 79.4 | 15.9 | 19.2 |
| 1998 | 73.8 | 79.5 | 16.0 | 19.2 |
| 1999 | 73.9 | 79.4 | 16.1 | 19.1 |
| 2000 | 74.3 | 79.7 | 16.2 | 19.3 |
| 2001 | 74.4 | 79.8 | 16.4 | 19.4 |
| 2002 | 74.5 | 79.9 | 16.6 | 19.5 |

NOTES: Death rates used to calculate life expectancies for 1997–1999 are based on postcensal 1990-based population estimates; life expectancies for 2000 and beyond are calculated with death rates based on census 2000. See Appendix I, Population Census and Population Estimates. Life expectancies prior to 1997 are from decennial life tables based on census data and deaths for a 3-year period around the census year. The middle year in each 3-year period is plotted in figure 26. Beginning in 1997, the annual life tables are complete life tables based on a methodology similar to that used for decennial life tables. Alaska and Hawaii were included beginning in 1959. For decennial periods prior to 1929–31, data are limited to death registration States: 1900–1902 and 1909–11, 10 States and the District of Columbia; 1919–21, 34 States and the District of Columbia. Deaths to nonresidents were excluded beginning in 1970. See Appendix II, Life expectancy. See related *Health, United States, 2005*, table 27.

SOURCE: Arias, E. United States life tables, 2002. National vital statistics reports; vol 53 no 6. Hyattsville, MD: National Center for Health Statistics. 2004.



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**Data table for figure 27. Infant, neonatal, and postneonatal mortality rates: United States, 1950–2002**

| Year | Infant | Neonatal | Postneonatal |
|---|---|---|---|
| | | Deaths per 1,000 live births | |
| 1950 | 29.2 | 20.5 | 8.7 |
| 1960 | 26.0 | 18.7 | 7.3 |
| 1970 | 20.0 | 15.1 | 4.9 |
| 1980 | 12.6 | 8.5 | 4.1 |
| 1985 | 10.6 | 7.0 | 3.7 |
| 1990 | 9.2 | 5.8 | 3.4 |
| 1995 | 7.6 | 4.9 | 2.7 |
| 1996 | 7.3 | 4.8 | 2.5 |
| 1997 | 7.2 | 4.8 | 2.5 |
| 1998 | 7.2 | 4.8 | 2.4 |
| 1999 | 7.1 | 4.7 | 2.3 |
| 2000 | 6.9 | 4.6 | 2.3 |
| 2001 | 6.8 | 4.5 | 2.3 |
| 2002 | 7.0 | 4.7 | 2.3 |

NOTES: Infant is defined as under 1 year of age, neonatal as under 28 days of age, and postneonatal as between 28 days and 1 year of age. See related *Health, United States, 2005*, table 22.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

**Data table for figure 28. Infant mortality rates by detailed race and Hispanic origin of mother: United States, 2000–2002**

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| Race and Hispanic origin of mother | Infant deaths per 1,000 live birth |
|---|---|
| White, not Hispanic or Latino | 5.7 |
| Black or African American, not Hispanic or Latino | 13.6 |
| Hispanic or Latino | 5.5 |
| Puerto Rican | 8.3 |
| Other and unknown Hispanic or Latino | 6.7 |
| Mexican | 5.4 |
| Central and South American | 4.9 |
| Cuban | 4.2 |
| Asian or Pacific Islander | 4.8 |
| Hawaiian | 8.7 |
| Filipino | 5.7 |
| Other Asian or Pacific Islander | 4.8 |
| Japanese | 4.5 |
| Chinese | 3.2 |
| American Indian or Alaska Native | 8.9 |

NOTES: Infant is defined as under 1 year of age. Persons of Hispanic origin may be of any race. Asian or Pacific Islander and American Indian or Alaska Native races include persons of Hispanic and non-Hispanic origin. See Appendix II, Hispanic origin; Race. See related *Health, United States, 2005*, table 19.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, National Linked Birth/Infant Death Data Sets.



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**Data table for figure 29. Death rates for leading causes of death for all ages: United States, 1950–2002**

| Year | All causes | Heart disease | Cancer | Stroke | Chronic lower respiratory diseases | Unintentional injuries |
|---|---|---|---|---|---|---|
| | Deaths per 100,000 population | | | | | |
| 1950 | 1,446.0 | 586.8 | 193.9 | 180.7 | --- | 78.0 |
| 1960 | 1,339.2 | 559.0 | 193.9 | 177.9 | --- | 62.3 |
| 1970 | 1,222.6 | 492.7 | 198.6 | 147.7 | --- | 60.1 |
| 1980 | 1,039.1 | 412.1 | 207.9 | 96.2 | 28.3 | 46.4 |
| 1985 | 988.1 | 375.0 | 211.3 | 76.4 | 34.5 | 38.5 |
| 1990 | 938.7 | 321.8 | 216.0 | 65.3 | 37.2 | 36.3 |
| 1995 | 909.8 | 293.4 | 209.9 | 63.1 | 40.1 | 34.4 |
| 1996 | 894.1 | 285.7 | 206.7 | 62.5 | 40.6 | 34.5 |
| 1997 | 878.1 | 277.7 | 203.4 | 61.1 | 41.1 | 34.2 |
| 1998 | 870.6 | 271.3 | 200.7 | 59.3 | 41.8 | 34.5 |
| 1998 (Comparability-modified) | 870.6 | 267.3 | 202.6 | 62.3 | 43.5 | 35.4 |
| 1999 | 875.6 | 266.5 | 200.8 | 61.6 | 45.4 | 35.3 |
| 2000 | 869.0 | 257.6 | 199.6 | 60.9 | 44.2 | 34.9 |
| 2001 | 854.5 | 247.8 | 196.0 | 57.9 | 43.7 | 35.7 |
| 2002 | 845.3 | 240.8 | 193.5 | 56.2 | 43.5 | 36.9 |

--- Data not available.

NOTES: Death rates are age adjusted to the year 2000 standard population using 10-year age groups from under 1 year, 1–4 years, 5–14 through 75–84 years, and 85 years and over. Causes of death shown are the five leading causes of death for all persons in 2002. The 1950 death rates are based on the 6th revision of the *International Classification of Disease* (ICD-6), 1960 death rates on the ICD-7, 1970 death rates on the ICDA-8, and 1980–98 death rates on the ICD-9. The 1998 (Comparability-modified) death rates use comparability ratios to adjust the rate to be comparable to records classified according to ICD-10. Starting in 1999 death rates are based on ICD-10. Comparability ratios across revisions for selected causes are available at www.cdc.gov/nchs/data/statab/comp2.pdf, and final comparability ratios for ICD-9 to ICD-10 are available at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/ComparabilityIcd9_Icd10/. Death rates for chronic lower respiratory diseases are available from 1980 when a category that included bronchitis, emphysema, asthma, and other chronic lung diseases was introduced in ICD-9. Cancer refers to malignant neoplasms; stroke to cerebrovascular diseases; and unintentional injuries is preferred to accidents in the public health community. Rates for 1991–99 were computed using intercensal population estimates based on the 2000 census. Rates for 2000 were computed using 2000 census counts. Rates for 2001–02 were computed using postcensal estimates based on the 2000 census. See Appendix I, Population Census and Population Estimates. See Appendix II, Age adjustment; Cause of death; Comparability ratio. See related *Health, United States, 2005*, tables 29, 31, 35, 36, 37, 38, and 41.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

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**Data table for figure 30. Aging of the population 45 years of age and over: United States, 2004, 2014, and 2024**

| Age | 2004 | 2014 | 2024 | 2004–2014 | 2004–2024 |
|---|---|---|---|---|---|
| | Number in millions | | | Percent change | |
| Total population | 293.6 | 319.7 | 346.7 | 8.9 | 18.1 |
| 0–19 years | 81.5 | 84.6 | 91.4 | 3.9 | 12.2 |
| 20–44 years | 105.2 | 106.5 | 111.3 | 1.3 | 5.8 |
| 45–54 years | 41.6 | 43.6 | 40.7 | 4.7 | –2.3 |
| 55–64 years | 29.1 | 39.6 | 41.6 | 35.9 | 42.9 |
| 65 years and over | 36.2 | 45.3 | 61.7 | 25.2 | 70.2 |

NOTE: Data for 2014 and 2024 are projections.

SOURCE: U.S. Census Bureau: Monthly Postcensal Resident Populations, from April 1, 2000 to July 1, 2004 by age, sex, race, and Hispanic origin available at www.census.gov/popest/national/asrh/2003_nat_res.html, July 1, 2004 file, accessed on January 24, 2005 [data for 2004]; U.S. Interim Projections detail file by age, sex, race, and Hispanic origin available at www.census.gov/ipc/www/usinterimproj accessed on January 21, 2005 [data for projections].



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**Data table for figure 31. Employment status among adults 55–64 years of age by sex, race and Hispanic origin: United States, 2002–03**

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| | | | Race and Hispanic origin | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Not Hispanic or Latino | | | |
| | All | | Hispanic or Latino | | White only | | Black or African American only | |
| Sex and employment status | Percent | SE | Percent | SE | Percent | SE | Percent | SE |
| Both sexes | | | | | | | | |
| Working | 57.8 | 0.5 | 52.6 | 1.2 | 59.1 | 0.6 | 51.1 | 1.3 |
| Retired | 17.1 | 0.4 | 10.7 | 0.8 | 18.0 | 0.5 | 16.0 | 0.9 |
| Unemployed due to disability | 11.6 | 0.3 | 14.5 | 0.8 | 10.2 | 0.3 | 21.7 | 1.1 |
| Taking care of house or family | 7.6 | 0.2 | 14.8 | 0.8 | 7.2 | 0.2 | 5.2 | 0.6 |
| Looking for work | 2.0 | 0.1 | 2.7 | 0.4 | 1.9 | 0.1 | 2.4 | 0.4 |
| Other | 3.9 | 0.2 | 4.7 | 0.5 | 3.7 | 0.2 | 3.6 | 0.4 |
| Men | | | | | | | | |
| Working | 64.4 | 0.6 | 65.5 | 1.7 | 64.9 | 0.7 | 57.2 | 1.8 |
| Retired | 17.4 | 0.5 | 10.3 | 1.1 | 18.4 | 0.6 | 16.3 | 1.4 |
| Unemployed due to disability | 11.5 | 0.4 | 14.7 | 1.2 | 10.4 | 0.5 | 19.2 | 1.6 |
| Taking care of house or family | 0.5 | 0.1 | * | * | *0.4 | 0.1 | *1.2 | 0.4 |
| Looking for work | 2.4 | 0.2 | 3.3 | 0.6 | 2.2 | 0.2 | *3.2 | 0.7 |
| Other | 3.7 | 0.2 | 5.2 | 0.8 | 3.5 | 0.3 | *2.9 | 0.6 |
| Women | | | | | | | | |
| Working | 51.7 | 0.6 | 41.2 | 1.6 | 53.6 | 0.7 | 46.3 | 1.6 |
| Retired | 16.8 | 0.5 | 11.0 | 1.0 | 17.6 | 0.5 | 15.7 | 1.1 |
| Unemployed due to disability | 11.7 | 0.4 | 14.4 | 1.1 | 9.9 | 0.4 | 23.8 | 1.4 |
| Taking care of house or family | 14.2 | 0.4 | 27.1 | 1.5 | 13.5 | 0.5 | 8.3 | 0.9 |
| Looking for work | 1.6 | 0.1 | 2.1 | 0.4 | 1.5 | 0.2 | *1.8 | 0.4 |
| Other | 4.0 | 0.2 | 4.3 | 0.6 | 3.9 | 0.3 | 4.2 | 0.6 |

SE Standard error.

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. Employment status is determined using the answers to two questions on the National Health Interview Survey: "Which of the following were you doing last week?" The category working includes working for pay at a job or business and with a job or business but not at work. Sample persons who were not working were asked: "What is the main reason you did not work or have a job or business last week?" Persons who said they were on a planned vacation from work or on family or maternity leave were included in the working category. The remaining categories responded retired, disabled, taking care of house or family, or looking to the follow up question. Other includes going to school, temporarily unable to work for health reasons (but not working and not looking for work), on layoff, have job contract (off season), and other not specified. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. See Appendix II, Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 32. Low income among adults 55–64 years of age by sex, race and Hispanic origin: United States, 2003**

| Sex and poverty status | Total | Race and Hispanic origin | | |
|---|---|---|---|---|
| | | Hispanic | Not Hispanic or Latino | |
| | | | White only | Black only |
| | Percent | | | |
| Both sexes | | | | |
| Poor | 9.4 | 15.9 | 7.8 | 16.8 |
| Near poor | 13.1 | 24.6 | 11.1 | 21.2 |
| Nonpoor | 77.5 | 59.5 | 81.1 | 62.0 |
| Men | | | | |
| Poor | 8.2 | 13.9 | 6.8 | 15.8 |
| Near poor | 11.4 | 23.2 | 9.6 | 18.5 |
| Nonpoor | 80.3 | 62.9 | 83.6 | 65.7 |
| Women | | | | |
| Poor | 10.4 | 17.8 | 8.8 | 17.6 |
| Near poor | 14.7 | 25.8 | 12.5 | 23.3 |
| Nonpoor | 74.9 | 56.4 | 78.7 | 59.1 |

NOTES: Data are for the civilian noninstitutionalized population. Total includes all other races not shown separately. Persons of Hispanic origin may be of any race. Poor is defined as family income less than 100 percent of the poverty level, near poor as 100–199 percent of the poverty level, and nonpoor as 200 percent or above the poverty level. See Appendix II, Family income; Hispanic origin; Poverty level; Race.

SOURCE: DeNavas-Walt C, Proctor B, and Mills R. Income, Poverty, and Health Insurance Coverage in the United States: 2003. Current population reports, series P-60 no 226. Washington: U.S. Government Printing Office. 2004; Age and sex of all people, family members, and unrelated individuals iterated by income-to-poverty ratio and race: 2003, available at ferret.bls.census.gov/macro/032004/pov/new01_000.htm accessed on October 29, 2004.

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**Data table for figure 33. Health insurance coverage among adults 55–64 years of age by marital status: United States, 2002–03**

| Characteristic | Health insurance coverage | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total private | | Private Employer-sponsored | | Other private | | Public | | Uninsured | |
| | Percent | SE | Percent | SE | Percent | SE | Percent | SE | Percent | SE |
| Race and Hispanic origin | | | | | | | | | | |
| Total | 76.7 | 0.4 | 68.5 | 0.5 | 8.2 | 0.3 | 12.1 | 0.3 | 11.2 | 0.3 |
| Hispanic or Latino | 52.2 | 1.4 | 47.1 | 1.3 | 5.1 | 0.6 | 19.1 | 1.0 | 28.7 | 1.2 |
| Not Hispanic or Latino: | | | | | | | | | | |
| White only | 81.4 | 0.5 | 72.7 | 0.6 | 8.7 | 0.3 | 10.0 | 0.4 | 8.7 | 0.3 |
| Black or African American only | 61.8 | 1.3 | 56.0 | 1.5 | 5.9 | 0.7 | 22.7 | 1.1 | 15.5 | 0.9 |
| Marital status | | | | | | | | | | |
| Married | 83.3 | 0.5 | 75.4 | 0.6 | 7.9 | 0.3 | 8.0 | 0.3 | 8.7 | 0.3 |
| Widowed | 58.8 | 1.5 | 49.8 | 1.5 | 8.9 | 0.8 | 22.8 | 1.3 | 18.4 | 1.2 |
| Separated or divorced | 61.5 | 1.0 | 52.8 | 1.0 | 8.8 | 0.6 | 21.4 | 0.9 | 17.0 | 0.8 |
| Single | 59.4 | 1.8 | 50.2 | 1.9 | 9.2 | 1.1 | 25.1 | 1.6 | 15.5 | 1.3 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Persons of Hispanic origin may be of any race. Public insurance includes Medicare, Medicaid, SCHIP, Military, and other State and government sponsored health plans. Health insurance categories are mutually exclusive. Persons who reported both public and private coverage are classified as having private coverage. Uninsured persons are not covered by private insurance or public insurance. Persons with Indian Health Service only are considered uninsured. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 Census. See Appendix II, Health insurance coverage; Hispanic origin; Race.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.



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**Data table for figure 34. Cardiovascular risk factors (hypertension, obesity, and high cholesterol) among adults 55–64 years of age by sex: United States, 1988–94 and 1999–2002**

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| Sex and selected cardiovascular risk factors | 1988–94 | | 1999–2002 | |
|---|---|---|---|---|
| | Percent | SE | Percent | SE |
| **Both sexes** | | | | |
| Individual selected cardiovascular risk factors: | | | | |
| Hypertension | 41.7 | 1.5 | 49.5 | 1.6 |
| Obesity | 30.7 | 1.5 | 38.9 | 2.0 |
| High cholesterol | 34.9 | 1.4 | 22.8 | 1.3 |
| Number of selected cardiovascular risk factors: | | | | |
| None | 31.5 | 1.6 | 26.6 | 2.0 |
| One or more | 68.5 | 1.6 | 73.4 | 2.0 |
| One | 37.1 | 1.6 | 42.0 | 1.8 |
| Two or three | 31.4 | 1.4 | 31.4 | 1.5 |
| **Men** | | | | |
| Individual selected cardiovascular risk factors: | | | | |
| Hypertension | 40.6 | 2.3 | 45.0 | 1.8 |
| Obesity | 27.2 | 2.2 | 35.5 | 2.4 |
| High cholesterol | 28.0 | 2.1 | 19.9 | 1.9 |
| Number of selected cardiovascular risk factors: | | | | |
| None | 36.5 | 2.2 | 27.8 | 2.6 |
| One or more | 63.5 | 2.2 | 72.2 | 2.6 |
| One | 35.9 | 2.1 | 48.7 | 2.8 |
| Two or Three | 27.6 | 2.1 | 23.5 | 1.6 |
| **Women** | | | | |
| Individual selected cardiovascular risk factors: | | | | |
| Hypertension | 42.6 | 2.3 | 53.9 | 2.2 |
| Obesity | 33.7 | 1.8 | 42.1 | 3.0 |
| High cholesterol | 40.9 | 1.9 | 25.6 | 1.5 |
| Number of selected cardiovascular risk factors: | | | | |
| None | 27.3 | 2.3 | 25.5 | 2.7 |
| One or more | 72.7 | 2.3 | 74.5 | 2.7 |
| One | 38.0 | 1.9 | 35.4 | 2.2 |
| Two or Three | 34.7 | 1.8 | 39.1 | 2.4 |

NOTES: In this analysis cardiovascular disease risk factors are: hypertension, obesity, and high cholesterol. Hypertension is defined as either having elevated blood pressure (systolic pressure of at least 140 mmHg or diastolic pressure of at least 90 mmHg) or taking antihypertensive medication. Hypertension is based on the average of blood pressure measurements taken. Obesity is defined as a body mass index (BMI) greater than or equal to 30. See Appendix II, Body mass index. High serum cholesterol is defined as having measured total serum cholesterol greater than or equal to 240 mg/dL (6.20 mmol/L). Data are for the civilian noninstitutionalized population. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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**Data table for figure 35. Visits to health professionals in the past 12 months among adults 55–64 years of age by health insurance status: United States, 2002–03**

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| Type of health professional | Total | | Public | | Private | | Uninsured | |
|---|---|---|---|---|---|---|---|---|
| | Percent | SE | Percent | SE | Percent | SE | Percent | SE |
| General physician | 77.4 | 0.5 | 84.2 | 1.2 | 79.5 | 0.6 | 54.4 | 1.8 |
| Specialist physician | 38.0 | 0.6 | 48.5 | 1.7 | 39.2 | 0.8 | 17.2 | 1.5 |
| Eye doctor | 44.2 | 0.7 | 45.0 | 1.7 | 46.5 | 0.8 | 26.4 | 1.6 |
| Physical or other type of therapist | 11.3 | 0.4 | 16.1 | 1.3 | 11.4 | 0.5 | 4.9 | 0.8 |
| Mental health professional | 6.3 | 0.3 | 15.5 | 1.2 | 5.0 | 0.3 | 4.6 | 0.8 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. Respondents were asked if they had seen or talked to selected types of health professionals within the past 12 months. Percents are respondents who reported at least one visit. General physician includes visits to a doctor in general practice, family medicine, or internal medicine. Specialist physician includes visits to a doctor who specializes in a particular medical disease or problem (other than obstetrician or gynecologist, psychiatrist, or ophthalmologist). Eye doctor includes visits to an optometrist, ophthalmologist, or eye doctor (someone who prescribes eyeglasses). Physical or other type of therapist includes visits to an audiologist or physical, speech, respiratory, or occupational therapist. Mental health professional includes visits to a psychiatrist, psychologist, psychiatric nurse, or clinical social worker. Total includes about 1 percent of adults with unknown health insurance coverage. Public coverage includes Medicare, Medicaid, SCHIP, Military, and other State and government sponsored health plans. Uninsured persons are not covered by private insurance or public insurance. Persons with Indian Health Service only are considered uninsured. See Appendix II, Health insurance coverage.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

**Data table for figure 36. Blood glucose regulators and cholesterol-lowering drugs prescribed during medical visits among adults 55–64 years of age by sex: United States, 1995–96 and 2002–03**

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| Selected drug classes and sex | 1995–96 | | 2002–03 | |
|---|---|---|---|---|
| | Drugs per 100 population | SE | Drugs per 100 population | SE |
| Blood glucose regulators | | | | |
| Both sexes | 24.5 | 2.2 | 46.4 | 3.9 |
| Men | 22.7 | 2.6 | 47.8 | 5.5 |
| Women | 26.2 | 2.5 | 45.0 | 4.8 |
| Cholesterol-lowering drugs | | | | |
| Both sexes | 16.9 | 1.4 | 52.8 | 3.9 |
| Men | 19.6 | 2.1 | 57.3 | 5.2 |
| Women | 14.5 | 1.7 | 48.6 | 4.4 |

SE Standard error.

NOTES: Medical visits with drugs prescribed are in-person visits to physician office and hospital outpatient departments with at least one drug prescribed, ordered, supplied, administered, or continued during the visit. Drugs per 100 population are calculated as the number of drugs recorded during visits for the 2-year period divided by the sum of the population estimates for both years, times 100. If more than one drug in the selected drug class was recorded on the visit record, then that drug class was counted multiple times. Until 2002, up to six prescription and nonprescription medications were recorded on the visit record. Beginning with the 2003 data, up to eight prescription and nonprescription medications are recorded on the visit record. If only up to six drugs are included for the 2003 data, the 2002–03 rate of blood glucose regulators is 5 percent lower than including up to eight drugs. The 2002–03 rate of cholesterol-lowering drugs, including only up to six drugs for 2003, is 4 percent lower. Drugs were classified according to the National Drug Code therapeutic classes. See Appendix II, Drugs; National Drug Code (NDC) Directory therapeutic classes. See related *Health, United States, 2005*, tables 91 and 92.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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**Data table for figure 37. Total health care expense and prescribed medicine expense per person per year among adults 55–64 years of age by source of payment and sex: United States, 1997 and 2002**

| | *Source of payment* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Expense per person* | | | | *Out-of-pocket expense per person* | | | | *"All other sources" expense per person* | | | |
| | *1997* | *SE* | *2002* | *SE* | *1997* | *SE* | *2002* | *SE* | *1997* | *SE* | *2002* | *SE* |
| Total health expense | $4,510 | $433 | $4,848 | $202 | $753 | $35 | $971 | $34 | $3,757 | $418 | $3,877 | $195 |
| Men | 4,640 | 668 | 4,615 | 274 | 674 | 50 | 818 | 41 | 3,966 | 660 | 3,797 | 268 |
| Women | 4,392 | 519 | 5,070 | 285 | 824 | 50 | 1,116 | 48 | 3,569 | 497 | 3,954 | 278 |
| Prescribed medicine expense | $637 | $25 | $1,114 | $39 | $286 | $15 | $425 | $18 | $351 | $15 | $689 | $30 |
| Men | 560 | 32 | 974 | 44 | 230 | 16 | 351 | 21 | 331 | 22 | 623 | 33 |
| Women | 706 | 37 | 1,247 | 56 | 338 | 24 | 495 | 25 | 369 | 20 | 752 | 44 |

SE Standard error.

NOTES: Data are for the civilian noninstitutionalized population. 1997 estimates have been adjusted to 2002 dollars using the Consumer Price Index (All Urban Consumers; U.S. City Average; All items). Table includes persons with no expense. "All other sources" includes private health insurance, public coverage and other miscellaneous sources. Total health expense include expenses for inpatient hospital and physician services, ambulatory physician and nonphysician services, prescribed medicines, home health services, dental services, and other medical equipment, supplies, and services that were purchased or rented during the year. Excludes expenses for over-the-counter medications, preventive care services, phone contacts with health providers, and premiums for health insurance. Prescribed medicine expense include expenses for all prescribed medications that were purchased or refilled during the survey year. See related *Health, United States, 2005*, tables 124 and 126.

SOURCE: Agency for Healthcare Research and Quality, Center for Cost and Financing Studies. 1997 and 2002 Medical Expenditure Panel Surveys.



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Trend Tables



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## Table 1 (page 1 of 3). Resident population, according to age, sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on decennial census updated by data from multiple sources]

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| Sex, race, Hispanic origin, and year | Total resident population | Under 1 year | 1–4 years | 5–14 years | 15–24 years | 25–34 years | 35–44 years | 45–54 years | 55–64 years | 65–74 years | 75–84 years | 85 years and over |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **All persons** | Number in thousands | | | | | | | | | | | |
| 1950 | 150,697 | 3,147 | 13,017 | 24,319 | 22,098 | 23,759 | 21,450 | 17,343 | 13,370 | 8,340 | 3,278 | 577 |
| 1960 | 179,323 | 4,112 | 16,209 | 35,465 | 24,020 | 22,818 | 24,081 | 20,485 | 15,572 | 10,997 | 4,633 | 929 |
| 1970 | 203,212 | 3,485 | 13,669 | 40,746 | 35,441 | 24,907 | 23,088 | 23,220 | 18,590 | 12,435 | 6,119 | 1,511 |
| 1980 | 226,546 | 3,534 | 12,815 | 34,942 | 42,487 | 37,082 | 25,635 | 22,800 | 21,703 | 15,581 | 7,729 | 2,240 |
| 1990 | 248,710 | 3,946 | 14,812 | 35,095 | 37,013 | 43,161 | 37,435 | 25,057 | 21,113 | 18,045 | 10,012 | 3,021 |
| 2000 | 281,422 | 3,806 | 15,370 | 41,078 | 39,184 | 39,892 | 45,149 | 37,678 | 24,275 | 18,391 | 12,361 | 4,240 |
| 2001 | 284,797 | 4,034 | 15,336 | 41,065 | 39,948 | 39,607 | 45,019 | 39,188 | 25,309 | 18,313 | 12,574 | 4,404 |
| 2002 | 288,369 | 4,034 | 15,575 | 41,037 | 40,590 | 39,928 | 44,917 | 40,084 | 26,602 | 18,274 | 12,735 | 4,593 |
| 2003 | 290,811 | 4,004 | 15,766 | 40,969 | 41,206 | 39,873 | 44,371 | 40,805 | 27,900 | 18,337 | 12,869 | 4,713 |
| **Male** | | | | | | | | | | | | |
| 1950 | 74,833 | 1,602 | 6,634 | 12,375 | 10,918 | 11,597 | 10,588 | 8,655 | 6,697 | 4,024 | 1,507 | 237 |
| 1960 | 88,331 | 2,090 | 8,240 | 18,029 | 11,906 | 11,179 | 11,755 | 10,093 | 7,537 | 5,116 | 2,025 | 362 |
| 1970 | 98,912 | 1,778 | 6,968 | 20,759 | 17,551 | 12,217 | 11,231 | 11,199 | 8,793 | 5,437 | 2,436 | 542 |
| 1980 | 110,053 | 1,806 | 6,556 | 17,855 | 21,419 | 18,382 | 12,570 | 11,009 | 10,152 | 6,757 | 2,867 | 682 |
| 1990 | 121,239 | 2,018 | 7,581 | 17,971 | 18,915 | 21,564 | 18,510 | 12,232 | 9,955 | 7,907 | 3,745 | 841 |
| 2000 | 138,054 | 1,949 | 7,862 | 21,043 | 20,079 | 20,121 | 22,448 | 18,497 | 11,645 | 8,303 | 4,879 | 1,227 |
| 2001 | 139,813 | 2,064 | 7,841 | 21,033 | 20,485 | 20,014 | 22,403 | 19,236 | 12,154 | 8,297 | 4,987 | 1,299 |
| 2002 | 141,661 | 2,064 | 7,962 | 21,013 | 20,821 | 20,203 | 22,367 | 19,676 | 12,784 | 8,301 | 5,081 | 1,390 |
| 2003 | 143,037 | 2,046 | 8,060 | 20,977 | 21,183 | 20,222 | 22,134 | 20,044 | 13,424 | 8,349 | 5,154 | 1,445 |
| **Female** | | | | | | | | | | | | |
| 1950 | 75,864 | 1,545 | 6,383 | 11,944 | 11,181 | 12,162 | 10,863 | 8,688 | 6,672 | 4,316 | 1,771 | 340 |
| 1960 | 90,992 | 2,022 | 7,969 | 17,437 | 12,114 | 11,639 | 12,326 | 10,393 | 8,036 | 5,881 | 2,609 | 567 |
| 1970 | 104,300 | 1,707 | 6,701 | 19,986 | 17,890 | 12,690 | 11,857 | 12,021 | 9,797 | 6,998 | 3,683 | 969 |
| 1980 | 116,493 | 1,727 | 6,259 | 17,087 | 21,068 | 18,700 | 13,065 | 11,791 | 11,551 | 8,824 | 4,862 | 1,559 |
| 1990 | 127,471 | 1,928 | 7,231 | 17,124 | 18,098 | 21,596 | 18,925 | 12,824 | 11,158 | 10,139 | 6,267 | 2,180 |
| 2000 | 143,368 | 1,857 | 7,508 | 20,034 | 19,105 | 19,771 | 22,701 | 19,181 | 12,629 | 10,088 | 7,482 | 3,013 |
| 2001 | 144,984 | 1,969 | 7,495 | 20,033 | 19,463 | 19,594 | 22,616 | 19,952 | 13,155 | 10,016 | 7,587 | 3,105 |
| 2002 | 146,708 | 1,970 | 7,614 | 20,025 | 19,769 | 19,726 | 22,550 | 20,408 | 13,817 | 9,973 | 7,654 | 3,203 |
| 2003 | 147,773 | 1,958 | 7,706 | 19,992 | 20,024 | 19,650 | 22,237 | 20,761 | 14,475 | 9,988 | 7,714 | 3,269 |
| **White male** | | | | | | | | | | | | |
| 1950 | 67,129 | 1,400 | 5,845 | 10,860 | 9,689 | 10,430 | 9,529 | 7,836 | 6,180 | 3,736 | 1,406 | 218 |
| 1960 | 78,367 | 1,784 | 7,065 | 15,659 | 10,483 | 9,940 | 10,564 | 9,114 | 6,850 | 4,702 | 1,875 | 331 |
| 1970 | 86,721 | 1,501 | 5,873 | 17,667 | 15,232 | 10,775 | 9,979 | 10,090 | 7,958 | 4,916 | 2,243 | 487 |
| 1980 | 94,976 | 1,487 | 5,402 | 14,773 | 18,123 | 15,940 | 11,010 | 9,774 | 9,151 | 6,096 | 2,600 | 621 |
| 1990 | 102,143 | 1,604 | 6,071 | 14,467 | 15,389 | 18,071 | 15,819 | 10,624 | 8,813 | 7,127 | 3,397 | 760 |
| 2000 | 113,445 | 1,524 | 6,143 | 16,428 | 15,942 | 16,232 | 18,568 | 15,670 | 10,067 | 7,343 | 4,419 | 1,109 |
| 2001 | 114,659 | 1,609 | 6,124 | 16,398 | 16,235 | 16,103 | 18,461 | 16,240 | 10,497 | 7,311 | 4,504 | 1,176 |
| 2002 | 115,966 | 1,603 | 6,212 | 16,363 | 16,482 | 16,214 | 18,368 | 16,553 | 11,045 | 7,288 | 4,580 | 1,257 |
| 2003 | 116,875 | 1,594 | 6,296 | 16,322 | 16,726 | 16,159 | 18,129 | 16,807 | 11,590 | 7,308 | 4,638 | 1,307 |
| **White female** | | | | | | | | | | | | |
| 1950 | 67,813 | 1,341 | 5,599 | 10,431 | 9,821 | 10,851 | 9,719 | 7,868 | 6,168 | 4,031 | 1,669 | 314 |
| 1960 | 80,465 | 1,714 | 6,795 | 15,068 | 10,596 | 10,204 | 11,000 | 9,364 | 7,327 | 5,428 | 2,441 | 527 |
| 1970 | 91,028 | 1,434 | 5,615 | 16,912 | 15,420 | 11,004 | 10,349 | 10,756 | 8,853 | 6,366 | 3,429 | 890 |
| 1980 | 99,835 | 1,412 | 5,127 | 14,057 | 17,653 | 15,896 | 11,232 | 10,285 | 10,325 | 7,951 | 4,457 | 1,440 |
| 1990 | 106,561 | 1,524 | 5,762 | 13,706 | 14,599 | 17,757 | 15,834 | 10,946 | 9,698 | 9,048 | 5,687 | 2,001 |
| 2000 | 116,641 | 1,447 | 5,839 | 15,576 | 14,966 | 15,574 | 18,386 | 15,921 | 10,731 | 8,757 | 6,715 | 2,729 |
| 2001 | 117,693 | 1,536 | 5,826 | 15,554 | 15,238 | 15,385 | 18,245 | 16,493 | 11,162 | 8,659 | 6,784 | 2,809 |
| 2002 | 118,780 | 1,528 | 5,915 | 15,519 | 15,471 | 15,412 | 18,115 | 16,794 | 11,716 | 8,590 | 6,825 | 2,895 |
| 2003 | 119,474 | 1,525 | 5,999 | 15,488 | 15,658 | 15,310 | 17,813 | 17,034 | 12,263 | 8,576 | 6,859 | 2,950 |

See notes at end of table.



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## Table 1 (page 2 of 3). Resident population, according to age, sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on decennial census updated by data from multiple sources]

Click here for spreadsheet version

| Sex, race, Hispanic origin, and year | Total resident population | Under 1 year | 1–4 years | 5–14 years | 15–24 years | 25–34 years | 35–44 years | 45–54 years | 55–64 years | 65–74 years | 75–84 years | 85 years and over |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Black or African American male | Number in thousands | | | | | | | | | | | |
| 1950 | 7,300 | --- | [1]944 | 1,442 | 1,162 | 1,105 | 1,003 | 772 | 459 | 299 | [2]113 | --- |
| 1960 | 9,114 | 281 | 1,082 | 2,185 | 1,305 | 1,120 | 1,086 | 891 | 617 | 382 | 137 | 29 |
| 1970 | 10,748 | 245 | 975 | 2,784 | 2,041 | 1,226 | 1,084 | 979 | 739 | 461 | 169 | 46 |
| 1980 | 12,585 | 269 | 967 | 2,614 | 2,807 | 1,967 | 1,235 | 1,024 | 854 | 567 | 228 | 53 |
| 1990 | 14,420 | 322 | 1,164 | 2,700 | 2,669 | 2,592 | 1,962 | 1,175 | 878 | 614 | 277 | 66 |
| 2000 | 17,407 | 313 | 1,271 | 3,454 | 2,932 | 2,586 | 2,705 | 1,957 | 1,090 | 683 | 330 | 87 |
| 2001 | 17,710 | 334 | 1,263 | 3,462 | 3,033 | 2,574 | 2,727 | 2,067 | 1,131 | 691 | 340 | 88 |
| 2002 | 17,979 | 344 | 1,290 | 3,454 | 3,107 | 2,589 | 2,726 | 2,149 | 1,177 | 701 | 349 | 93 |
| 2003 | 18,190 | 336 | 1,301 | 3,444 | 3,180 | 2,613 | 2,705 | 2,218 | 1,232 | 711 | 355 | 96 |
| Black or African American female | | | | | | | | | | | | |
| 1950 | 7,745 | --- | [1]941 | 1,446 | 1,300 | 1,260 | 1,112 | 796 | 443 | 322 | [2]125 | --- |
| 1960 | 9,758 | 283 | 1,085 | 2,191 | 1,404 | 1,300 | 1,229 | 974 | 663 | 430 | 160 | 38 |
| 1970 | 11,832 | 243 | 970 | 2,773 | 2,196 | 1,456 | 1,309 | 1,134 | 868 | 582 | 230 | 71 |
| 1980 | 14,046 | 266 | 951 | 2,578 | 2,937 | 2,267 | 1,488 | 1,258 | 1,059 | 776 | 360 | 106 |
| 1990 | 16,063 | 316 | 1,137 | 2,641 | 2,700 | 2,905 | 2,279 | 1,416 | 1,135 | 884 | 495 | 156 |
| 2000 | 19,187 | 302 | 1,228 | 3,348 | 2,971 | 2,866 | 3,055 | 2,274 | 1,353 | 971 | 587 | 233 |
| 2001 | 19,486 | 317 | 1,221 | 3,356 | 3,040 | 2,846 | 3,076 | 2,405 | 1,404 | 979 | 605 | 238 |
| 2002 | 19,769 | 330 | 1,249 | 3,351 | 3,091 | 2,855 | 3,079 | 2,503 | 1,464 | 987 | 616 | 243 |
| 2003 | 19,958 | 323 | 1,260 | 3,337 | 3,140 | 2,862 | 3,052 | 2,579 | 1,531 | 999 | 627 | 247 |
| American Indian or Alaska Native male | | | | | | | | | | | | |
| 1980 | 702 | 17 | 59 | 153 | 161 | 114 | 75 | 53 | 37 | 22 | 9 | 2 |
| 1990 | 1,024 | 24 | 88 | 206 | 192 | 183 | 140 | 86 | 55 | 32 | 13 | 3 |
| 2000 | 1,488 | 28 | 109 | 301 | 271 | 229 | 229 | 165 | 88 | 45 | 18 | 5 |
| 2001 | 1,524 | 29 | 109 | 298 | 280 | 232 | 232 | 175 | 95 | 49 | 21 | 5 |
| 2002 | 1,535 | 21 | 101 | 295 | 287 | 237 | 233 | 181 | 101 | 51 | 22 | 6 |
| 2003 | 1,553 | 21 | 96 | 293 | 294 | 240 | 232 | 187 | 107 | 53 | 24 | 6 |
| American Indian or Alaska Native female | | | | | | | | | | | | |
| 1980 | 718 | 16 | 57 | 149 | 158 | 118 | 79 | 57 | 41 | 27 | 12 | 4 |
| 1990 | 1,041 | 24 | 85 | 200 | 178 | 186 | 148 | 92 | 61 | 41 | 21 | 6 |
| 2000 | 1,496 | 26 | 106 | 293 | 254 | 219 | 236 | 174 | 95 | 54 | 28 | 10 |
| 2001 | 1,530 | 28 | 105 | 290 | 263 | 220 | 238 | 185 | 102 | 58 | 30 | 11 |
| 2002 | 1,541 | 20 | 98 | 287 | 271 | 223 | 238 | 192 | 109 | 60 | 32 | 12 |
| 2003 | 1,558 | 21 | 93 | 286 | 278 | 224 | 235 | 198 | 115 | 62 | 33 | 13 |
| Asian or Pacific Islander male | | | | | | | | | | | | |
| 1980 | 1,814 | 35 | 130 | 321 | 334 | 366 | 252 | 159 | 110 | 72 | 30 | 6 |
| 1990 | 3,652 | 68 | 258 | 598 | 665 | 718 | 588 | 347 | 208 | 133 | 57 | 12 |
| 2000 | 5,713 | 84 | 339 | 861 | 934 | 1,073 | 947 | 705 | 399 | 231 | 112 | 27 |
| 2001 | 5,919 | 92 | 344 | 875 | 937 | 1,104 | 983 | 754 | 431 | 247 | 122 | 30 |
| 2002 | 6,180 | 95 | 358 | 900 | 946 | 1,163 | 1,040 | 793 | 461 | 261 | 130 | 33 |
| 2003 | 6,419 | 94 | 367 | 917 | 983 | 1,211 | 1,068 | 832 | 496 | 277 | 138 | 36 |
| Asian or Pacific Islander female | | | | | | | | | | | | |
| 1980 | 1,915 | 34 | 127 | 307 | 325 | 423 | 269 | 192 | 126 | 71 | 33 | 9 |
| 1990 | 3,805 | 65 | 247 | 578 | 621 | 749 | 664 | 371 | 264 | 166 | 65 | 17 |
| 2000 | 6,044 | 81 | 336 | 817 | 914 | 1,112 | 1,024 | 812 | 451 | 305 | 152 | 41 |
| 2001 | 6,275 | 88 | 342 | 833 | 922 | 1,143 | 1,057 | 869 | 486 | 321 | 167 | 47 |
| 2002 | 6,618 | 91 | 352 | 868 | 936 | 1,235 | 1,118 | 919 | 529 | 337 | 181 | 53 |
| 2003 | 6,783 | 89 | 354 | 882 | 947 | 1,254 | 1,137 | 950 | 565 | 351 | 196 | 59 |
| Hispanic or Latino male | | | | | | | | | | | | |
| 1980 | 7,280 | 187 | 661 | 1,530 | 1,646 | 1,256 | 761 | 570 | 364 | 200 | 86 | 19 |
| 1990 | 11,388 | 279 | 980 | 2,128 | 2,376 | 2,310 | 1,471 | 818 | 551 | 312 | 131 | 32 |
| 2000 | 18,162 | 395 | 1,506 | 3,469 | 3,564 | 3,494 | 2,653 | 1,551 | 804 | 474 | 203 | 50 |
| 2001 | 19,018 | 417 | 1,533 | 3,606 | 3,606 | 3,699 | 2,828 | 1,684 | 869 | 501 | 224 | 53 |
| 2002 | 19,991 | 426 | 1,598 | 3,721 | 3,656 | 3,978 | 3,027 | 1,823 | 935 | 523 | 244 | 60 |
| 2003 | 20,599 | 442 | 1,682 | 3,832 | 3,759 | 4,016 | 3,101 | 1,910 | 991 | 542 | 261 | 65 |
| Hispanic or Latino female | | | | | | | | | | | | |
| 1980 | 7,329 | 181 | 634 | 1,482 | 1,546 | 1,249 | 805 | 615 | 411 | 257 | 117 | 30 |
| 1990 | 10,966 | 268 | 939 | 2,039 | 2,028 | 2,073 | 1,448 | 868 | 632 | 403 | 209 | 59 |
| 2000 | 17,144 | 376 | 1,441 | 3,318 | 3,017 | 3,016 | 2,476 | 1,585 | 907 | 603 | 303 | 101 |
| 2001 | 17,955 | 401 | 1,467 | 3,450 | 3,085 | 3,163 | 2,624 | 1,714 | 978 | 635 | 331 | 107 |
| 2002 | 18,770 | 408 | 1,530 | 3,545 | 3,147 | 3,354 | 2,782 | 1,832 | 1,040 | 658 | 356 | 121 |
| 2003 | 19,300 | 424 | 1,611 | 3,659 | 3,235 | 3,363 | 2,815 | 1,908 | 1,097 | 680 | 380 | 128 |

See notes at end of table.



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## Table 1 (page 3 of 3). Resident population, according to age, sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on decennial census updated by data from multiple sources]

Click here for spreadsheet version

| Sex, race, Hispanic origin, and year | Total resident population | Under 1 year | 1–4 years | 5–14 years | 15–24 years | 25–34 years | 35–44 years | 45–54 years | 55–64 years | 65–74 years | 75–84 years | 85 years and over |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino male | Number in thousands | | | | | | | | | | | |
| 1980 | 88,035 | 1,308 | 4,772 | 13,317 | 16,554 | 14,739 | 10,284 | 9,229 | 8,803 | 5,906 | 2,519 | 603 |
| 1990 | 91,743 | 1,351 | 5,181 | 12,525 | 13,219 | 15,967 | 14,481 | 9,875 | 8,303 | 6,837 | 3,275 | 729 |
| 2000 | 96,551 | 1,163 | 4,761 | 13,238 | 12,628 | 12,958 | 16,088 | 14,223 | 9,312 | 6,894 | 4,225 | 1,062 |
| 2001 | 96,966 | 1,228 | 4,719 | 13,082 | 12,885 | 12,634 | 15,816 | 14,669 | 9,680 | 6,836 | 4,291 | 1,126 |
| 2002 | 97,329 | 1,198 | 4,729 | 12,941 | 13,086 | 12,480 | 15,534 | 14,851 | 10,168 | 6,793 | 4,348 | 1,201 |
| 2003 | 97,660 | 1,173 | 4,718 | 12,797 | 13,237 | 12,393 | 15,225 | 15,025 | 10,660 | 6,796 | 4,390 | 1,245 |
| White, not Hispanic or Latino female | | | | | | | | | | | | |
| 1980 | 92,872 | 1,240 | 4,522 | 12,647 | 16,185 | 14,711 | 10,468 | 9,700 | 9,935 | 7,707 | 4,345 | 1,411 |
| 1990 | 96,557 | 1,280 | 4,909 | 11,846 | 12,749 | 15,872 | 14,520 | 10,153 | 9,116 | 8,674 | 5,491 | 1,945 |
| 2000 | 100,774 | 1,102 | 4,517 | 12,529 | 12,183 | 12,778 | 16,089 | 14,446 | 9,879 | 8,188 | 6,429 | 2,633 |
| 2001 | 101,070 | 1,169 | 4,482 | 12,385 | 12,393 | 12,449 | 15,810 | 14,900 | 10,244 | 8,059 | 6,471 | 2,707 |
| 2002 | 101,363 | 1,140 | 4,496 | 12,263 | 12,567 | 12,296 | 15,531 | 15,091 | 10,740 | 7,970 | 6,489 | 2,780 |
| 2003 | 101,555 | 1,121 | 4,488 | 12,125 | 12,673 | 12,188 | 15,201 | 15,261 | 11,236 | 7,935 | 6,499 | 2,829 |

--- Data not available.
[1]Population for age group under 5 years.
[2]Population for age group 75 years and over.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with *Health, United States, 2003*, intercensal population estimates for the 1990s and 2000 are based on census 2000. Population estimates for 2001 and later years are 2000-based postcensal estimates. Population figures are census counts as of April 1 for 1950, 1960, 1970, 1980, 1990, and 2000; estimates as of July 1 for other years. See Appendix I, Population Census and Population Estimates. Populations for age groups may not sum to the total due to rounding. Although population figures are shown rounded to the nearest 1,000, calculations of birth rates and death rates shown in this volume are based on unrounded population figures for decennial years and for all years starting with 1991. See Appendix II, Rate. Unrounded population figures are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data for additional years are available. See Appendix III.

SOURCES: U.S. Bureau of the Census: 1950 Nonwhite Population by Race. Special Report P-E, No. 3B. Washington. U.S. Government Printing Office, 1951; U.S. Census of Population: 1960, Number of Inhabitants, PC(1)-A1, United States Summary, 1964; 1970, Number of Inhabitants, Final Report PC(1)-A1, United States Summary, 1971; U.S. population estimates, by age, sex, race, and Hispanic origin: 1980 to 1991. Current population reports, series P–25, no 1095. Washington. U.S. Government Printing Office, Feb. 1993; National Center for Health Statistics. Estimates of the July 1, 1991-July 1, 1999, April 1, 2000, and July 1, 2001-July 1, 2003 United States resident population by age, sex, race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau, Population Estimates Program. Available at www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm. 2004.



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## Table 2 (page 1 of 2). Persons and families below poverty level, according to selected characteristics, race, and Hispanic origin: United States, selected years 1973–2003

[Data are based on household interviews of the civilian noninstitutionalized population]

Click here for spreadsheet version

| *Selected characteristics, race, and Hispanic origin*[1] | *1973* | *1980* | *1985* | *1990* | *1995* | *2000*[2] | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| All persons | | | | Percent below poverty | | | | | |
| All races | 11.1 | 13.0 | 14.0 | 13.5 | 13.8 | 11.3 | 11.7 | 12.1 | 12.5 |
| White only | 8.4 | 10.2 | 11.4 | 10.7 | 11.2 | 9.5 | 9.9 | 10.2 | 10.5 |
| Black or African American only | 31.4 | 32.5 | 31.3 | 31.9 | 29.3 | 22.5 | 22.7 | 24.1 | 24.4 |
| Asian only | --- | --- | --- | 12.2 | 14.6 | 9.9 | 10.2 | 10.1 | 11.8 |
| Hispanic or Latino | 21.9 | 25.7 | 29.0 | 28.1 | 30.3 | 21.5 | 21.4 | 21.8 | 22.5 |
| Mexican | --- | --- | 28.8 | 28.1 | 31.2 | 22.9 | 22.8 | --- | --- |
| Puerto Rican | --- | --- | 43.3 | 40.6 | 38.1 | 25.6 | 26.1 | --- | --- |
| White only, not Hispanic or Latino | 7.5 | 9.1 | 9.7 | 8.8 | 8.5 | 7.4 | 7.8 | 8.0 | 8.2 |
| Related children under 18 years of age in families | | | | | | | | | |
| All races | 14.2 | 17.9 | 20.1 | 19.9 | 20.2 | 15.6 | 15.8 | 16.3 | 17.2 |
| White only | 9.7 | 13.4 | 15.6 | 15.1 | 15.5 | 12.4 | 12.8 | 13.1 | 13.9 |
| Black or African American only | 40.6 | 42.1 | 43.1 | 44.2 | 41.5 | 30.9 | 30.0 | 32.1 | 33.6 |
| Asian only | --- | --- | --- | 17.0 | 18.6 | 12.5 | 11.1 | 11.4 | 12.1 |
| Hispanic or Latino | 27.8 | 33.0 | 39.6 | 37.7 | 39.3 | 27.6 | 27.4 | 28.2 | 29.5 |
| Mexican | --- | --- | 37.4 | 35.5 | 39.3 | 29.5 | 28.8 | --- | --- |
| Puerto Rican | --- | --- | 58.6 | 56.7 | 53.2 | 32.1 | 33.0 | --- | --- |
| White only, not Hispanic or Latino | --- | 11.3 | 12.3 | 11.6 | 10.6 | 8.5 | 8.9 | 8.9 | 9.3 |
| Related children under 18 years of age in families with female householder and no spouse present | | | | | | | | | |
| All races | --- | 50.8 | 53.6 | 53.4 | 50.3 | 40.1 | 39.3 | 39.6 | 41.8 |
| White only | --- | 41.6 | 45.2 | 45.9 | 42.5 | 33.9 | 34.7 | 34.7 | 37.0 |
| Black or African American only | --- | 64.8 | 66.9 | 64.7 | 61.6 | 49.3 | 46.6 | 47.5 | 49.8 |
| Asian only | --- | --- | --- | 32.2 | 42.4 | 38.0 | 26.7 | 29.8 | 37.4 |
| Hispanic or Latino | --- | 65.0 | 72.4 | 68.4 | 65.7 | 49.8 | 49.3 | 47.9 | 50.6 |
| Mexican | --- | --- | 64.4 | 62.4 | 65.9 | 51.4 | 50.9 | --- | --- |
| Puerto Rican | --- | --- | 85.4 | 82.7 | 79.6 | 55.3 | 52.9 | --- | --- |
| White only, not Hispanic or Latino | --- | --- | --- | 39.6 | 33.5 | 28.0 | 29.0 | 29.2 | 30.7 |
| All persons | | | | Number below poverty in thousands | | | | | |
| All races | 22,973 | 29,272 | 33,064 | 33,585 | 36,425 | 31,581 | 32,907 | 34,570 | 35,861 |
| White only | 15,142 | 19,699 | 22,860 | 22,326 | 24,423 | 21,645 | 22,739 | 23,466 | 24,272 |
| Black or African American only | 7,388 | 8,579 | 8,926 | 9,837 | 9,872 | 7,982 | 8,136 | 8,602 | 8,781 |
| Asian only | --- | --- | --- | 858 | 1,411 | 1,258 | 1,275 | 1,161 | 1,401 |
| Hispanic or Latino | 2,366 | 3,491 | 5,236 | 6,006 | 8,574 | 7,747 | 7,997 | 8,555 | 9,051 |
| Mexican | --- | --- | 3,220 | 3,764 | 5,608 | 5,460 | 5,698 | --- | --- |
| Puerto Rican | --- | --- | 1,011 | 966 | 1,183 | 814 | 839 | --- | --- |
| White only, not Hispanic or Latino | 12,864 | 16,365 | 17,839 | 16,622 | 16,267 | 14,366 | 15,271 | 15,567 | 15,902 |
| Related children under 18 years of age in families | | | | | | | | | |
| All races | 9,453 | 11,114 | 12,483 | 12,715 | 13,999 | 11,005 | 11,175 | 11,646 | 12,340 |
| White only | 5,462 | 6,817 | 7,838 | 7,696 | 8,474 | 6,834 | 7,086 | 7,203 | 7,624 |
| Black or African American only | 3,822 | 3,906 | 4,057 | 4,412 | 4,644 | 3,495 | 3,423 | 3,570 | 3,750 |
| Asian only | --- | --- | --- | 356 | 532 | 407 | 353 | 302 | 331 |
| Hispanic or Latino | 1,364 | 1,718 | 2,512 | 2,750 | 3,938 | 3,342 | 3,433 | 3,653 | 3,982 |
| Mexican | --- | --- | 1,589 | 1,733 | 2,655 | 2,537 | 2,613 | --- | --- |
| Puerto Rican | --- | --- | 535 | 490 | 610 | 329 | 319 | --- | --- |
| White only, not Hispanic or Latino | --- | 5,174 | 5,421 | 5,106 | 4,745 | 3,715 | 3,887 | 3,848 | 3,957 |

See footnotes at end of table.



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## Table 2 (page 2 of 2). Persons and families below poverty level, according to selected characteristics, race, and Hispanic origin: United States, selected years 1973–2003

[Data are based on household interviews of the civilian noninstitutionalized population]

Click here for spreadsheet version

| *Selected characteristics, race, and Hispanic origin*[1] | *1973* | *1980* | *1985* | *1990* | *1995* | *2000*[2] | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| Related children under 18 years of age in families with female householder and no spouse present | | | | Number below poverty in thousands | | | | | |
| All races | --- | 5,866 | 6,716 | 7,363 | 8,364 | 6,300 | 6,341 | 6,564 | 7,085 |
| White only | --- | 2,813 | 3,372 | 3,597 | 4,051 | 3,090 | 3,291 | 3,271 | 3,580 |
| Black or African American only | --- | 2,944 | 3,181 | 3,543 | 3,954 | 2,908 | 2,741 | 2,855 | 3,026 |
| Asian only | --- | --- | --- | 80 | 145 | 162 | 105 | 85 | 119 |
| Hispanic or Latino | --- | 809 | 1,247 | 1,314 | 1,872 | 1,407 | 1,508 | 1,501 | 1,727 |
| Mexican | --- | --- | 553 | 615 | 1,056 | 938 | 1,001 | --- | --- |
| Puerto Rican | --- | --- | 449 | 382 | 459 | 242 | 236 | --- | --- |
| White only, not Hispanic or Latino | --- | --- | --- | 2,411 | 2,299 | 1,832 | 1,953 | 1,949 | 2,033 |

--- Data not available.

[1]The race groups, white, black, and Asian, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 2002 race-specific estimates are tabulated according to 1997 Standards for Federal Data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The three single race categories shown in the table conform to 1997 Standards. For 2002 and later years, race-specific estimates are for persons who reported only one racial group. Prior to data year 2002, data were tabulated according to 1977 Standards in which the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 2002 are based on answers to the Current Population Survey questionnaire which asked respondents to choose only a single race. See Appendix II, Race.

[2]Estimates are consistent with 2001 data through implementation of Census 2000-based population controls and a 28,000 household sample expansion.

NOTES: Estimates of poverty for 1991–98 are based on 1990 postcensal population estimates. Estimates for 1999 and later years are based on 2000 census population controls. Poverty status is based on family income and family size using Bureau of the Census poverty thresholds. See Appendix II, Poverty status. The Current Population Survey is not large enough to produce reliable annual estimates for American Indian or Alaska Native persons, or for Native Hawaiians. The 2001–03 average poverty rate for American Indian or Alaskan Native only or in combination was 20.0 percent, representing 883,000 persons; for American Indian or Alaska Native only was 23.2 percent, representing 612,000 persons. Data for additional years are available. See Appendix III.

SOURCES: U.S. Census Bureau, Current Population Survey 2000–2004 Annual Social and Economic Supplements; DeNavas-Walt C, Proctor BD, Mills RJ. Income, Poverty and Health Insurance Coverage in the United States: 2003. Current population reports, series P–60, no 226. Washington: U.S. Government Printing Office. 2004.



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## Table 3 (page 1 of 2). Crude birth rates, fertility rates, and birth rates by age of mother, according to race and Hispanic origin: United States, selected years 1950–2003

[Data are based on birth certificates]

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| Race, Hispanic origin, and year | Crude birth rate[1] | Fertility rate[2] | Age of mother | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 10–14 years | 15–19 years | | | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–54 years[3] |
| | | | | Total | 15–17 years | 18–19 years | | | | | | |
| All races | Live births per 1,000 women | | | | | | | | | | | |
| 1950 | 24.1 | 106.2 | 1.0 | 81.6 | 40.7 | 132.7 | 196.6 | 166.1 | 103.7 | 52.9 | 15.1 | 1.2 |
| 1960 | 23.7 | 118.0 | 0.8 | 89.1 | 43.9 | 166.7 | 258.1 | 197.4 | 112.7 | 56.2 | 15.5 | 0.9 |
| 1970 | 18.4 | 87.9 | 1.2 | 68.3 | 38.8 | 114.7 | 167.8 | 145.1 | 73.3 | 31.7 | 8.1 | 0.5 |
| 1980 | 15.9 | 68.4 | 1.1 | 53.0 | 32.5 | 82.1 | 115.1 | 112.9 | 61.9 | 19.8 | 3.9 | 0.2 |
| 1985 | 15.8 | 66.3 | 1.2 | 51.0 | 31.0 | 79.6 | 108.3 | 111.0 | 69.1 | 24.0 | 4.0 | 0.2 |
| 1990 | 16.7 | 70.9 | 1.4 | 59.9 | 37.5 | 88.6 | 116.5 | 120.2 | 80.8 | 31.7 | 5.5 | 0.2 |
| 1995 | 14.6 | 64.6 | 1.3 | 56.0 | 35.5 | 87.7 | 107.5 | 108.8 | 81.1 | 34.0 | 6.6 | 0.3 |
| 1999 | 14.2 | 64.4 | 0.9 | 48.8 | 28.2 | 79.0 | 107.9 | 111.2 | 87.1 | 37.8 | 7.4 | 0.4 |
| 2000 | 14.4 | 65.9 | 0.9 | 47.7 | 26.9 | 78.1 | 109.7 | 113.5 | 91.2 | 39.7 | 8.0 | 0.5 |
| 2001 | 14.1 | 65.3 | 0.8 | 45.3 | 24.7 | 76.1 | 106.2 | 113.4 | 91.9 | 40.6 | 8.1 | 0.5 |
| 2002 | 13.9 | 64.8 | 0.7 | 43.0 | 23.2 | 72.8 | 103.6 | 113.6 | 91.5 | 41.4 | 8.3 | 0.5 |
| 2003 | 14.1 | 66.1 | 0.6 | 41.6 | 22.4 | 70.7 | 102.6 | 115.6 | 95.1 | 43.8 | 8.7 | 0.5 |
| Race of child:[4] White | | | | | | | | | | | | |
| 1950 | 23.0 | 102.3 | 0.4 | 70.0 | 31.3 | 120.5 | 190.4 | 165.1 | 102.6 | 51.4 | 14.5 | 1.0 |
| 1960 | 22.7 | 113.2 | 0.4 | 79.4 | 35.5 | 154.6 | 252.8 | 194.9 | 109.6 | 54.0 | 14.7 | 0.8 |
| 1970 | 17.4 | 84.1 | 0.5 | 57.4 | 29.2 | 101.5 | 163.4 | 145.9 | 71.9 | 30.0 | 7.5 | 0.4 |
| 1980 | 14.9 | 64.7 | 0.6 | 44.7 | 25.2 | 72.1 | 109.5 | 112.4 | 60.4 | 18.5 | 3.4 | 0.2 |
| Race of mother:[5] White | | | | | | | | | | | | |
| 1980 | 15.1 | 65.6 | 0.6 | 45.4 | 25.5 | 73.2 | 111.1 | 113.8 | 61.2 | 18.8 | 3.5 | 0.2 |
| 1985 | 15.0 | 64.1 | 0.6 | 43.3 | 24.4 | 70.4 | 104.1 | 112.3 | 69.9 | 23.3 | 3.7 | 0.2 |
| 1990 | 15.8 | 68.3 | 0.7 | 50.8 | 29.5 | 78.0 | 109.8 | 120.7 | 81.7 | 31.5 | 5.2 | 0.2 |
| 1995 | 14.1 | 63.6 | 0.8 | 49.5 | 29.6 | 80.2 | 104.7 | 111.7 | 83.3 | 34.2 | 6.4 | 0.3 |
| 1999 | 13.7 | 64.0 | 0.6 | 44.0 | 24.4 | 73.0 | 105.0 | 114.9 | 90.7 | 38.5 | 7.4 | 0.4 |
| 2000 | 13.9 | 65.3 | 0.6 | 43.2 | 23.3 | 72.3 | 106.6 | 116.7 | 94.6 | 40.2 | 7.9 | 0.4 |
| 2001 | 13.7 | 65.0 | 0.5 | 41.2 | 21.4 | 70.8 | 103.7 | 117.0 | 95.8 | 41.3 | 8.0 | 0.5 |
| 2002 | 13.5 | 64.8 | 0.5 | 39.4 | 20.5 | 68.0 | 101.6 | 117.4 | 95.5 | 42.4 | 8.2 | 0.5 |
| 2003 | 13.6 | 66.1 | 0.5 | 38.3 | 19.8 | 66.2 | 100.6 | 119.5 | 99.3 | 44.8 | 8.7 | 0.5 |
| Race of child:[4] Black or African American | | | | | | | | | | | | |
| 1960 | 31.9 | 153.5 | 4.3 | 156.1 | --- | --- | 295.4 | 218.6 | 137.1 | 73.9 | 21.9 | 1.1 |
| 1970 | 25.3 | 115.4 | 5.2 | 140.7 | 101.4 | 204.9 | 202.7 | 136.3 | 79.6 | 41.9 | 12.5 | 1.0 |
| 1980 | 22.1 | 88.1 | 4.3 | 100.0 | 73.6 | 138.8 | 146.3 | 109.1 | 62.9 | 24.5 | 5.8 | 0.3 |
| Race of mother:[5] Black or African American | | | | | | | | | | | | |
| 1980 | 21.3 | 84.9 | 4.3 | 97.8 | 72.5 | 135.1 | 140.0 | 103.9 | 59.9 | 23.5 | 5.6 | 0.3 |
| 1985 | 20.4 | 78.8 | 4.5 | 95.4 | 69.3 | 132.4 | 135.0 | 100.2 | 57.9 | 23.9 | 4.6 | 0.3 |
| 1990 | 22.4 | 86.8 | 4.9 | 112.8 | 82.3 | 152.9 | 160.2 | 115.5 | 68.7 | 28.1 | 5.5 | 0.3 |
| 1995 | 17.8 | 71.0 | 4.1 | 94.4 | 68.5 | 135.0 | 133.7 | 95.6 | 63.0 | 28.4 | 6.0 | 0.3 |
| 1999 | 16.8 | 68.5 | 2.5 | 79.1 | 50.5 | 120.6 | 137.9 | 97.3 | 62.7 | 30.2 | 6.5 | 0.3 |
| 2000 | 17.0 | 70.0 | 2.3 | 77.4 | 49.0 | 118.8 | 141.3 | 100.3 | 65.4 | 31.5 | 7.2 | 0.4 |
| 2001 | 16.3 | 67.6 | 2.0 | 71.8 | 43.9 | 114.0 | 133.2 | 99.2 | 64.8 | 31.6 | 7.2 | 0.4 |
| 2002 | 15.7 | 65.8 | 1.8 | 66.6 | 40.0 | 107.6 | 127.1 | 99.0 | 64.4 | 31.5 | 7.4 | 0.4 |
| 2003 | 15.7 | 66.3 | 1.6 | 63.8 | 38.2 | 103.7 | 126.1 | 100.4 | 66.5 | 33.2 | 7.7 | 0.5 |
| American Indian or Alaska Native mothers[5] | | | | | | | | | | | | |
| 1980 | 20.7 | 82.7 | 1.9 | 82.2 | 51.5 | 129.5 | 143.7 | 106.6 | 61.8 | 28.1 | 8.2 | * |
| 1985 | 19.8 | 78.6 | 1.7 | 79.2 | 47.7 | 124.1 | 139.1 | 109.6 | 62.6 | 27.4 | 6.0 | * |
| 1990 | 18.9 | 76.2 | 1.6 | 81.1 | 48.5 | 129.3 | 148.7 | 110.3 | 61.5 | 27.5 | 5.9 | * |
| 1995 | 15.3 | 63.0 | 1.6 | 72.9 | 44.6 | 122.2 | 123.1 | 91.6 | 56.5 | 24.3 | 5.5 | * |
| 1999 | 14.2 | 59.0 | 1.4 | 59.9 | 36.5 | 98.0 | 120.7 | 90.6 | 53.8 | 24.3 | 5.7 | 0.3 |
| 2000 | 14.0 | 58.7 | 1.1 | 58.3 | 34.1 | 97.1 | 117.2 | 91.8 | 55.5 | 24.6 | 5.7 | 0.3 |
| 2001 | 13.7 | 58.1 | 1.0 | 56.3 | 31.4 | 94.8 | 115.0 | 90.4 | 55.9 | 24.7 | 5.7 | 0.3 |
| 2002 | 13.8 | 58.0 | 0.9 | 53.8 | 30.7 | 89.2 | 112.6 | 91.8 | 56.4 | 25.4 | 5.8 | 0.3 |
| 2003 | 13.8 | 58.4 | 1.0 | 53.1 | 30.6 | 87.3 | 110.0 | 93.5 | 57.4 | 25.4 | 5.5 | 0.4 |

See footnotes at end of table.



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## Table 3 (page 2 of 2). Crude birth rates, fertility rates, and birth rates by age of mother, according to race and Hispanic origin: United States, selected years 1950–2003

[Data are based on birth certificates]

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| Race, Hispanic origin, and year | Crude birth rate[1] | Fertility rate[2] | Age of mother | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 10–14 years | 15–19 years | | | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–54 years[3] |
| | | | | Total | 15–17 years | 18–19 years | | | | | | |
| **Asian or Pacific Islander mothers[5]** | | | Live births per 1,000 women | | | | | | | | | |
| 1980 | 19.9 | 73.2 | 0.3 | 26.2 | 12.0 | 46.2 | 93.3 | 127.4 | 96.0 | 38.3 | 8.5 | 0.7 |
| 1985 | 18.7 | 68.4 | 0.4 | 23.8 | 12.5 | 40.8 | 83.6 | 123.0 | 93.6 | 42.7 | 8.7 | 1.2 |
| 1990 | 19.0 | 69.6 | 0.7 | 26.4 | 16.0 | 40.2 | 79.2 | 126.3 | 106.5 | 49.6 | 10.7 | 1.1 |
| 1995 | 16.7 | 62.6 | 0.7 | 25.5 | 15.6 | 40.1 | 64.2 | 103.7 | 102.3 | 50.1 | 11.8 | 0.8 |
| 1999 | 15.9 | 60.9 | 0.4 | 21.4 | 12.4 | 33.9 | 58.9 | 100.8 | 104.3 | 52.9 | 11.3 | 0.9 |
| 2000 | 17.1 | 65.8 | 0.3 | 20.5 | 11.6 | 32.6 | 60.3 | 108.4 | 116.5 | 59.0 | 12.6 | 0.8 |
| 2001 | 16.4 | 64.2 | 0.2 | 19.8 | 10.3 | 32.8 | 59.1 | 106.4 | 112.6 | 56.7 | 12.3 | 0.9 |
| 2002 | 16.5 | 64.1 | 0.3 | 18.3 | 9.0 | 31.5 | 60.4 | 105.4 | 109.6 | 56.5 | 12.5 | 0.9 |
| 2003 | 16.8 | 66.3 | 0.2 | 17.4 | 8.8 | 29.8 | 59.6 | 108.5 | 114.6 | 59.9 | 13.5 | 0.9 |
| **Hispanic or Latino mothers[5,6,7]** | | | | | | | | | | | | |
| 1980 | 23.5 | 95.4 | 1.7 | 82.2 | 52.1 | 126.9 | 156.4 | 132.1 | 83.2 | 39.9 | 10.6 | 0.7 |
| 1990 | 26.7 | 107.7 | 2.4 | 100.3 | 65.9 | 147.7 | 181.0 | 153.0 | 98.3 | 45.3 | 10.9 | 0.7 |
| 1995 | 24.1 | 98.8 | 2.6 | 99.3 | 68.3 | 145.4 | 171.9 | 140.4 | 90.5 | 43.7 | 10.7 | 0.6 |
| 1999 | 22.5 | 93.0 | 1.9 | 86.8 | 56.9 | 129.5 | 157.3 | 135.8 | 92.3 | 44.5 | 10.6 | 0.6 |
| 2000 | 23.1 | 95.9 | 1.7 | 87.3 | 55.5 | 132.6 | 161.3 | 139.9 | 97.1 | 46.6 | 11.5 | 0.6 |
| 2001 | 23.0 | 96.0 | 1.6 | 86.4 | 52.8 | 135.5 | 163.5 | 140.4 | 97.6 | 47.9 | 11.6 | 0.7 |
| 2002 | 22.6 | 94.4 | 1.4 | 83.4 | 50.7 | 133.0 | 164.3 | 139.4 | 95.1 | 47.8 | 11.5 | 0.7 |
| 2003 | 22.9 | 96.9 | 1.3 | 82.3 | 49.7 | 132.0 | 163.4 | 144.4 | 102.0 | 50.8 | 12.2 | 0.7 |
| **White, not Hispanic or Latino mothers[5,6,7]** | | | | | | | | | | | | |
| 1980 | 14.2 | 62.4 | 0.4 | 41.2 | 22.4 | 67.7 | 105.5 | 110.6 | 59.9 | 17.7 | 3.0 | 0.1 |
| 1990 | 14.4 | 62.8 | 0.5 | 42.5 | 23.2 | 66.6 | 97.5 | 115.3 | 79.4 | 30.0 | 4.7 | 0.2 |
| 1995 | 12.5 | 57.5 | 0.4 | 39.3 | 22.0 | 66.2 | 90.2 | 105.1 | 81.5 | 32.8 | 5.9 | 0.3 |
| 1999 | 12.1 | 57.7 | 0.3 | 34.1 | 17.1 | 59.4 | 90.6 | 108.6 | 89.5 | 37.3 | 6.9 | 0.4 |
| 2000 | 12.2 | 58.5 | 0.3 | 32.6 | 15.8 | 57.5 | 91.2 | 109.4 | 93.2 | 38.8 | 7.3 | 0.4 |
| 2001 | 11.8 | 57.7 | 0.3 | 30.3 | 14.0 | 54.8 | 87.1 | 108.9 | 94.3 | 39.8 | 7.5 | 0.4 |
| 2002 | 11.7 | 57.4 | 0.2 | 28.5 | 13.1 | 51.9 | 84.3 | 109.3 | 94.4 | 40.9 | 7.6 | 0.5 |
| 2003 | 11.8 | 58.5 | 0.2 | 27.4 | 12.4 | 50.0 | 83.5 | 110.8 | 97.6 | 43.2 | 8.1 | 0.5 |
| **Black or African American, not Hispanic or Latino mothers[5,6,7]** | | | | | | | | | | | | |
| 1980 | 22.9 | 90.7 | 4.6 | 105.1 | 77.2 | 146.5 | 152.2 | 111.7 | 65.2 | 25.8 | 5.8 | 0.3 |
| 1990 | 23.0 | 89.0 | 5.0 | 116.2 | 84.9 | 157.5 | 165.1 | 118.4 | 70.2 | 28.7 | 5.6 | 0.3 |
| 1995 | 18.2 | 72.8 | 4.2 | 97.2 | 70.4 | 139.2 | 137.8 | 98.5 | 64.4 | 28.8 | 6.1 | 0.3 |
| 1999 | 17.1 | 69.9 | 2.6 | 81.0 | 51.7 | 123.9 | 142.1 | 99.8 | 63.9 | 30.6 | 6.5 | 0.3 |
| 2000 | 17.3 | 71.4 | 2.4 | 79.2 | 50.1 | 121.9 | 145.4 | 102.8 | 66.5 | 31.8 | 7.2 | 0.4 |
| 2001 | 16.6 | 69.1 | 2.1 | 73.5 | 44.9 | 116.7 | 137.2 | 102.1 | 66.2 | 32.1 | 7.3 | 0.4 |
| 2002 | 16.1 | 67.4 | 1.9 | 68.3 | 41.0 | 110.3 | 131.0 | 102.1 | 66.1 | 32.1 | 7.5 | 0.4 |
| 2003 | 15.9 | 67.1 | 1.6 | 64.7 | 38.7 | 105.3 | 128.1 | 102.1 | 67.4 | 33.4 | 7.7 | 0.5 |

--- Data not available.

* Rates based on fewer than 20 births are considered unreliable and are not shown.

[1]Live births per 1,000 population.

[2]Total number of live births regardless of age of mother per 1,000 women 15–44 years of age.

[3]Prior to 1997 data are for live births to mothers 45–49 years of age per 1,000 women 45–49 years of age. Starting in 1997 data are for live births to mothers 45–54 years of age per 1,000 women 45–49 years of age. See Appendix II, Age.

[4]Live births are tabulated by race of child. See Appendix II, Race, Birth File.

[5]Live births are tabulated by race and/or Hispanic origin of mother. See Appendix II, Race, Birth File.

[6]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin.

[7]Rates in 1985 were not calculated because estimates for the Hispanic and non-Hispanic populations were not available.

NOTES: Data are based on births adjusted for underregistration for 1950 and on registered births for all other years. Beginning in 1970, births to persons who were not residents of the 50 States and the District of Columbia are excluded. Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on Census 2000. Rates for 2000 were computed using Census 2000 counts and starting in 2001 rates were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Hamilton BE, Sutton PD, Ventura SJ. Revised birth and fertility rates for the 1990s and new rates for Hispanic populations, 2000 and 2001: United States. National vital statistics reports; vol 51, no 12. Hyattsville, Maryland: National Center for Health Statistics, 2003; Ventura SJ. Births of Hispanic parentage, 1980 and 1985. Monthly vital statistics report; vol 32, no 6 and vol 36, no 11, suppl. Public Health Service. Hyattsville, Maryland. 1983 and 1988; Internet release of *Vital statistics of the United States, 2000, vol 1, natality*, tables 1–1 and 1–7 at www.cdc.gov/nchs/data/vsus/statab/unpubd/natality/natab2000.htm.



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## Table 4 (page 1 of 2). Live births, according to plurality, and detailed race and Hispanic origin of mother: United States, selected years 1970–2003

[Data are based on birth certificates]

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| Plurality of birth and race and Hispanic origin of mother | 1970 | 1971 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| **All births** | | | | | Number of live births | | | | | |
| All races | 3,731,386 | 3,555,970 | 3,144,198 | 3,612,258 | 3,760,561 | 4,158,212 | 3,899,589 | 4,058,814 | 4,021,726 | 4,089,950 |
| White | 3,109,956 | 2,939,568 | 2,576,818 | 2,936,351 | 3,037,913 | 3,290,273 | 3,098,885 | 3,194,005 | 3,174,760 | 3,225,848 |
| Black or African American | 561,992 | 553,750 | 496,829 | 568,080 | 581,824 | 684,336 | 603,139 | 622,598 | 593,691 | 599,847 |
| American Indian or Alaska Native | 22,264 | 23,254 | 22,690 | 29,389 | 34,037 | 39,051 | 37,278 | 41,668 | 42,368 | 43,052 |
| Asian or Pacific Islander[1] | --- | 27,004 | 28,884 | 74,355 | 104,606 | 141,635 | 160,287 | 200,543 | 210,907 | 221,203 |
| Chinese | 7,044 | 7,222 | 7,778 | 11,671 | 16,405 | 22,737 | 27,380 | 34,271 | 33,673 | --- |
| Japanese | 7,744 | 7,846 | 6,725 | 7,482 | 8,035 | 8,674 | 8,901 | 8,969 | 9,264 | --- |
| Filipino | 8,066 | 7,946 | 10,359 | 13,968 | 20,058 | 25,770 | 30,551 | 32,107 | 33,016 | --- |
| Hawaiian | --- | 3,718 | 3,711 | 4,669 | 4,938 | 6,099 | 5,787 | 6,608 | 6,772 | --- |
| Other Asian or Pacific Islander | --- | 272 | 311 | 36,565 | 55,170 | 78,355 | 87,668 | 118,588 | 128,182 | --- |
| Hispanic or Latino[2] | --- | --- | --- | 307,163 | 372,814 | 595,073 | 679,768 | 815,868 | 876,642 | 912,329 |
| Mexican | --- | --- | --- | 215,439 | 242,976 | 385,640 | 469,615 | 581,915 | 627,505 | 654,504 |
| Puerto Rican | --- | --- | --- | 33,671 | 35,147 | 58,807 | 54,824 | 58,124 | 57,465 | 58,400 |
| Cuban | --- | --- | --- | 7,163 | 10,024 | 11,311 | 12,473 | 13,429 | 14,232 | 14,867 |
| Central and South American | --- | --- | --- | 21,268 | 40,985 | 83,008 | 94,996 | 113,344 | 125,981 | 135,586 |
| Other and unknown Hispanic or Latino | --- | --- | --- | 29,622 | 43,682 | 56,307 | 47,860 | 49,056 | 51,459 | 48,972 |
| Not Hispanic or Latino:[2] | | | | | | | | | | |
| White | --- | --- | --- | 1,256,777 | 1,407,460 | 2,626,500 | 2,382,638 | 2,362,968 | 2,298,156 | 2,321,904 |
| Black or African American | --- | --- | --- | 300,480 | 337,448 | 661,701 | 587,781 | 604,346 | 578,335 | 576,033 |
| **Twin births** | | | | | | | | | | |
| All races | --- | 63,298 | 59,192 | 68,339 | 77,102 | 93,865 | 96,736 | 118,916 | 125,134 | 128,665 |
| White | --- | 49,972 | 46,715 | 53,104 | 60,351 | 72,617 | 76,196 | 93,235 | 98,304 | 101,297 |
| Black or African American | --- | 12,452 | 11,375 | 13,638 | 14,646 | 18,164 | 17,000 | 20,626 | 20,423 | 20,633 |
| American Indian or Alaska Native | --- | 362 | 348 | 491 | 537 | 699 | 769 | 900 | 982 | 1,047 |
| Asian or Pacific Islander[1] | --- | 320 | 505 | 1,045 | 1,536 | 2,320 | 2,771 | 4,155 | 5,425 | 5,688 |
| Chinese | --- | 80 | 120 | 135 | 232 | 368 | 507 | 748 | 929 | --- |
| Japanese | --- | 98 | 115 | 103 | 131 | 161 | 217 | 218 | 317 | --- |
| Filipino | --- | 92 | 176 | 173 | 247 | 388 | 542 | 612 | 757 | --- |
| Hawaiian | --- | 46 | 92 | 69 | 74 | 101 | 98 | 109 | 157 | --- |
| Other Asian or Pacific Islander | --- | 4 | 2 | 565 | 852 | 1,302 | 1,407 | 2,468 | 3,265 | --- |
| Hispanic or Latino[2] | --- | --- | --- | 5,154 | 6,550 | 10,713 | 12,685 | 16,470 | 18,128 | 19,472 |
| Mexican | --- | --- | --- | 3,599 | 4,292 | 6,701 | 8,341 | 11,130 | 12,052 | 12,954 |
| Puerto Rican | --- | --- | --- | 631 | 705 | 1,226 | 1,248 | 1,461 | 1,654 | 1,666 |
| Cuban | --- | --- | --- | 102 | 201 | 228 | 312 | 371 | 409 | 465 |
| Central and South American | --- | --- | --- | 371 | 665 | 1,463 | 1,769 | 2,361 | 2,787 | 3,141 |
| Other and unknown Hispanic or Latino | --- | --- | --- | 451 | 687 | 1,095 | 1,015 | 1,147 | 1,226 | 1,246 |
| Not Hispanic or Latino:[2] | | | | | | | | | | |
| White | --- | --- | --- | 23,004 | 28,402 | 60,210 | 62,370 | 76,018 | 79,949 | 81,691 |
| Black or African American | --- | --- | --- | 7,278 | 8,400 | 17,646 | 16,622 | 20,173 | 20,064 | 20,010 |
| **Triplet and higher order multiple births** | | | | | | | | | | |
| All races | --- | 1,034 | 1,066 | 1,337 | 1,925 | 3,028 | 4,973 | 7,325 | 7,401 | 7,663 |
| White | --- | 834 | 909 | 1,104 | 1,648 | 2,639 | 4,505 | 6,551 | 6,541 | 6,733 |
| Black or African American | --- | 196 | 151 | 211 | 240 | 321 | 352 | 521 | 609 | 650 |
| American Indian or Alaska Native | --- | 0 | 2 | 9 | 13 | 4 | 20 | 18 | 23 | 33 |
| Asian or Pacific Islander[1] | --- | 0 | 4 | 9 | 23 | 61 | 96 | 235 | 228 | 247 |
| Chinese | --- | 0 | 0 | 3 | 2 | 13 | 21 | 29 | 30 | --- |
| Japanese | --- | 0 | 4 | 6 | 0 | 0 | 3 | 8 | 17 | --- |
| Filipino | --- | 0 | 0 | 0 | 4 | 15 | 15 | 57 | 47 | --- |
| Hawaiian | --- | 0 | 0 | 0 | 0 | 3 | 3 | 6 | 12 | --- |
| Other Asian or Pacific Islander | --- | 0 | 0 | 0 | 17 | 30 | 54 | 135 | 122 | --- |
| Hispanic or Latino[2] | --- | --- | --- | 78 | 106 | 235 | 355 | 659 | 737 | 784 |
| Mexican | --- | --- | --- | 43 | 82 | 121 | 202 | 391 | 435 | 480 |
| Puerto Rican | --- | --- | --- | 12 | 14 | 28 | 35 | 73 | 106 | 88 |
| Cuban | --- | --- | --- | 0 | 3 | 9 | 24 | 15 | 28 | 28 |
| Central and South American | --- | --- | --- | 8 | 4 | 59 | 59 | 122 | 123 | 140 |
| Other and unknown Hispanic or Latino | --- | --- | --- | 15 | 3 | 18 | 35 | 58 | 45 | 48 |
| Not Hispanic or Latino:[2] | | | | | | | | | | |
| White | --- | --- | --- | 490 | 779 | 2,358 | 4,050 | 5,821 | 5,754 | 5,922 |
| Black or African American | --- | --- | --- | 128 | 132 | 306 | 340 | 506 | 591 | 631 |

See footnotes at end of table.



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## Table 4 (page 2 of 2). Live births, according to plurality, and detailed race and Hispanic origin of mother: United States, selected years 1970–2003

[Data are based on birth certificates]

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- - - Data not available.
[1]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.
[2]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for non-Hispanic white and non-Hispanic black, 1980–88, have been revised and differ from previous editions of *Health, United States*.
Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Births: Final data for each data year 1997–2002. National vital statistics reports. Hyattsville, Maryland; Final natality statistics for each data year 1970–96. Monthly vital statistics report. Hyattsville, Maryland.



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## Table 5. Twin and higher order multiple births, according to race, Hispanic origin, and age of mother: United States, selected years 1971–2003

[Data are based on birth certificates]

Click here for spreadsheet version

| *Plurality of birth and race, Hispanic origin, and age of mother* | *1971* | *1975* | *1980* | *1985* | *1990* | *1995* | *1997* | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Twin births | | | | | | Number per 1,000 live births | | | | | | |
| All races | 17.8 | 18.8 | 18.9 | 20.5 | 22.6 | 24.8 | 26.8 | 28.9 | 29.3 | 30.1 | 31.1 | 31.5 |
| White | 17.0 | 18.1 | 18.1 | 19.9 | 22.1 | 24.6 | 26.7 | 28.8 | 29.2 | 30.0 | 31.0 | 31.4 |
| Black or African American | 22.5 | 22.9 | 24.0 | 25.2 | 26.5 | 28.2 | 30.0 | 32.0 | 33.1 | 33.7 | 34.4 | 34.4 |
| American Indian or Alaska Native | 15.6 | 15.3 | 16.7 | 15.8 | 17.9 | 20.6 | 20.6 | 21.7 | 21.6 | 22.3 | 23.2 | 24.3 |
| Asian or Pacific Islander[1] | 11.9 | 17.5 | 14.1 | 14.7 | 16.4 | 17.3 | 19.2 | 21.4 | 20.7 | 22.9 | 25.7 | 25.7 |
| Chinese | 11.1 | 15.4 | 11.6 | 14.1 | 16.2 | 18.5 | 19.8 | 24.1 | 21.8 | 24.5 | 27.6 | --- |
| Japanese | 12.5 | 17.1 | 13.8 | 16.3 | 18.6 | 24.4 | 22.7 | 25.0 | 24.3 | 24.2 | 34.2 | --- |
| Filipino | 11.6 | 17.0 | 12.4 | 12.3 | 15.1 | 17.7 | 17.5 | 18.8 | 19.1 | 23.3 | 22.9 | --- |
| Hawaiian | *12.4 | 24.8 | 14.8 | 15.0 | 16.6 | 16.9 | 16.7 | 23.6 | 16.5 | 26.8 | 23.2 | --- |
| Other Asian or Pacific Islander | * | * | 15.5 | 15.4 | 16.6 | 16.0 | 19.4 | 21.0 | 20.8 | 22.1 | 25.5 | --- |
| Hispanic or Latino[2] | --- | --- | 16.8 | 17.6 | 18.0 | 18.7 | 19.5 | 20.1 | 20.2 | 20.3 | 20.7 | 21.3 |
| Mexican | --- | --- | 16.7 | 17.7 | 17.4 | 17.8 | 18.5 | 18.9 | 19.1 | 19.0 | 19.2 | 19.8 |
| Puerto Rican | --- | --- | 18.7 | 20.1 | 20.8 | 22.8 | 23.0 | 25.4 | 25.1 | 26.8 | 28.8 | 28.5 |
| Cuban | --- | --- | 14.2 | 20.1 | 20.2 | 25.0 | 28.6 | 32.7 | 27.6 | 27.1 | 28.7 | 31.3 |
| Central and South American | --- | --- | 17.4 | 16.2 | 17.6 | 18.6 | 20.6 | 22.0 | 20.8 | 21.6 | 22.1 | 23.2 |
| Other and unknown Hispanic or Latino | --- | --- | 15.2 | 15.7 | 19.4 | 21.2 | 21.1 | 20.6 | 23.4 | 22.4 | 23.8 | 25.4 |
| Not Hispanic or Latino:[2] | | | | | | | | | | | | |
| White | --- | --- | 18.3 | 20.2 | 22.9 | 26.2 | 28.8 | 31.5 | 32.2 | 33.5 | 34.8 | 35.2 |
| Black or African American | --- | --- | 24.2 | 24.9 | 26.7 | 28.3 | 30.0 | 32.1 | 33.4 | 33.9 | 34.7 | 34.7 |
| Age of mother: | | | | | | | | | | | | |
| Under 20 years | 11.6 | 12.7 | 12.8 | 13.0 | 14.3 | 14.2 | 15.0 | 15.2 | 15.8 | 15.3 | 15.8 | 15.3 |
| 20–24 years | 16.2 | 17.6 | 17.4 | 18.3 | 19.2 | 19.9 | 20.4 | 22.0 | 22.0 | 22.3 | 22.4 | 22.4 |
| 25–29 years | 19.8 | 20.9 | 20.5 | 21.6 | 23.5 | 24.8 | 26.3 | 28.3 | 28.2 | 28.7 | 29.0 | 29.6 |
| 30–34 years | 23.7 | 24.5 | 23.5 | 25.5 | 27.6 | 30.6 | 33.7 | 35.8 | 36.5 | 37.7 | 38.9 | 39.2 |
| 35–39 years | 27.3 | 25.8 | 25.3 | 26.3 | 30.2 | 35.7 | 39.3 | 42.6 | 43.5 | 44.9 | 47.7 | 47.8 |
| 40–44 years | 22.3 | 23.3 | 23.0 | 20.5 | 24.7 | 32.3 | 38.6 | 44.5 | 45.2 | 48.1 | 52.5 | 51.3 |
| 45–49 years | *18.1 | * | * | *18.9 | *23.8 | 101.9 | 133.2 | 155.7 | 153.1 | 170.1 | 189.7 | 189.2 |
| 50–54 years | --- | --- | --- | --- | --- | --- | 347.2 | 344.8 | 313.7 | 368.2 | 384.0 | 374.6 |
| Triplet and higher order multiple births | | | | | | Number per 100,000 live births | | | | | | |
| All races | 29.1 | 33.9 | 37.0 | 51.2 | 72.8 | 127.5 | 173.6 | 184.9 | 180.5 | 185.6 | 184.0 | 187.4 |
| White | 28.4 | 35.3 | 37.6 | 54.2 | 80.2 | 145.4 | 195.9 | 209.2 | 205.1 | 208.6 | 206.0 | 208.7 |
| Black or African American | 35.4 | 30.4 | 37.1 | 41.2 | 46.9 | 58.4 | 88.3 | 93.9 | 83.7 | 91.2 | 102.6 | 108.4 |
| American Indian or Alaska Native | * | * | * | * | * | *53.7 | * | * | * | *76.4 | *54.3 | *76.7 |
| Asian or Pacific Islander | * | * | * | *22.0 | 43.1 | 59.9 | 103.1 | 101.8 | 117.2 | 128.8 | 108.1 | 111.7 |
| Hispanic or Latino[2] | --- | --- | 25.4 | 28.4 | 39.5 | 52.2 | 72.7 | 76.3 | 80.8 | 83.3 | 84.1 | 85.9 |
| Not Hispanic or Latino:[2] | | | | | | | | | | | | |
| White | --- | --- | 39.0 | 55.3 | 89.8 | 170.0 | 230.8 | 251.8 | 246.3 | 253.3 | 250.4 | 255 |
| Black or African American | --- | --- | 42.6 | 39.1 | 46.2 | 57.8 | 90.0 | 95.2 | 83.7 | 90.0 | 102.2 | 109.5 |
| Age of mother: | | | | | | | | | | | | |
| Under 20 years | 9.1 | 10.9 | 14.8 | 13.8 | 15.9 | 17.6 | 20.7 | 13.6 | 23.2 | 22.0 | 21.5 | 12.8 |
| 20–24 years | 25.4 | 28.1 | 31.4 | 35.0 | 32.4 | 35.3 | 46.8 | 41.9 | 44.2 | 56.1 | 50.0 | 48.4 |
| 25–29 years | 43.7 | 45.4 | 42.8 | 66.3 | 73.9 | 118.3 | 151.0 | 153.3 | 163.3 | 152.9 | 153.5 | 158.9 |
| 30–34 years | 36.4 | 53.5 | 58.3 | 71.2 | 126.3 | 217.2 | 293.6 | 327.9 | 307.3 | 317.4 | 297.7 | 309.1 |
| 35–39 years | 35.7 | 45.1 | 47.6 | 70.0 | 156.8 | 285.3 | 403.2 | 417.5 | 368.5 | 387.0 | 406.0 | 409.5 |
| 40–44 years | * | * | * | * | *57.6 | 273.6 | 315.4 | 428.5 | 415.5 | 354.5 | 393.6 | 330.7 |
| 45–49 years | * | * | * | * | * | *1,466.8 | 2,100.2 | 2,108.3 | 1,586.6 | 2,043.8 | 2,010.0 | 1,919.6 |
| 50–54 years | --- | --- | --- | --- | --- | --- | * | * | *9,019.6 | * | * | * |

--- Data not available.

* Rates preceded by an asterisk are based on fewer than 50 births. Rates based on fewer than 20 births are considered unreliable and are not shown.

[1]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[2]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File; Martin JA, Park MM. Trends in Twin and Triplet Births: 1980–97. National vital statistics reports; vol 47, no 24. Hyattsville, Maryland: National Center for Health Statistics, 1999.



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## Table 6. Women 15–44 years of age who have not had at least 1 live birth, by age: United States, selected years 1960–2002

[Data are based on birth certificates]

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| Year[1] | 15–19 years | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years |
|---|---|---|---|---|---|---|
| | Percent of women | | | | | |
| 1960 | 91.4 | 47.5 | 20.0 | 14.2 | 12.0 | 15.1 |
| 1965 | 92.7 | 51.4 | 19.7 | 11.7 | 11.4 | 11.0 |
| 1970 | 93.0 | 57.0 | 24.4 | 11.8 | 9.4 | 10.6 |
| 1975 | 92.6 | 62.5 | 31.1 | 15.2 | 9.6 | 8.8 |
| 1980 | 93.4 | 66.2 | 38.9 | 19.7 | 12.5 | 9.0 |
| 1985 | 93.7 | 67.7 | 41.5 | 24.6 | 15.4 | 11.7 |
| 1986 | 93.8 | 68.0 | 42.0 | 25.1 | 16.1 | 12.2 |
| 1987 | 93.8 | 68.2 | 42.5 | 25.5 | 16.9 | 12.6 |
| 1988 | 93.8 | 68.4 | 43.0 | 25.7 | 17.7 | 13.0 |
| 1989 | 93.7 | 68.4 | 43.3 | 25.9 | 18.2 | 13.5 |
| 1990 | 93.3 | 68.3 | 43.5 | 25.9 | 18.5 | 13.9 |
| 1991 | 93.0 | 67.9 | 43.6 | 26.0 | 18.7 | 14.5 |
| 1992 | 92.7 | 67.3 | 43.7 | 26.0 | 18.8 | 15.2 |
| 1993 | 92.6 | 66.7 | 43.8 | 26.1 | 18.8 | 15.8 |
| 1994 | 92.6 | 66.1 | 43.9 | 26.2 | 18.7 | 16.2 |
| 1995 | 92.5 | 65.5 | 44.0 | 26.2 | 18.6 | 16.5 |
| 1996 | 92.5 | 65.0 | 43.8 | 26.2 | 18.5 | 16.6 |
| 1997 | 92.8 | 64.9 | 43.5 | 26.2 | 18.4 | 16.6 |
| 1998 | 93.1 | 65.1 | 43.0 | 26.1 | 18.2 | 16.5 |
| 1999 | 93.4 | 65.5 | 42.5 | 26.1 | 18.1 | 16.4 |
| 2000 | 93.7 | 66.0 | 42.1 | 25.9 | 17.9 | 16.2 |
| 2001 | 94.0 | 66.6 | 41.7 | 25.5 | 17.6 | 16.0 |
| 2002 | 94.4 | 66.8 | 41.5 | 24.9 | 17.3 | 15.8 |

[1]As of January 1.

NOTES: Data are based on cohort fertility. See Appendix II, Cohort fertility. Percents are derived from the cumulative childbearing experience of cohorts of women, up to the ages specified. Data on births are adjusted for underregistration and population estimates are corrected for underregistration and misstatement of age. Beginning in 1970 births to persons who were not residents of the 50 States and the District of Columbia are excluded. Some data for 2001–02 were revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Table 1–32 at www.cdc.gov/nchs/data/vsh/statab/unpubd/natality/natab99.htm; *Vital statistics of the United States, 2001, vol 1, natality*. In preparation, forthcoming on CD-ROM.



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## Table 7. Prenatal care for live births, according to detailed race and Hispanic origin of mother: United States, selected years 1970–2003

[Data are based on birth certificates]

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| Prenatal care, race, and Hispanic origin of mother | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 1997 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prenatal care began during 1st trimester | Percent of live births[1] | | | | | | | | | | | |
| All races | 68.0 | 72.4 | 76.3 | 76.2 | 75.8 | 81.3 | 82.5 | 83.2 | 83.2 | 83.4 | 83.7 | 84.1 |
| White | 72.3 | 75.8 | 79.2 | 79.3 | 79.2 | 83.6 | 84.7 | 85.1 | 85.0 | 85.2 | 85.4 | 85.7 |
| Black or African American | 44.2 | 55.5 | 62.4 | 61.5 | 60.6 | 70.4 | 72.3 | 74.1 | 74.3 | 74.5 | 75.2 | 75.9 |
| American Indian or Alaska Native | 38.2 | 45.4 | 55.8 | 57.5 | 57.9 | 66.7 | 68.1 | 69.5 | 69.3 | 69.3 | 69.8 | 70.8 |
| Asian or Pacific Islander[2] | --- | --- | 73.7 | 74.1 | 75.1 | 79.9 | 82.1 | 83.7 | 84.0 | 84.0 | 84.8 | 85.4 |
| Chinese | 71.8 | 76.7 | 82.6 | 82.0 | 81.3 | 85.7 | 87.4 | 88.5 | 87.6 | 87.0 | 87.2 | --- |
| Japanese | 78.1 | 82.7 | 86.1 | 84.7 | 87.0 | 89.7 | 89.3 | 90.7 | 91.0 | 90.1 | 90.5 | --- |
| Filipino | 60.6 | 70.6 | 77.3 | 76.5 | 77.1 | 80.9 | 83.3 | 84.2 | 84.9 | 85.0 | 85.4 | --- |
| Hawaiian | --- | --- | 68.8 | 67.7 | 65.8 | 75.9 | 78.0 | 79.6 | 79.9 | 79.1 | 78.1 | --- |
| Other Asian or Pacific Islander | --- | --- | 67.4 | 69.9 | 71.9 | 77.0 | 79.7 | 81.8 | 82.5 | 82.7 | 83.9 | --- |
| Hispanic or Latino[3] | --- | --- | 60.2 | 61.2 | 60.2 | 70.8 | 73.7 | 74.4 | 74.4 | 75.7 | 76.7 | 77.5 |
| Mexican | --- | --- | 59.6 | 60.0 | 57.8 | 69.1 | 72.1 | 73.1 | 72.9 | 74.6 | 75.7 | 76.5 |
| Puerto Rican | --- | --- | 55.1 | 58.3 | 63.5 | 74.0 | 76.5 | 77.7 | 78.5 | 79.1 | 79.9 | 81.2 |
| Cuban | --- | --- | 82.7 | 82.5 | 84.8 | 89.2 | 90.4 | 91.4 | 91.7 | 91.8 | 92.0 | 92.1 |
| Central and South American | --- | --- | 58.8 | 60.6 | 61.5 | 73.2 | 76.9 | 77.6 | 77.6 | 77.4 | 78.7 | 79.2 |
| Other and unknown Hispanic or Latino | --- | --- | 66.4 | 65.8 | 66.4 | 74.3 | 76.0 | 74.8 | 75.8 | 77.3 | 76.7 | 77.0 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 81.2 | 81.4 | 83.3 | 87.1 | 87.9 | 88.4 | 88.5 | 88.5 | 88.6 | 89.0 |
| Black or African American | --- | --- | 60.8 | 60.2 | 60.7 | 70.4 | 72.3 | 74.1 | 74.3 | 74.5 | 75.2 | 75.9 |
| Prenatal care began during 3d trimester or no prenatal care | | | | | | | | | | | | |
| All races | 7.9 | 6.0 | 5.1 | 5.7 | 6.1 | 4.2 | 3.9 | 3.8 | 3.9 | 3.7 | 3.6 | 3.5 |
| White | 6.3 | 5.0 | 4.3 | 4.8 | 4.9 | 3.5 | 3.2 | 3.2 | 3.3 | 3.2 | 3.1 | 3.0 |
| Black or African American | 16.6 | 10.5 | 8.9 | 10.2 | 11.3 | 7.6 | 7.3 | 6.6 | 6.7 | 6.5 | 6.2 | 6.0 |
| American Indian or Alaska Native | 28.9 | 22.4 | 15.2 | 12.9 | 12.9 | 9.5 | 8.6 | 8.2 | 8.6 | 8.2 | 8.0 | 7.6 |
| Asian or Pacific Islander[2] | --- | --- | 6.5 | 6.5 | 5.8 | 4.3 | 3.8 | 3.5 | 3.3 | 3.4 | 3.1 | 3.1 |
| Chinese | 6.5 | 4.4 | 3.7 | 4.4 | 3.4 | 3.0 | 2.4 | 2.0 | 2.2 | 2.4 | 2.1 | --- |
| Japanese | 4.1 | 2.7 | 2.1 | 3.1 | 2.9 | 2.3 | 2.7 | 2.1 | 1.8 | 2.0 | 2.1 | --- |
| Filipino | 7.2 | 4.1 | 4.0 | 4.8 | 4.5 | 4.1 | 3.3 | 2.8 | 3.0 | 3.0 | 2.8 | --- |
| Hawaiian | --- | --- | 6.7 | 7.4 | 8.7 | 5.1 | 5.4 | 4.0 | 4.2 | 4.8 | 4.7 | --- |
| Other Asian or Pacific Islander | --- | --- | 9.3 | 8.2 | 7.1 | 5.0 | 4.4 | 4.1 | 3.8 | 3.8 | 3.5 | --- |
| Hispanic or Latino[3] | --- | --- | 12.0 | 12.4 | 12.0 | 7.4 | 6.2 | 6.3 | 6.3 | 5.9 | 5.5 | 5.3 |
| Mexican | --- | --- | 11.8 | 12.9 | 13.2 | 8.1 | 6.7 | 6.7 | 6.9 | 6.2 | 5.8 | 5.6 |
| Puerto Rican | --- | --- | 16.2 | 15.5 | 10.6 | 5.5 | 5.4 | 5.0 | 4.5 | 4.6 | 4.1 | 3.7 |
| Cuban | --- | --- | 3.9 | 3.7 | 2.8 | 2.1 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 |
| Central and South American | --- | --- | 13.1 | 12.5 | 10.9 | 6.1 | 5.0 | 5.2 | 5.4 | 5.7 | 4.9 | 4.7 |
| Other and unknown Hispanic or Latino | --- | --- | 9.2 | 9.4 | 8.5 | 6.0 | 5.3 | 6.3 | 5.9 | 5.4 | 5.3 | 5.4 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 3.5 | 4.0 | 3.4 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 |
| Black or African American | --- | --- | 9.7 | 10.9 | 11.2 | 7.6 | 7.3 | 6.6 | 6.7 | 6.5 | 6.2 | 6.0 |

--- Data not available.

[1]Excludes live births for whom trimester when prenatal care began is unknown.

[2]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[3]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

NOTES: Data for 2003 exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Prenatal care data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. See Appendix II, Prenatal Care. Data for 1970 and 1975 exclude births that occurred in States not reporting prenatal care. The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III. Some data for 1980–88 were revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Births: Final data for each data year 1997–2002. National vital statistics reports. Hyattsville, Maryland; Final natality statistics for each data year 1970–96. Monthly vital statistics report. Hyattsville, Maryland.



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## Table 8 (page 1 of 2). Early prenatal care according to race and Hispanic origin of mother, geographic division, and State: United States, average annual 1995–97, 1998–2000, and 2001–2003

[Data are based on birth certificates]

Click here for spreadsheet version

| Geographic division and State | All races | | | Not Hispanic or Latino | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | White | | | Black or African American | | |
| | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 |
| | Percent of live births with early prenatal care (beginning in the 1st trimester) | | | | | | | | |
| United States[1] | 81.9 | 83.1 | 83.7 | 87.4 | 88.3 | 88.8 | 71.4 | 73.9 | 75.2 |
| New England | 88.1 | 89.4 | 89.6 | 90.7 | 91.8 | 92.0 | 77.0 | 80.5 | 80.5 |
| Connecticut | 88.4 | 88.9 | 88.5 | 92.1 | 92.5 | 92.4 | 78.5 | 81.2 | 81.9 |
| Maine | 89.3 | 88.9 | 87.8 | 89.8 | 89.3 | 88.2 | 82.0 | 81.3 | 76.1 |
| Massachusetts | 87.3 | 89.4 | 89.8 | 90.4 | 92.3 | 92.6 | 75.6 | 79.7 | 79.3 |
| New Hampshire | 89.6 | 90.5 | 91.6 | 90.0 | 91.1 | 92.4 | 78.3 | 75.5 | 81.3 |
| Rhode Island | 89.6 | 90.6 | 90.6 | 92.1 | 92.9 | 93.2 | 79.3 | 83.3 | 82.1 |
| Vermont | 87.6 | 87.9 | 89.6 | 87.8 | 88.1 | 89.9 | 74.6 | 75.6 | 73.3 |
| Middle Atlantic[1] | 81.2 | 82.2 | 81.0 | 87.9 | 88.5 | 88.5 | 67.3 | 69.7 | 69.3 |
| New Jersey | 82.0 | 81.2 | 80.1 | 89.7 | 89.5 | 89.0 | 65.3 | 64.4 | 63.5 |
| New York | 79.2 | 81.0 | 81.5 | 87.2 | 88.2 | 88.2 | 68.3 | 71.2 | 71.6 |
| Pennsylvania[1] | 83.8 | 85.1 | --- | 87.6 | 88.4 | --- | 66.8 | 71.7 | --- |
| East North Central | 83.1 | 83.7 | 85.0 | 87.3 | 87.9 | 88.8 | 69.3 | 71.0 | 73.6 |
| Illinois | 81.6 | 82.5 | 84.8 | 88.9 | 89.7 | 90.7 | 68.5 | 70.4 | 73.7 |
| Indiana | 80.4 | 80.4 | 81.2 | 82.8 | 83.2 | 84.3 | 65.9 | 67.0 | 69.3 |
| Michigan | 84.0 | 84.1 | 85.4 | 88.1 | 88.6 | 89.4 | 70.5 | 70.3 | 71.0 |
| Ohio | 85.1 | 86.2 | 87.6 | 87.7 | 88.5 | 89.7 | 71.4 | 75.0 | 78.3 |
| Wisconsin | 84.0 | 84.2 | 84.4 | 87.9 | 87.9 | 88.1 | 66.8 | 68.8 | 71.5 |
| West North Central | 85.0 | 85.8 | 86.4 | 87.8 | 88.7 | 89.4 | 71.6 | 74.5 | 76.8 |
| Iowa | 87.2 | 87.7 | 88.7 | 88.5 | 89.2 | 90.3 | 73.4 | 75.6 | 78.0 |
| Kansas | 85.6 | 86.2 | 87.1 | 89.0 | 89.6 | 90.3 | 75.7 | 77.4 | 79.8 |
| Minnesota | 83.7 | 84.6 | 85.5 | 87.0 | 88.2 | 89.8 | 63.6 | 66.8 | 69.7 |
| Missouri | 85.6 | 87.0 | 88.0 | 88.2 | 89.3 | 90.0 | 72.5 | 76.6 | 79.8 |
| Nebraska | 84.2 | 83.8 | 83.3 | 87.0 | 87.0 | 87.0 | 71.9 | 70.9 | 70.5 |
| North Dakota | 84.5 | 86.1 | 86.4 | 86.3 | 88.5 | 89.2 | 76.0 | 76.5 | 81.9 |
| South Dakota | 81.9 | 81.6 | 78.1 | 85.6 | 85.7 | 82.8 | 69.4 | 73.3 | 62.2 |
| South Atlantic | 83.8 | 84.7 | 84.3 | 89.2 | 89.9 | 89.8 | 73.1 | 75.8 | 76.4 |
| Delaware | 83.8 | 84.1 | 86.2 | 88.8 | 88.8 | 90.5 | 73.1 | 75.8 | 81.1 |
| District of Columbia | 63.4 | 73.1 | 75.7 | 87.4 | 90.8 | 90.4 | 58.3 | 68.0 | 70.1 |
| Florida | 83.3 | 83.8 | 85.1 | 88.3 | 88.9 | 89.7 | 72.1 | 73.3 | 76.6 |
| Georgia | 85.1 | 86.9 | 85.0 | 90.5 | 91.7 | 90.8 | 77.3 | 80.4 | 79.5 |
| Maryland | 88.3 | 87.0 | 83.8 | 93.2 | 92.3 | 90.5 | 78.8 | 78.7 | 76.1 |
| North Carolina | 83.6 | 84.7 | 84.4 | 89.7 | 90.8 | 90.9 | 72.1 | 75.7 | 76.0 |
| South Carolina | 79.5 | 80.5 | 78.3 | 86.8 | 87.0 | 84.8 | 67.4 | 70.9 | 70.1 |
| Virginia | 84.5 | 85.2 | 85.2 | 89.7 | 90.2 | 90.5 | 72.4 | 75.0 | 76.8 |
| West Virginia | 82.0 | 84.9 | 86.0 | 82.6 | 85.6 | 86.5 | 66.0 | 70.4 | 75.2 |
| East South Central | 82.4 | 83.7 | 84.1 | 87.4 | 88.4 | 88.7 | 69.8 | 72.5 | 74.7 |
| Alabama | 81.9 | 82.8 | 83.2 | 88.4 | 89.5 | 89.8 | 69.5 | 71.2 | 73.6 |
| Kentucky | 84.9 | 86.6 | 86.8 | 86.3 | 87.7 | 88.1 | 73.6 | 78.3 | 80.3 |
| Mississippi | 78.6 | 81.1 | 83.8 | 88.2 | 89.4 | 90.5 | 67.9 | 71.8 | 76.3 |
| Tennessee | 83.3 | 83.8 | 83.0 | 87.2 | 87.9 | 87.8 | 71.5 | 73.1 | 72.5 |
| West South Central | 78.3 | 79.6 | 80.6 | 85.5 | 86.6 | 87.0 | 71.2 | 74.1 | 75.1 |
| Arkansas | 75.7 | 78.8 | 80.3 | 80.6 | 83.0 | 84.1 | 61.9 | 68.7 | 71.3 |
| Louisiana | 81.0 | 82.8 | 83.7 | 88.7 | 90.0 | 90.5 | 70.5 | 73.0 | 74.5 |
| Oklahoma | 78.5 | 79.4 | 77.3 | 81.8 | 82.8 | 81.4 | 66.9 | 71.2 | 69.5 |
| Texas | 78.0 | 79.1 | 80.6 | 86.4 | 87.3 | 88.1 | 74.1 | 76.3 | 76.9 |
| Mountain | 77.9 | 77.7 | 77.8 | 84.6 | 84.9 | 85.3 | 70.5 | 71.8 | 72.4 |
| Arizona | 73.7 | 75.9 | 76.6 | 83.3 | 86.0 | 87.5 | 69.8 | 74.0 | 77.6 |
| Colorado | 81.6 | 81.5 | 79.4 | 86.8 | 88.0 | 86.5 | 75.4 | 75.6 | 71.3 |
| Idaho | 79.1 | 80.0 | 81.8 | 81.9 | 82.7 | 84.0 | 75.6 | 71.7 | 83.3 |
| Montana | 82.2 | 83.1 | 83.6 | 84.5 | 85.8 | 86.5 | 79.3 | 82.7 | 81.5 |
| Nevada | 76.5 | 74.7 | 75.8 | 83.3 | 83.3 | 85.3 | 66.7 | 67.2 | 69.6 |
| New Mexico | 69.8 | 67.7 | 68.9 | 79.0 | 75.2 | 76.8 | 62.7 | 62.4 | 67.9 |
| Utah | 83.9 | 80.6 | 79.7 | 86.9 | 84.2 | 83.7 | 68.5 | 60.5 | 60.6 |
| Wyoming | 82.5 | 82.3 | 84.8 | 84.3 | 84.0 | 86.2 | 71.3 | 73.1 | 86.3 |
| Pacific[1] | 80.7 | 83.2 | 85.8 | 86.1 | 87.6 | 89.3 | 77.9 | 80.5 | 83.1 |
| Alaska | 81.5 | 80.3 | 80.2 | 84.2 | 83.4 | 83.6 | 82.9 | 82.9 | 83.0 |
| California | 80.3 | 83.5 | 86.4 | 86.7 | 89.1 | 90.4 | 77.9 | 80.8 | 83.2 |
| Hawaii | 83.8 | 85.5 | 83.5 | 89.7 | 90.8 | 88.0 | 89.6 | 91.1 | 92.0 |
| Oregon | 79.9 | 80.8 | 81.5 | 82.6 | 83.6 | 84.5 | 76.2 | 77.3 | 76.8 |
| Washington[1] | 83.1 | 82.8 | --- | 86.0 | 85.9 | --- | 76.6 | 75.9 | --- |

See footnotes at end of table.



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## Table 8 (page 2 of 2). Early prenatal care according to race and Hispanic origin of mother, geographic division, and State: United States, average annual 1995–97, 1998–2000, and 2001–2003

[Data are based on birth certificates]

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| Geographic division and State | Hispanic or Latino[2] | | | American Indian or Alaska Native[3] | | | Asian or Pacific Islander[3] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 |
| | Percent of live births with early prenatal care (beginning in the 1st trimester) | | | | | | | | |
| United States[1] | 72.2 | 74.4 | 76.7 | 67.5 | 69.2 | 69.8 | 81.1 | 83.6 | 84.8 |
| New England | 76.9 | 79.8 | 81.5 | 75.2 | 79.0 | 84.6 | 81.7 | 85.0 | 86.0 |
| Connecticut | 77.1 | 78.8 | 77.9 | 74.9 | 79.0 | 85.0 | 85.6 | 87.2 | 88.3 |
| Maine | 79.3 | 81.0 | 80.4 | 74.4 | 73.8 | 79.3 | 79.6 | 84.6 | 82.8 |
| Massachusetts | 75.7 | 79.3 | 82.8 | 71.9 | 78.3 | 89.4 | 80.7 | 84.3 | 85.4 |
| New Hampshire | 78.8 | 79.4 | 83.5 | 78.9 | 84.2 | 86.9 | 84.3 | 86.9 | 87.6 |
| Rhode Island | 82.8 | 85.2 | 86.8 | 79.2 | 82.3 | 81.3 | 80.0 | 82.6 | 83.5 |
| Vermont | 82.6 | 83.3 | 81.5 | * | *83.0 | *87.5 | 75.0 | 83.0 | 87.6 |
| Middle Atlantic[1] | 69.0 | 71.7 | 72.7 | 73.4 | 76.7 | 75.6 | 76.7 | 78.8 | 79.8 |
| New Jersey | 70.9 | 69.8 | 68.3 | 75.3 | 74.1 | 68.7 | 82.9 | 83.5 | 84.3 |
| New York | 67.9 | 72.3 | 74.8 | 71.9 | 75.0 | 77.3 | 73.7 | 76.0 | 77.5 |
| Pennsylvania[1] | 70.6 | 73.3 | --- | 75.2 | 81.1 | --- | 77.9 | 80.8 | --- |
| East North Central | 71.5 | 72.1 | 76.0 | 71.8 | 74.5 | 75.8 | 80.4 | 83.1 | 85.1 |
| Illinois | 71.4 | 72.9 | 78.4 | 73.7 | 75.2 | 81.1 | 83.2 | 85.5 | 86.9 |
| Indiana | 66.6 | 63.5 | 64.8 | 69.7 | 71.8 | 72.4 | 80.8 | 82.0 | 81.6 |
| Michigan | 72.8 | 72.1 | 75.4 | 73.9 | 75.0 | 79.5 | 85.1 | 86.0 | 88.2 |
| Ohio | 76.2 | 76.7 | 78.1 | 78.7 | 81.1 | 80.8 | 86.2 | 87.8 | 90.1 |
| Wisconsin | 70.6 | 70.3 | 70.0 | 67.5 | 72.2 | 71.4 | 59.6 | 64.7 | 68.5 |
| West North Central | 67.1 | 69.5 | 72.4 | 66.4 | 66.7 | 66.0 | 72.1 | 76.9 | 80.4 |
| Iowa | 71.0 | 72.6 | 74.8 | 70.0 | 74.8 | 75.5 | 81.9 | 82.9 | 86.6 |
| Kansas | 64.7 | 68.3 | 73.6 | 79.9 | 77.0 | 82.0 | 81.3 | 85.5 | 85.6 |
| Minnesota | 60.8 | 63.6 | 67.3 | 60.5 | 62.2 | 63.5 | 59.3 | 66.8 | 73.4 |
| Missouri | 76.8 | 78.1 | 79.1 | 77.1 | 77.0 | 80.2 | 83.6 | 87.3 | 88.0 |
| Nebraska | 66.7 | 68.3 | 69.2 | 66.7 | 68.9 | 67.6 | 81.4 | 82.0 | 81.9 |
| North Dakota | 76.4 | 75.8 | 80.4 | 69.9 | 68.8 | 66.2 | 77.4 | 85.5 | 87.2 |
| South Dakota | 73.2 | 71.1 | 65.0 | 63.5 | 62.9 | 59.3 | 74.3 | 78.9 | 75.6 |
| South Atlantic | 77.5 | 77.9 | 76.8 | 74.3 | 73.5 | 76.0 | 84.5 | 86.8 | 86.2 |
| Delaware | 68.6 | 71.3 | 73.4 | *80.4 | 76.4 | 82.4 | 84.5 | 86.7 | 91.6 |
| District of Columbia | 60.6 | 70.3 | 71.3 | * | * | * | 67.1 | 76.8 | 82.2 |
| Florida | 80.7 | 81.4 | 83.2 | 71.8 | 65.2 | 68.1 | 86.6 | 87.8 | 88.7 |
| Georgia | 74.4 | 78.6 | 72.8 | 83.2 | 83.7 | 80.7 | 85.7 | 89.6 | 89.3 |
| Maryland | 81.3 | 80.8 | 71.0 | 85.4 | 81.8 | 81.5 | 89.3 | 89.9 | 83.7 |
| North Carolina | 68.4 | 68.5 | 69.9 | 72.2 | 74.4 | 79.5 | 80.9 | 83.2 | 84.6 |
| South Carolina | 66.2 | 61.4 | 60.2 | 73.1 | 79.1 | 75.3 | 76.6 | 79.2 | 76.3 |
| Virginia | 71.3 | 72.9 | 70.4 | 81.0 | 80.8 | 81.5 | 82.5 | 85.3 | 85.4 |
| West Virginia | 74.3 | 74.9 | 69.2 | *78.0 | *77.4 | *66.7 | 81.4 | 80.7 | 83.6 |
| East South Central | 67.3 | 63.3 | 61.2 | 75.0 | 78.4 | 76.8 | 82.2 | 84.9 | 84.4 |
| Alabama | 63.0 | 59.3 | 52.7 | 79.7 | 76.5 | 83.3 | 82.2 | 86.4 | 87.6 |
| Kentucky | 74.7 | 70.7 | 71.6 | 77.9 | 83.7 | 84.7 | 84.0 | 87.4 | 84.7 |
| Mississippi | 78.1 | 74.6 | 74.7 | 72.1 | 78.0 | 70.9 | 78.8 | 82.0 | 85.3 |
| Tennessee | 64.9 | 60.9 | 60.1 | 73.1 | 77.9 | 75.1 | 82.7 | 84.0 | 82.8 |
| West South Central | 70.2 | 72.0 | 74.6 | 69.7 | 71.3 | 71.5 | 84.8 | 87.0 | 87.5 |
| Arkansas | 59.0 | 64.3 | 69.2 | 68.7 | 73.1 | 75.1 | 73.2 | 77.7 | 80.6 |
| Louisiana | 82.4 | 85.4 | 83.5 | 80.1 | 80.0 | 82.4 | 81.6 | 85.3 | 87.3 |
| Oklahoma | 68.6 | 67.9 | 64.8 | 68.5 | 70.0 | 69.5 | 81.1 | 81.7 | 79.4 |
| Texas | 70.2 | 72.0 | 75.0 | 72.8 | 74.8 | 77.7 | 85.8 | 87.9 | 88.5 |
| Mountain | 64.8 | 64.9 | 66.0 | 60.0 | 63.1 | 64.6 | 77.4 | 78.7 | 79.0 |
| Arizona | 62.8 | 65.0 | 66.7 | 59.5 | 64.8 | 66.9 | 80.7 | 84.7 | 84.3 |
| Colorado | 67.6 | 66.5 | 66.0 | 70.4 | 71.6 | 65.3 | 78.9 | 82.1 | 80.6 |
| Idaho | 61.3 | 64.2 | 69.3 | 60.5 | 62.7 | 69.5 | 80.0 | 78.5 | 82.8 |
| Montana | 75.7 | 78.9 | 79.9 | 67.2 | 65.2 | 65.9 | 75.2 | 81.6 | 82.8 |
| Nevada | 64.0 | 61.5 | 63.4 | 69.4 | 66.2 | 70.5 | 78.9 | 78.9 | 80.3 |
| New Mexico | 66.6 | 65.0 | 66.3 | 54.9 | 58.1 | 59.5 | 73.4 | 75.6 | 75.6 |
| Utah | 64.9 | 62.6 | 62.8 | 58.4 | 56.7 | 56.8 | 70.1 | 65.6 | 65.3 |
| Wyoming | 71.6 | 73.0 | 77.2 | 65.6 | 69.5 | 72.7 | 84.3 | 82.5 | 84.3 |
| Pacific[1] | 75.0 | 79.0 | 83.5 | 72.0 | 72.6 | 73.1 | 82.4 | 85.0 | 86.7 |
| Alaska | 78.8 | 80.5 | 79.4 | 75.7 | 72.9 | 70.7 | 77.1 | 76.3 | 76.5 |
| California | 75.3 | 79.5 | 83.9 | 70.0 | 73.4 | 75.4 | 83.0 | 85.8 | 87.9 |
| Hawaii | 82.0 | 83.8 | 82.1 | 83.1 | 83.2 | 81.5 | 81.5 | 83.8 | 81.9 |
| Oregon | 65.4 | 68.3 | 70.4 | 66.2 | 67.5 | 70.5 | 78.8 | 81.5 | 81.9 |
| Washington[1] | 70.1 | 71.0 | --- | 71.9 | 71.9 | --- | 79.4 | 81.1 | --- |

* Percents preceded by an asterisk are based on fewer than 50 births. Percents not shown are based on fewer than 20 births.

[1]Data for 2003 exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Prenatal care data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. See Appendix II, Prenatal Care.

[2]Persons of Hispanic origin may be of any race.

[3]Includes persons of Hispanic and non-Hispanic origin.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File.



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## Table 9. Teenage childbearing, according to detailed race and Hispanic origin of mother: United States, selected years 1970–2003

[Data are based on birth certificates]

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| Maternal age, race, and Hispanic origin of mother | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age of mother under 18 years | Percent of live births | | | | | | | | | | | |
| All races | 6.3 | 7.6 | 5.8 | 4.7 | 4.7 | 5.3 | 4.6 | 4.4 | 4.1 | 3.8 | 3.6 | 3.4 |
| White | 4.8 | 6.0 | 4.5 | 3.7 | 3.6 | 4.3 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 3.0 |
| Black or African American | 14.8 | 16.3 | 12.5 | 10.6 | 10.1 | 10.8 | 8.9 | 8.2 | 7.8 | 7.3 | 6.9 | 6.6 |
| American Indian or Alaska Native | 7.5 | 11.2 | 9.4 | 7.6 | 7.2 | 8.7 | 8.4 | 7.9 | 7.3 | 6.8 | 6.6 | 6.6 |
| Asian or Pacific Islander[1] | --- | --- | 1.5 | 1.6 | 2.1 | 2.2 | 2.0 | 1.8 | 1.5 | 1.3 | 1.1 | 1.1 |
| Chinese | 1.1 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | --- |
| Japanese | 2.0 | 1.7 | 1.0 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.5 | 0.6 | --- |
| Filipino | 3.7 | 2.4 | 1.6 | 1.6 | 2.0 | 2.2 | 2.1 | 1.8 | 1.6 | 1.5 | 1.2 | --- |
| Hawaiian | --- | --- | 6.6 | 5.7 | 6.5 | 7.6 | 7.8 | 6.2 | 5.7 | 4.9 | 4.5 | --- |
| Other Asian or Pacific Islander | --- | --- | 1.2 | 1.8 | 2.4 | 2.5 | 2.3 | 2.0 | 1.7 | 1.5 | 1.3 | --- |
| Hispanic or Latino[2] | --- | --- | 7.4 | 6.4 | 6.6 | 7.6 | 6.9 | 6.7 | 6.3 | 5.8 | 5.6 | 5.4 |
| Mexican | --- | --- | 7.7 | 6.9 | 6.9 | 8.0 | 7.2 | 7.0 | 6.6 | 6.2 | 6.0 | 5.8 |
| Puerto Rican | --- | --- | 10.0 | 8.5 | 9.1 | 10.8 | 9.2 | 8.5 | 7.8 | 7.4 | 6.9 | 6.9 |
| Cuban | --- | --- | 3.8 | 2.2 | 2.7 | 2.8 | 2.9 | 2.9 | 3.1 | 2.7 | 2.7 | 2.4 |
| Central and South American | --- | --- | 2.4 | 2.4 | 3.2 | 4.1 | 3.6 | 3.5 | 3.3 | 3.1 | 2.8 | 2.8 |
| Other and unknown Hispanic or Latino | --- | --- | 6.5 | 7.0 | 8.0 | 9.0 | 8.8 | 8.1 | 7.6 | 6.8 | 6.5 | 6.3 |
| Not Hispanic or Latino:[2] | | | | | | | | | | | | |
| White | --- | --- | 4.0 | 3.2 | 3.0 | 3.4 | 3.0 | 2.8 | 2.6 | 2.3 | 2.2 | 2.1 |
| Black or African American | --- | --- | 12.7 | 10.7 | 10.2 | 10.8 | 9.0 | 8.3 | 7.8 | 7.3 | 6.9 | 6.6 |
| Age of mother 18–19 years | | | | | | | | | | | | |
| All races | 11.3 | 11.3 | 9.8 | 8.0 | 8.1 | 7.9 | 7.9 | 7.9 | 7.7 | 7.5 | 7.1 | 6.9 |
| White | 10.4 | 10.3 | 9.0 | 7.1 | 7.3 | 7.2 | 7.2 | 7.2 | 7.1 | 6.9 | 6.6 | 6.4 |
| Black or African American | 16.6 | 16.9 | 14.5 | 12.9 | 13.0 | 12.4 | 12.6 | 12.4 | 11.9 | 11.5 | 11.1 | 10.7 |
| American Indian or Alaska Native | 12.8 | 15.2 | 14.6 | 12.4 | 12.3 | 12.7 | 12.5 | 12.3 | 12.4 | 12.5 | 11.9 | 11.6 |
| Asian or Pacific Islander[1] | --- | --- | 3.9 | 3.4 | 3.7 | 3.5 | 3.3 | 3.3 | 3.0 | 3.0 | 2.7 | 2.4 |
| Chinese | 3.9 | 1.7 | 1.0 | 0.6 | 0.8 | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 | 0.7 | --- |
| Japanese | 4.1 | 3.3 | 2.3 | 1.9 | 2.0 | 1.7 | 1.6 | 1.4 | 1.4 | 1.2 | 1.1 | --- |
| Filipino | 7.1 | 5.0 | 4.0 | 3.7 | 4.1 | 4.1 | 4.1 | 4.0 | 3.7 | 3.6 | 3.3 | --- |
| Hawaiian | --- | --- | 13.3 | 12.3 | 11.9 | 11.5 | 11.0 | 11.9 | 11.7 | 11.3 | 10.2 | --- |
| Other Asian or Pacific Islander | --- | --- | 3.8 | 3.5 | 3.9 | 3.8 | 3.5 | 3.5 | 3.2 | 3.1 | 2.8 | --- |
| Hispanic or Latino[2] | --- | --- | 11.6 | 10.1 | 10.2 | 10.3 | 10.0 | 10.0 | 9.9 | 9.7 | 9.3 | 8.9 |
| Mexican | --- | --- | 12.0 | 10.6 | 10.7 | 10.8 | 10.3 | 10.4 | 10.4 | 10.3 | 9.8 | 9.5 |
| Puerto Rican | --- | --- | 13.3 | 12.4 | 12.6 | 12.7 | 12.7 | 12.6 | 12.2 | 11.8 | 10.9 | 11.0 |
| Cuban | --- | --- | 9.2 | 4.9 | 5.0 | 4.9 | 4.0 | 4.8 | 4.4 | 4.8 | 5.5 | 5.5 |
| Central and South American | --- | --- | 6.0 | 5.8 | 5.9 | 6.5 | 6.6 | 6.5 | 6.5 | 6.3 | 5.7 | 5.6 |
| Other and unknown Hispanic or Latino | --- | --- | 10.8 | 10.5 | 11.1 | 11.1 | 11.4 | 11.4 | 11.3 | 10.5 | 10.2 | 9.6 |
| Not Hispanic or Latino:[2] | | | | | | | | | | | | |
| White | --- | --- | 8.5 | 6.5 | 6.6 | 6.4 | 6.4 | 6.4 | 6.1 | 5.9 | 5.6 | 5.4 |
| Black or African American | --- | --- | 14.7 | 12.9 | 13.0 | 12.4 | 12.7 | 12.5 | 12.0 | 11.6 | 11.1 | 10.8 |

--- Data not available.

[1]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[2]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III. Some data for 1980–88 were revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File.



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## Table 10. Nonmarital childbearing according to detailed race and Hispanic origin of mother, and maternal age: United States, selected years 1970–2003

[Data are based on birth certificates]

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| *Race, Hispanic origin of mother, and maternal age* | *1970* | *1975* | *1980* | *1985* | *1990* | *1995* | *1998* | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Live births per 1,000 unmarried women 15–44 years of age[1] | | | | | | | |
| All races and origins | 26.4 | 24.5 | 29.4 | 32.8 | 43.8 | 44.3 | 43.3 | 43.3 | 44.0 | 43.8 | 43.7 | 44.9 |
| White[2] | 13.9 | 12.4 | 18.1 | 22.5 | 32.9 | 37.0 | 36.9 | 37.4 | 38.2 | 38.5 | 38.9 | 40.4 |
| Black or African American[2] | 95.5 | 84.2 | 81.1 | 77.0 | 90.5 | 74.5 | 71.6 | 69.7 | 70.5 | 68.2 | 66.2 | 66.3 |
| Asian or Pacific Islander | --- | --- | --- | --- | --- | --- | --- | --- | 20.9 | 21.2 | 21.3 | 22.2 |
| Hispanic or Latino[3] | --- | --- | --- | --- | 89.6 | 88.7 | 82.8 | 84.9 | 87.2 | 87.8 | 87.9 | 92.2 |
| White, not Hispanic or Latino | --- | --- | --- | --- | 24.4 | 28.1 | 27.9 | 27.9 | 28.0 | 27.8 | 27.8 | 28.6 |
| | | | | | Percent of live births to unmarried mothers | | | | | | | |
| All races and origins | 10.7 | 14.3 | 18.4 | 22.0 | 28.0 | 32.2 | 32.8 | 33.0 | 33.2 | 33.5 | 34.0 | 34.6 |
| White | 5.5 | 7.1 | 11.2 | 14.7 | 20.4 | 25.3 | 26.3 | 26.8 | 27.1 | 27.7 | 28.5 | 29.4 |
| Black or African American | 37.5 | 49.5 | 56.1 | 61.2 | 66.5 | 69.9 | 69.1 | 68.9 | 68.5 | 68.4 | 68.2 | 68.2 |
| American Indian or Alaska Native | 22.4 | 32.7 | 39.2 | 46.8 | 53.6 | 57.2 | 59.3 | 58.9 | 58.4 | 59.7 | 59.7 | 61.3 |
| Asian or Pacific Islander[4] | --- | --- | 7.3 | 9.5 | 13.2 | 16.3 | 15.6 | 15.4 | 14.8 | 14.9 | 14.9 | 15.0 |
| Chinese | 3.0 | 1.6 | 2.7 | 3.0 | 5.0 | 7.9 | 6.4 | 6.9 | 7.6 | 8.4 | 9.0 | --- |
| Japanese | 4.6 | 4.6 | 5.2 | 7.9 | 9.6 | 10.8 | 9.7 | 9.9 | 9.5 | 9.2 | 10.3 | --- |
| Filipino | 9.1 | 6.9 | 8.6 | 11.4 | 15.9 | 19.5 | 19.7 | 21.1 | 20.3 | 20.4 | 20.0 | --- |
| Hawaiian | --- | --- | 32.9 | 37.3 | 45.0 | 49.0 | 51.1 | 50.4 | 50.0 | 50.6 | 50.4 | --- |
| Other Asian or Pacific Islander | --- | --- | 5.4 | 8.5 | 12.6 | 16.2 | 15.2 | 14.5 | 13.8 | 13.7 | 13.5 | --- |
| Hispanic or Latino[3] | --- | --- | 23.6 | 29.5 | 36.7 | 40.8 | 41.6 | 42.2 | 42.7 | 42.5 | 43.5 | 45.0 |
| Mexican | --- | --- | 20.3 | 25.7 | 33.3 | 38.1 | 39.6 | 40.1 | 40.7 | 40.8 | 42.1 | 43.7 |
| Puerto Rican | --- | --- | 46.3 | 51.1 | 55.9 | 60.0 | 59.5 | 59.6 | 59.6 | 58.9 | 59.1 | 59.8 |
| Cuban | --- | --- | 10.0 | 16.1 | 18.2 | 23.8 | 24.8 | 26.4 | 27.3 | 27.2 | 29.8 | 31.4 |
| Central and South American | --- | --- | 27.1 | 34.9 | 41.2 | 44.1 | 42.0 | 43.7 | 44.7 | 44.3 | 44.8 | 46.0 |
| Other and unknown Hispanic or Latino | --- | --- | 22.4 | 31.1 | 37.2 | 44.0 | 45.3 | 45.8 | 46.2 | 44.2 | 44.4 | 46.7 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 9.5 | 12.4 | 16.9 | 21.2 | 21.9 | 22.1 | 22.1 | 22.5 | 23.0 | 23.6 |
| Black or African American | --- | --- | 57.2 | 62.0 | 66.7 | 70.0 | 69.3 | 69.1 | 68.7 | 68.6 | 68.4 | 68.5 |
| | | | | | Number of live births, in thousands | | | | | | | |
| Live births to unmarried mothers | 399 | 448 | 666 | 828 | 1,165 | 1,254 | 1,294 | 1,309 | 1,347 | 1,349 | 1,366 | 1,416 |
| Maternal age | | | | | Percent distribution of live births to unmarried mothers | | | | | | | |
| Under 20 years | 50.1 | 52.1 | 40.8 | 33.8 | 30.9 | 30.9 | 30.1 | 29.3 | 28.0 | 26.6 | 25.4 | 24.3 |
| 20–24 years | 31.8 | 29.9 | 35.6 | 36.3 | 34.7 | 34.5 | 35.6 | 36.4 | 37.4 | 38.2 | 38.6 | 38.8 |
| 25 years and over | 18.1 | 18.0 | 23.5 | 29.9 | 34.4 | 34.7 | 34.3 | 34.3 | 34.6 | 35.2 | 35.9 | 36.9 |

--- Data not available.

[1]Rates computed by relating births to unmarried mothers, regardless of age of mother, to unmarried women 15–44 years of age. Population data for unmarried American Indian or Alaska Native women are not available for rate calculations. Prior to 2000, population data for unmarried Asian or Pacific Islander women were not available for rate calculations.

[2]For 1970 and 1975, birth rates are by race of child.

[3]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

[4]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

NOTES: National estimates for 1970 and 1975 for unmarried mothers are based on births occurring in States reporting marital status of mother. Changes in reporting procedures for marital status occurred in some States during the 1990s. Interpretation of trend data should also take into consideration expansion of reporting areas and immigration. See Appendix II, Marital status. The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on Census 2000. Rates for 2000 were computed using Census 2000 counts and starting with 2001, rates were computed using 2000-based postcensal estimates. Data for additional years are available. See Appendix III. Some data for 1980–88 were revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Hamilton BE, Sutton PD, Ventura SJ. Revised birth and fertility rates for the 1990s and new rates for Hispanic populations, 2000 and 2001: United States. National vital statistics reports; vol 51, no 12. Hyattsville, Maryland: National Center for Health Statistics, 2003; Births: Final data for each data year 1997–2002. National vital statistics reports. Hyattsville, Maryland; Final natality statistics for each data year 1993–96. Monthly vital statistics report. Hyattsville, Maryland; Ventura SJ. Births to unmarried mothers: United States, 1980–92. Vital Health Stat 21(53). 1995.



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## Table 11. Maternal education for live births, according to detailed race and Hispanic origin of mother: United States, selected years 1970–2003

[Data are based on birth certificates]

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| Education, race, and Hispanic origin of mother | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Less than 12 years of education** | Percent of live births[1] | | | | | | | | | | | |
| All races | 30.8 | 28.6 | 23.7 | 20.6 | 23.8 | 22.6 | 21.9 | 21.7 | 21.7 | 21.7 | 21.5 | 21.6 |
| White | 27.1 | 25.1 | 20.8 | 17.8 | 22.4 | 21.6 | 21.2 | 21.3 | 21.4 | 21.7 | 21.6 | 21.8 |
| Black or African American | 51.2 | 45.3 | 36.4 | 32.6 | 30.2 | 28.7 | 26.9 | 26.0 | 25.5 | 24.9 | 24.4 | 24.0 |
| American Indian or Alaska Native | 60.5 | 52.7 | 44.2 | 39.0 | 36.4 | 33.0 | 32.7 | 32.2 | 31.6 | 31.0 | 30.8 | 30.5 |
| Asian or Pacific Islander[2] | --- | --- | 21.0 | 19.4 | 20.0 | 16.1 | 12.9 | 12.4 | 11.6 | 10.8 | 10.3 | 9.9 |
| Chinese | 23.0 | 16.5 | 15.2 | 15.5 | 15.8 | 12.9 | 11.4 | 12.0 | 11.7 | 11.9 | 11.3 | --- |
| Japanese | 11.8 | 9.1 | 5.0 | 4.8 | 3.5 | 2.6 | 2.4 | 2.0 | 2.1 | 1.8 | 2.2 | --- |
| Filipino | 26.4 | 22.3 | 16.4 | 13.9 | 10.3 | 8.0 | 6.9 | 6.3 | 6.2 | 6.0 | 5.3 | --- |
| Hawaiian | --- | --- | 20.7 | 18.7 | 19.3 | 17.6 | 18.5 | 16.8 | 16.7 | 15.4 | 14.3 | --- |
| Other Asian or Pacific Islander | --- | --- | 27.6 | 24.3 | 26.8 | 21.2 | 15.9 | 14.8 | 13.5 | 12.2 | 11.6 | --- |
| Hispanic or Latino[3] | --- | --- | 51.1 | 44.5 | 53.9 | 52.1 | 49.3 | 49.1 | 48.9 | 48.8 | 48.1 | 47.5 |
| Mexican | --- | --- | 62.8 | 59.0 | 61.4 | 58.6 | 55.2 | 55.2 | 55.0 | 55.0 | 54.2 | 53.6 |
| Puerto Rican | --- | --- | 55.3 | 46.6 | 42.7 | 38.6 | 35.9 | 34.4 | 33.4 | 32.3 | 31.5 | 29.9 |
| Cuban | --- | --- | 24.1 | 21.1 | 17.8 | 14.4 | 13.0 | 12.3 | 11.9 | 11.8 | 11.8 | 11.5 |
| Central and South American | --- | --- | 41.2 | 37.0 | 44.2 | 41.7 | 38.5 | 37.9 | 37.2 | 36.5 | 35.8 | 35.3 |
| Other and unknown Hispanic or Latino | --- | --- | 40.1 | 36.5 | 33.3 | 33.8 | 33.6 | 32.5 | 31.4 | 30.4 | 31.7 | 30.1 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 18.1 | 15.7 | 15.2 | 13.3 | 12.8 | 12.6 | 12.2 | 12.0 | 11.7 | 11.5 |
| Black or African American | --- | --- | 37.3 | 33.4 | 30.0 | 28.6 | 26.7 | 25.9 | 25.3 | 24.8 | 24.3 | 23.8 |
| **16 years or more of education** | | | | | | | | | | | | |
| All races | 8.6 | 11.4 | 14.0 | 16.7 | 17.5 | 21.4 | 23.4 | 24.1 | 24.7 | 25.2 | 25.9 | 26.6 |
| White | 9.6 | 12.7 | 15.5 | 18.6 | 19.3 | 23.1 | 25.1 | 25.7 | 26.3 | 26.7 | 27.3 | 27.9 |
| Black or African American | 2.8 | 4.3 | 6.2 | 7.0 | 7.2 | 9.5 | 11.0 | 11.4 | 11.7 | 12.1 | 12.7 | 13.4 |
| American Indian or Alaska Native | 2.7 | 2.2 | 3.5 | 3.7 | 4.4 | 6.2 | 6.8 | 7.2 | 7.8 | 8.2 | 8.7 | 8.5 |
| Asian or Pacific Islander[2] | --- | --- | 30.8 | 30.3 | 31.0 | 35.0 | 39.7 | 40.9 | 42.8 | 44.0 | 45.7 | 47.1 |
| Chinese | 34.0 | 37.8 | 41.5 | 35.2 | 40.3 | 49.0 | 53.8 | 54.3 | 55.6 | 55.9 | 57.3 | --- |
| Japanese | 20.7 | 30.6 | 36.8 | 38.1 | 44.1 | 46.2 | 49.1 | 49.5 | 51.1 | 52.0 | 53.5 | --- |
| Filipino | 28.1 | 36.6 | 37.1 | 35.2 | 34.5 | 36.7 | 39.2 | 39.6 | 40.5 | 41.8 | 43.3 | --- |
| Hawaiian | --- | --- | 7.9 | 6.5 | 6.8 | 9.7 | 11.0 | 12.7 | 13.5 | 13.2 | 14.6 | --- |
| Other Asian or Pacific Islander | --- | --- | 29.2 | 30.2 | 27.3 | 30.5 | 36.7 | 38.5 | 40.7 | 42.6 | 44.4 | --- |
| Hispanic or Latino[3] | --- | --- | 4.2 | 6.0 | 5.1 | 6.1 | 7.0 | 7.4 | 7.6 | 7.9 | 8.3 | 8.7 |
| Mexican | --- | --- | 2.2 | 3.0 | 3.3 | 4.0 | 4.7 | 5.0 | 5.1 | 5.3 | 5.5 | 5.9 |
| Puerto Rican | --- | --- | 3.0 | 4.6 | 6.5 | 8.7 | 9.5 | 10.3 | 10.4 | 11.1 | 11.8 | 12.9 |
| Cuban | --- | --- | 11.6 | 15.0 | 20.4 | 26.5 | 28.6 | 29.9 | 31.0 | 30.8 | 30.5 | 31.3 |
| Central and South American | --- | --- | 6.1 | 8.1 | 8.6 | 10.3 | 12.5 | 13.2 | 14.1 | 14.8 | 15.5 | 16.0 |
| Other and unknown Hispanic or Latino | --- | --- | 5.5 | 7.2 | 8.5 | 10.5 | 11.5 | 12.0 | 12.5 | 13.2 | 13.2 | 14.4 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 16.6 | 19.4 | 22.6 | 27.7 | 30.4 | 31.4 | 32.5 | 33.3 | 34.3 | 35.5 |
| Black or African American | --- | --- | 5.8 | 6.7 | 7.3 | 9.5 | 11.0 | 11.4 | 11.7 | 12.2 | 12.7 | 13.4 |

--- Data not available.

[1] Excludes live births for whom education of mother is unknown.

[2] For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[3] Prior to 1993, data shown only for States with an Hispanic-origin item and education of mother item on the birth certificate. See Appendix II, Education; Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

NOTES: Data for 2003 exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Education data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. In 1992–2002, education of mother was reported on the birth certificate by all 50 States and the District of Columbia. Prior to 1992, data from States lacking an education of mother item were excluded. See Appendix II, Education. The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Maternal education groups shown in this table generally represent the group at highest risk for unfavorable birth outcomes (less than 12 years of education) and the group at lowest risk (16 years or more of education). Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III. Some data for 1980–88 were revised and differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File.



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## Table 12. Mothers who smoked cigarettes during pregnancy, according to mother's detailed race, Hispanic origin, age, and education: United States, selected years, 1989–2003

[Data are based on birth certificates]

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| Characteristic of mother | 1989 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Race of mother | Percent of mothers who smoked[1,2] | | | | | | | | |
| All races | 19.5 | 18.4 | 13.9 | 12.9 | 12.6 | 12.2 | 12.0 | 11.4 | 10.7 |
| White | 20.4 | 19.4 | 15.0 | 14.0 | 13.6 | 13.2 | 13.0 | 12.3 | 11.6 |
| Black or African American | 17.1 | 15.9 | 10.6 | 9.5 | 9.3 | 9.1 | 9.0 | 8.7 | 8.1 |
| American Indian or Alaska Native | 23.0 | 22.4 | 20.9 | 20.2 | 20.2 | 20.0 | 19.9 | 19.7 | 18.1 |
| Asian or Pacific Islander[3] | 5.7 | 5.5 | 3.4 | 3.1 | 2.9 | 2.8 | 2.8 | 2.5 | 2.2 |
| Chinese | 2.7 | 2.0 | 0.8 | 0.8 | 0.5 | 0.6 | 0.7 | 0.5 | --- |
| Japanese | 8.2 | 8.0 | 5.2 | 4.8 | 4.5 | 4.2 | 3.8 | 4.0 | --- |
| Filipino | 5.1 | 5.3 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 2.9 | --- |
| Hawaiian | 19.3 | 21.0 | 15.9 | 16.8 | 14.7 | 14.4 | 14.8 | 13.7 | --- |
| Other Asian or Pacific Islander | 4.2 | 3.8 | 2.7 | 2.4 | 2.3 | 2.3 | 2.3 | 2.1 | --- |
| Hispanic origin and race of mother[4] | | | | | | | | | |
| Hispanic or Latino | 8.0 | 6.7 | 4.3 | 4.0 | 3.7 | 3.5 | 3.2 | 3.0 | 2.7 |
| Mexican | 6.3 | 5.3 | 3.1 | 2.8 | 2.6 | 2.4 | 2.4 | 2.2 | 2.0 |
| Puerto Rican | 14.5 | 13.6 | 10.4 | 10.7 | 10.5 | 10.3 | 9.7 | 9.0 | 7.9 |
| Cuban | 6.9 | 6.4 | 4.1 | 3.7 | 3.3 | 3.3 | 3.0 | 2.8 | 2.4 |
| Central and South American | 3.6 | 3.0 | 1.8 | 1.5 | 1.4 | 1.5 | 1.3 | 1.3 | 1.1 |
| Other and unknown Hispanic or Latino | 12.1 | 10.8 | 8.2 | 8.0 | 7.7 | 7.4 | 6.8 | 6.5 | 6.6 |
| Not Hispanic or Latino: | | | | | | | | | |
| White | 21.7 | 21.0 | 17.1 | 16.2 | 15.9 | 15.6 | 15.5 | 15.0 | 14.3 |
| Black or African American | 17.2 | 15.9 | 10.6 | 9.6 | 9.4 | 9.2 | 9.1 | 8.8 | 8.3 |
| Age of mother[1] | | | | | | | | | |
| Under 15 years | 7.7 | 7.5 | 7.3 | 7.7 | 7.8 | 7.1 | 6.0 | 5.8 | 5.3 |
| 15–19 years | 22.2 | 20.8 | 16.8 | 17.8 | 18.1 | 17.8 | 17.5 | 16.7 | 15.4 |
| 15–17 years | 19.0 | 17.6 | 14.6 | 15.5 | 15.5 | 15.0 | 14.4 | 13.4 | 11.9 |
| 18–19 years | 23.9 | 22.5 | 18.1 | 19.2 | 19.5 | 19.2 | 19.0 | 18.2 | 17.1 |
| 20–24 years | 23.5 | 22.1 | 17.1 | 16.5 | 16.7 | 16.8 | 17.0 | 16.7 | 16.1 |
| 25–29 years | 19.0 | 18.0 | 12.8 | 11.4 | 11.0 | 10.5 | 10.3 | 9.9 | 9.4 |
| 30–34 years | 15.7 | 15.3 | 11.4 | 9.3 | 8.6 | 8.0 | 7.6 | 7.1 | 6.5 |
| 35–39 years | 13.6 | 13.3 | 12.0 | 10.6 | 9.9 | 9.1 | 8.6 | 7.8 | 6.8 |
| 40–54 years[5] | 13.2 | 12.3 | 10.1 | 10.0 | 9.5 | 9.5 | 9.3 | 8.4 | 8.0 |
| Education of mother[6] | Percent of mothers 20 years of age and over who smoked[2] | | | | | | | | |
| 0–8 years | 18.9 | 17.5 | 11.0 | 9.5 | 8.9 | 7.9 | 7.2 | 6.8 | 6.2 |
| 9–11 years | 42.2 | 40.5 | 32.0 | 29.3 | 29.0 | 28.2 | 27.6 | 26.8 | 25.5 |
| 12 years | 22.8 | 21.9 | 18.3 | 17.1 | 16.9 | 16.6 | 16.5 | 16.0 | 15.2 |
| 13–15 years | 13.7 | 12.8 | 10.6 | 9.6 | 9.4 | 9.1 | 9.2 | 8.8 | 8.5 |
| 16 years or more | 5.0 | 4.5 | 2.7 | 2.2 | 2.1 | 2.0 | 1.9 | 1.7 | 1.6 |

[1]Data from States that did not require the reporting of mother's tobacco use during pregnancy on the birth certificate are not included. Reporting area for tobacco use increased from 43 States and the District of Columbia (DC) in 1989 to 49 States and DC in 2000–02, and decreased to 47 States and DC in 2003. See Appendix II, Cigarette smoking.

[2]Excludes live births for whom smoking status of mother is unknown.

[3]Maternal tobacco use during pregnancy was not reported on the birth certificates of California, which in 2003 accounted for 30 percent of the births to Asian or Pacific Islander mothers. For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[4]Data from States that did not require the reporting of either Hispanic origin of mother or tobacco use during pregnancy on the birth certificate are not included. Reporting area for tobacco use and Hispanic origin of mother increased from 42 States and DC in 1989 to 49 States and DC in 2000–02. In 2003 California did not require reporting of tobacco use during pregnancy. Data for 2003 also exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Tobacco use data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. See Appendix II, Hispanic origin; Cigarette smoking.

[5]Prior to 1997 data are for live births to mothers 45–49 years of age.

[6]Data from States that did not require the reporting of either mother's education or tobacco use during pregnancy on the birth certificate are not included. Reporting area for tobacco use and education of mother increased from 42 States and DC in 1989 to 49 States and DC in 2000–02. In 2003 California did not require reporting of tobacco use during pregnancy. Data for 2003 also exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Tobacco use and education data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. See Appendix II, Education; Cigarette smoking.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Births: Final data for each data year 1997–2002. National vital statistics reports. Hyattsville, Maryland; Final natality statistics for each data year 1989–96. Monthly vital statistics report. Hyattsville, Maryland.



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## Table 13. Low-birthweight live births, according to mother's detailed race, Hispanic origin, and smoking status: United States, selected years 1970–2003

[Data are based on birth certificates]

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| *Birthweight, race, Hispanic origin of mother, and smoking status of mother* | *1970* | *1975* | *1980* | *1985* | *1990* | *1995* | *1998* | *1999* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low birthweight (less than 2,500 grams) | | | | | Percent of live births[1] | | | | | | | |
| All races | 7.93 | 7.38 | 6.84 | 6.75 | 6.97 | 7.32 | 7.57 | 7.62 | 7.57 | 7.68 | 7.82 | 7.93 |
| White | 6.85 | 6.27 | 5.72 | 5.65 | 5.70 | 6.22 | 6.52 | 6.57 | 6.55 | 6.68 | 6.80 | 6.94 |
| Black or African American | 13.90 | 13.19 | 12.69 | 12.65 | 13.25 | 13.13 | 13.05 | 13.11 | 12.99 | 12.95 | 13.29 | 13.37 |
| American Indian or Alaska Native | 7.97 | 6.41 | 6.44 | 5.86 | 6.11 | 6.61 | 6.81 | 7.15 | 6.76 | 7.33 | 7.23 | 7.37 |
| Asian or Pacific Islander[2] | --- | --- | 6.68 | 6.16 | 6.45 | 6.90 | 7.42 | 7.45 | 7.31 | 7.51 | 7.78 | 7.78 |
| Chinese | 6.67 | 5.29 | 5.21 | 4.98 | 4.69 | 5.29 | 5.34 | 5.19 | 5.10 | 5.33 | 5.52 | --- |
| Japanese | 9.03 | 7.47 | 6.60 | 6.21 | 6.16 | 7.26 | 7.50 | 7.95 | 7.14 | 7.28 | 7.57 | --- |
| Filipino | 10.02 | 8.08 | 7.40 | 6.95 | 7.30 | 7.83 | 8.23 | 8.30 | 8.46 | 8.66 | 8.61 | --- |
| Hawaiian | --- | --- | 7.23 | 6.49 | 7.24 | 6.84 | 7.15 | 7.69 | 6.76 | 7.91 | 8.14 | --- |
| Other Asian or Pacific Islander | --- | --- | 6.83 | 6.19 | 6.65 | 7.05 | 7.76 | 7.76 | 7.67 | 7.76 | 8.16 | --- |
| Hispanic or Latino[3] | --- | --- | 6.12 | 6.16 | 6.06 | 6.29 | 6.44 | 6.38 | 6.41 | 6.47 | 6.55 | 6.69 |
| Mexican | --- | --- | 5.62 | 5.77 | 5.55 | 5.81 | 5.97 | 5.94 | 6.01 | 6.08 | 6.16 | 6.28 |
| Puerto Rican | --- | --- | 8.95 | 8.69 | 8.99 | 9.41 | 9.68 | 9.30 | 9.30 | 9.34 | 9.68 | 10.01 |
| Cuban | --- | --- | 5.62 | 6.02 | 5.67 | 6.50 | 6.50 | 6.80 | 6.49 | 6.49 | 6.50 | 7.04 |
| Central and South American | --- | --- | 5.76 | 5.68 | 5.84 | 6.20 | 6.47 | 6.38 | 6.34 | 6.49 | 6.53 | 6.70 |
| Other and unknown Hispanic or Latino | --- | --- | 6.96 | 6.83 | 6.87 | 7.55 | 7.59 | 7.63 | 7.84 | 7.96 | 7.87 | 8.01 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 5.69 | 5.61 | 5.61 | 6.20 | 6.55 | 6.64 | 6.60 | 6.76 | 6.91 | 7.04 |
| Black or African American | --- | --- | 12.71 | 12.62 | 13.32 | 13.21 | 13.17 | 13.23 | 13.13 | 13.07 | 13.39 | 13.55 |
| Cigarette smoker[4] | --- | --- | --- | --- | 11.25 | 12.18 | 12.01 | 12.06 | 11.88 | 11.90 | 12.15 | 12.40 |
| Nonsmoker[4] | --- | --- | --- | --- | 6.14 | 6.79 | 7.18 | 7.21 | 7.19 | 7.32 | 7.48 | 7.66 |
| Very low birthweight (less than 1,500 grams) | | | | | | | | | | | | |
| All races | 1.17 | 1.16 | 1.15 | 1.21 | 1.27 | 1.35 | 1.45 | 1.45 | 1.43 | 1.44 | 1.46 | 1.45 |
| White | 0.95 | 0.92 | 0.90 | 0.94 | 0.95 | 1.06 | 1.15 | 1.15 | 1.14 | 1.16 | 1.17 | 1.17 |
| Black or African American | 2.40 | 2.40 | 2.48 | 2.71 | 2.92 | 2.97 | 3.08 | 3.14 | 3.07 | 3.04 | 3.13 | 3.07 |
| American Indian or Alaska Native | 0.98 | 0.95 | 0.92 | 1.01 | 1.01 | 1.10 | 1.24 | 1.26 | 1.16 | 1.26 | 1.28 | 1.30 |
| Asian or Pacific Islander[2] | --- | --- | 0.92 | 0.85 | 0.87 | 0.91 | 1.10 | 1.08 | 1.05 | 1.03 | 1.12 | 1.09 |
| Chinese | 0.80 | 0.52 | 0.66 | 0.57 | 0.51 | 0.67 | 0.75 | 0.68 | 0.77 | 0.69 | 0.74 | --- |
| Japanese | 1.48 | 0.89 | 0.94 | 0.84 | 0.73 | 0.87 | 0.84 | 0.86 | 0.75 | 0.71 | 0.97 | --- |
| Filipino | 1.08 | 0.93 | 0.99 | 0.86 | 1.05 | 1.13 | 1.35 | 1.41 | 1.38 | 1.23 | 1.31 | --- |
| Hawaiian | --- | --- | 1.05 | 1.03 | 0.97 | 0.94 | 1.53 | 1.41 | 1.39 | 1.50 | 1.55 | --- |
| Other Asian or Pacific Islander | --- | --- | 0.96 | 0.91 | 0.92 | 0.91 | 1.12 | 1.09 | 1.04 | 1.06 | 1.17 | --- |
| Hispanic or Latino[3] | --- | --- | 0.98 | 1.01 | 1.03 | 1.11 | 1.15 | 1.14 | 1.14 | 1.14 | 1.17 | 1.16 |
| Mexican | --- | --- | 0.92 | 0.97 | 0.92 | 1.01 | 1.02 | 1.04 | 1.03 | 1.05 | 1.06 | 1.06 |
| Puerto Rican | --- | --- | 1.29 | 1.30 | 1.62 | 1.79 | 1.86 | 1.86 | 1.93 | 1.85 | 1.96 | 2.01 |
| Cuban | --- | --- | 1.02 | 1.18 | 1.20 | 1.19 | 1.33 | 1.49 | 1.21 | 1.27 | 1.15 | 1.37 |
| Central and South American | --- | --- | 0.99 | 1.01 | 1.05 | 1.13 | 1.23 | 1.15 | 1.20 | 1.19 | 1.20 | 1.17 |
| Other and unknown Hispanic or Latino | --- | --- | 1.01 | 0.96 | 1.09 | 1.28 | 1.38 | 1.32 | 1.42 | 1.27 | 1.44 | 1.28 |
| Not Hispanic or Latino:[3] | | | | | | | | | | | | |
| White | --- | --- | 0.87 | 0.91 | 0.93 | 1.04 | 1.15 | 1.15 | 1.14 | 1.17 | 1.17 | 1.18 |
| Black or African American | --- | --- | 2.47 | 2.67 | 2.93 | 2.98 | 3.11 | 3.18 | 3.10 | 3.08 | 3.15 | 3.12 |
| Cigarette smoker[4] | --- | --- | --- | --- | 1.73 | 1.85 | 1.87 | 1.91 | 1.91 | 1.88 | 1.88 | 1.92 |
| Nonsmoker[4] | --- | --- | --- | --- | 1.18 | 1.31 | 1.44 | 1.43 | 1.40 | 1.42 | 1.45 | 1.44 |

--- Data not available.

[1]Excludes live births with unknown birthweight. Percent based on live births with known birthweight.

[2]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.

[3]Prior to 1993, data from States lacking an Hispanic-origin item on the birth certificate were excluded. See Appendix II, Hispanic origin. Data for non-Hispanic white and non-Hispanic black women for years prior to 1989 are not nationally representative and are provided for comparison with Hispanic data.

[4]Percent based on live births with known smoking status of mother and known birthweight. Data from States that did not require the reporting of mother's tobacco use during pregnancy on the birth certificate are not included. Reporting area for tobacco use increased from 43 States and the District of Columbia (DC) in 1989 to 49 States and DC in 2000–02. In 2003 California did not require reporting of tobacco use during pregnancy. Data for 2003 also exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Tobacco use data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. See Appendix II, Cigarette smoking.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III. Some data for 1980–88 were revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005; Births: Final data for each data year 1997–2002. National vital statistics reports. Hyattsville, Maryland; Final natality statistics for each data year 1970–96. Monthly vital statistics report. Hyattsville, Maryland.



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## Table 14. Low-birthweight live births among mothers 20 years of age and over, by mother's detailed race, Hispanic origin, and education: United States, selected years 1989–2003

[Data are based on birth certificates]

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| Education, race, and Hispanic origin of mother | 1989 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Less than 12 years of education | Percent of live births weighing less than 2,500 grams[1] | | | | | | | | |
| All races | 9.0 | 8.6 | 8.4 | 8.4 | 8.3 | 8.2 | 8.2 | 8.2 | 8.4 |
| White | 7.3 | 7.0 | 7.1 | 7.2 | 7.2 | 7.1 | 7.1 | 7.1 | 7.3 |
| Black or African American | 17.0 | 16.5 | 16.0 | 15.0 | 15.0 | 14.8 | 14.6 | 15.0 | 15.2 |
| American Indian or Alaska Native | 7.3 | 7.4 | 8.0 | 8.0 | 8.1 | 7.2 | 8.3 | 8.4 | 8.0 |
| Asian or Pacific Islander[2] | 6.6 | 6.4 | 6.7 | 7.4 | 7.1 | 7.2 | 7.5 | 7.4 | 7.5 |
| Chinese | 5.4 | 5.2 | 5.3 | 5.9 | 5.2 | 5.3 | 4.9 | 4.4 | --- |
| Japanese | 4.0 | 10.6 | 11.0 | 5.0 | 11.0 | 6.8 | 8.4 | 4.7 | --- |
| Filipino | 6.9 | 7.2 | 7.5 | 7.9 | 8.4 | 8.6 | 8.5 | 9.0 | --- |
| Hawaiian | 11.0 | 10.7 | 9.8 | 8.5 | 7.2 | 9.4 | 8.9 | 7.8 | --- |
| Other Asian or Pacific Islander | 6.8 | 6.4 | 6.7 | 7.8 | 7.5 | 7.5 | 8.1 | 8.1 | --- |
| Hispanic or Latino[3] | 6.0 | 5.7 | 5.8 | 5.9 | 5.9 | 6.0 | 6.0 | 6.0 | 6.2 |
| Mexican | 5.3 | 5.2 | 5.4 | 5.6 | 5.5 | 5.6 | 5.7 | 5.7 | 5.9 |
| Puerto Rican | 11.3 | 10.3 | 10.5 | 10.7 | 10.5 | 10.9 | 10.4 | 10.4 | 11.2 |
| Cuban | 9.4 | 7.9 | 9.2 | 7.4 | 6.7 | 8.4 | 6.7 | 7.5 | 7.9 |
| Central and South American | 5.8 | 5.8 | 6.2 | 6.2 | 6.0 | 6.2 | 6.4 | 6.2 | 6.4 |
| Other and unknown Hispanic or Latino | 8.2 | 8.0 | 7.7 | 7.7 | 8.0 | 8.6 | 8.2 | 7.8 | 8.1 |
| Not Hispanic or Latino:[3] | | | | | | | | | |
| White | 8.4 | 8.3 | 8.9 | 9.1 | 9.2 | 9.0 | 9.1 | 9.3 | 9.5 |
| Black or African American | 17.6 | 16.7 | 16.2 | 15.3 | 15.2 | 15.2 | 14.9 | 15.3 | 15.7 |
| 12 years of education | | | | | | | | | |
| All races | 7.1 | 7.1 | 7.6 | 7.9 | 8.0 | 7.9 | 8.1 | 8.2 | 8.4 |
| White | 5.7 | 5.8 | 6.4 | 6.7 | 6.8 | 6.8 | 7.0 | 7.0 | 7.2 |
| Black or African American | 13.4 | 13.1 | 13.3 | 13.1 | 13.3 | 13.0 | 13.1 | 13.4 | 13.5 |
| American Indian or Alaska Native | 5.6 | 6.1 | 6.5 | 6.9 | 6.9 | 6.7 | 7.2 | 7.1 | 7.2 |
| Asian or Pacific Islander[2] | 6.4 | 6.5 | 7.0 | 7.2 | 7.4 | 7.4 | 7.5 | 7.9 | 7.8 |
| Chinese | 5.1 | 4.9 | 5.7 | 4.7 | 5.8 | 5.6 | 5.4 | 5.2 | --- |
| Japanese | 7.4 | 6.2 | 7.4 | 8.0 | 8.9 | 7.2 | 8.6 | 7.1 | --- |
| Filipino | 6.8 | 7.6 | 7.7 | 8.0 | 8.0 | 8.1 | 9.2 | 8.7 | --- |
| Hawaiian | 7.0 | 6.7 | 6.6 | 6.7 | 8.7 | 6.8 | 7.5 | 8.3 | --- |
| Other Asian or Pacific Islander | 6.5 | 6.7 | 7.1 | 7.6 | 7.3 | 7.7 | 7.4 | 8.2 | --- |
| Hispanic or Latino[3] | 5.9 | 6.0 | 6.1 | 6.4 | 6.2 | 6.2 | 6.4 | 6.5 | 6.5 |
| Mexican | 5.2 | 5.5 | 5.6 | 6.0 | 5.8 | 5.8 | 6.0 | 6.1 | 6.1 |
| Puerto Rican | 8.8 | 8.3 | 8.7 | 9.4 | 8.6 | 8.8 | 9.3 | 9.3 | 9.8 |
| Cuban | 5.3 | 5.2 | 6.7 | 6.0 | 6.5 | 6.5 | 5.8 | 6.0 | 6.4 |
| Central and South American | 5.7 | 5.8 | 5.9 | 6.2 | 6.2 | 6.0 | 6.3 | 6.4 | 6.6 |
| Other and unknown Hispanic or Latino | 6.1 | 6.6 | 7.1 | 7.3 | 7.1 | 7.3 | 7.7 | 7.7 | 7.4 |
| Not Hispanic or Latino:[3] | | | | | | | | | |
| White | 5.7 | 5.7 | 6.5 | 6.8 | 7.0 | 6.9 | 7.2 | 7.3 | 7.5 |
| Black or African American | 13.6 | 13.2 | 13.4 | 13.3 | 13.4 | 13.1 | 13.3 | 13.5 | 13.7 |
| 13 years or more of education | | | | | | | | | |
| All races | 5.5 | 5.4 | 6.0 | 6.5 | 6.6 | 6.6 | 6.7 | 7.0 | 7.1 |
| White | 4.6 | 4.6 | 5.3 | 5.8 | 5.8 | 5.8 | 6.0 | 6.2 | 6.4 |
| Black or African American | 11.2 | 11.1 | 11.4 | 11.5 | 11.6 | 11.6 | 11.6 | 12.0 | 12.0 |
| American Indian or Alaska Native | 5.6 | 4.7 | 5.7 | 5.9 | 6.1 | 6.5 | 6.7 | 7.0 | 7.3 |
| Asian or Pacific Islander[2] | 6.1 | 6.0 | 6.6 | 7.2 | 7.2 | 7.0 | 7.3 | 7.6 | 7.6 |
| Chinese | 4.5 | 4.4 | 5.1 | 5.3 | 4.9 | 4.8 | 5.3 | 5.7 | --- |
| Japanese | 6.6 | 6.0 | 7.1 | 7.4 | 7.6 | 7.0 | 6.9 | 7.7 | --- |
| Filipino | 7.2 | 7.0 | 7.6 | 8.0 | 8.0 | 8.3 | 8.3 | 8.4 | --- |
| Hawaiian | 6.3 | 4.7 | 5.0 | 6.6 | 6.3 | 4.5 | 7.7 | 7.2 | --- |
| Other Asian or Pacific Islander | 6.1 | 6.2 | 6.7 | 7.5 | 7.6 | 7.4 | 7.6 | 7.9 | --- |
| Hispanic or Latino[3] | 5.5 | 5.5 | 5.9 | 6.3 | 6.2 | 6.2 | 6.4 | 6.6 | 6.8 |
| Mexican | 5.1 | 5.2 | 5.6 | 5.8 | 5.6 | 5.8 | 6.0 | 6.2 | 6.3 |
| Puerto Rican | 7.4 | 7.4 | 7.9 | 8.2 | 8.2 | 7.9 | 8.0 | 8.9 | 9.1 |
| Cuban | 4.9 | 5.0 | 5.6 | 6.3 | 6.9 | 5.9 | 6.7 | 6.4 | 6.9 |
| Central and South American | 5.2 | 5.6 | 5.8 | 6.5 | 6.3 | 6.3 | 6.3 | 6.5 | 6.8 |
| Other and unknown Hispanic or Latino | 5.4 | 5.2 | 6.1 | 6.8 | 6.4 | 6.6 | 7.0 | 7.0 | 7.6 |
| Not Hispanic or Latino:[3] | | | | | | | | | |
| White | 4.6 | 4.5 | 5.2 | 5.7 | 5.8 | 5.8 | 6.0 | 6.2 | 6.4 |
| Black or African American | 11.2 | 11.1 | 11.5 | 11.6 | 11.7 | 11.7 | 11.7 | 12.1 | 12.1 |

[1]Excludes live births with unknown birthweight. Percent based on live births with known birthweight.
[2]For 2003, data are not shown for Asian or Pacific Islander subgroups during the transition from single race to multiple race reporting. See Appendix II, Race, Birth File.
[3]Prior to 1993, data shown only for States with an Hispanic-origin item and education of mother item on the birth certificate. See Appendix II, Education; Hispanic origin.

NOTES: Data for 2003 exclude Pennsylvania and Washington that implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth. Education data based on the 2003 Revision are not comparable with data based on the 1989 Revision to the U.S. Standard Certificate of Live Birth. In 1992–2002, education of mother was reported on the birth certificate by all 50 States and the District of Columbia. Prior to 1992, data from States lacking an education of mother item were excluded. See Appendix II, Education. The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File.



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## Table 15 (page 1 of 2). Low-birthweight live births, according to race and Hispanic origin of mother, geographic division, and State: United States, average annual 1995–97, 1998–2000, and 2001–2003

[Data are based on birth certificates]

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| Geographic division and State | All races | | | Not Hispanic or Latino | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | White | | | Black or African American | | |
| | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 |
| | Percent of live births weighing less than 2,500 grams [1] | | | | | | | | |
| United States | 7.41 | 7.59 | 7.81 | 6.34 | 6.60 | 6.90 | 13.15 | 13.18 | 13.33 |
| New England | 6.59 | 7.00 | 7.28 | 5.86 | 6.28 | 6.61 | 11.78 | 12.08 | 11.86 |
| Connecticut | 7.21 | 7.61 | 7.55 | 5.92 | 6.40 | 6.47 | 12.67 | 12.83 | 12.46 |
| Maine | 5.97 | 5.96 | 6.29 | 6.01 | 5.99 | 6.31 | *13.55 | *10.45 | *8.47 |
| Massachusetts | 6.57 | 7.04 | 7.42 | 5.89 | 6.36 | 6.74 | 11.22 | 11.53 | 11.56 |
| New Hampshire | 5.38 | 6.08 | 6.37 | 5.26 | 5.85 | 6.26 | *8.24 | *9.26 | 11.70 |
| Rhode Island | 7.03 | 7.35 | 7.94 | 6.22 | 6.63 | 7.23 | 11.06 | 12.55 | 11.80 |
| Vermont | 5.94 | 6.09 | 6.47 | 5.86 | 6.02 | 6.53 | * | * | * |
| Middle Atlantic | 7.64 | 7.82 | 7.93 | 6.10 | 6.49 | 6.72 | 13.08 | 12.90 | 12.75 |
| New Jersey | 7.69 | 7.96 | 8.02 | 6.08 | 6.46 | 6.86 | 13.71 | 13.69 | 13.22 |
| New York | 7.70 | 7.80 | 7.81 | 5.98 | 6.44 | 6.52 | 12.40 | 12.19 | 12.06 |
| Pennsylvania | 7.49 | 7.74 | 8.05 | 6.24 | 6.56 | 6.88 | 14.09 | 13.81 | 13.93 |
| East North Central | 7.57 | 7.74 | 7.91 | 6.38 | 6.57 | 6.88 | 13.82 | 13.86 | 13.85 |
| Illinois | 7.92 | 7.98 | 8.14 | 6.34 | 6.51 | 6.94 | 14.34 | 14.16 | 14.16 |
| Indiana | 7.61 | 7.71 | 7.71 | 6.93 | 7.13 | 7.11 | 13.50 | 13.01 | 13.11 |
| Michigan | 7.69 | 7.89 | 8.05 | 6.32 | 6.31 | 6.76 | 13.55 | 14.38 | 14.08 |
| Ohio | 7.62 | 7.84 | 8.21 | 6.57 | 6.85 | 7.22 | 13.57 | 13.30 | 13.63 |
| Wisconsin | 6.23 | 6.57 | 6.67 | 5.40 | 5.75 | 5.93 | 13.25 | 13.45 | 13.35 |
| West North Central | 6.60 | 6.76 | 6.98 | 6.09 | 6.24 | 6.48 | 12.90 | 12.88 | 12.38 |
| Iowa | 6.23 | 6.23 | 6.54 | 5.95 | 5.98 | 6.31 | 12.01 | 12.36 | 12.38 |
| Kansas | 6.76 | 7.00 | 7.11 | 6.28 | 6.64 | 6.81 | 12.88 | 12.58 | 12.52 |
| Minnesota | 5.85 | 6.01 | 6.27 | 5.58 | 5.69 | 5.81 | 11.84 | 11.05 | 10.29 |
| Missouri | 7.61 | 7.71 | 7.88 | 6.56 | 6.67 | 6.99 | 13.47 | 13.68 | 13.32 |
| Nebraska | 6.54 | 6.69 | 6.91 | 6.25 | 6.30 | 6.64 | 11.47 | 12.78 | 12.56 |
| North Dakota | 5.73 | 6.38 | 6.32 | 5.66 | 6.39 | 6.14 | *11.54 | *10.25 | *8.50 |
| South Dakota | 5.65 | 5.96 | 6.73 | 5.62 | 5.85 | 6.53 | *9.40 | *13.14 | *8.54 |
| South Atlantic | 8.40 | 8.52 | 8.75 | 6.65 | 6.89 | 7.26 | 13.13 | 13.08 | 13.31 |
| Delaware | 8.55 | 8.54 | 9.55 | 6.82 | 6.68 | 7.99 | 13.74 | 14.05 | 14.39 |
| District of Columbia | 13.70 | 12.68 | 11.54 | 5.89 | 6.40 | 6.16 | 16.29 | 15.35 | 14.52 |
| Florida | 7.86 | 8.06 | 8.36 | 6.60 | 6.88 | 7.18 | 12.27 | 12.34 | 12.85 |
| Georgia | 8.70 | 8.63 | 8.91 | 6.58 | 6.71 | 7.15 | 12.94 | 12.77 | 13.07 |
| Maryland | 8.63 | 8.77 | 9.02 | 6.33 | 6.52 | 7.00 | 13.54 | 13.15 | 13.07 |
| North Carolina | 8.75 | 8.83 | 8.97 | 6.98 | 7.24 | 7.60 | 13.77 | 13.76 | 14.03 |
| South Carolina | 9.22 | 9.67 | 9.88 | 6.87 | 7.22 | 7.58 | 13.47 | 14.31 | 14.58 |
| Virginia | 7.69 | 7.87 | 7.99 | 6.18 | 6.48 | 6.66 | 12.59 | 12.44 | 12.71 |
| West Virginia | 8.05 | 8.14 | 8.70 | 7.86 | 7.94 | 8.54 | 14.02 | 13.78 | 12.61 |
| East South Central | 8.86 | 9.23 | 9.56 | 7.29 | 7.65 | 8.03 | 13.33 | 13.90 | 14.44 |
| Alabama | 9.18 | 9.45 | 9.82 | 7.24 | 7.50 | 7.88 | 13.24 | 13.64 | 14.27 |
| Kentucky | 7.77 | 8.20 | 8.55 | 7.31 | 7.66 | 8.06 | 12.49 | 13.72 | 13.85 |
| Mississippi | 9.93 | 10.37 | 11.09 | 7.23 | 7.55 | 8.19 | 13.10 | 13.84 | 14.91 |
| Tennessee | 8.77 | 9.16 | 9.25 | 7.33 | 7.79 | 8.05 | 13.95 | 14.35 | 14.30 |
| West South Central | 7.65 | 7.84 | 8.15 | 6.59 | 6.85 | 7.28 | 13.13 | 13.37 | 13.76 |
| Arkansas | 8.35 | 8.69 | 8.74 | 7.07 | 7.47 | 7.62 | 13.12 | 13.56 | 14.08 |
| Louisiana | 9.91 | 10.13 | 10.53 | 6.89 | 7.11 | 7.67 | 14.29 | 14.48 | 14.64 |
| Oklahoma | 7.20 | 7.34 | 7.85 | 6.71 | 6.97 | 7.50 | 12.68 | 12.52 | 13.72 |
| Texas | 7.19 | 7.39 | 7.72 | 6.39 | 6.63 | 7.06 | 12.37 | 12.66 | 13.14 |
| Mountain | 7.26 | 7.34 | 7.46 | 6.96 | 7.11 | 7.19 | 14.04 | 13.20 | 13.77 |
| Arizona | 6.78 | 6.91 | 6.93 | 6.65 | 6.69 | 6.75 | 13.11 | 12.61 | 12.90 |
| Colorado | 8.70 | 8.45 | 8.80 | 8.22 | 8.08 | 8.51 | 15.44 | 14.13 | 14.82 |
| Idaho | 5.98 | 6.30 | 6.34 | 5.80 | 6.17 | 6.28 | *10.19 | * | *9.25 |
| Montana | 6.18 | 6.67 | 6.85 | 5.90 | 6.62 | 6.72 | * | * | * |
| Nevada | 7.52 | 7.45 | 7.73 | 7.13 | 7.31 | 7.40 | 13.89 | 12.94 | 13.55 |
| New Mexico | 7.61 | 7.76 | 8.14 | 7.52 | 7.95 | 7.93 | 13.10 | 12.59 | 14.63 |
| Utah | 6.50 | 6.71 | 6.47 | 6.29 | 6.54 | 6.29 | 13.52 | 14.01 | 14.04 |
| Wyoming | 8.27 | 8.51 | 8.58 | 8.14 | 8.49 | 8.37 | *11.43 | *16.95 | *11.83 |
| Pacific | 6.02 | 6.10 | 6.36 | 5.42 | 5.53 | 5.86 | 11.89 | 11.57 | 11.73 |
| Alaska | 5.56 | 5.80 | 5.83 | 5.10 | 5.22 | 4.96 | 12.64 | 10.65 | 10.13 |
| California | 6.11 | 6.18 | 6.43 | 5.55 | 5.67 | 5.99 | 12.02 | 11.73 | 11.90 |
| Hawaii | 7.18 | 7.54 | 8.34 | 4.97 | 5.47 | 6.67 | 9.87 | 10.60 | 11.93 |
| Oregon | 5.43 | 5.46 | 5.82 | 5.21 | 5.24 | 5.70 | 10.92 | 10.59 | 10.50 |
| Washington | 5.56 | 5.71 | 5.90 | 5.21 | 5.31 | 5.57 | 10.70 | 10.26 | 10.46 |

See footnotes at end of table.



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## Table 15 (page 2 of 2). Low-birthweight live births, according to race and Hispanic origin of mother, geographic division, and State: United States, average annual 1995–97, 1998–2000, and 2001–2003

[Data are based on birth certificates]

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| Geographic division and State | Hispanic or Latino[2] | | | American Indian or Alaska Native[3] | | | Asian or Pacific Islander[3] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 | 1995–97 | 1998–2000 | 2001–2003 |
| | Percent of live births weighing less than 2,500 grams[1] | | | | | | | | |
| United States | 6.33 | 6.41 | 6.57 | 6.62 | 6.90 | 7.31 | 7.07 | 7.39 | 7.70 |
| New England | 8.10 | 8.30 | 8.18 | 9.16 | 7.39 | 8.39 | 7.09 | 7.44 | 7.83 |
| Connecticut | 8.64 | 9.12 | 8.29 | *12.87 | * | 10.31 | 8.38 | 7.29 | 7.91 |
| Maine | *5.75 | *6.42 | *5.53 | * | * | * | *6.05 | *5.50 | *5.91 |
| Massachusetts | 7.91 | 8.13 | 8.34 | *7.53 | *6.46 | *6.78 | 6.70 | 7.47 | 7.81 |
| New Hampshire | *7.34 | 5.48 | 5.26 | * | * | * | *6.16 | 7.14 | 6.29 |
| Rhode Island | 7.46 | 7.11 | 8.03 | *10.40 | 11.36 | 11.63 | 7.70 | 8.72 | 10.42 |
| Vermont | * | * | * | * | * | * | * | * | * |
| Middle Atlantic | 7.70 | 7.61 | 7.52 | 8.39 | 9.27 | 8.40 | 7.09 | 7.39 | 7.70 |
| New Jersey | 7.33 | 7.32 | 7.15 | 11.21 | 11.03 | 10.63 | 7.29 | 7.73 | 7.75 |
| New York | 7.64 | 7.52 | 7.45 | 7.15 | 8.58 | 7.01 | 6.99 | 7.26 | 7.62 |
| Pennsylvania | 9.23 | 9.14 | 8.95 | 8.40 | 9.68 | 10.00 | 7.20 | 7.21 | 7.97 |
| East North Central | 6.22 | 6.38 | 6.39 | 6.25 | 6.83 | 7.65 | 7.37 | 7.93 | 7.99 |
| Illinois | 6.01 | 6.28 | 6.37 | 7.61 | 8.56 | 9.81 | 8.01 | 8.30 | 8.36 |
| Indiana | 6.79 | 6.11 | 6.27 | *8.74 | *8.52 | *9.13 | 6.51 | 7.30 | 7.75 |
| Michigan | 6.46 | 6.52 | 6.36 | 6.10 | 6.80 | 6.73 | 7.03 | 7.69 | 7.72 |
| Ohio | 7.26 | 7.51 | 7.17 | 8.56 | 7.57 | 10.68 | 6.87 | 7.89 | 7.93 |
| Wisconsin | 6.45 | 6.41 | 6.01 | 4.95 | 5.92 | 6.59 | 6.67 | 7.35 | 7.27 |
| West North Central | 6.22 | 6.04 | 6.06 | 6.26 | 6.29 | 7.08 | 6.89 | 7.22 | 7.68 |
| Iowa | 6.40 | 5.76 | 6.21 | *7.28 | 8.74 | 8.54 | 8.30 | 7.22 | 7.38 |
| Kansas | 5.87 | 5.99 | 6.02 | 8.87 | 5.11 | 7.14 | 6.35 | 7.67 | 7.55 |
| Minnesota | 6.46 | 5.82 | 5.78 | 6.73 | 6.54 | 7.00 | 6.54 | 7.17 | 7.69 |
| Missouri | 6.36 | 6.19 | 6.10 | 7.29 | 7.78 | 7.83 | 7.27 | 6.74 | 7.36 |
| Nebraska | 6.10 | 6.64 | 6.15 | 6.12 | 5.99 | 7.05 | 7.24 | 8.00 | 8.22 |
| North Dakota | *7.49 | *5.69 | *6.58 | 5.52 | 5.82 | 7.07 | * | * | *6.67 |
| South Dakota | *7.20 | *5.05 | 8.42 | 5.49 | 6.10 | 6.78 | * | *7.72 | 13.04 |
| South Atlantic | 6.35 | 6.32 | 6.47 | 9.15 | 8.92 | 9.71 | 7.39 | 7.64 | 7.96 |
| Delaware | 7.55 | 6.99 | 7.22 | * | * | * | 8.74 | 7.83 | 9.49 |
| District of Columbia | 7.10 | 6.85 | 7.79 | * | * | * | *7.60 | *9.15 | *6.76 |
| Florida | 6.50 | 6.50 | 6.74 | 8.31 | 6.68 | 7.72 | 7.78 | 8.52 | 8.24 |
| Georgia | 5.54 | 5.57 | 5.81 | *6.09 | 9.06 | 8.91 | 7.66 | 7.05 | 8.29 |
| Maryland | 6.08 | 6.55 | 6.94 | *8.16 | 8.35 | 11.74 | 7.05 | 7.44 | 7.53 |
| North Carolina | 6.05 | 6.23 | 6.14 | 9.98 | 10.33 | 10.81 | 7.54 | 7.68 | 7.98 |
| South Carolina | 6.43 | 6.39 | 6.59 | *10.79 | *8.72 | *9.73 | 7.56 | 7.06 | 8.83 |
| Virginia | 6.50 | 6.21 | 6.09 | *7.71 | *7.38 | *10.87 | 6.94 | 7.32 | 7.53 |
| West Virginia | * | * | *7.75 | * | * | * | *5.83 | *7.54 | *9.31 |
| East South Central | 6.58 | 6.53 | 6.59 | 7.57 | 7.71 | 8.03 | 7.35 | 7.84 | 7.84 |
| Alabama | 6.38 | 6.38 | 6.97 | *6.53 | *6.82 | 11.20 | 7.48 | 8.03 | 7.65 |
| Kentucky | 7.05 | 6.85 | 7.24 | *9.39 | *9.33 | *8.85 | 6.55 | 7.16 | 7.50 |
| Mississippi | 6.18 | 6.09 | 6.52 | *7.23 | 7.22 | 6.36 | 6.69 | 7.48 | 7.00 |
| Tennessee | 6.59 | 6.60 | 6.13 | *7.90 | *8.53 | *7.16 | 7.88 | 8.20 | 8.31 |
| West South Central | 6.54 | 6.68 | 6.93 | 6.15 | 6.41 | 6.78 | 7.49 | 7.72 | 7.92 |
| Arkansas | 5.97 | 6.09 | 5.92 | *6.58 | *6.80 | 7.77 | 8.44 | 8.54 | 6.79 |
| Louisiana | 5.97 | 6.92 | 6.83 | 7.40 | 7.41 | 10.54 | 8.12 | 8.21 | 8.04 |
| Oklahoma | 6.20 | 6.06 | 6.32 | 6.01 | 6.22 | 6.51 | 6.85 | 6.58 | 7.63 |
| Texas | 6.55 | 6.70 | 6.97 | 6.36 | 7.03 | 6.41 | 7.44 | 7.74 | 7.98 |
| Mountain | 7.24 | 7.16 | 7.31 | 6.54 | 7.01 | 7.17 | 8.41 | 8.38 | 8.60 |
| Arizona | 6.51 | 6.66 | 6.63 | 6.41 | 6.87 | 6.89 | 7.19 | 7.60 | 8.28 |
| Colorado | 8.67 | 8.21 | 8.40 | 8.47 | 8.76 | 9.86 | 9.48 | 10.04 | 10.21 |
| Idaho | 6.82 | 6.77 | 6.63 | 7.68 | 7.43 | 5.88 | *6.77 | 7.48 | 6.38 |
| Montana | 7.82 | 6.81 | 7.91 | 6.60 | 7.17 | 7.38 | *9.74 | * | *8.09 |
| Nevada | 6.24 | 6.19 | 6.63 | 6.84 | 8.00 | 6.36 | 9.16 | 8.21 | 8.62 |
| New Mexico | 7.81 | 7.77 | 8.30 | 6.05 | 6.54 | 7.16 | 9.27 | 8.54 | 7.17 |
| Utah | 7.66 | 7.26 | 6.97 | 6.94 | 7.47 | 6.42 | 7.55 | 7.41 | 7.30 |
| Wyoming | 8.39 | 7.32 | 8.83 | 8.26 | 7.70 | 11.10 | * | *15.48 | * |
| Pacific | 5.51 | 5.58 | 5.80 | 6.00 | 6.21 | 6.65 | 6.78 | 7.06 | 7.40 |
| Alaska | 6.28 | 6.12 | 5.91 | 5.35 | 5.91 | 5.94 | 5.71 | 7.39 | 6.67 |
| California | 5.50 | 5.57 | 5.81 | 6.24 | 6.00 | 6.66 | 6.67 | 6.92 | 7.26 |
| Hawaii | 6.89 | 7.66 | 8.36 | *8.00 | *6.77 | * | 7.82 | 8.06 | 8.81 |
| Oregon | 5.77 | 5.59 | 5.40 | 5.77 | 6.09 | 7.59 | 6.07 | 6.23 | 6.59 |
| Washington | 5.31 | 5.45 | 5.39 | 6.30 | 6.96 | 7.32 | 5.93 | 6.71 | 6.58 |

* Percents preceded by an asterisk are based on fewer than 50 births. Percents not shown are based on fewer than 20 births.
[1]Excludes live births with unknown birthweight.
[2]Persons of Hispanic origin may be of any race.
[3]Includes persons of Hispanic and non-Hispanic origin.

NOTES: For information on very low birthweight live births, see table 47 in Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: Final Data for 2003. National vital statistics reports; vol 54, no 2. Hyattsville, Maryland: National Center for Health Statistics, 2005.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Birth File.



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## Table 16. Legal abortions and legal abortion ratios, according to selected patient characteristics: United States, selected years 1973–2002

[Data are based on reporting by State health departments and by hospitals and other medical facilities] Updated March 2006 Click here for spreadsheet version

| Characteristic | 1973 | 1975 | 1980 | 1985 | 1990 | 1995 | 1998[1] | 1999[1] | 2000[2] | 2001[2] | 2002[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Number of legal abortions reported in thousands | | | | | | |
| Centers for Disease Control and Prevention | 616 | 855 | 1,298 | 1,329 | 1,429 | 1,211 | 884 | 862 | 857 | 853 | 854 |
| Alan Guttmacher Institute[3] | 745 | 1,034 | 1,554 | 1,589 | 1,609 | 1,359 | 1,319 | 1,315 | 1,313 | 1,303 | 1,293 |
| | | | | | Abortions per 100 live births[4] | | | | | | |
| Total | 19.6 | 27.2 | 35.9 | 35.4 | 34.4 | 31.1 | 26.4 | 25.6 | 24.5 | 24.6 | 24.6 |
| Age | | | | | | | | | | | |
| Under 15 years | 123.7 | 119.3 | 139.7 | 137.6 | 81.8 | 66.4 | 75.0 | 70.9 | 70.8 | 74.4 | 75.3 |
| 15–19 years | 53.9 | 54.2 | 71.4 | 68.8 | 51.1 | 39.9 | 39.1 | 37.5 | 36.1 | 36.6 | 36.8 |
| 20–24 years | 29.4 | 28.9 | 39.5 | 38.6 | 37.8 | 34.8 | 32.9 | 31.6 | 30.0 | 30.4 | 30.3 |
| 25–29 years | 20.7 | 19.2 | 23.7 | 21.7 | 21.8 | 22.0 | 21.6 | 20.8 | 19.8 | 20.0 | 20.0 |
| 30–34 years | 28.0 | 25.0 | 23.7 | 19.9 | 19.0 | 16.4 | 15.7 | 15.2 | 14.5 | 14.7 | 14.8 |
| 35–39 years | 45.1 | 42.2 | 41.0 | 33.6 | 27.3 | 22.3 | 20.0 | 19.3 | 18.1 | 18.0 | 18.0 |
| 40 years and over | 68.4 | 66.8 | 80.7 | 62.3 | 50.6 | 38.5 | 33.8 | 32.9 | 30.1 | 30.4 | 31.0 |
| Race | | | | | | | | | | | |
| White[5] | 32.6 | 27.7 | 33.2 | 27.7 | 25.8 | 20.3 | 18.9 | 17.7 | 16.7 | 16.5 | 16.4 |
| Black or African American[6] | 42.0 | 47.6 | 54.3 | 47.2 | 53.7 | 53.1 | 51.2 | 52.9 | 50.3 | 49.1 | 49.5 |
| Hispanic origin[7] | | | | | | | | | | | |
| Hispanic or Latino | --- | --- | --- | --- | --- | 27.1 | 27.3 | 26.1 | 22.5 | 23.0 | 23.3 |
| Not Hispanic or Latino | --- | --- | --- | --- | --- | 27.9 | 27.1 | 25.2 | 23.3 | 23.2 | 23.7 |
| Marital status | | | | | | | | | | | |
| Married | 7.6 | 9.6 | 10.5 | 8.0 | 8.7 | 7.6 | 7.1 | 7.0 | 6.5 | 6.5 | 6.5 |
| Unmarried | 139.8 | 161.0 | 147.6 | 117.4 | 86.3 | 64.5 | 62.7 | 60.4 | 57.0 | 57.2 | 57.0 |
| Previous live births[8] | | | | | | | | | | | |
| 0 | 43.7 | 38.4 | 45.7 | 45.1 | 36.0 | 28.6 | 25.5 | 24.3 | 22.6 | 26.4 | 23.3 |
| 1 | 23.5 | 22.0 | 20.2 | 21.6 | 22.7 | 22.0 | 21.4 | 20.6 | 19.4 | 18.0 | 19.4 |
| 2 | 36.8 | 36.8 | 29.5 | 29.9 | 31.5 | 30.6 | 30.0 | 29.0 | 27.4 | 25.5 | 27.9 |
| 3 | 46.9 | 47.7 | 29.8 | 18.2 | 30.1 | 30.7 | 30.5 | 29.8 | 28.5 | 26.4 | 29.1 |
| 4 or more[9] | 44.7 | 43.5 | 24.3 | 21.5 | 26.6 | 23.7 | 24.3 | 24.2 | 23.7 | 21.9 | 23.6 |
| | | | | | Percent distribution[10] | | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Period of gestation | | | | | | | | | | | |
| Under 9 weeks | 36.1 | 44.6 | 51.7 | 50.3 | 51.6 | 54.0 | 55.7 | 57.6 | 58.1 | 59.1 | 60.5 |
| 9–10 weeks | 29.4 | 28.4 | 26.2 | 26.6 | 25.3 | 23.1 | 21.5 | 20.2 | 19.8 | 19.0 | 18.4 |
| 11–12 weeks | 17.9 | 14.9 | 12.2 | 12.5 | 11.7 | 10.9 | 10.9 | 10.2 | 10.2 | 10.0 | 9.6 |
| 13–15 weeks | 6.9 | 5.0 | 5.1 | 5.9 | 6.4 | 6.3 | 6.4 | 6.2 | 6.2 | 6.2 | 6.0 |
| 16–20 weeks | 8.0 | 6.1 | 3.9 | 3.9 | 4.0 | 4.3 | 4.1 | 4.3 | 4.3 | 4.3 | 4.1 |
| 21 weeks and over | 1.7 | 1.0 | 0.9 | 0.8 | 1.0 | 1.4 | 1.4 | 1.5 | 1.4 | 1.4 | 1.4 |
| Previous induced abortions | | | | | | | | | | | |
| 0 | --- | 81.9 | 67.6 | 60.1 | 57.1 | 55.1 | 53.8 | 53.7 | 54.7 | 55.5 | 55.3 |
| 1 | --- | 14.9 | 23.5 | 25.7 | 26.9 | 26.9 | 27.0 | 27.1 | 26.4 | 25.8 | 25.8 |
| 2 | --- | 2.5 | 6.6 | 9.8 | 10.1 | 10.9 | 11.4 | 11.5 | 11.3 | 11.0 | 11.3 |
| 3 or more | --- | 0.7 | 2.3 | 4.4 | 5.9 | 7.1 | 7.8 | 7.7 | 7.6 | 7.7 | 7.6 |

--- Data not available.

[1]In 1998 and 1999 Alaska, California, New Hampshire, and Oklahoma did not report abortion data to CDC. For comparison, in 1997 the 48 corresponding reporting areas reported about 900,000 legal abortions. [2]In 2000, 2001, and 2002 Alaska, California, and New Hampshire did not report abortion data to CDC.

[3]No surveys were conducted in 1983, 1986, 1989, 1990, 1993, 1994, 1997, 1998, 2001, or 2002. Data for these years were estimated by interpolation.

[4]For calculation of ratios by each characteristic, abortions with characteristic unknown were distributed in proportion to abortions with characteristic known.

[5]For 1989 and later years, white race includes women of Hispanic ethnicity. [6]Before 1989 black race includes races other than white.

[7]Reporting area increased from 20–22 States, the District of Columbia (DC), and New York City (NYC) in 1991–95 to 31 States and NYC in 2002. California, Florida, Illinois, and Arizona, States with large Hispanic populations, do not report Hispanic ethnicity.

[8]For 1973–75, data indicate number of living children. [9]For 1975, data refer to four previous live births, not four or more. For five or more previous live births, the ratio is 47.3. [10]For calculation of percent distribution by each characteristic, abortions with characteristic unknown were excluded.

NOTES: See Appendix I, Abortion Surveillance and Alan Guttmacher Institute Abortion Provider Survey, for methodological differences between these two data sources. The number of areas reporting adequate data (less than or equal to 15 percent missing) for each characteristic varies from year to year. See Appendix I, Abortion Surveillance. Some data for 2000 have been revised and differ from the previous edition of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion: Abortion Surveillance, 1973, 1975, 1979–80. Public Health Service, Atlanta, Ga., 1975, 1977, 1983; CDC MMWR Surveillance Summaries. Abortion Surveillance, United States, 1984 and 1985, Vol. 38, No. SS–2, 1989; 1990, Vol. 42, No. SS–6, 1993; 1995, Vol. 47, No. SS–2, 1998; 1997, Vol. 49, No. SS–11, 2000; 1998, Vol. 51, No. SS–3, 2002; 1999, Vol. 51, No. SS–9, 2002; 2000, Vol. 52, No. SS–12, 2003; 2001, Vol. 53, No. SS–9, 2004; 2002, Vol. 54, No. SS–7, 2005. Alan Guttmacher Institute Abortion Provider Survey. Finer LB and Henshaw SK: Abortion incidence and services in the United States in 2000. Perspectives on Sexual and Reproductive Health. 35(1), 2003; and Finer LB, Henshaw SK. Estimates of U.S. abortion incidence in 2001 and 2002. The Alan Guttmacher Institute. May 2005 at www.guttmacher.org/pubs/2005/05/18/ab_incidence.pdf.



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## Table 17 (page 1 of 4). Contraceptive use among women 15–44 years of age, according to age, race, Hispanic origin, and method of contraception: United States, 1982, 1988, 1995, and 2002

[Data are based on household interviews of samples of women in the childbearing ages]

Click here for spreadsheet version

| Race, Hispanic origin, and year[1] | Age in years | | | | |
|---|---|---|---|---|---|
| | 15–44 | 15–19 | 20–24 | 25–34 | 35–44 |
| | Number of women in population in thousands | | | | |
| All women:[2] | | | | | |
| 1982 | 54,099 | 9,521 | 10,629 | 19,644 | 14,305 |
| 1988 | 57,900 | 9,179 | 9,413 | 21,726 | 17,582 |
| 1995 | 60,201 | 8,961 | 9,041 | 20,758 | 21,440 |
| 2002 | 61,561 | 9,834 | 9,840 | 19,522 | 22,365 |
| Not Hispanic or Latino: | | | | | |
| White only: | | | | | |
| 1982 | 41,279 | 7,010 | 8,081 | 14,945 | 11,243 |
| 1988 | 42,575 | 6,531 | 6,630 | 15,929 | 13,486 |
| 1995 | 42,154 | 5,865 | 6,020 | 14,471 | 15,798 |
| 2002 | 39,498 | 6,069 | 5,938 | 12,073 | 15,418 |
| Black or African American only: | | | | | |
| 1982 | 6,825 | 1,383 | 1,456 | 2,392 | 1,593 |
| 1988 | 7,408 | 1,362 | 1,322 | 2,760 | 1,965 |
| 1995 | 8,060 | 1,334 | 1,305 | 2,780 | 2,641 |
| 2002 | 8,250 | 1,409 | 1,396 | 2,587 | 2,857 |
| Hispanic or Latino: | | | | | |
| 1982 | 4,393 | 886 | 811 | 1,677 | 1,018 |
| 1988 | 5,557 | 999 | 1,003 | 2,104 | 1,451 |
| 1995 | 6,702 | 1,150 | 1,163 | 2,450 | 1,940 |
| 2002 | 9,107 | 1,521 | 1,632 | 3,249 | 2,705 |
| | Percent of women in population using contraception | | | | |
| All women:[2] | | | | | |
| 1982 | 55.7 | 24.2 | 55.8 | 66.7 | 61.6 |
| 1988 | 60.3 | 32.1 | 59.0 | 66.3 | 68.3 |
| 1995 | 64.2 | 29.8 | 63.5 | 71.1 | 72.3 |
| 2002 | 61.9 | 31.5 | 60.7 | 68.6 | 69.9 |
| Not Hispanic or Latino: | | | | | |
| White only: | | | | | |
| 1982 | 57.3 | 23.6 | 58.7 | 67.8 | 63.5 |
| 1988 | 63.0 | 34.0 | 62.6 | 67.7 | 71.5 |
| 1995 | 66.2 | 30.5 | 65.4 | 72.9 | 73.6 |
| 2002 | 64.6 | 35.0 | 66.3 | 69.9 | 71.4 |
| Black or African American only: | | | | | |
| 1982 | 51.6 | 29.8 | 52.3 | 63.5 | 52.0 |
| 1988 | 56.8 | 35.7 | 61.8 | 63.5 | 58.7 |
| 1995 | 62.3 | 36.1 | 67.6 | 66.8 | 68.3 |
| 2002 | 57.6 | 32.9 | 50.8 | 67.9 | 63.8 |
| Hispanic or Latino: | | | | | |
| 1982 | 50.6 | * | *36.8 | 67.2 | 59.0 |
| 1988 | 50.4 | *18.3 | 40.8 | 67.4 | 54.3 |
| 1995 | 59.0 | 26.1 | 50.6 | 69.2 | 70.8 |
| 2002 | 59.0 | 20.4 | 57.4 | 66.2 | 72.9 |

See footnotes at end of table.



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## Table 17 (page 2 of 4). Contraceptive use among women 15–44 years of age, according to age, race, Hispanic origin, and method of contraception: United States, 1982, 1988, 1995, and 2002

[Data are based on household interviews of samples of women in the childbearing ages]

Click here for spreadsheet version

| Method of contraception and year | Age in years | | | | |
|---|---|---|---|---|---|
| | 15–44 | 15–19 | 20–24 | 25–34 | 35–44 |
| **Female sterilization** | Percent of contracepting women | | | | |
| 1982 | 23.2 | – | *4.5 | 22.1 | 43.5 |
| 1988 | 27.6 | * | *4.6 | 25.0 | 47.6 |
| 1995 | 27.8 | * | 4.0 | 23.8 | 45.0 |
| 2002 | 27.0 | – | 3.6 | 21.7 | 45.8 |
| **Male sterilization** | | | | | |
| 1982 | 10.9 | * | *3.6 | 10.1 | 19.9 |
| 1988 | 11.7 | * | * | 10.2 | 20.8 |
| 1995 | 10.9 | – | * | 7.8 | 19.5 |
| 2002 | 10.2 | – | * | 7.2 | 18.2 |
| **Implant[3]** | | | | | |
| 1982 | . . . | . . . | . . . | . . . | . . . |
| 1988 | . . . | . . . | . . . | . . . | . . . |
| 1995 | 1.3 | * | 3.7 | *1.3 | * |
| 2002 | 1.2 | * | * | *1.9 | * |
| **Injectable[3]** | | | | | |
| 1982 | . . . | . . . | . . . | . . . | . . . |
| 1988 | . . . | . . . | . . . | . . . | . . . |
| 1995 | 3.0 | 9.7 | 6.1 | 2.9 | *0.8 |
| 2002 | 5.4 | 13.9 | 10.2 | 5.3 | *1.8 |
| **Birth control pill** | | | | | |
| 1982 | 28.0 | 63.9 | 55.1 | 25.7 | *3.7 |
| 1988 | 30.8 | 58.8 | 68.2 | 32.6 | 4.3 |
| 1995 | 27.0 | 43.8 | 52.1 | 33.4 | 8.7 |
| 2002 | 31.0 | 53.8 | 52.5 | 34.8 | 15.0 |
| **Intrauterine device** | | | | | |
| 1982 | 7.1 | * | *4.2 | 9.7 | 6.9 |
| 1988 | 2.0 | – | * | 2.1 | 3.1 |
| 1995 | 0.8 | – | * | *0.8 | 1.1 |
| 2002 | 2.2 | * | 1.8 | 3.7 | * |
| **Diaphragm** | | | | | |
| 1982 | 8.1 | *6.0 | 10.2 | 10.3 | 4.0 |
| 1988 | 5.7 | * | *3.7 | 7.3 | 6.0 |
| 1995 | 1.9 | * | * | 1.7 | 2.8 |
| 2002 | 0.6 | – | * | * | * |
| **Condom** | | | | | |
| 1982 | 12.0 | 20.8 | 10.7 | 11.4 | 11.3 |
| 1988 | 14.6 | 32.8 | 14.5 | 13.7 | 11.2 |
| 1995 | 23.4 | 45.8 | 33.7 | 23.7 | 15.3 |
| 2002 | 23.8 | 44.6 | 36.0 | 23.1 | 15.6 |
| **Periodic abstinence-calendar rhythm** | | | | | |
| 1982 | 3.3 | 2.0 | 3.1 | 3.3 | 3.7 |
| 1988 | 1.7 | * | 1.1 | 1.8 | 2.0 |
| 1995 | 3.3 | * | *1.5 | 3.7 | 3.9 |
| 2002 | 2.0 | * | *2.3 | *1.7 | *2.4 |
| **Periodic abstinence-natural family planning** | | | | | |
| 1982 | 0.6 | – | * | 0.9 | * |
| 1988 | 0.6 | – | * | 0.7 | 0.7 |
| 1995 | *0.5 | – | * | *0.7 | * |
| 2002 | *0.4 | – | – | * | * |
| **Withdrawal** | | | | | |
| 1982 | 2.0 | 2.9 | 3.0 | 1.8 | 1.3 |
| 1988 | 2.2 | 3.0 | 3.4 | 2.8 | 0.8 |
| 1995 | 6.1 | 13.2 | 7.1 | 6.0 | 4.5 |
| 2002 | 8.8 | 15.0 | 11.9 | 10.7 | 4.7 |
| **Other methods[4]** | | | | | |
| 1982 | 4.9 | 2.6 | 5.4 | 4.8 | 5.3 |
| 1988 | 3.2 | * | 1.8 | 3.8 | 3.5 |
| 1995 | 3.2 | * | 3.2 | 3.1 | 3.4 |
| 2002 | 1.7 | * | * | *1.5 | *1.8 |

See footnotes at end of table.



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## Table 17 (page 3 of 4). Contraceptive use among women 15–44 years of age, according to age, race, Hispanic origin, and method of contraception: United States, 1982, 1988, 1995, and 2002

[Data are based on household interviews of samples of women in the childbearing ages]

Click here for spreadsheet version

| Method of contraception and year | Not Hispanic or Latino[1] | | Hispanic or Latino[1] |
|---|---|---|---|
| | White only | Black or African American only | |
| | Percent of contracepting women | | |
| **Female sterilization** | | | |
| 1982 | 22.0 | 30.0 | 23.0 |
| 1988 | 25.6 | 37.8 | 31.7 |
| 1995 | 24.5 | 39.9 | 36.6 |
| 2002 | 23.9 | 39.2 | 33.8 |
| **Male sterilization** | | | |
| 1982 | 13.0 | *1.5 | * |
| 1988 | 14.3 | *0.9 | * |
| 1995 | 13.7 | *1.8 | *4.0 |
| 2002 | 12.9 | * | 4.7 |
| **Implant[3]** | | | |
| 1982 | . . . | . . . | . . . |
| 1988 | . . . | . . . | . . . |
| 1995 | *1.0 | *2.4 | *2.0 |
| 2002 | *0.8 | * | *1.3 |
| **Injectable[3]** | | | |
| 1982 | . . . | . . . | . . . |
| 1988 | . . . | . . . | . . . |
| 1995 | 2.4 | 5.4 | 4.7 |
| 2002 | 4.2 | 9.4 | 7.3 |
| **Birth control pill** | | | |
| 1982 | 26.4 | 37.9 | 30.2 |
| 1988 | 29.5 | 38.2 | 33.4 |
| 1995 | 28.7 | 23.7 | 23.0 |
| 2002 | 34.9 | 23.1 | 22.1 |
| **Intrauterine device** | | | |
| 1982 | 5.8 | 9.3 | 19.2 |
| 1988 | 1.5 | 3.2 | *5.0 |
| 1995 | 0.7 | * | * |
| 2002 | 1.7 | * | 5.3 |
| **Diaphragm** | | | |
| 1982 | 9.2 | *3.2 | * |
| 1988 | 6.6 | *2.0 | * |
| 1995 | 2.3 | * | * |
| 2002 | * | * | – |
| **Condom** | | | |
| 1982 | 13.1 | 6.3 | *6.9 |
| 1988 | 15.2 | 10.1 | 13.7 |
| 1995 | 22.5 | 24.9 | 21.2 |
| 2002 | 21.7 | 29.6 | 24.1 |
| **Periodic abstinence-calendar rhythm** | | | |
| 1982 | 3.2 | 2.9 | 3.9 |
| 1988 | 1.6 | 1.9 | * |
| 1995 | 3.3 | *1.7 | 3.2 |
| 2002 | 2.3 | * | * |
| **Periodic abstinence-natural family planning** | | | |
| 1982 | 0.7 | 0.3 | – |
| 1988 | 0.7 | * | * |
| 1995 | 0.7 | * | * |
| 2002 | * | * | * |
| **Withdrawal** | | | |
| 1982 | 2.1 | 1.3 | 2.6 |
| 1988 | 2.0 | 1.4 | 4.5 |
| 1995 | 6.4 | 3.3 | 5.7 |
| 2002 | 9.5 | 4.9 | 6.3 |
| **Other methods[4]** | | | |
| 1982 | 4.6 | 7.3 | 5.0 |
| 1988 | 3.0 | 4.4 | 2.6 |
| 1995 | 3.3 | 3.8 | *2.2 |
| 2002 | *1.7 | *1.9 | *1.2 |

See footnotes at end of table.



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## Table 17 (page 4 of 4). Contraceptive use among women 15–44 years of age, according to age, race, Hispanic origin, and method of contraception: United States, 1982, 1988, 1995, and 2002

[Data are based on household interviews of samples of women in the childbearing ages]

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– Quantity zero.
- - - Data not available.
* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
. . . Data not applicable.
[1]Persons of Hispanic origin may be of any race. Starting with data year 1995, race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. Starting with data year 1995, race-specific estimates are for persons who reported only one racial group. Prior to data year 1995, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1995 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[2]Includes women of other or unknown race not shown separately.
[3]Data collected starting with the 1995 survey.
[4]In 2002, includes female condom, foam, cervical cap, Today Sponge®, suppository or insert, jelly or cream, and other methods. See Appendix II, Contraception, for the list of other methods in previous surveys.

NOTES: Data show up to four methods of contraception used in the month of interview. Percents may not add to the total because more than one method could have been used in the month of interview. These data replace estimates of most effective method used and may differ from previous editions of *Health, United States*. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Survey of Family Growth.



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## Table 18. Breastfeeding by mothers 15–44 years of age by year of baby's birth, according to selected characteristics of mother: United States, average annual 1986–88 to 1999–2001

[Data are based on household interviews of samples of women in the childbearing ages]

Click here for spreadsheet version

| Selected characteristics of mother | 1986–88 | 1989–91 | 1992–94 | 1995–98 | 1999–2001 |
|---|---|---|---|---|---|
| | | | Percent of babies breastfed | | |
| Total | 54.1 | 53.3 | 57.6 | 64.4 | 66.5 |
| Age at baby's birth | | | | | |
| Under 20 years | 28.4 | 34.7 | 41.0 | 49.5 | 47.3 |
| 20–24 years | 48.2 | 44.3 | 50.0 | 55.9 | 59.3 |
| 25–29 years | 58.2 | 56.4 | 57.4 | 68.1 | 63.5 |
| 30–44 years | 68.6 | 66.0 | 70.2 | 72.8 | 80.0 |
| Race and Hispanic origin[1] | | | | | |
| Not Hispanic or Latino: | | | | | |
| White | 59.1 | 58.4 | 61.7 | 66.5 | 68.7 |
| Black or African American | 22.3 | 22.4 | 26.1 | 47.9 | 45.3 |
| Hispanic or Latino | 55.6 | 57.0 | 63.8 | 71.2 | 76.0 |
| Education[2] | | | | | |
| No high school diploma or GED | 31.8 | 36.5 | 44.6 | 50.6 | 46.6 |
| High school diploma or GED | 47.4 | 45.5 | 51.1 | 55.9 | 61.6 |
| Some college, no bachelor's degree | 62.2 | 61.4 | 64.3 | 70.1 | 75.6 |
| Bachelor's degree or higher | 78.4 | 80.6 | 82.5 | 82.0 | 81.3 |
| Geographic region | | | | | |
| Northeast | 51.3 | 53.5 | 56.5 | 61.6 | 66.9 |
| Midwest | 52.3 | 49.6 | 51.7 | 61.7 | 61.9 |
| South | 44.6 | 43.6 | 48.6 | 58.1 | 60.9 |
| West | 71.4 | 69.5 | 77.3 | 78.1 | 78.9 |
| | | | Percent of babies who were breastfed 3 months or more | | |
| Total | 34.6 | 31.8 | 33.6 | 45.8 | 48.4 |
| Age at baby's birth | | | | | |
| Under 20 years | 18.5 | *10.5 | *11.7 | 30.0 | 30.0 |
| 20–24 years | 26.1 | 24.1 | 25.1 | 36.6 | 41.8 |
| 25–29 years | 36.9 | 32.3 | 35.6 | 46.3 | 43.7 |
| 30–44 years | 50.1 | 46.8 | 46.7 | 57.5 | 62.4 |
| Race and Hispanic origin[1] | | | | | |
| Not Hispanic or Latino: | | | | | |
| White | 37.7 | 35.2 | 36.6 | 47.8 | 49.7 |
| Black or African American | 11.6 | 11.5 | 13.3 | 29.6 | 33.7 |
| Hispanic or Latino | 38.2 | 33.9 | 35.0 | 49.7 | 54.3 |
| Education[2] | | | | | |
| No high school diploma or GED | 21.8 | 17.6 | 25.2 | 33.9 | 37.0 |
| High school diploma or GED | 28.2 | 28.0 | 27.4 | 36.9 | 43.1 |
| Some college, no bachelor's degree | 38.7 | 33.1 | 38.7 | 49.6 | 52.8 |
| Bachelor's degree or higher | 55.0 | 56.1 | 59.3 | 64.5 | 64.1 |
| Geographic region | | | | | |
| Northeast | 29.9 | 37.2 | 36.4 | 48.2 | 48.8 |
| Midwest | 30.3 | 31.5 | 30.1 | 42.0 | 42.8 |
| South | 27.7 | 20.1 | 26.2 | 38.9 | 44.4 |
| West | 52.4 | 42.9 | 45.3 | 58.2 | 59.2 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.

[1]Persons of Hispanic origin may be of any race. All race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are for persons who reported only one racial group. See Appendix II, Race.

[2]Educational attainment is presented only for women 22–44 years of age. Education is as of year of interview. GED stands for General Educational Development high school equivalency diploma. See Appendix II, Education.

NOTES: Data are based on single births to mothers 15–44 years of age at interview, including those births that occurred when the mothers were younger than 15 years of age. Data on breastfeeding during 1986–94 are based on responses to questions in the National Survey of Family Growth (NSFG) Cycle 5, conducted in 1995. Data for 1995–2001 are based on the NSFG Cycle 6 conducted in 2002. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data have been revised to reflect the duration of breastfeeding among all babies, and replace duration of breastfeeding data only among breastfed babies reported in previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Survey of Family Growth, Cycle 5 1995, Cycle 6 2002.



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## Table 19 (page 1 of 2). Infant, neonatal, and postneonatal mortality rates, according to detailed race and Hispanic origin of mother: United States, selected years 1983–2002

[Data are based on linked birth and death certificates for infants]

Click here for spreadsheet version

| Race and Hispanic origin of mother | 1983[1] | 1985[1] | 1990[1] | 1995[2] | 1998[2] | 1999[2] | 2000[2] | 2001[2] | 2002[2] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Infant[3] deaths per 1,000 live births | | | | | |
| All mothers | 10.9 | 10.4 | 8.9 | 7.6 | 7.2 | 7.0 | 6.9 | 6.8 | 7.0 |
| White | 9.3 | 8.9 | 7.3 | 6.3 | 6.0 | 5.8 | 5.7 | 5.7 | 5.8 |
| Black or African American | 19.2 | 18.6 | 16.9 | 14.6 | 13.8 | 14.0 | 13.5 | 13.3 | 13.8 |
| American Indian or Alaska Native | 15.2 | 13.1 | 13.1 | 9.0 | 9.3 | 9.3 | 8.3 | 9.7 | 8.6 |
| Asian or Pacific Islander | 8.3 | 7.8 | 6.6 | 5.3 | 5.5 | 4.8 | 4.9 | 4.7 | 4.8 |
| Chinese | 9.5 | 5.8 | 4.3 | 3.8 | 4.0 | 2.9 | 3.5 | 3.2 | 3.0 |
| Japanese | *5.6 | *6.0 | *5.5 | *5.3 | *3.4 | *3.5 | *4.5 | *4.0 | *4.9 |
| Filipino | 8.4 | 7.7 | 6.0 | 5.6 | 6.2 | 5.8 | 5.7 | 5.5 | 5.7 |
| Hawaiian | 11.2 | *9.9 | *8.0 | *6.5 | 9.9 | *7.0 | 9.0 | *7.3 | 9.6 |
| Other Asian or Pacific Islander | 8.1 | 8.5 | 7.4 | 5.5 | 5.7 | 5.1 | 4.8 | 4.8 | 4.7 |
| Hispanic or Latino[4,5] | 9.5 | 8.8 | 7.5 | 6.3 | 5.8 | 5.7 | 5.6 | 5.4 | 5.6 |
| Mexican | 9.1 | 8.5 | 7.2 | 6.0 | 5.6 | 5.5 | 5.4 | 5.2 | 5.4 |
| Puerto Rican | 12.9 | 11.2 | 9.9 | 8.9 | 7.8 | 8.3 | 8.2 | 8.5 | 8.2 |
| Cuban | 7.5 | 8.5 | 7.2 | 5.3 | *3.7 | 4.6 | 4.6 | 4.2 | 3.7 |
| Central and South American | 8.5 | 8.0 | 6.8 | 5.5 | 5.3 | 4.7 | 4.6 | 5.0 | 5.1 |
| Other and unknown Hispanic or Latino | 10.6 | 9.5 | 8.0 | 7.4 | 6.5 | 7.2 | 6.9 | 6.0 | 7.1 |
| Not Hispanic or Latino: | | | | | | | | | |
| White[5] | 9.2 | 8.6 | 7.2 | 6.3 | 6.0 | 5.8 | 5.7 | 5.7 | 5.8 |
| Black or African American[5] | 19.1 | 18.3 | 16.9 | 14.7 | 13.9 | 14.1 | 13.6 | 13.5 | 13.9 |
| | | | | Neonatal[3] deaths per 1,000 live births | | | | | |
| All mothers | 7.1 | 6.8 | 5.7 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.7 |
| White | 6.1 | 5.8 | 4.6 | 4.1 | 4.0 | 3.9 | 3.8 | 3.8 | 3.9 |
| Black or African American | 12.5 | 12.3 | 11.1 | 9.6 | 9.4 | 9.5 | 9.1 | 8.9 | 9.3 |
| American Indian or Alaska Native | 7.5 | 6.1 | 6.1 | 4.0 | 5.0 | 5.0 | 4.4 | 4.2 | 4.6 |
| Asian or Pacific Islander | 5.2 | 4.8 | 3.9 | 3.4 | 3.9 | 3.2 | 3.4 | 3.1 | 3.4 |
| Chinese | 5.5 | 3.3 | 2.3 | 2.3 | 2.7 | 1.8 | 2.5 | 1.9 | 2.4 |
| Japanese | *3.7 | *3.1 | *3.5 | *3.3 | *2.5 | *2.8 | *2.6 | *2.5 | *3.7 |
| Filipino | 5.6 | 5.1 | 3.5 | 3.4 | 4.6 | 3.9 | 4.1 | 4.0 | 4.1 |
| Hawaiian | *7.0 | *5.7 | *4.3 | *4.0 | *7.2 | *4.9 | *6.2 | *3.6 | *5.6 |
| Other Asian or Pacific Islander | 5.0 | 5.4 | 4.4 | 3.7 | 3.9 | 3.3 | 3.4 | 3.2 | 3.3 |
| Hispanic or Latino[4,5] | 6.2 | 5.7 | 4.8 | 4.1 | 3.9 | 3.9 | 3.8 | 3.6 | 3.8 |
| Mexican | 5.9 | 5.4 | 4.5 | 3.9 | 3.7 | 3.7 | 3.6 | 3.5 | 3.6 |
| Puerto Rican | 8.7 | 7.6 | 6.9 | 6.1 | 5.2 | 5.9 | 5.8 | 6.0 | 5.8 |
| Cuban | *5.0 | 6.2 | 5.3 | *3.6 | *2.7 | *3.5 | *3.2 | *2.5 | *3.2 |
| Central and South American | 5.8 | 5.6 | 4.4 | 3.7 | 3.6 | 3.3 | 3.3 | 3.4 | 3.5 |
| Other and unknown Hispanic or Latino | 6.4 | 5.6 | 5.0 | 4.8 | 4.5 | 4.8 | 4.6 | 3.9 | 5.1 |
| Not Hispanic or Latino: | | | | | | | | | |
| White[5] | 5.9 | 5.6 | 4.5 | 4.0 | 3.9 | 3.8 | 3.8 | 3.8 | 3.9 |
| Black or African American[5] | 12.0 | 11.9 | 11.0 | 9.6 | 9.4 | 9.6 | 9.2 | 9.0 | 9.3 |
| | | | | Postneonatal[3] deaths per 1,000 live births | | | | | |
| All mothers | 3.8 | 3.6 | 3.2 | 2.6 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 |
| White | 3.2 | 3.1 | 2.7 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 |
| Black or African American | 6.7 | 6.3 | 5.9 | 5.0 | 4.4 | 4.5 | 4.3 | 4.4 | 4.5 |
| American Indian or Alaska Native | 7.7 | 7.0 | 7.0 | 5.1 | 4.4 | 4.3 | 3.9 | 5.4 | 4.0 |
| Asian or Pacific Islander | 3.1 | 2.9 | 2.7 | 1.9 | 1.7 | 1.7 | 1.4 | 1.6 | 1.4 |
| Chinese | 4.0 | *2.5 | *2.0 | *1.5 | *1.3 | *1.2 | *1.0 | *1.3 | *0.7 |
| Japanese | * | *2.9 | * | * | * | * | * | * | * |
| Filipino | *2.8 | 2.7 | 2.5 | 2.2 | 1.6 | 1.9 | 1.6 | *1.5 | 1.7 |
| Hawaiian | *4.2 | *4.3 | *3.8 | * | * | * | * | *3.7 | *4.0 |
| Other Asian or Pacific Islander | 3.0 | 3.0 | 3.0 | 1.9 | 1.8 | 1.8 | 1.4 | 1.6 | 1.4 |
| Hispanic or Latino[4,5] | 3.3 | 3.2 | 2.7 | 2.1 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 |
| Mexican | 3.2 | 3.2 | 2.7 | 2.1 | 1.9 | 1.8 | 1.8 | 1.7 | 1.8 |
| Puerto Rican | 4.2 | 3.5 | 3.0 | 2.8 | 2.6 | 2.4 | 2.4 | 2.5 | 2.4 |
| Cuban | *2.5 | *2.3 | *1.9 | *1.7 | * | * | * | *1.7 | * |
| Central and South American | 2.6 | 2.4 | 2.4 | 1.9 | 1.7 | 1.4 | 1.4 | 1.6 | 1.6 |
| Other and unknown Hispanic or Latino | 4.2 | 3.9 | 3.0 | 2.6 | 2.0 | 2.5 | 2.3 | 2.1 | 2.0 |
| Not Hispanic or Latino: | | | | | | | | | |
| White[5] | 3.2 | 3.0 | 2.7 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 |
| Black or African American[5] | 7.0 | 6.4 | 5.9 | 5.0 | 4.5 | 4.6 | 4.4 | 4.5 | 4.6 |

See footnotes at end of table.

**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 19 (page 2 of 2). Infant, neonatal, and postneonatal mortality rates, according to detailed race and Hispanic origin of mother: United States, selected years 1983–2002

[Data are based on linked birth and death certificates for infants]

Click here for spreadsheet version

| Race and Hispanic origin of mother | 1983–85[1,6] | 1986–88[1,6] | 1989–91[1,6] | 1996–98[2,6] | 1997–99[2,6] | 2000–2002[2,6] |
|---|---|---|---|---|---|---|
| | | | Infant[3] deaths per 1,000 live births | | | |
| All mothers | 10.6 | 9.8 | 9.0 | 7.2 | 7.1 | 6.9 |
| White | 9.0 | 8.2 | 7.4 | 6.0 | 5.9 | 5.7 |
| Black or African American | 18.7 | 17.9 | 17.1 | 13.9 | 13.8 | 13.5 |
| American Indian or Alaska Native | 13.9 | 13.2 | 12.6 | 9.3 | 9.1 | 8.9 |
| Asian or Pacific Islander | 8.3 | 7.3 | 6.6 | 5.2 | 5.1 | 4.8 |
| Chinese | 7.4 | 5.8 | 5.1 | 3.4 | 3.3 | 3.2 |
| Japanese | 6.0 | 6.9 | 5.3 | 4.3 | 4.1 | 4.5 |
| Filipino | 8.2 | 6.9 | 6.4 | 5.9 | 6.0 | 5.7 |
| Hawaiian | 11.3 | 11.1 | 9.0 | 8.2 | 8.6 | 8.7 |
| Other Asian or Pacific Islander | 8.6 | 7.6 | 7.0 | 5.5 | 5.2 | 4.8 |
| Hispanic or Latino[4,5] | 9.2 | 8.3 | 7.5 | 5.9 | 5.8 | 5.5 |
| Mexican | 8.8 | 7.9 | 7.2 | 5.8 | 5.6 | 5.4 |
| Puerto Rican | 12.3 | 11.1 | 10.4 | 8.1 | 8.0 | 8.3 |
| Cuban | 8.0 | 7.3 | 6.2 | 4.7 | 4.6 | 4.2 |
| Central and South American | 8.2 | 7.5 | 6.6 | 5.2 | 5.1 | 4.9 |
| Other and unknown Hispanic or Latino | 9.8 | 9.0 | 8.2 | 6.8 | 6.7 | 6.7 |
| Not Hispanic or Latino: | | | | | | |
| White[5] | 8.8 | 8.1 | 7.3 | 6.0 | 5.9 | 5.7 |
| Black or African American[5] | 18.5 | 17.9 | 17.2 | 13.9 | 13.9 | 13.6 |
| | | | Neonatal[3] deaths per 1,000 live births | | | |
| All mothers | 6.9 | 6.3 | 5.7 | 4.8 | 4.8 | 4.6 |
| White | 5.9 | 5.2 | 4.7 | 4.0 | 3.9 | 3.8 |
| Black or African American | 12.2 | 11.7 | 11.1 | 9.3 | 9.4 | 9.1 |
| American Indian or Alaska Native | 6.7 | 5.9 | 5.9 | 4.7 | 4.8 | 4.4 |
| Asian or Pacific Islander | 5.2 | 4.5 | 3.9 | 3.5 | 3.4 | 3.3 |
| Chinese | 4.3 | 3.3 | 2.7 | 2.3 | 2.2 | 2.3 |
| Japanese | 3.4 | 4.4 | 3.0 | 2.6 | 2.8 | 2.9 |
| Filipino | 5.3 | 4.5 | 4.0 | 4.1 | 4.0 | 4.1 |
| Hawaiian | 7.4 | 7.1 | 4.8 | 5.6 | 6.1 | 5.2 |
| Other Asian or Pacific Islander | 5.5 | 4.7 | 4.2 | 3.6 | 3.5 | 3.3 |
| Hispanic or Latino[4,5] | 6.0 | 5.3 | 4.8 | 3.9 | 3.9 | 3.8 |
| Mexican | 5.7 | 5.0 | 4.5 | 3.8 | 3.8 | 3.6 |
| Puerto Rican | 8.3 | 7.2 | 7.0 | 5.4 | 5.5 | 5.9 |
| Cuban | 5.9 | 5.3 | 4.6 | 3.5 | 3.4 | 3.0 |
| Central and South American | 5.7 | 4.9 | 4.4 | 3.6 | 3.6 | 3.4 |
| Other and unknown Hispanic or Latino | 6.1 | 5.8 | 5.2 | 4.5 | 4.3 | 4.5 |
| Not Hispanic or Latino: | | | | | | |
| White[5] | 5.7 | 5.1 | 4.6 | 3.9 | 3.9 | 3.8 |
| Black or African American[5] | 11.8 | 11.4 | 11.1 | 9.3 | 9.4 | 9.2 |
| | | | Postneonatal[3] deaths per 1,000 live births | | | |
| All mothers | 3.7 | 3.5 | 3.3 | 2.5 | 2.4 | 2.3 |
| White | 3.1 | 3.0 | 2.7 | 2.1 | 2.0 | 1.9 |
| Black or African American | 6.4 | 6.2 | 6.0 | 4.6 | 4.5 | 4.4 |
| American Indian or Alaska Native | 7.2 | 7.3 | 6.7 | 4.6 | 4.3 | 4.5 |
| Asian or Pacific Islander | 3.1 | 2.8 | 2.6 | 1.8 | 1.7 | 1.5 |
| Chinese | 3.1 | 2.5 | 2.4 | 1.2 | 1.1 | 1.0 |
| Japanese | 2.6 | 2.5 | 2.2 | *1.7 | *1.3 | *1.6 |
| Filipino | 2.9 | 2.4 | 2.3 | 1.9 | 1.9 | 1.6 |
| Hawaiian | 3.9 | 4.0 | 4.1 | *2.6 | *2.5 | 3.5 |
| Other Asian or Pacific Islander | 3.1 | 2.9 | 2.8 | 1.8 | 1.8 | 1.5 |
| Hispanic or Latino[4,5] | 3.2 | 3.0 | 2.7 | 2.0 | 1.9 | 1.8 |
| Mexican | 3.2 | 2.9 | 2.7 | 2.0 | 1.9 | 1.8 |
| Puerto Rican | 4.0 | 3.9 | 3.4 | 2.7 | 2.5 | 2.4 |
| Cuban | 2.2 | 2.0 | 1.6 | *1.3 | *1.2 | *1.2 |
| Central and South American | 2.5 | 2.6 | 2.2 | 1.6 | 1.5 | 1.5 |
| Other and unknown Hispanic or Latino | 3.7 | 3.2 | 3.0 | 2.3 | 2.3 | 2.1 |
| Not Hispanic or Latino: | | | | | | |
| White[5] | 3.1 | 3.0 | 2.7 | 2.1 | 2.0 | 1.9 |
| Black or African American[5] | 6.7 | 6.5 | 6.1 | 4.6 | 4.5 | 4.5 |

* Estimates are considered unreliable. Rates preceded by an asterisk are based on fewer than 50 deaths in the numerator. Rates not shown are based on fewer than 20 deaths in the numerator.

[1]Rates based on unweighted birth cohort data.

[2]Rates based on a period file using weighted data. See Appendix I, National Vital Statistics System, Linked Birth/Infant Death Data Set.

[3]Infant (under 1 year of age), neonatal (under 28 days), and postneonatal (28 days–11 months).

[4]Persons of Hispanic origin may be of any race.

[5]Prior to 1995, data shown only for States with an Hispanic-origin item on their birth certificates. See Appendix II, Hispanic origin.

[6]Average annual mortality rate.

NOTES: The race groups white, black, American Indian or Alaska Native, and Asian or Pacific Islander include persons of Hispanic and non-Hispanic origin. National linked files do not exist for 1992–94. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Linked Birth/Infant Death Data Set.

**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 20. Infant mortality rates for mothers 20 years of age and over, according to mother's education, detailed race, and Hispanic origin: United States, selected years 1983–2002

[Data are based on linked birth and death certificates for infants]

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| Education, race, and Hispanic origin of mother | 1983[1] | 1990[1] | 1995[2] | 2001[2] | 2002[2] | 1983–85[1,3] | 1986–88[1,3] | 1989–91[1,3] | 1997–99[2,3] | 2000–2002[2,3] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Less than 12 years of education** | | | | | Infant deaths per 1,000 live births | | | | | |
| All mothers | 15.0 | 10.8 | 8.9 | 7.6 | 7.9 | 14.6 | 13.8 | 11.1 | 8.2 | 7.8 |
| White | 12.5 | 9.0 | 7.6 | 6.5 | 6.7 | 12.4 | 11.4 | 9.2 | 7.1 | 6.7 |
| Black or African American | 23.4 | 19.5 | 17.0 | 14.0 | 15.6 | 21.8 | 21.1 | 20.3 | 14.7 | 14.8 |
| American Indian or Alaska Native | 14.5 | 14.3 | 12.7 | 12.9 | 8.6 | 15.2 | 16.8 | 13.8 | 10.2 | 10.5 |
| Asian or Pacific Islander[4] | 9.7 | 6.6 | 5.7 | 5.5 | 4.5 | 9.5 | 8.2 | 6.9 | 5.5 | 5.3 |
| Hispanic or Latino[5,6] | 10.9 | 7.3 | 6.0 | 5.1 | 5.3 | 10.6 | 9.9 | 7.5 | 5.6 | 5.2 |
| Mexican | 8.7 | 7.0 | 5.8 | 4.9 | 5.0 | 9.5 | 8.3 | 7.1 | 5.5 | 5.0 |
| Puerto Rican | 15.3 | 10.1 | 10.6 | 7.8 | 10.1 | 14.1 | 12.8 | 11.7 | 8.7 | 9.2 |
| Cuban | *14.5 | * | * | * | * | *10.5 | *9.4 | *8.2 | *6.4 | * |
| Central and South American | 9.8 | 7.0 | 5.1 | 5.0 | 5.7 | 8.6 | 9.2 | 6.8 | 5.4 | 5.2 |
| Other and unknown Hispanic or Latino | 9.2 | 9.9 | 7.3 | 5.8 | 6.0 | 10.1 | 10.6 | 10.0 | 6.8 | 6.4 |
| Not Hispanic or Latino: | | | | | | | | | | |
| White[6] | 12.8 | 10.9 | 9.9 | 9.0 | 9.4 | 12.6 | 11.8 | 11.0 | 9.2 | 9.2 |
| Black or African American[6] | 24.7 | 19.7 | 17.3 | 14.3 | 15.9 | 22.6 | 21.6 | 20.6 | 15.0 | 15.1 |
| **12 years of education** | | | | | | | | | | |
| All mothers | 10.2 | 8.8 | 7.8 | 7.3 | 7.6 | 10.0 | 9.6 | 8.9 | 7.5 | 7.4 |
| White | 8.7 | 7.1 | 6.4 | 6.0 | 6.3 | 8.5 | 8.0 | 7.2 | 6.1 | 6.1 |
| Black or African American | 17.8 | 16.0 | 14.7 | 12.9 | 13.6 | 17.7 | 17.1 | 16.4 | 14.0 | 13.3 |
| American Indian or Alaska Native | 15.5 | 13.4 | 7.9 | 9.6 | 8.8 | 13.4 | 11.6 | 12.3 | 8.8 | 8.7 |
| Asian or Pacific Islander[4] | 10.0 | 7.5 | 5.5 | 5.9 | 5.3 | 9.3 | 7.9 | 7.5 | 5.7 | 5.4 |
| Hispanic or Latino[5,6] | 8.4 | 7.0 | 5.9 | 5.1 | 5.4 | 9.1 | 8.3 | 6.8 | 5.5 | 5.2 |
| Mexican | 6.9 | 6.8 | 5.7 | 4.7 | 5.2 | 7.8 | 8.2 | 6.5 | 5.2 | 4.9 |
| Puerto Rican | 9.5 | 8.5 | 6.5 | 9.2 | 8.1 | 10.8 | 10.1 | 8.6 | 7.9 | 8.1 |
| Cuban | *6.9 | *8.0 | * | * | * | 8.6 | 6.6 | 7.6 | 4.5 | *3.6 |
| Central and South American | 8.7 | 6.5 | 6.1 | 4.8 | 4.6 | 8.7 | 7.4 | 6.3 | 5.1 | 4.5 |
| Other and unknown Hispanic or Latino | 8.8 | 7.4 | 6.5 | 5.6 | 7.2 | 8.8 | 7.7 | 7.0 | 6.1 | 6.2 |
| Not Hispanic or Latino: | | | | | | | | | | |
| White[6] | 8.7 | 7.1 | 6.5 | 6.2 | 6.7 | 8.3 | 7.9 | 7.3 | 6.3 | 6.4 |
| Black or African American[6] | 17.8 | 16.1 | 14.8 | 13.1 | 13.7 | 17.9 | 17.4 | 16.5 | 14.1 | 13.4 |
| **13 years or more of education** | | | | | | | | | | |
| All mothers | 8.1 | 6.4 | 5.4 | 5.1 | 5.0 | 7.8 | 7.2 | 6.4 | 5.2 | 5.0 |
| White | 7.2 | 5.4 | 4.7 | 4.3 | 4.2 | 6.9 | 6.2 | 5.5 | 4.4 | 4.2 |
| Black or African American | 15.3 | 13.7 | 11.9 | 11.7 | 11.1 | 15.3 | 14.9 | 13.7 | 11.3 | 11.4 |
| American Indian or Alaska Native | 12.5 | 6.8 | 5.9 | 6.7 | 7.3 | 10.4 | 8.4 | 8.1 | 7.0 | 6.9 |
| Asian or Pacific Islander[4] | 6.6 | 5.1 | 4.4 | 3.7 | 4.0 | 6.7 | 5.9 | 5.1 | 4.2 | 3.9 |
| Hispanic or Latino[5,6] | 9.0 | 5.7 | 5.0 | 4.6 | 4.5 | 7.4 | 7.0 | 5.8 | 4.8 | 4.6 |
| Mexican | *8.3 | 5.5 | 5.2 | 4.7 | 4.7 | 7.6 | 6.4 | 5.7 | 4.9 | 4.6 |
| Puerto Rican | 10.9 | 7.3 | 6.3 | 5.9 | 5.4 | 8.1 | 6.9 | 7.8 | 6.0 | 5.9 |
| Cuban | * | *5.3 | *5.3 | *4.0 | *3.0 | 5.5 | 5.9 | 4.2 | 3.9 | 3.9 |
| Central and South American | *7.1 | 5.6 | 3.7 | 4.1 | 4.2 | 7.2 | 7.6 | 5.4 | 4.1 | 4.0 |
| Other and unknown Hispanic or Latino | 11.6 | 5.4 | 5.2 | 3.8 | 3.9 | 7.9 | 7.5 | 5.6 | 4.3 | 4.0 |
| Not Hispanic or Latino: | | | | | | | | | | |
| White[6] | 7.0 | 5.4 | 4.6 | 4.3 | 4.2 | 6.8 | 6.1 | 5.4 | 4.4 | 4.2 |
| Black or African American[6] | 14.8 | 13.7 | 12.0 | 11.8 | 11.2 | 14.7 | 14.9 | 13.8 | 11.4 | 11.5 |

* Estimates are considered unreliable. Rates preceded by an asterisk are based on fewer than 50 deaths. Rates not shown are based on fewer than 20 deaths.

[1]Rates based on unweighted birth cohort data.

[2]Rates based on a period file using weighted data. See Appendix I, National Vital Statistics System, Linked Birth/Infant Death Data Set.

[3]Average annual mortality rate.

[4]The States not reporting maternal education on the birth certificate accounted for 49–51 percent of the Asian or Pacific Islander births in the United States in 1983–87, 59 percent in 1988, and 12 percent in 1989–91. Starting in 1992 maternal education was reported by all 50 States and the District of Columbia.

[5]Persons of Hispanic origin may be of any race.

[6]Prior to 1995, data shown only for States with an Hispanic-origin item and education of mother on their birth certificates. See Appendix II, Education; Hispanic origin. The Hispanic-reporting States that did not report maternal education on the birth certificate during 1983–88 together accounted for 28–85 percent of the births in each Hispanic subgroup (except Cuban, 11–16 percent, and Puerto Rican, 6–7 percent in 1983–87); and in 1989–91 accounted for 27–39 percent of Central and South American and Puerto Rican births and 2–9 percent of births in other Hispanic subgroups.

NOTES: Prior to 1995, data for all mothers and by race are shown only for States reporting education of mother on their birth certificates. See Appendix II, Education. The race groups white, black, American Indian or Alaska Native, and Asian or Pacific Islander include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. National linked files do not exist for 1992–94. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Linked Birth/Infant Death Data Set.

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## Table 21. Infant mortality rates according to birthweight: United States, selected years 1983–2002

[Data are based on linked birth and death certificates for infants]

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| Birthweight | 1983[1] | 1985[1] | 1990[1] | 1995[2] | 1998[2] | 1999[2] | 2000[2] | 2001[2] | 2002[2] |
|---|---|---|---|---|---|---|---|---|---|
| | Infant deaths per 1,000 live births[3] | | | | | | | | |
| All birthweights | 10.9 | 10.4 | 8.9 | 7.6 | 7.2 | 7.0 | 6.9 | 6.8 | 7.0 |
| Less than 2,500 grams | 95.9 | 93.9 | 78.1 | 65.3 | 62.3 | 61.3 | 60.2 | 59.4 | 60.3 |
| Less than 1,500 grams | 400.6 | 387.7 | 317.6 | 270.7 | 252.4 | 249.5 | 246.9 | 246.9 | 253.2 |
| Less than 500 grams | 890.3 | 895.9 | 898.2 | 904.9 | 869.6 | 857.7 | 847.9 | 856.8 | 863.6 |
| 500–999 grams | 584.2 | 559.2 | 440.1 | 351.0 | 319.4 | 318.6 | 313.8 | 313.0 | 321.5 |
| 1,000–1,499 grams | 162.3 | 145.4 | 97.9 | 69.6 | 60.6 | 59.2 | 60.9 | 59.4 | 57.7 |
| 1,500–1,999 grams | 58.4 | 54.0 | 43.8 | 33.5 | 29.0 | 29.1 | 28.7 | 27.6 | 26.9 |
| 2,000–2,499 grams | 22.5 | 20.9 | 17.8 | 13.7 | 12.7 | 12.0 | 11.9 | 11.4 | 11.7 |
| 2,500 grams or more | 4.7 | 4.3 | 3.7 | 3.0 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 |
| 2,500–2,999 grams | 8.8 | 7.9 | 6.7 | 5.5 | 4.9 | 4.7 | 4.6 | 4.5 | 4.5 |
| 3,000–3,499 grams | 4.4 | 4.3 | 3.7 | 2.9 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 |
| 3,500–3,999 grams | 3.2 | 3.0 | 2.6 | 2.0 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 |
| 4,000 grams or more | 3.3 | 3.2 | 2.4 | 2.0 | 1.7 | 1.8 | 1.6 | 1.6 | 1.5 |
| 4,000–4,499 grams | 2.9 | 2.9 | 2.2 | 1.8 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 |
| 4,500–4,999 grams | 3.9 | 3.8 | 2.5 | 2.2 | 2.0 | 1.9 | 2.1 | 2.0 | 2.0 |
| 5,000 grams or more[4] | 14.4 | 14.7 | 9.8 | 8.5 | *4.3 | *7.9 | *6.1 | *6.5 | *5.1 |

* Estimates are considered unreliable. Rates preceded by an asterisk are based on fewer than 50 deaths in the numerator.

[1]Rates based on unweighted birth cohort data.

[2]Rates based on a period file using weighted data; unknown birthweight imputed when period of gestation is known and proportionately distributed when period of gestation is unknown. See Appendix I, National Vital Statistics System, Linked Birth/Infant Death Data Set.

[3]For calculation of birthweight-specific infant mortality rates, unknown birthweight has been distributed in proportion to known birthweight separately for live births (denominator) and infant deaths (numerator).

[4]In 1989 a birthweight-gestational age consistency check instituted for the natality file resulted in a decrease in the number of deaths to infants coded with birthweights of 5,000 grams or more and a discontinuity in the mortality trend for infants weighing 5,000 grams or more at birth. Starting with 1989 the rates are believed to be more accurate.

NOTES: National linked files do not exist for 1992–94. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Linked Birth/Infant Death Data Set.

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## Table 22. Infant mortality rates, fetal mortality rates, and perinatal mortality rates, according to race: United States, selected years 1950–2003

[Data are based on death certificates, fetal death records, and birth certificates] Updated March 2006 Click here for spreadsheet version

| Race and year | Infant[1] | Neonatal[1] | | Postneonatal[1] | Fetal mortality rate[2] | Late fetal mortality rate[3] | Perinatal mortality rate[4] |
|---|---|---|---|---|---|---|---|
| | | Under 28 days | Under 7 days | | | | |
| All races | Deaths per 1,000 live births | | | | | | |
| 1950[5] | 29.2 | 20.5 | 17.8 | 8.7 | 18.4 | 14.9 | 32.5 |
| 1960[5] | 26.0 | 18.7 | 16.7 | 7.3 | 15.8 | 12.1 | 28.6 |
| 1970 | 20.0 | 15.1 | 13.6 | 4.9 | 14.0 | 9.5 | 23.0 |
| 1980 | 12.6 | 8.5 | 7.1 | 4.1 | 9.1 | 6.2 | 13.2 |
| 1990 | 9.2 | 5.8 | 4.8 | 3.4 | 7.5 | 4.3 | 9.1 |
| 1995 | 7.6 | 4.9 | 4.0 | 2.7 | 7.0 | 3.6 | 7.6 |
| 1997 | 7.2 | 4.8 | 3.8 | 2.5 | 6.8 | 3.5 | 7.3 |
| 1998 | 7.2 | 4.8 | 3.8 | 2.4 | 6.7 | 3.4 | 7.2 |
| 1999 | 7.1 | 4.7 | 3.8 | 2.3 | 6.7 | 3.4 | 7.1 |
| 2000 | 6.9 | 4.6 | 3.7 | 2.3 | 6.6 | 3.3 | 7.0 |
| 2001 | 6.8 | 4.5 | 3.6 | 2.3 | 6.5 | 3.3 | 6.9 |
| 2002 | 7.0 | 4.7 | 3.7 | 2.3 | 6.4 | 3.2 | 6.9 |
| 2003 | 6.9 | 4.6 | 3.7 | 2.2 | --- | --- | --- |
| Race of child:[6] White | | | | | | | |
| 1950[5] | 26.8 | 19.4 | 17.1 | 7.4 | 16.6 | 13.3 | 30.1 |
| 1960[5] | 22.9 | 17.2 | 15.6 | 5.7 | 13.9 | 10.8 | 26.2 |
| 1970 | 17.8 | 13.8 | 12.5 | 4.0 | 12.3 | 8.6 | 21.0 |
| 1980 | 11.0 | 7.5 | 6.2 | 3.5 | 8.1 | 5.7 | 11.9 |
| Race of mother:[7] White | | | | | | | |
| 1980 | 10.9 | 7.4 | 6.1 | 3.5 | 8.1 | 5.7 | 11.8 |
| 1990 | 7.6 | 4.8 | 3.9 | 2.8 | 6.4 | 3.8 | 7.7 |
| 1995 | 6.3 | 4.1 | 3.3 | 2.2 | 5.9 | 3.3 | 6.5 |
| 1997 | 6.0 | 4.0 | 3.2 | 2.0 | 5.8 | 3.2 | 6.3 |
| 1998 | 6.0 | 4.0 | 3.1 | 2.0 | 5.7 | 3.1 | 6.2 |
| 1999 | 5.8 | 3.9 | 3.1 | 1.9 | 5.7 | 3.0 | 6.1 |
| 2000 | 5.7 | 3.8 | 3.0 | 1.9 | 5.6 | 2.9 | 5.9 |
| 2001 | 5.7 | 3.8 | 3.0 | 1.9 | 5.5 | 2.9 | 5.9 |
| 2002 | 5.8 | 3.9 | 3.1 | 1.9 | 5.5 | 2.8 | 5.9 |
| 2003 | 5.7 | 3.9 | 3.1 | 1.8 | --- | --- | --- |
| Race of child:[6] Black or African American | | | | | | | |
| 1950[5] | 43.9 | 27.8 | 23.0 | 16.1 | 32.1 | --- | --- |
| 1960[5] | 44.3 | 27.8 | 23.7 | 16.5 | --- | --- | --- |
| 1970 | 32.6 | 22.8 | 20.3 | 9.9 | 23.2 | --- | 34.5 |
| 1980 | 21.4 | 14.1 | 11.9 | 7.3 | 14.4 | 8.9 | 20.7 |
| Race of mother:[7] Black or African American | | | | | | | |
| 1980 | 22.2 | 14.6 | 12.3 | 7.6 | 14.7 | 9.1 | 21.3 |
| 1990 | 18.0 | 11.6 | 9.7 | 6.4 | 13.3 | 6.7 | 16.4 |
| 1995 | 15.1 | 9.8 | 8.2 | 5.3 | 12.7 | 5.7 | 13.8 |
| 1997 | 14.2 | 9.4 | 7.8 | 4.8 | 12.5 | 5.5 | 13.2 |
| 1998 | 14.3 | 9.5 | 7.8 | 4.8 | 12.3 | 5.3 | 13.1 |
| 1999 | 14.6 | 9.8 | 7.9 | 4.8 | 12.6 | 5.4 | 13.2 |
| 2000 | 14.1 | 9.4 | 7.6 | 4.7 | 12.4 | 5.4 | 13.0 |
| 2001 | 14.0 | 9.2 | 7.6 | 4.8 | 12.1 | 5.3 | 12.8 |
| 2002 | 14.4 | 9.5 | 7.8 | 4.8 | 11.9 | 5.2 | 12.8 |
| 2003 | 14.0 | 9.4 | 7.5 | 4.6 | --- | --- | --- |

--- Data not available.
[1]Infant (under 1 year of age), neonatal (under 28 days), early neonatal (under 7 days), and postneonatal (28 days–11 months).
[2]Number of fetal deaths of 20 weeks or more gestation per 1,000 live births plus fetal deaths.
[3]Number of fetal deaths of 28 weeks or more gestation per 1,000 live births plus late fetal deaths.
[4]Number of late fetal deaths plus infant deaths within 7 days of birth per 1,000 live births plus late fetal deaths.
[5]Includes births and deaths of persons who were not residents of the 50 States and the District of Columbia.
[6]Infant deaths are tabulated by race of decedent; live births and fetal deaths are tabulated by race of child. See Appendix II, Race.
[7]Infant deaths are tabulated by race of decedent; fetal deaths and live births are tabulated by race of mother. See Appendix II, Race.

NOTES: Infant mortality rates in this table are based on infant deaths from the mortality file (numerator) and live births from the natality file (denominator). Inconsistencies in reporting race for the same infant between the birth and death certificate can result in underestimated infant mortality rates for races other than white or black. Infant mortality rates for minority population groups are available from the Linked Birth/Infant Death Data Set and are presented in tables 19–20 and 23–24. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System: Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006; and unpublished numbers.



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## Table 23 (page 1 of 2). Infant mortality rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1989–91, 1997–99, and 2000–2002

[Data are based on linked birth and death certificates for infants]

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| Geographic division and State | All races | | | Not Hispanic or Latino | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | White | | | Black or African American | | |
| | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] |
| | Infant[3] deaths per 1,000 live births | | | | | | | | |
| United States | 9.0 | 7.1 | 6.9 | 7.3 | 5.9 | 5.7 | 17.2 | 13.9 | 13.6 |
| New England[4] | 7.3 | 5.7 | 5.4 | 6.2 | 4.7 | 4.5 | 15.1 | 11.8 | 12.1 |
| Connecticut | 7.9 | 6.7 | 6.4 | 5.9 | 4.8 | 4.9 | 17.0 | 13.4 | 14.3 |
| Maine | 6.6 | 5.5 | 5.1 | 6.2 | 5.6 | 5.0 | * | * | * |
| Massachusetts | 7.0 | 5.2 | 4.8 | 5.9 | 4.4 | 4.0 | 14.2 | 10.8 | 10.5 |
| New Hampshire[4] | 7.1 | 4.8 | 4.9 | 7.2 | 4.4 | 4.5 | * | * | * |
| Rhode Island | 8.7 | 6.7 | 6.7 | 7.5 | 4.8 | 5.3 | *13.6 | *12.4 | *12.6 |
| Vermont | 6.6 | 6.2 | 5.5 | 6.3 | 6.0 | 5.5 | * | * | * |
| Middle Atlantic | 9.2 | 6.7 | 6.4 | 6.6 | 5.0 | 5.0 | 18.5 | 13.3 | 12.5 |
| New Jersey | 8.4 | 6.5 | 6.1 | 6.1 | 4.3 | 4.0 | 17.8 | 13.9 | 13.6 |
| New York | 9.5 | 6.4 | 6.1 | 6.3 | 4.6 | 4.8 | 18.4 | 11.9 | 11.2 |
| Pennsylvania | 9.2 | 7.4 | 7.3 | 7.2 | 5.8 | 5.9 | 19.1 | 16.0 | 14.4 |
| East North Central | 9.8 | 8.0 | 7.7 | 7.7 | 6.4 | 6.2 | 19.1 | 16.0 | 15.9 |
| Illinois | 10.7 | 8.5 | 7.8 | 7.6 | 6.2 | 5.9 | 20.5 | 17.1 | 15.8 |
| Indiana | 9.4 | 7.9 | 7.7 | 8.4 | 7.0 | 7.0 | 17.3 | 15.2 | 13.9 |
| Michigan | 10.5 | 8.1 | 8.1 | 7.7 | 6.1 | 6.0 | 20.7 | 16.1 | 16.9 |
| Ohio | 9.0 | 8.0 | 7.7 | 7.7 | 6.8 | 6.3 | 16.2 | 14.5 | 15.3 |
| Wisconsin | 8.4 | 6.8 | 6.9 | 7.4 | 5.6 | 5.6 | 17.0 | 15.7 | 17.9 |
| West North Central | 8.5 | 6.9 | 6.6 | 7.4 | 6.1 | 5.8 | 17.5 | 15.2 | 14.1 |
| Iowa | 8.2 | 6.1 | 5.8 | 7.8 | 5.7 | 5.5 | 15.8 | 17.2 | *11.4 |
| Kansas | 8.5 | 7.3 | 7.0 | 7.8 | 7.1 | 6.4 | 15.4 | 12.0 | 14.7 |
| Minnesota | 7.3 | 6.0 | 5.5 | 6.4 | 5.4 | 4.7 | 18.5 | 12.5 | 10.8 |
| Missouri | 9.7 | 7.6 | 7.7 | 8.0 | 6.1 | 6.3 | 18.0 | 16.4 | 15.6 |
| Nebraska | 8.1 | 7.2 | 7.0 | 7.2 | 6.3 | 6.2 | 18.3 | 17.0 | 15.0 |
| North Dakota | 8.0 | 7.3 | 7.8 | 7.3 | 6.7 | 6.8 | * | * | * |
| South Dakota | 9.5 | 8.5 | 6.4 | 7.5 | 7.1 | 5.4 | * | * | * |
| South Atlantic | 10.4 | 8.3 | 8.0 | 7.6 | 6.2 | 6.0 | 17.2 | 14.1 | 13.7 |
| Delaware | 11.2 | 8.3 | 9.6 | 8.2 | 6.0 | 7.9 | 20.1 | 16.1 | 14.9 |
| District of Columbia | 20.3 | 14.1 | 11.4 | *8.2 | * | * | 23.9 | 17.4 | 15.3 |
| Florida | 9.4 | 7.2 | 7.2 | 7.2 | 6.0 | 5.7 | 16.2 | 12.5 | 13.0 |
| Georgia | 11.9 | 8.4 | 8.7 | 8.4 | 6.0 | 6.3 | 17.9 | 13.3 | 13.4 |
| Maryland | 9.1 | 8.6 | 7.7 | 6.3 | 5.5 | 5.3 | 15.0 | 14.8 | 12.7 |
| North Carolina | 10.7 | 9.2 | 8.4 | 8.0 | 6.9 | 6.4 | 16.9 | 15.9 | 15.1 |
| South Carolina | 11.8 | 9.8 | 9.0 | 8.4 | 6.5 | 6.0 | 17.2 | 15.8 | 14.9 |
| Virginia | 9.9 | 7.5 | 7.2 | 7.4 | 5.8 | 5.5 | 18.0 | 13.3 | 13.6 |
| West Virginia | 9.1 | 8.3 | 7.9 | 8.8 | 8.2 | 7.7 | *15.7 | *12.7 | *11.7 |
| East South Central | 10.4 | 8.8 | 8.8 | 8.1 | 6.8 | 6.8 | 16.5 | 14.6 | 15.0 |
| Alabama | 11.4 | 9.8 | 9.3 | 8.6 | 7.3 | 6.8 | 16.8 | 14.8 | 14.7 |
| Kentucky | 8.7 | 7.4 | 6.7 | 8.1 | 6.9 | 6.4 | 14.4 | 12.2 | 10.8 |
| Mississippi | 11.5 | 10.3 | 10.5 | 7.9 | 6.7 | 7.0 | 15.2 | 14.5 | 14.7 |
| Tennessee | 10.2 | 8.2 | 9.0 | 7.8 | 6.2 | 7.0 | 18.2 | 15.0 | 17.0 |
| West South Central[4] | 8.4 | 7.0 | 6.8 | 7.2 | 6.4 | 6.2 | 14.2 | 12.3 | 12.3 |
| Arkansas | 9.8 | 8.5 | 8.3 | 8.1 | 7.5 | 7.5 | 15.2 | 12.8 | 12.8 |
| Louisiana[4] | 10.2 | 9.3 | 9.8 | 7.5 | 6.4 | 6.9 | 14.3 | 13.7 | 13.7 |
| Oklahoma[4] | 8.0 | 8.2 | 8.0 | 7.3 | 7.9 | 7.4 | 12.7 | 13.4 | 14.5 |
| Texas | 7.9 | 6.3 | 5.9 | 6.9 | 5.8 | 5.5 | 14.1 | 11.1 | 11.1 |
| Mountain | 8.4 | 6.7 | 6.2 | 7.9 | 6.2 | 5.7 | 16.9 | 12.7 | 13.5 |
| Arizona | 8.8 | 7.1 | 6.7 | 8.2 | 6.5 | 6.5 | 17.3 | 13.7 | 14.4 |
| Colorado | 8.7 | 6.8 | 6.0 | 8.0 | 6.3 | 5.2 | 16.7 | 13.7 | 13.7 |
| Idaho | 8.9 | 6.8 | 6.6 | 8.9 | 6.6 | 6.2 | * | * | * |
| Montana | 9.0 | 7.0 | 6.9 | 8.0 | 6.2 | 6.4 | * | * | * |
| Nevada | 8.6 | 6.8 | 6.0 | 7.8 | 6.8 | 5.1 | 16.9 | 11.8 | 13.7 |
| New Mexico | 8.4 | 6.7 | 6.4 | 8.1 | 6.7 | 6.0 | *17.2 | * | *15.8 |
| Utah | 7.0 | 5.4 | 5.3 | 6.8 | 5.3 | 5.0 | * | * | * |
| Wyoming | 8.4 | 6.7 | 6.5 | 8.0 | 6.3 | 6.3 | * | * | * |
| Pacific | 7.7 | 5.7 | 5.5 | 7.0 | 5.1 | 4.9 | 15.4 | 12.0 | 11.2 |
| Alaska | 9.2 | 6.5 | 6.8 | 7.2 | 5.5 | 5.1 | * | * | * |
| California | 7.6 | 5.7 | 5.4 | 6.9 | 5.0 | 4.7 | 15.4 | 12.2 | 11.4 |
| Hawaii | 7.0 | 6.9 | 7.2 | 5.5 | 5.8 | 6.3 | *13.6 | * | * |
| Oregon | 8.0 | 5.6 | 5.5 | 7.4 | 5.4 | 5.6 | 21.3 | *8.8 | *10.4 |
| Washington | 8.0 | 5.4 | 5.5 | 7.4 | 4.9 | 5.2 | 15.1 | 11.4 | 9.5 |

See footnotes at end of table.

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## Table 23 (page 2 of 2). Infant mortality rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1989–91, 1997–99, and 2000–2002

[Data are based on linked birth and death certificates for infants]

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| Geographic division and State | Hispanic or Latino[5] | | | American Indian or Alaska Native[6] | | | Asian or Pacific Islander[6] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] |
| | Infant[3] deaths per 1,000 live births | | | | | | | | |
| United States | 7.5 | 5.8 | 5.5 | 12.6 | 9.1 | 8.9 | 6.6 | 5.1 | 4.8 |
| New England[7] | 8.1 | 7.6 | 6.5 | * | * | * | 5.8 | 3.8 | 3.9 |
| Connecticut | 7.9 | 8.9 | 7.1 | * | * | * | * | * | *3.7 |
| Maine | * | * | * | * | * | * | * | * | * |
| Massachusetts | 8.3 | 6.3 | 6.0 | * | * | * | 5.7 | *3.5 | 3.7 |
| New Hampshire[7] | --- | * | * | * | * | * | * | * | * |
| Rhode Island | *7.2 | *8.3 | 8.0 | * | * | * | * | * | * |
| Vermont | * | * | * | * | * | * | * | * | * |
| Middle Atlantic | 9.1 | 6.3 | 6.0 | *11.6 | * | *7.9 | 6.4 | 4.2 | 3.4 |
| New Jersey | 7.5 | 6.4 | 6.3 | * | * | * | 5.6 | 4.4 | 3.3 |
| New York | 9.4 | 5.9 | 5.5 | *15.2 | * | * | 6.4 | 4.0 | 3.4 |
| Pennsylvania | 10.9 | 8.2 | 8.6 | * | * | * | 7.8 | *4.7 | *4.0 |
| East North Central | 8.7 | 7.2 | 6.5 | 11.6 | 8.4 | 9.7 | 6.1 | 6.0 | 5.6 |
| Illinois | 9.2 | 6.9 | 6.4 | * | * | * | 6.0 | 6.3 | 6.5 |
| Indiana | *7.2 | 7.4 | 6.4 | * | * | * | * | *6.4 | * |
| Michigan | 7.9 | 7.0 | 6.7 | *10.7 | * | * | *6.1 | 6.0 | 4.9 |
| Ohio | 8.0 | 8.8 | 7.6 | * | * | * | *4.8 | *4.9 | *4.8 |
| Wisconsin | *7.3 | 9.2 | 6.2 | *11.9 | *9.2 | *11.5 | *6.7 | *5.7 | *5.2 |
| West North Central | 9.3 | 6.5 | 7.0 | 17.1 | 12.3 | 10.9 | 7.4 | 6.6 | 5.6 |
| Iowa | *11.9 | *5.6 | *6.7 | * | * | * | * | * | * |
| Kansas | 8.7 | 5.8 | 7.1 | * | * | * | * | * | * |
| Minnesota | *8.4 | 7.0 | 6.5 | 17.3 | *10.9 | *10.3 | *5.1 | 7.0 | 6.1 |
| Missouri | *9.1 | *5.6 | 7.2 | * | * | * | *9.1 | *5.7 | *4.5 |
| Nebraska | *8.8 | 8.7 | 7.2 | *18.2 | * | *15.8 | * | * | * |
| North Dakota | * | * | * | *13.8 | *13.8 | *13.4 | * | * | * |
| South Dakota | * | * | * | 19.9 | 15.2 | 11.6 | * | * | * |
| South Atlantic | 7.4 | 5.1 | 5.4 | 12.7 | 10.7 | 8.5 | 6.8 | 5.2 | 5.3 |
| Delaware | * | * | *7.9 | * | * | * | * | * | * |
| District of Columbia | *8.8 | * | *7.5 | * | * | * | * | * | * |
| Florida | 7.1 | 4.7 | 5.2 | * | *8.5 | *5.8 | *6.2 | 4.5 | 5.1 |
| Georgia | 9.0 | 4.9 | 6.0 | * | * | * | *8.2 | *5.0 | 6.8 |
| Maryland | 7.2 | 5.4 | 5.7 | * | * | * | 7.5 | *5.2 | *4.5 |
| North Carolina | *7.5 | 6.7 | 5.6 | 12.2 | 13.7 | 10.6 | *6.3 | *5.8 | 5.9 |
| South Carolina | * | *7.5 | *4.6 | * | * | * | * | * | * |
| Virginia | 7.6 | 5.0 | 4.8 | * | * | * | 6.0 | 5.2 | 4.6 |
| West Virginia | * | * | * | * | * | * | * | * | * |
| East South Central | *5.9 | 6.7 | 6.2 | * | * | *10.1 | *7.7 | *6.2 | *5.4 |
| Alabama | * | *7.5 | *7.0 | * | * | * | * | * | * |
| Kentucky | * | * | *4.8 | * | * | * | * | * | * |
| Mississippi | * | * | * | * | * | * | * | * | * |
| Tennessee | * | *7.0 | 6.2 | * | * | * | * | * | * |
| West South Central[7] | 7.0 | 5.5 | 5.1 | 8.4 | 7.9 | 7.5 | 6.7 | 4.4 | 4.4 |
| Arkansas | * | *6.2 | *4.5 | * | * | * | * | * | * |
| Louisiana[7] | --- | * | *6.0 | * | * | * | * | * | *8.1 |
| Oklahoma[7] | --- | 5.1 | 5.7 | 7.8 | 8.0 | 7.6 | * | * | * |
| Texas | 7.0 | 5.5 | 5.1 | * | *8.6 | * | 6.8 | 4.4 | 4.0 |
| Mountain | 7.9 | 6.7 | 6.2 | 11.6 | 8.8 | 8.6 | 8.1 | 5.7 | 5.9 |
| Arizona | 8.0 | 7.1 | 6.0 | 11.4 | 8.6 | 9.4 | *8.5 | *6.1 | *5.3 |
| Colorado | 8.5 | 7.0 | 6.2 | *16.5 | * | *11.8 | *7.8 | *5.9 | *6.2 |
| Idaho | *7.2 | 7.0 | 8.8 | * | * | * | * | * | * |
| Montana | * | * | * | 16.7 | *12.0 | *9.9 | * | * | * |
| Nevada | 7.0 | 5.6 | 5.1 | * | * | * | * | *4.7 | *4.7 |
| New Mexico | 7.8 | 6.5 | 6.3 | 9.8 | 7.7 | 6.8 | * | * | * |
| Utah | *7.0 | 5.9 | 6.5 | *10.0 | * | * | *10.7 | *6.5 | *8.4 |
| Wyoming | * | * | * | * | * | * | * | * | * |
| Pacific | 7.1 | 5.3 | 5.1 | 14.6 | 8.9 | 9.3 | 6.5 | 5.3 | 4.9 |
| Alaska | * | * | * | 15.7 | 9.1 | 11.2 | * | * | * |
| California | 7.0 | 5.3 | 5.1 | 11.0 | 8.9 | 7.6 | 6.4 | 4.9 | 4.5 |
| Hawaii | 10.7 | *7.0 | *6.0 | * | * | * | 7.1 | 7.4 | 7.3 |
| Oregon | 8.5 | 6.2 | 5.1 | *15.7 | * | * | *8.4 | *5.2 | *3.7 |
| Washington | 7.6 | 5.0 | 5.1 | 19.6 | 9.6 | 10.6 | 6.2 | 4.9 | 4.8 |

* Estimates are considered unreliable. Rates preceded by an asterisk are based on fewer than 50 deaths. Rates not shown are based on fewer than 20 deaths.
--- Data not available. [1]Rates based on unweighted birth cohort data.
[2]Rates based on period file using weighted data. See Appendix I, National Vital Statistics System, Linked Birth/Infant Death Data Set. [3]Under 1 year of age.
[4]Rates for white and black are substituted for non-Hispanic white and non-Hispanic black for Louisiana 1989, Oklahoma 1989–90, and New Hampshire 1989–91.
[5]Persons of Hispanic origin may be of any race. [6]Includes persons of Hispanic origin.
[7]Rates for Hispanic origin exclude data from States not reporting Hispanic origin on the birth certificate for 1 or more years in a 3-year period.

NOTE: National linked files do not exist for 1992–94.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Linked Birth/Infant Death Data Set.
**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 24 (page 1 of 2). Neonatal mortality rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1989–91, 1997–99, and 2000–2002

[Data are based on linked birth and death certificates for infants]

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| Geographic division and State | All races | | | Not Hispanic or Latino | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | White | | | Black or African American | | |
| | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] |
| | Neonatal[3] deaths per 1,000 live births | | | | | | | | |
| United States | 5.7 | 4.8 | 4.6 | 4.6 | 3.9 | 3.8 | 11.1 | 9.4 | 9.2 |
| New England[4] | 5.1 | 4.4 | 4.0 | 4.2 | 3.6 | 3.3 | 11.0 | 8.8 | 9.0 |
| Connecticut | 5.7 | 5.1 | 4.8 | 4.2 | 3.7 | 3.8 | 12.5 | 10.0 | 10.1 |
| Maine | 4.5 | 3.9 | 3.8 | 4.2 | 3.9 | 3.7 | * | * | * |
| Massachusetts | 4.9 | 4.0 | 3.7 | 4.1 | 3.4 | 3.0 | 10.4 | 8.3 | 8.0 |
| New Hampshire[4] | 4.3 | 3.6 | 3.4 | 4.4 | 3.4 | 3.1 | * | * | * |
| Rhode Island | 6.4 | 5.0 | 5.1 | 5.3 | 3.9 | 3.8 | *9.8 | * | *10.2 |
| Vermont | 4.1 | 4.4 | 3.5 | 3.9 | 4.4 | 3.6 | * | * | * |
| Middle Atlantic | 6.3 | 4.7 | 4.5 | 4.6 | 3.5 | 3.6 | 12.3 | 9.2 | 8.6 |
| New Jersey | 5.8 | 4.6 | 4.3 | 4.5 | 3.2 | 2.9 | 11.4 | 9.6 | 9.3 |
| New York | 6.5 | 4.5 | 4.3 | 4.3 | 3.2 | 3.4 | 12.6 | 8.2 | 7.8 |
| Pennsylvania | 6.2 | 5.1 | 5.2 | 4.9 | 4.0 | 4.3 | 12.5 | 11.1 | 9.6 |
| East North Central | 6.3 | 5.4 | 5.3 | 4.9 | 4.3 | 4.2 | 12.1 | 10.6 | 10.4 |
| Illinois | 7.0 | 5.7 | 5.3 | 5.1 | 4.3 | 4.2 | 12.7 | 11.1 | 10.0 |
| Indiana | 6.0 | 5.2 | 5.1 | 5.2 | 4.6 | 4.6 | 11.5 | 10.3 | 8.6 |
| Michigan | 6.9 | 5.5 | 5.6 | 4.9 | 4.0 | 4.2 | 14.0 | 11.0 | 11.4 |
| Ohio | 5.5 | 5.3 | 5.3 | 4.8 | 4.6 | 4.2 | 9.8 | 9.4 | 10.4 |
| Wisconsin | 5.1 | 4.6 | 4.6 | 4.6 | 3.7 | 3.9 | 9.1 | 10.5 | 11.3 |
| West North Central | 5.0 | 4.5 | 4.3 | 4.5 | 4.0 | 3.7 | 10.2 | 10.0 | 9.6 |
| Iowa | 4.8 | 4.0 | 3.7 | 4.5 | 3.7 | 3.5 | *10.5 | *11.3 | *8.4 |
| Kansas | 4.9 | 4.8 | 4.6 | 4.6 | 4.7 | 4.0 | 8.3 | 8.1 | 10.3 |
| Minnesota | 4.3 | 3.9 | 3.6 | 3.9 | 3.6 | 3.2 | 10.7 | 8.1 | 6.4 |
| Missouri | 6.0 | 4.9 | 5.1 | 5.0 | 3.9 | 4.1 | 10.6 | 10.8 | 10.7 |
| Nebraska | 4.5 | 4.9 | 4.8 | 4.2 | 4.3 | 4.3 | *9.8 | *11.6 | *10.9 |
| North Dakota | 5.0 | 4.4 | 5.1 | 4.7 | 4.5 | 4.5 | * | * | * |
| South Dakota | 5.1 | 4.6 | 3.4 | 4.5 | 4.2 | 3.0 | * | * | * |
| South Atlantic | 6.9 | 5.7 | 5.5 | 4.9 | 4.1 | 4.0 | 11.7 | 10.0 | 9.6 |
| Delaware | 7.5 | 5.9 | 7.0 | 5.8 | 3.8 | 5.8 | 12.4 | 12.8 | 11.1 |
| District of Columbia | 14.1 | 9.8 | 8.3 | *5.2 | * | * | 16.7 | 12.4 | 10.9 |
| Florida | 6.2 | 4.8 | 4.8 | 4.7 | 3.9 | 3.6 | 10.5 | 8.3 | 8.7 |
| Georgia | 7.9 | 5.8 | 5.8 | 5.5 | 4.0 | 4.1 | 12.0 | 9.4 | 9.2 |
| Maryland | 5.9 | 6.2 | 5.6 | 3.9 | 3.8 | 3.8 | 10.2 | 10.8 | 9.2 |
| North Carolina | 7.3 | 6.5 | 5.9 | 5.3 | 4.8 | 4.4 | 11.9 | 11.5 | 11.0 |
| South Carolina | 7.7 | 6.9 | 6.2 | 5.4 | 4.3 | 3.9 | 11.3 | 11.6 | 10.6 |
| Virginia | 6.8 | 5.3 | 4.9 | 4.8 | 3.9 | 3.6 | 13.0 | 9.8 | 9.6 |
| West Virginia | 5.8 | 5.3 | 5.1 | 5.6 | 5.2 | 5.0 | *9.7 | *8.1 | *9.8 |
| East South Central | 6.6 | 5.6 | 5.6 | 5.0 | 4.2 | 4.2 | 10.6 | 9.5 | 9.8 |
| Alabama | 7.5 | 6.3 | 5.9 | 5.7 | 4.6 | 4.2 | 11.1 | 9.9 | 9.4 |
| Kentucky | 5.0 | 4.7 | 4.2 | 4.6 | 4.4 | 4.0 | 8.9 | 7.6 | 6.3 |
| Mississippi | 7.1 | 6.2 | 6.6 | 4.9 | 3.9 | 4.2 | 9.5 | 9.0 | 9.5 |
| Tennessee | 6.5 | 5.2 | 5.8 | 4.9 | 3.9 | 4.3 | 11.8 | 9.9 | 11.4 |
| West South Central[4] | 5.0 | 4.4 | 4.2 | 4.2 | 3.9 | 3.7 | 8.4 | 7.6 | 7.7 |
| Arkansas | 5.4 | 5.1 | 4.9 | 4.5 | 4.4 | 4.2 | 8.5 | 7.5 | 8.1 |
| Louisiana[4] | 6.3 | 6.0 | 6.3 | 4.8 | 4.1 | 4.3 | 8.5 | 8.9 | 8.9 |
| Oklahoma[4] | 4.4 | 5.0 | 4.8 | 4.1 | 4.9 | 4.6 | 6.3 | 8.1 | 8.5 |
| Texas | 4.7 | 3.9 | 3.6 | 4.1 | 3.5 | 3.3 | 8.5 | 6.7 | 6.7 |
| Mountain | 4.8 | 4.2 | 4.1 | 4.4 | 3.9 | 3.7 | 10.1 | 8.2 | 8.9 |
| Arizona | 5.3 | 4.6 | 4.3 | 4.9 | 4.3 | 4.2 | 11.0 | 9.0 | 9.6 |
| Colorado | 5.0 | 4.5 | 4.2 | 4.7 | 4.0 | 3.5 | 10.9 | 9.8 | 10.5 |
| Idaho | 5.3 | 4.4 | 4.5 | 5.2 | 4.3 | 4.1 | * | * | * |
| Montana | 4.6 | 3.7 | 4.5 | 4.2 | 3.2 | 4.3 | * | * | * |
| Nevada | 4.3 | 3.8 | 3.6 | 3.8 | 3.5 | 2.9 | *8.3 | * | 7.4 |
| New Mexico | 5.0 | 3.9 | 4.0 | 4.8 | 4.3 | 3.5 | * | * | * |
| Utah | 3.7 | 3.5 | 3.5 | 3.6 | 3.3 | 3.4 | * | * | * |
| Wyoming | 3.9 | 3.8 | 4.3 | 3.8 | 3.5 | 4.3 | * | * | * |
| Pacific | 4.6 | 3.7 | 3.6 | 4.0 | 3.3 | 3.2 | 9.2 | 7.5 | 7.2 |
| Alaska | 4.1 | 3.1 | 3.1 | 3.7 | 2.9 | *2.9 | * | * | * |
| California | 4.6 | 3.8 | 3.6 | 4.1 | 3.3 | 3.1 | 9.2 | 7.7 | 7.5 |
| Hawaii | 4.3 | 4.7 | 5.0 | 3.5 | *3.9 | 5.3 | * | * | * |
| Oregon | 4.4 | 3.6 | 3.6 | 4.0 | 3.4 | 3.6 | *11.6 | * | * |
| Washington | 4.3 | 3.4 | 3.5 | 3.8 | 3.0 | 3.3 | 9.7 | 7.1 | 6.0 |

See footnotes at end of table.

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## Table 24 (page 2 of 2). Neonatal mortality rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1989–91, 1997–99, and 2000–2002

[Data are based on linked birth and death certificates for infants]

Click here for spreadsheet version

| Geographic division and State | Hispanic or Latino[5] | | | American Indian or Alaska Native[6] | | | Asian or Pacific Islander[6] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] | 1989–91[1] | 1997–99[2] | 2000–2002[2] |
| | Neonatal[3] deaths per 1,000 live births | | | | | | | | |
| United States | 4.8 | 3.9 | 3.8 | 5.9 | 4.8 | 4.4 | 3.9 | 3.4 | 3.3 |
| New England[7] | 5.5 | 5.7 | 4.9 | * | * | * | 4.4 | *2.6 | 3.1 |
| Connecticut | 5.3 | 6.5 | 5.3 | * | * | * | * | * | * |
| Maine | * | * | * | * | * | * | * | * | * |
| Massachusetts | 5.8 | 5.1 | 4.6 | * | * | * | *3.9 | *2.5 | *2.7 |
| New Hampshire[7] | --- | * | * | * | * | * | * | * | * |
| Rhode Island | *4.9 | *5.4 | *6.0 | * | * | * | * | * | * |
| Vermont | * | * | * | * | * | * | * | * | * |
| Middle Atlantic | 6.2 | 4.5 | 4.2 | * | * | * | 4.1 | 3.0 | 2.3 |
| New Jersey | 5.1 | 4.6 | 4.3 | * | * | * | *3.4 | 3.1 | 2.2 |
| New York | 6.4 | 4.2 | 3.9 | * | * | * | 4.1 | 2.9 | 2.3 |
| Pennsylvania | 7.3 | 5.5 | 5.8 | * | * | * | *5.2 | *3.4 | *2.7 |
| East North Central | 5.9 | 5.1 | 4.5 | *6.2 | *5.3 | *5.0 | 3.6 | 4.1 | 4.3 |
| Illinois | 6.4 | 4.8 | 4.4 | * | * | * | 3.9 | 4.4 | 4.8 |
| Indiana | *4.7 | 5.2 | 4.8 | * | * | * | * | * | * |
| Michigan | 5.2 | 4.8 | 4.7 | * | * | * | * | *3.9 | *3.8 |
| Ohio | *5.4 | 6.7 | 5.3 | * | * | * | * | *3.0 | *4.0 |
| Wisconsin | *3.9 | 7.3 | 4.4 | * | * | * | * | *4.2 | *3.8 |
| West North Central | 5.3 | 4.5 | 4.9 | 6.1 | 5.3 | 5.3 | 4.6 | 4.5 | 3.9 |
| Iowa | * | *3.9 | *4.9 | * | * | * | * | * | * |
| Kansas | *5.4 | *3.7 | 4.9 | * | * | * | * | * | * |
| Minnesota | * | *4.7 | 4.6 | *4.9 | * | * | *3.2 | *4.5 | *4.2 |
| Missouri | * | *4.6 | *5.2 | * | * | * | * | * | * |
| Nebraska | * | *6.5 | *4.6 | * | * | * | * | * | * |
| North Dakota | * | * | * | * | * | * | * | * | * |
| South Dakota | * | * | * | *8.2 | *6.1 | *4.7 | * | * | * |
| South Atlantic | 5.2 | 3.6 | 3.7 | 7.4 | 8.0 | 5.8 | 4.6 | 3.5 | 4.0 |
| Delaware | * | * | * | * | * | * | * | * | * |
| District of Columbia | * | * | * | * | * | * | * | * | * |
| Florida | 5.1 | 3.2 | 3.6 | * | * | * | *4.4 | *2.9 | 3.8 |
| Georgia | *5.7 | 3.3 | 4.0 | * | * | * | *5.3 | *3.2 | 5.4 |
| Maryland | *4.7 | *4.4 | 4.2 | * | * | * | *4.5 | *4.0 | *3.6 |
| North Carolina | *5.5 | 4.8 | 3.8 | *7.7 | 11.2 | *8.1 | * | *3.6 | *4.4 |
| South Carolina | * | *5.5 | *3.6 | * | * | * | * | * | * |
| Virginia | *4.8 | 3.8 | 3.5 | * | * | * | *4.1 | 4.0 | 3.2 |
| West Virginia | * | * | * | * | * | * | * | * | * |
| East South Central | * | 4.3 | 3.9 | * | * | * | * | *4.7 | *3.6 |
| Alabama | * | * | *4.6 | * | * | * | * | * | * |
| Kentucky | * | * | * | * | * | * | * | * | * |
| Mississippi | * | * | * | * | * | * | * | * | * |
| Tennessee | * | *4.9 | *3.8 | * | * | * | * | * | * |
| West South Central[7] | 4.2 | 3.5 | 3.2 | 4.3 | 4.4 | 3.7 | 4.1 | 2.7 | 2.9 |
| Arkansas | * | *4.1 | *3.1 | * | * | * | * | * | * |
| Louisiana[7] | --- | * | * | * | * | * | * | * | *7.1 |
| Oklahoma[7] | --- | *3.1 | *3.3 | *3.7 | 4.5 | 3.9 | * | * | * |
| Texas | 4.2 | 3.5 | 3.2 | * | * | * | 4.0 | 2.8 | 2.5 |
| Mountain | 4.7 | 4.3 | 4.2 | 5.8 | 4.4 | 4.3 | 4.6 | 3.6 | 3.7 |
| Arizona | 5.0 | 4.6 | 4.1 | 5.4 | 4.4 | 4.4 | * | * | * |
| Colorado | 4.4 | 4.8 | 4.6 | * | * | * | * | * | *4.7 |
| Idaho | * | *4.3 | 6.8 | * | * | * | * | * | * |
| Montana | * | * | * | *7.6 | *5.3 | *5.9 | * | * | * |
| Nevada | *4.1 | 3.4 | 3.3 | * | * | * | * | * | * |
| New Mexico | 4.9 | 3.6 | 4.3 | 4.9 | *3.6 | *3.5 | * | * | * |
| Utah | *3.6 | 4.0 | 4.1 | * | * | * | * | * | *5.0 |
| Wyoming | * | * | * | * | * | * | * | * | * |
| Pacific | 4.5 | 3.6 | 3.5 | 6.5 | 4.3 | 4.1 | 3.7 | 3.4 | 3.3 |
| Alaska | * | * | * | *5.7 | *3.3 | *3.9 | * | * | * |
| California | 4.4 | 3.6 | 3.5 | 6.3 | *4.6 | *4.0 | 3.6 | 3.1 | 3.0 |
| Hawaii | *6.6 | *4.3 | *3.8 | * | * | * | 4.2 | 5.0 | 4.9 |
| Oregon | 6.5 | 4.7 | 3.6 | * | * | * | *5.3 | *3.8 | * |
| Washington | 4.9 | 3.4 | 3.2 | *8.5 | *5.6 | *4.1 | *2.7 | 3.1 | 3.2 |

* Estimates are considered unreliable. Rates preceded by an asterisk are based on fewer than 50 deaths. Rates not shown are based on fewer than 20 deaths.
--- Data not available. [1]Rates based on unweighted birth cohort data.
[2]Rates based on period file using weighted data. See Appendix I, National Vital Statistics System, Linked Birth/Infant Death Data Set.
[3]Infants under 28 days of age.
[4]Rates for white and black are substituted for non-Hispanic white and non-Hispanic black for Louisiana 1989, Oklahoma 1989–90, and New Hampshire 1989–91.
[5]Persons of Hispanic origin may be of any race. [6]Includes persons of Hispanic origin.
[7]Rates for Hispanic origin exclude data from States not reporting Hispanic origin on the birth certificate for 1 or more years in a 3-year period.

NOTE: National linked files do not exist for 1992–94.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Linked Birth/Infant Death Data Set.
**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 25. Infant mortality rates and international rankings: Selected countries, selected years 1960–2002

[Data are based on reporting by countries]

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| Country[2] | 1960 | 1970 | 1980 | 1990 | 2000 | 2001 | 2002 | International rankings[1] 1960 | International rankings[1] 2002 |
|---|---|---|---|---|---|---|---|---|---|
| | Infant[3] deaths per 1,000 live births | | | | | | | | |
| Australia | 20.2 | 17.9 | 10.7 | 8.2 | 5.2 | 5.3 | 5.0 | 5 | 17 |
| Austria | 37.5 | 25.9 | 14.3 | 7.8 | 4.8 | 4.8 | 4.1 | 24 | 8 |
| Belgium | 31.2 | 21.1 | 12.1 | 8.0 | 4.8 | 4.5 | 4.9 | 20 | 16 |
| Bulgaria | 45.1 | 27.3 | 20.2 | 14.8 | 13.3 | 14.4 | 13.3 | 30 | 36 |
| Canada | 27.3 | 18.8 | 10.4 | 6.8 | 5.3 | 5.2 | 5.4 | 14 | 23 |
| Chile | 120.3 | 82.2 | 33.0 | 16.0 | 11.7 | 8.3 | 7.8 | 36 | 32 |
| Costa Rica | 67.8 | 65.4 | 20.3 | 15.3 | 10.2 | 10.8 | 11.2 | 33 | 34 |
| Cuba | 37.3 | 38.7 | 19.6 | 10.7 | 7.2 | 6.2 | 6.5 | 23 | 27 |
| Czech Republic | 20.0 | 20.2 | 16.9 | 10.8 | 4.1 | 4.0 | 4.2 | 4 | 10 |
| Denmark | 21.5 | 14.2 | 8.4 | 7.5 | 5.3 | 4.9 | 4.4 | 8 | 12 |
| England and Wales | 22.4 | 18.5 | 12.1 | 7.9 | 5.6 | 5.5 | 5.2 | 9 | 21 |
| Finland | 21.0 | 13.2 | 7.6 | 5.6 | 3.8 | 3.2 | 3.0 | 6 | 4 |
| France | 27.5 | 18.2 | 10.0 | 7.3 | 4.6 | 4.5 | 4.1 | 15 | 8 |
| Germany[4] | 35.0 | 22.5 | 12.4 | 7.0 | 4.4 | 4.3 | 4.3 | 22 | 11 |
| Greece | 40.1 | 29.6 | 17.9 | 9.7 | 6.1 | 5.1 | 5.9 | 25 | 25 |
| Hong Kong | 41.5 | 19.2 | 11.2 | 6.2 | 3.0 | 2.6 | 2.3 | 26 | 1 |
| Hungary | 47.6 | 35.9 | 23.2 | 14.8 | 9.2 | 8.1 | 7.2 | 31 | 29 |
| Ireland | 29.3 | 19.5 | 11.1 | 8.2 | 6.2 | 5.7 | 5.1 | 17 | 20 |
| Israel[5] | 31.0 | 18.9 | 15.6 | 9.9 | 5.4 | 5.1 | 5.4 | 19 | 23 |
| Italy | 43.9 | 29.6 | 14.6 | 8.2 | 4.5 | 4.7 | 4.7 | 29 | 14 |
| Japan | 30.7 | 13.1 | 7.5 | 4.6 | 3.2 | 3.1 | 3.0 | 18 | 4 |
| Netherlands | 17.9 | 12.7 | 8.6 | 7.1 | 5.1 | 5.4 | 5.0 | 2 | 17 |
| New Zealand | 22.6 | 16.7 | 13.0 | 8.4 | 6.3 | 5.6 | 6.2 | 10 | 26 |
| Northern Ireland | 27.2 | 22.9 | 13.4 | 7.5 | 5.1 | 6.1 | 4.7 | 13 | 14 |
| Norway | 18.9 | 12.7 | 8.1 | 7.0 | 3.8 | 3.9 | 3.5 | 3 | 7 |
| Poland | 54.8 | 36.7 | 25.5 | 19.3 | 8.1 | 7.7 | 7.5 | 32 | 30 |
| Portugal | 77.5 | 55.5 | 24.3 | 11.0 | 5.5 | 5.0 | 5.0 | 35 | 17 |
| Puerto Rico | 43.3 | 27.9 | 18.5 | 13.4 | 9.9 | 9.2 | 9.8 | 27 | 33 |
| Romania | 75.7 | 49.4 | 29.3 | 26.9 | 18.6 | 18.4 | 17.3 | 34 | 37 |
| Russian Federation[6] | --- | --- | 22.0 | 17.6 | 15.2 | 14.6 | 13.2 | --- | 35 |
| Scotland | 26.4 | 19.6 | 12.1 | 7.7 | 5.7 | 5.5 | 5.3 | 12 | 22 |
| Singapore | 34.8 | 21.4 | 11.7 | 6.7 | 2.5 | 2.2 | 2.9 | 21 | 3 |
| Slovakia | 28.6 | 25.7 | 20.9 | 12.0 | 8.6 | 6.2 | 7.6 | 16 | 31 |
| Spain | 43.7 | 28.1 | 12.3 | 7.6 | 3.9 | 3.5 | 3.4 | 28 | 6 |
| Sweden | 16.6 | 11.0 | 6.9 | 6.0 | 3.4 | 3.7 | 2.8 | 1 | 2 |
| Switzerland | 21.1 | 15.1 | 9.1 | 6.8 | 4.9 | 5.0 | 4.5 | 7 | 13 |
| United States | 26.0 | 20.0 | 12.6 | 9.2 | 6.9 | 6.8 | 7.0 | 11 | 28 |

--- Data not available.

[1]Rankings are from lowest to highest infant mortality rates (IMR). Countries with the same IMR receive the same rank. The country with the next highest IMR is assigned the rank it would have received had the lower-ranked countries not been tied, i.e., skip a rank. Some of the variation in IMRs is due to differences among countries in distinguishing between fetal and infant deaths.

[2]Refers to countries, territories, cities, or geographic areas with at least 1 million population and with "complete" counts of live births and infant deaths as indicated in the United Nations Demographic Yearbook.

[3]Under 1 year of age.

[4]Rates for 1990 and earlier years were calculated by combining information from the Federal Republic of Germany and the German Democratic Republic.

[5]Includes data for East Jerusalem and Israeli residents in certain other territories under occupation by Israeli military forces since June 1967.

[6]Excludes infants born alive after less than 28 weeks' gestation, of less than 1,000 grams in weight and 35 centimeters in length, who die within 7 days of birth.

NOTE: Some rates for selected countries and selected years were revised and differ from the previous edition of *Health, United States*.

SOURCES: Organization for Economic Cooperation and Development (OECD): OECD Health Data 2004 3rd edition, A Comparative Analysis of 30 Countries, www.oecd.org/els/health/; United Nations: 2000 Demographic Yearbook, United Nations Publication, Sales No. E/F.02.XIII.1, New York, 2002; World Health Organization Statistical Information System (WHOSIS), www3.who.int/whosis/; United States and Puerto Rico: Centers for Disease Control and Prevention, National Center for Health Statistics. Vital Statistics of the United States, vol. II, mortality part A (selected years). Public Health Service. Washington; Sweden: Statistics Sweden; Costa Rica: Dirección General de Estadísticas y Censos. Elaboración y estimación, Centro Centroamericano de Población, Universidad de Costa Rica, populi.eest.ucr.ac.cr/observa/index1.htm; Russian Federation: Goskomstat, www.gks.ru/eng/. Israel: Central Bureau Statistics of Israel, www.cbs.gov.il/engindex.htm.



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## Table 26 (page 1 of 2). Life expectancy at birth and at 65 years of age, according to sex: Selected countries, selected years 1980–2001

[Data are based on reporting by countries]

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| Country | Male | | | | | | | Female | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1990 | 1995 | 1999 | 2000 | 2001 | 2001 | 1980 | 1990 | 1995 | 1999 | 2000 | 2001 | 2001 |
| At birth | Life expectancy in years | | | | | | Rank | Life expectancy in years | | | | | | Rank |
| Australia | 71.0 | 73.9 | 75.0 | 76.2 | 76.6 | 77.0 | 7 | 78.1 | 80.1 | 80.8 | 81.8 | 82.0 | 82.4 | 7 |
| Austria | 69.0 | 72.2 | 73.3 | 74.8 | 75.1 | 75.6 | 14 | 76.1 | 78.8 | 79.9 | 80.8 | 81.1 | 81.5 | 11 |
| Belgium | 70.0 | 72.7 | 73.4 | 74.4 | 74.6 | 74.9 | 21 | 76.8 | 79.4 | 80.2 | 80.8 | 80.8 | 81.1 | 15 |
| Bulgaria | 68.5 | 68.3 | 67.4 | 68.4 | 68.5 | 68.6 | 34 | 73.9 | 75.0 | 74.9 | 75.1 | 75.1 | 75.4 | 35 |
| Canada | 71.7 | 74.4 | 75.1 | 76.3 | 76.7 | 77.1 | 5 | 78.9 | 80.8 | 81.1 | 81.7 | 82.0 | 82.2 | 8 |
| Chile | --- | 71.1 | 71.8 | 72.4 | 72.6 | 72.7 | 29 | --- | 76.9 | 77.8 | 78.4 | 78.6 | 78.7 | 30 |
| Costa Rica | 71.9 | 74.7 | 74.0 | 75.0 | 75.4 | 75.6 | 14 | 77.0 | 79.1 | 78.6 | 79.8 | 80.2 | 79.9 | 24 |
| Cuba | 72.2 | 74.6 | 75.4 | 73.3 | 74.7 | 74.7 | 22 | --- | 76.9 | 77.7 | 77.5 | 79.0 | 79.2 | 28 |
| Czech Republic[1] | 66.8 | 67.6 | 69.7 | 71.4 | 71.7 | 72.1 | 30 | 73.9 | 75.4 | 76.6 | 78.2 | 78.4 | 78.5 | 31 |
| Denmark | 71.2 | 72.0 | 72.7 | 74.2 | 74.5 | 74.7 | 22 | 77.3 | 77.7 | 77.8 | 79.0 | 79.3 | 79.3 | 27 |
| England and Wales | 70.8 | 73.1 | 74.3 | 75.3 | 75.6 | 76.0 | 11 | 76.8 | 78.6 | 79.5 | 80.1 | 80.3 | 80.6 | 20 |
| Finland | 69.2 | 70.9 | 72.8 | 73.8 | 74.2 | 74.6 | 25 | 77.6 | 78.9 | 80.2 | 81.0 | 81.0 | 81.5 | 11 |
| France | 70.2 | 72.8 | 73.9 | 75.0 | 75.2 | 75.5 | 18 | 78.4 | 80.9 | 81.8 | 82.5 | 82.7 | 82.9 | 4 |
| Germany[2] | 69.6 | 72.0 | 73.3 | 74.7 | 75.0 | 75.6 | 14 | 76.1 | 78.4 | 79.7 | 80.7 | 81.0 | 81.3 | 14 |
| Greece | 72.2 | 74.6 | 75.0 | 75.5 | 75.5 | 75.4 | 19 | 76.8 | 79.5 | 80.3 | 80.6 | 80.6 | 80.7 | 18 |
| Hong Kong | 71.6 | 74.6 | 76.0 | 77.7 | 78.0 | 78.4 | 1 | 77.9 | 80.3 | 81.5 | 83.2 | 83.9 | 84.6 | 2 |
| Hungary | 65.5 | 65.1 | 65.3 | 66.4 | 67.4 | 68.1 | 35 | 72.7 | 73.7 | 74.5 | 75.2 | 75.9 | 76.4 | 34 |
| Ireland | 70.1 | 72.1 | 72.9 | 73.9 | 73.9 | 74.7 | 22 | 75.6 | 77.6 | 78.4 | 78.8 | 79.1 | 79.7 | 26 |
| Israel | 72.2 | 75.1 | 75.5 | 76.6 | 76.7 | 77.1 | 5 | 75.8 | 78.5 | 79.5 | 80.7 | 81.1 | 81.6 | 10 |
| Italy | 70.6 | 73.6 | 74.9 | 76.1 | 76.6 | 76.7 | 8 | 77.4 | 80.1 | 81.3 | 82.2 | 82.5 | 82.8 | 6 |
| Japan | 73.4 | 75.9 | 76.4 | 77.1 | 77.7 | 78.1 | 2 | 78.8 | 81.9 | 82.9 | 84.0 | 84.6 | 84.9 | 1 |
| Netherlands | 72.5 | 73.8 | 74.6 | 75.3 | 75.5 | 75.8 | 13 | 79.2 | 80.9 | 80.4 | 80.5 | 80.5 | 80.7 | 18 |
| New Zealand | 70.0 | 72.4 | 74.2 | 76.0 | 76.0 | 76.0 | 11 | 76.3 | 78.3 | 79.5 | 80.9 | 80.9 | 80.9 | 17 |
| Northern Ireland | 68.3 | 72.1 | 73.5 | 74.5 | 74.8 | 75.2 | 20 | 75.0 | 78.0 | 78.9 | 79.6 | 79.8 | 80.1 | 22 |
| Norway | 72.3 | 73.4 | 74.8 | 75.6 | 76.0 | 76.2 | 10 | 79.2 | 79.8 | 80.8 | 81.1 | 81.4 | 81.5 | 11 |
| Poland | 66.0 | 66.7 | 67.6 | 68.2 | 69.7 | 70.2 | 32 | 74.4 | 76.3 | 76.4 | 77.2 | 77.9 | 78.3 | 32 |
| Portugal | 67.7 | 70.4 | 71.6 | 72.6 | 73.2 | 73.5 | 27 | 75.2 | 77.4 | 78.7 | 79.5 | 80.0 | 80.3 | 21 |
| Puerto Rico | 70.8 | 69.1 | 69.6 | 70.7 | 70.8 | 71.0 | 31 | 76.9 | 77.2 | 78.9 | 79.8 | 79.9 | 80.0 | 23 |
| Romania | 66.6 | 66.6 | 65.5 | 67.2 | 67.8 | 67.7 | 36 | 71.9 | 73.1 | 73.5 | 74.2 | 74.8 | 75.0 | 36 |
| Russian Federation | 61.4 | 63.8 | 58.3 | 60.0 | 59.2 | 59.1 | 37 | 73.0 | 74.4 | 71.7 | 72.5 | 72.4 | 72.3 | 37 |
| Scotland | 69.0 | 71.1 | 72.1 | 72.8 | 73.1 | 73.3 | 28 | 75.2 | 76.7 | 77.7 | 78.4 | 78.6 | 78.8 | 29 |
| Singapore | 69.8 | 73.1 | 74.2 | 75.6 | 76.1 | 76.5 | 9 | 74.7 | 77.6 | 78.6 | 79.7 | 80.8 | 81.1 | 15 |
| Slovakia[1] | 66.8 | 66.6 | 68.4 | 69.0 | 69.2 | 69.6 | 33 | 74.3 | 75.4 | 76.3 | 77.2 | 77.4 | 77.7 | 33 |
| Spain | 72.5 | 73.3 | 74.3 | 75.1 | 75.7 | 75.6 | 14 | 78.6 | 80.3 | 81.5 | 82.1 | 82.5 | 82.9 | 4 |
| Sweden | 72.8 | 74.8 | 76.2 | 77.1 | 77.4 | 77.6 | 3 | 78.8 | 80.4 | 81.4 | 81.9 | 82.0 | 82.1 | 9 |
| Switzerland | 72.8 | 74.0 | 75.3 | 76.8 | 76.9 | 77.4 | 4 | 79.6 | 80.7 | 81.7 | 82.5 | 82.6 | 83.0 | 3 |
| United States | 70.0 | 71.8 | 72.5 | 73.9 | 74.1 | 74.4 | 26 | 77.4 | 78.8 | 78.9 | 79.4 | 79.5 | 79.8 | 25 |

See footnotes at end of table.



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## Table 26 (page 2 of 2). Life expectancy at birth and at 65 years of age, according to sex: Selected countries, selected years 1980–2001

[Data are based on reporting by countries]

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| Country | Male | | | | | | | Female | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1990 | 1995 | 1999 | 2000 | 2001 | 2001 | 1980 | 1990 | 1995 | 1999 | 2000 | 2001 | 2001 |
| At 65 years | Life expectancy in years | | | | | | Rank | Life expectancy in years | | | | | | Rank |
| Australia | 13.7 | 15.2 | 15.7 | 16.6 | 16.9 | 17.2 | 3 | 17.9 | 19.0 | 19.5 | 20.2 | 20.4 | 20.7 | 5 |
| Austria | 12.9 | 14.3 | 14.9 | 15.6 | 16.0 | 16.3 | 13 | 16.3 | 17.8 | 18.6 | 19.2 | 19.4 | 19.8 | 8 |
| Belgium | 13.0 | 14.3 | 14.8 | 15.4 | 15.5 | 15.8 | 18 | 16.9 | 18.5 | 19.1 | 19.4 | 19.5 | 19.7 | 12 |
| Bulgaria | 12.7 | 12.9 | 12.8 | 13.0 | 12.8 | 13.1 | 30 | 14.7 | 15.4 | 15.4 | 15.4 | 15.4 | 15.8 | 32 |
| Canada | 14.5 | 15.7 | 16.0 | 16.5 | 16.4 | 17.1 | 6 | 18.9 | 19.9 | 20.0 | 20.3 | 20.5 | 20.6 | 6 |
| Chile | --- | 14.6 | 14.9 | 15.2 | 15.3 | 15.4 | 23 | --- | 17.6 | 18.1 | 18.5 | 18.6 | 18.7 | 22 |
| Costa Rica | 16.1 | 17.1 | 16.7 | 17.1 | 17.2 | 17.1 | 6 | 18.1 | 19.3 | 18.6 | 19.3 | 19.6 | 19.4 | 15 |
| Cuba | --- | --- | --- | 15.6 | 16.7 | 16.8 | 10 | --- | --- | --- | 17.5 | 19.0 | 19.3 | 17 |
| Czech Republic[1] | 11.2 | 11.6 | 12.7 | 13.6 | 13.7 | 14.0 | 27 | 14.3 | 15.2 | 16.0 | 16.9 | 17.1 | 17.2 | 28 |
| Denmark | 13.6 | 14.0 | 14.1 | 14.9 | 15.2 | 15.2 | 24 | 17.6 | 17.8 | 17.5 | 18.1 | 18.3 | 18.4 | 24 |
| England and Wales | 12.9 | 14.1 | 14.8 | 15.5 | 15.8 | 16.1 | 14 | 16.9 | 17.9 | 18.3 | 18.8 | 19.0 | 19.2 | 19 |
| Finland | 12.5 | 13.7 | 14.5 | 15.1 | 15.5 | 15.7 | 19 | 16.5 | 17.7 | 18.6 | 19.2 | 19.3 | 19.6 | 13 |
| France | 13.6 | 15.5 | 16.1 | 16.5 | 16.7 | 16.9 | 8 | 18.2 | 19.8 | 20.6 | 20.9 | 21.2 | 21.3 | 3 |
| Germany[2] | 13.0 | 14.0 | 14.7 | 15.5 | 15.7 | 16.0 | 16 | 16.7 | 17.6 | 18.5 | 19.2 | 19.4 | 19.6 | 13 |
| Greece | 14.6 | 15.7 | 16.1 | 16.3 | --- | --- | --- | 16.8 | 18.0 | 18.4 | 18.7 | --- | --- | --- |
| Hong Kong | 13.9 | 15.3 | 16.2 | 17.2 | 17.3 | 17.7 | 2 | 13.9 | 18.8 | 19.5 | 21.0 | 21.5 | 22.1 | 2 |
| Hungary | 11.6 | 12.0 | 12.1 | 12.2 | 12.7 | 13.0 | 31 | 14.6 | 15.3 | 15.8 | 15.9 | 16.4 | 16.7 | 30 |
| Ireland | 12.6 | 13.3 | 13.6 | 14.1 | 14.6 | 15.0 | 25 | 15.7 | 16.9 | 17.3 | 17.5 | 17.8 | 18.3 | 25 |
| Israel | 14.4 | 15.9 | 16.0 | 16.6 | 16.9 | 17.2 | 3 | 15.8 | 17.8 | 18.0 | 19.0 | 19.3 | 19.8 | 8 |
| Italy | 13.3 | 15.1 | 15.8 | 16.2 | 16.6 | --- | --- | 17.1 | 18.8 | 19.6 | 20.1 | 20.4 | --- | --- |
| Japan | 14.6 | 16.2 | 16.5 | 17.0 | 17.5 | 17.8 | 1 | 17.7 | 20.0 | 20.9 | 21.9 | 22.4 | 22.7 | 1 |
| Netherlands | 13.7 | 14.4 | 14.7 | 15.1 | 15.3 | 15.5 | 22 | 18.0 | 18.9 | 19.0 | 19.1 | 19.2 | 19.3 | 17 |
| New Zealand | 13.2 | 14.7 | 15.4 | 16.5 | 16.5 | 16.5 | 11 | 17.0 | 18.3 | 19.0 | 19.8 | 19.8 | 19.8 | 8 |
| Northern Ireland | 11.9 | 13.7 | 14.4 | 15.0 | 15.3 | 15.7 | 19 | 15.8 | 17.5 | 18.0 | 18.4 | 18.5 | 18.7 | 22 |
| Norway | 14.3 | 14.6 | 15.1 | 15.6 | 16.0 | 16.1 | 14 | 18.0 | 18.5 | 19.1 | 19.5 | 19.7 | 19.8 | 8 |
| Poland | 12.0 | 12.7 | 12.9 | 13.2 | 13.6 | 13.9 | 28 | 15.5 | 16.9 | 16.6 | 17.0 | 17.3 | 17.6 | 27 |
| Portugal | 12.9 | 13.9 | 14.6 | 14.9 | 15.3 | 15.6 | 21 | 16.5 | 17.0 | 17.8 | 18.3 | 18.7 | 18.9 | 21 |
| Puerto Rico | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Romania | 12.6 | 13.3 | 12.9 | 13.0 | 13.5 | 13.5 | 29 | 14.2 | 15.3 | 15.4 | 15.5 | 15.9 | 16.1 | 31 |
| Russian Federation | 11.6 | 12.1 | 10.9 | 11.2 | 11.1 | 11.1 | 33 | 15.6 | 15.9 | 15.1 | 15.2 | 15.2 | 15.3 | 33 |
| Scotland | 12.3 | 13.1 | 13.8 | 14.4 | 14.7 | 14.9 | 26 | 16.2 | 16.7 | 17.3 | 17.6 | 17.8 | 18.0 | 26 |
| Singapore | 12.6 | 14.5 | 14.6 | 15.4 | 15.8 | 16.0 | 16 | 15.4 | 16.9 | 17.3 | 17.9 | 19.0 | 19.2 | 19 |
| Slovakia[1] | 12.3 | 12.2 | 12.7 | 13.0 | 12.9 | 13.0 | 31 | 15.4 | 15.7 | 16.1 | 16.6 | 16.5 | 16.8 | 29 |
| Spain | 14.8 | 15.4 | 16.0 | 16.1 | 16.5 | --- | --- | 17.9 | 19.0 | 19.8 | 20.1 | 20.4 | --- | --- |
| Sweden | 14.3 | 15.3 | 16.0 | 16.4 | 16.7 | 16.9 | 8 | 17.9 | 19.0 | 19.6 | 19.9 | 20.0 | 20.1 | 7 |
| Switzerland | 14.4 | 15.3 | 16.1 | 16.8 | 16.9 | 17.2 | 3 | 17.9 | 19.4 | 20.2 | 20.6 | 20.7 | 21.0 | 4 |
| United States | 14.1 | 15.1 | 15.6 | 16.1 | 16.3 | 16.4 | 12 | 18.3 | 18.9 | 18.9 | 19.1 | 19.2 | 19.4 | 15 |

--- Data not available.

[1]In 1993 Czechoslovakia was divided into two Nations, the Czech Republic and Slovakia. Data for years prior to 1993 are from the Czech and Slovak regions of Czechoslovakia.

[2]Until 1990 estimates refer to the Federal Republic of Germany; from 1995 onwards data refer to Germany after reunification.

NOTES: Rankings are from highest to lowest life expectancy (LE) for the most recent year available. Since calculation of LE estimates varies among countries, comparisons among them and their interpretation should be made with caution. See Appendix II, Life expectancy. Countries with the same LE receive the same rank. The country with the next lower LE is assigned the rank it would have received had the higher-ranked countries not been tied, i.e., skip a rank. Some estimates for selected countries and selected years were revised and differ from the previous edition of *Health, United States*.

SOURCES: Organization for Economic Cooperation and Development (OECD) Health Data 2004 3rd edition, A Comparative Analysis of 30 Countries, www.oecd.org/els/health/; European health for all database, World Health Organization Regional Office for Europe, www.who.dk/hfadb; Centers for Disease Control and Prevention, National Center for Health Statistics. Vital statistics of the United States (selected years). Public Health Service. Washington, DC. www.cdc.gov/nchs/fastats/lifexpec.htm; Puerto Rico: Commonwealth of Puerto Rico, Department of Health, Auxiliary Secretariat for Planning, Evaluation, Statistics, and Information Systems: Unpublished data; Singapore: Singapore Department of Statistics, Population Statistics Section, www.singstat.gov.sg/stats/dingstat/internet.html; England and Wales, Northern Ireland, and Scotland: Government Actuary's Department, London www.gad.gov.uk; Hong Kong: Government of Hong Kong, Special Administrative Region, Department of Health, http://info.gov.hk/dh/index.htm; Costa Rica: Instituto Nacional de Estadística y Censos (INEC) y Centro Centroamericano de Población (CCP) http://ccp.ucr.ac.cr/observa/series/series3.htm; Chile: Instituto Nacional de Estadísticas, Departamento de Demografía. Gobierno de Chile. Ministerio de Salud Departamento de Estadísticas e Información de Salud; Puerto Rico (1999–2001): Pan American Health Organization, Special Program for Health Analysis. Regional Initiative for Health Basic Data, Technical Information Health System, Washington, DC 2001. Cuba and Singapore (2000–2001): WHO Statistical Information System (WHOSIS) www3.who.int/whosis/core/core_select.cfm



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## Table 27. Life expectancy at birth, at 65 years of age, and at 75 years of age, according to race and sex: United States, selected years 1900–2003

[Data are based on death certificates] Updated March 2006 Click here for spreadsheet version

| Specified age and year | All races | | | White | | | Black or African American[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Both sexes | Male | Female | Both sexes | Male | Female | Both sexes | Male | Female |
| **At birth** | Remaining life expectancy in years | | | | | | | | |
| 1900[2,3] | 47.3 | 46.3 | 48.3 | 47.6 | 46.6 | 48.7 | 33.0 | 32.5 | 33.5 |
| 1950[3] | 68.2 | 65.6 | 71.1 | 69.1 | 66.5 | 72.2 | 60.8 | 59.1 | 62.9 |
| 1960[3] | 69.7 | 66.6 | 73.1 | 70.6 | 67.4 | 74.1 | 63.6 | 61.1 | 66.3 |
| 1970 | 70.8 | 67.1 | 74.7 | 71.7 | 68.0 | 75.6 | 64.1 | 60.0 | 68.3 |
| 1980 | 73.7 | 70.0 | 77.4 | 74.4 | 70.7 | 78.1 | 68.1 | 63.8 | 72.5 |
| 1990 | 75.4 | 71.8 | 78.8 | 76.1 | 72.7 | 79.4 | 69.1 | 64.5 | 73.6 |
| 1995 | 75.8 | 72.5 | 78.9 | 76.5 | 73.4 | 79.6 | 69.6 | 65.2 | 73.9 |
| 1996 | 76.1 | 73.1 | 79.1 | 76.8 | 73.9 | 79.7 | 70.2 | 66.1 | 74.2 |
| 1997 | 76.5 | 73.6 | 79.4 | 77.1 | 74.3 | 79.9 | 71.1 | 67.2 | 74.7 |
| 1998 | 76.7 | 73.8 | 79.5 | 77.3 | 74.5 | 80.0 | 71.3 | 67.6 | 74.8 |
| 1999 | 76.7 | 73.9 | 79.4 | 77.3 | 74.6 | 79.9 | 71.4 | 67.8 | 74.7 |
| 2000 | 77.0 | 74.3 | 79.7 | 77.6 | 74.9 | 80.1 | 71.9 | 68.3 | 75.2 |
| 2001 | 77.2 | 74.4 | 79.8 | 77.7 | 75.0 | 80.2 | 72.2 | 68.6 | 75.5 |
| 2002 | 77.3 | 74.5 | 79.9 | 77.7 | 75.1 | 80.3 | 72.3 | 68.8 | 75.6 |
| 2003 | 77.5 | 74.8 | 80.1 | 78.0 | 75.3 | 80.5 | 72.7 | 69.0 | 76.1 |
| **At 65 years** | | | | | | | | | |
| 1950[3] | 13.9 | 12.8 | 15.0 | - - - | 12.8 | 15.1 | 13.9 | 12.9 | 14.9 |
| 1960[3] | 14.3 | 12.8 | 15.8 | 14.4 | 12.9 | 15.9 | 13.9 | 12.7 | 15.1 |
| 1970 | 15.2 | 13.1 | 17.0 | 15.2 | 13.1 | 17.1 | 14.2 | 12.5 | 15.7 |
| 1980 | 16.4 | 14.1 | 18.3 | 16.5 | 14.2 | 18.4 | 15.1 | 13.0 | 16.8 |
| 1990 | 17.2 | 15.1 | 18.9 | 17.3 | 15.2 | 19.1 | 15.4 | 13.2 | 17.2 |
| 1995 | 17.4 | 15.6 | 18.9 | 17.6 | 15.7 | 19.1 | 15.6 | 13.6 | 17.1 |
| 1996 | 17.5 | 15.7 | 19.0 | 17.6 | 15.8 | 19.1 | 15.8 | 13.9 | 17.2 |
| 1997 | 17.7 | 15.9 | 19.2 | 17.8 | 16.0 | 19.3 | 16.1 | 14.2 | 17.6 |
| 1998 | 17.8 | 16.0 | 19.2 | 17.8 | 16.1 | 19.3 | 16.1 | 14.3 | 17.4 |
| 1999 | 17.7 | 16.1 | 19.1 | 17.8 | 16.1 | 19.2 | 16.0 | 14.3 | 17.3 |
| 2000 | 18.0 | 16.2 | 19.3 | 18.0 | 16.3 | 19.4 | 16.2 | 14.2 | 17.7 |
| 2001 | 18.1 | 16.4 | 19.4 | 18.2 | 16.5 | 19.5 | 16.4 | 14.4 | 17.9 |
| 2002 | 18.2 | 16.6 | 19.5 | 18.2 | 16.6 | 19.5 | 16.6 | 14.6 | 18.0 |
| 2003 | 18.4 | 16.8 | 19.8 | 18.5 | 16.9 | 19.8 | 17.0 | 14.9 | 18.5 |
| **At 75 years** | | | | | | | | | |
| 1980 | 10.4 | 8.8 | 11.5 | 10.4 | 8.8 | 11.5 | 9.7 | 8.3 | 10.7 |
| 1990 | 10.9 | 9.4 | 12.0 | 11.0 | 9.4 | 12.0 | 10.2 | 8.6 | 11.2 |
| 1995 | 11.0 | 9.7 | 11.9 | 11.1 | 9.7 | 12.0 | 10.2 | 8.8 | 11.1 |
| 1996 | 11.1 | 9.8 | 12.0 | 11.1 | 9.8 | 12.0 | 10.3 | 9.0 | 11.2 |
| 1997 | 11.2 | 9.9 | 12.1 | 11.2 | 9.9 | 12.1 | 10.7 | 9.3 | 11.5 |
| 1998 | 11.3 | 10.0 | 12.2 | 11.3 | 10.0 | 12.2 | 10.5 | 9.2 | 11.3 |
| 1999 | 11.2 | 10.0 | 12.1 | 11.2 | 10.0 | 12.1 | 10.4 | 9.2 | 11.1 |
| 2000 | 11.4 | 10.1 | 12.3 | 11.4 | 10.1 | 12.3 | 10.7 | 9.2 | 11.6 |
| 2001 | 11.5 | 10.2 | 12.4 | 11.5 | 10.2 | 12.3 | 10.8 | 9.3 | 11.7 |
| 2002 | 11.5 | 10.3 | 12.4 | 11.5 | 10.3 | 12.3 | 10.9 | 9.5 | 11.7 |
| 2003 | 11.8 | 10.5 | 12.6 | 11.7 | 10.5 | 12.6 | 11.4 | 9.8 | 12.4 |

- - - Data not available.
[1]Data shown for 1900–60 are for the nonwhite population.
[2]Death registration area only. The death registration area increased from 10 States and the District of Columbia in 1900 to the coterminous United States in 1933. See Appendix II, Registration area. [3]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.

NOTES: Populations for computing life expectancy for 1991–99 are 1990-based postcensal estimates of U.S. resident population. See Appendix I, Population Census and Population Estimates. In 1997 life table methodology was revised to construct complete life tables by single years of age that extend to age 100 (Anderson RN. Method for Constructing Complete Annual U.S. Life Tables. National Center for Health Statistics. Vital Health Stat 2(129). 1999). Previously abridged life tables were constructed for 5-year age groups ending with 85 years and over. Life table values for 2000 and later years were computed using a slight modification of the new life table method due to a change in the age detail of populations received from the U.S. Census Bureau. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data.The multiple-race data for these States were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office, 1968; life expectancy trend data available at www.cdc.gov/nchs/about/major/dvs/mortdata.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 28 (page 1 of 2). Age-adjusted death rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1979–81, 1989–91, and 2001–03

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Geographic division and State | All persons | | | White | Black or African American | American Indian or Alaska Native | Asian or Pacific Islander | Hispanic or Latino[1] | White, not Hispanic or Latino |
|---|---|---|---|---|---|---|---|---|---|
| | 1979–81 | 1989–91 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 |
| | Age-adjusted death rate per 100,000 population[2] | | | | | | | | |
| United States | 1,022.8 | 942.2 | 842.7 | 826.1 | 1,081.6 | 683.0 | 475.6 | 631.4 | 834.5 |
| New England | 979.9 | 882.4 | 784.3 | 784.9 | 874.5 | * | 373.3 | 542.0 | 782.7 |
| Connecticut | 961.5 | 857.5 | 756.1 | 749.0 | 879.6 | * | 312.3 | 575.5 | 744.4 |
| Maine | 1,002.9 | 918.7 | 836.7 | 836.1 | 837.2 | * | 493.6 | * | 834.8 |
| Massachusetts | 982.6 | 884.8 | 788.5 | 792.1 | 874.1 | * | 379.3 | 560.2 | 791.3 |
| New Hampshire | 982.3 | 891.7 | 776.7 | 779.6 | 731.3 | * | 336.9 | 394.3 | 768.0 |
| Rhode Island | 990.8 | 889.6 | 798.8 | 799.3 | 899.4 | * | 499.7 | 456.5 | 800.6 |
| Vermont | 990.2 | 908.6 | 784.1 | 787.6 | * | * | * | * | 789.5 |
| Middle Atlantic | 1,059.1 | 967.8 | 813.8 | 805.6 | 952.2 | * | 385.8 | 596.2 | 806.0 |
| New Jersey | 1,047.5 | 956.0 | 810.3 | 792.3 | 1,055.1 | * | 367.2 | 544.7 | 803.5 |
| New York | 1,051.8 | 973.7 | 781.6 | 785.1 | 841.5 | * | 394.8 | 603.9 | 779.2 |
| Pennsylvania | 1,076.4 | 963.4 | 859.9 | 838.5 | 1,142.0 | * | 372.5 | 704.0 | 837.2 |
| East North Central | 1,048.0 | 957.9 | 867.2 | 842.1 | 1,136.8 | * | 389.9 | 535.1 | 844.1 |
| Illinois | 1,063.7 | 973.8 | 849.3 | 815.6 | 1,148.1 | * | 393.4 | 508.2 | 824.4 |
| Indiana | 1,048.3 | 962.0 | 901.6 | 886.8 | 1,154.3 | * | 311.6 | 522.1 | 890.7 |
| Michigan | 1,050.2 | 966.0 | 868.1 | 833.7 | 1,134.9 | * | 377.7 | 651.0 | 827.8 |
| Ohio | 1,070.6 | 967.4 | 901.6 | 882.0 | 1,124.9 | * | 366.1 | 622.5 | 880.7 |
| Wisconsin | 956.4 | 879.1 | 793.2 | 780.7 | 1,075.4 | * | 493.9 | 381.8 | 783.9 |
| West North Central | 951.6 | 876.6 | 815.0 | 800.7 | 1,124.7 | * | 442.8 | 592.6 | 797.1 |
| Iowa | 919.9 | 848.2 | 774.4 | 772.3 | 1,066.4 | * | 418.9 | 590.5 | 772.7 |
| Kansas | 940.1 | 867.2 | 834.9 | 824.2 | 1,152.0 | * | 332.4 | 577.1 | 818.6 |
| Minnesota | 892.9 | 825.2 | 736.7 | 730.4 | 925.0 | 1,189.9 | 516.1 | 515.5 | 722.6 |
| Missouri | 1,033.7 | 952.4 | 909.4 | 888.0 | 1,162.9 | * | 421.2 | 719.2 | 888.1 |
| Nebraska | 930.6 | 867.9 | 799.9 | 790.1 | 1,105.7 | 1,176.4 | 417.9 | 583.0 | 787.9 |
| North Dakota | 922.4 | 818.4 | 765.1 | 747.0 | * | 1,480.5 | * | * | 724.6 |
| South Dakota | 941.9 | 846.4 | 782.1 | 745.3 | * | 1,494.8 | * | 337.6 | 746.6 |
| South Atlantic | 1,033.1 | 951.3 | 859.2 | 819.9 | 1,089.5 | * | 375.7 | 584.2 | 833.5 |
| Delaware | 1,069.7 | 1,001.9 | 856.7 | 826.3 | 1,065.1 | * | 358.8 | 673.9 | 826.6 |
| District of Columbia | 1,243.1 | 1,255.3 | 1,011.2 | 630.0 | 1,246.2 | * | 438.8 | 147.1 | 674.1 |
| Florida | 960.8 | 870.9 | 787.0 | 766.1 | 1,024.5 | * | 330.9 | 620.7 | 789.0 |
| Georgia | 1,094.3 | 1,037.4 | 949.0 | 903.8 | 1,130.4 | * | 373.9 | 360.5 | 911.1 |
| Maryland | 1,063.3 | 985.2 | 866.9 | 813.8 | 1,084.5 | * | 377.0 | 299.0 | 824.2 |
| North Carolina | 1,050.4 | 986.0 | 907.3 | 865.6 | 1,106.6 | 929.1 | 358.4 | 289.9 | 870.6 |
| South Carolina | 1,104.6 | 1,030.0 | 939.3 | 886.7 | 1,111.6 | * | 389.9 | 358.2 | 889.8 |
| Virginia | 1,054.0 | 963.1 | 857.2 | 824.3 | 1,076.5 | * | 437.7 | 481.9 | 827.3 |
| West Virginia | 1,100.3 | 1,031.5 | 994.0 | 994.0 | 1,157.3 | * | * | 327.1 | 996.7 |
| East South Central | 1,079.3 | 1,031.6 | 991.3 | 959.2 | 1,181.8 | * | 401.6 | 386.3 | 962.1 |
| Alabama | 1,091.2 | 1,037.9 | 997.2 | 957.7 | 1,162.4 | * | 329.5 | 323.5 | 962.1 |
| Kentucky | 1,088.9 | 1,024.5 | 983.5 | 977.0 | 1,157.5 | * | 419.7 | 763.2 | 977.0 |
| Mississippi | 1,108.7 | 1,071.4 | 1,024.8 | 961.3 | 1,186.1 | * | 461.0 | 224.9 | 965.1 |
| Tennessee | 1,045.5 | 1,011.8 | 977.1 | 946.8 | 1,215.4 | * | 413.6 | 305.2 | 950.5 |
| West South Central | 1,036.8 | 974.9 | 904.9 | 880.9 | 1,159.0 | * | 418.9 | 712.1 | 905.8 |
| Arkansas | 1,017.0 | 996.3 | 949.5 | 924.5 | 1,172.5 | * | 568.0 | 191.0 | 933.8 |
| Louisiana | 1,132.6 | 1,074.6 | 1,004.5 | 935.9 | 1,207.0 | * | 481.7 | 510.7 | 943.5 |
| Oklahoma | 1,025.6 | 961.4 | 967.9 | 966.3 | 1,161.1 | * | 424.3 | 699.9 | 970.1 |
| Texas | 1,014.9 | 947.6 | 863.6 | 847.5 | 1,129.6 | * | 406.9 | 721.1 | 875.0 |
| Mountain | 961.8 | 878.2 | 808.1 | 803.1 | 990.8 | 933.5 | 515.0 | 741.5 | 804.3 |
| Arizona | 951.5 | 873.5 | 788.0 | 778.9 | 977.3 | 966.5 | 452.5 | 747.5 | 778.7 |
| Colorado | 941.1 | 856.1 | 784.5 | 785.9 | 928.0 | 514.4 | 458.1 | 770.9 | 781.0 |
| Idaho | 936.7 | 856.6 | 800.4 | 799.0 | 1,024.9 | 1,057.0 | 532.0 | 599.8 | 801.6 |
| Montana | 1,013.6 | 890.2 | 841.3 | 822.9 | 900.0 | 1,288.3 | 446.5 | 708.4 | 821.2 |
| Nevada | 1,077.4 | 1,017.4 | 920.1 | 921.2 | 1,125.1 | 764.4 | 603.3 | 518.3 | 952.7 |
| New Mexico | 967.1 | 891.9 | 820.1 | 814.1 | 877.0 | 900.6 | 432.4 | 801.5 | 805.7 |
| Utah | 924.9 | 823.2 | 778.2 | 778.0 | 987.4 | 866.3 | 617.7 | 618.8 | 781.4 |
| Wyoming | 1,016.1 | 897.4 | 852.9 | 845.8 | 767.9 | 1,358.2 | * | 768.9 | 847.1 |

See footnotes at end of table.



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## Table 28 (page 2 of 2). Age-adjusted death rates, according to race, Hispanic origin, geographic division, and State: United States, average annual 1979–81, 1989–91, and 2001–03

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Geographic division and State | All persons | | | White | Black or African American | American Indian or Alaska Native | Asian or Pacific Islander | Hispanic or Latino[1] | White, not Hispanic or Latino |
|---|---|---|---|---|---|---|---|---|---|
| | 1979–81 | 1989–91 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 | 2001–03 |
| | Age-adjusted death rate per 100,000 population[2] | | | | | | | | |
| Pacific | 966.5 | 900.1 | 767.9 | 784.1 | 1,035.3 | * | 528.7 | 606.1 | 806.6 |
| Alaska | 1,087.4 | 944.6 | 812.5 | 762.9 | 742.4 | 1,161.7 | 555.0 | 656.8 | 764.4 |
| California | 975.5 | 911.0 | 762.3 | 778.8 | 1,049.0 | * | 496.2 | 605.9 | 808.5 |
| Hawaii | 801.2 | 752.2 | 655.0 | 682.1 | 372.3 | * | 647.9 | 1,163.8 | 677.0 |
| Oregon | 953.9 | 893.0 | 823.7 | 827.5 | 1,004.4 | * | 498.9 | 459.2 | 834.9 |
| Washington | 947.7 | 869.4 | 785.2 | 788.9 | 965.9 | 960.0 | 540.0 | 540.9 | 792.4 |

* Data for States with population under 10,000 in the middle year of a 3-year period or fewer than 50 deaths for the 3-year period are considered unreliable and are not shown. Data for American Indian or Alaska Native in States with more than 10 percent misclassification of American Indian or Alaska Native deaths on death certificates or without information on misclassification are also not shown. (Support Services International, Inc. Methodology for adjusting IHS mortality data for miscoding race-ethnicity of American Indians and Alaska Natives on State death certificates. Report submitted to Indian Health Service. 1996.) Division death rates for American Indian or Alaska Native are not shown when any State within the division does not meet reliability criteria.

[1]Caution should be used when comparing death rates by Hispanic origin and race among States. Estimates of death rates may be affected by several factors including possible misreporting of race and Hispanic origin on the death certificate, migration patterns between United States and country of origin for persons who were born outside the United States, and possible biases in population estimates. See Appendix I, National Vital Statistics System, Mortality File and Appendix II, Hispanic origin; Race.

[2]Average annual death rates, age-adjusted using the year 2000 standard population. See Appendix II, Age adjustment. Denominators for rates are resident population estimates for the middle year of each 3-year period, multiplied by 3. See Appendix I, Population Census and Population Estimates.

NOTES: The race groups, white, black, American Indian or Alaska Native, and Asian or Pacific Islander, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from State population estimates prepared by the U.S. Bureau of the Census: 1980 from April 1, 1980 MARS Census File; 1990 from April 1, 1990 MARS Census File; 2002 from National Center for Health Statistics. Estimates of the July 1, 2002, resident populations of the United States by State and county, race, age, sex, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. Available at: www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm. 2005.



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## Table 29 (page 1 of 4). Age-adjusted death rates for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[1] | 1950[2,3] | 1960[2,3] | 1970[3] | 1980[3] | 1990 | 2000[4] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| **All persons** | Age-adjusted death rate per 100,000 population[5] | | | | | | | | |
| All causes | 1,446.0 | 1,339.2 | 1,222.6 | 1,039.1 | 938.7 | 869.0 | 854.5 | 845.3 | 832.7 |
| Diseases of heart | 586.8 | 559.0 | 492.7 | 412.1 | 321.8 | 257.6 | 247.8 | 240.8 | 232.3 |
| Ischemic heart disease | --- | --- | --- | 345.2 | 249.6 | 186.8 | 177.8 | 170.8 | 162.9 |
| Cerebrovascular diseases | 180.7 | 177.9 | 147.7 | 96.2 | 65.3 | 60.9 | 57.9 | 56.2 | 53.5 |
| Malignant neoplasms | 193.9 | 193.9 | 198.6 | 207.9 | 216.0 | 199.6 | 196.0 | 193.5 | 190.1 |
| Trachea, bronchus, and lung | 15.0 | 24.1 | 37.1 | 49.9 | 59.3 | 56.1 | 55.3 | 54.9 | 54.1 |
| Colon, rectum, and anus | --- | 30.3 | 28.9 | 27.4 | 24.5 | 20.8 | 20.1 | 19.7 | 19.1 |
| Prostate[6] | 28.6 | 28.7 | 28.8 | 32.8 | 38.4 | 30.4 | 29.1 | 27.9 | 26.5 |
| Breast[7] | 31.9 | 31.7 | 32.1 | 31.9 | 33.3 | 26.8 | 26.0 | 25.6 | 25.3 |
| Chronic lower respiratory diseases | --- | --- | --- | 28.3 | 37.2 | 44.2 | 43.7 | 43.5 | 43.3 |
| Influenza and pneumonia | 48.1 | 53.7 | 41.7 | 31.4 | 36.8 | 23.7 | 22.0 | 22.6 | 22.0 |
| Chronic liver disease and cirrhosis | 11.3 | 13.3 | 17.8 | 15.1 | 11.1 | 9.5 | 9.5 | 9.4 | 9.3 |
| Diabetes mellitus | 23.1 | 22.5 | 24.3 | 18.1 | 20.7 | 25.0 | 25.3 | 25.4 | 25.3 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 10.2 | 5.2 | 5.0 | 4.9 | 4.7 |
| Unintentional injuries | 78.0 | 62.3 | 60.1 | 46.4 | 36.3 | 34.9 | 35.7 | 36.9 | 37.3 |
| Motor vehicle-related injuries | 24.6 | 23.1 | 27.6 | 22.3 | 18.5 | 15.4 | 15.3 | 15.7 | 15.3 |
| Suicide[8] | 13.2 | 12.5 | 13.1 | 12.2 | 12.5 | 10.4 | 10.7 | 10.9 | 10.8 |
| Homicide[8] | 5.1 | 5.0 | 8.8 | 10.4 | 9.4 | 5.9 | 7.1 | 6.1 | 6.0 |
| **Male** | | | | | | | | | |
| All causes | 1,674.2 | 1,609.0 | 1,542.1 | 1,348.1 | 1,202.8 | 1,053.8 | 1,029.1 | 1,013.7 | 994.3 |
| Diseases of heart | 697.0 | 687.6 | 634.0 | 538.9 | 412.4 | 320.0 | 305.4 | 297.4 | 286.6 |
| Ischemic heart disease | --- | --- | --- | 459.7 | 328.2 | 241.4 | 228.5 | 220.4 | 209.9 |
| Cerebrovascular diseases | 186.4 | 186.1 | 157.4 | 102.2 | 68.5 | 62.4 | 59.0 | 56.5 | 54.1 |
| Malignant neoplasms | 208.1 | 225.1 | 247.6 | 271.2 | 280.4 | 248.9 | 243.7 | 238.9 | 233.3 |
| Trachea, bronchus, and lung | 24.6 | 43.6 | 67.5 | 85.2 | 91.1 | 76.7 | 75.2 | 73.2 | 71.7 |
| Colon, rectum, and anus | --- | 31.8 | 32.3 | 32.8 | 30.4 | 25.1 | 24.2 | 23.7 | 22.9 |
| Prostate | 28.6 | 28.7 | 28.8 | 32.8 | 38.4 | 30.4 | 29.1 | 27.9 | 26.5 |
| Chronic lower respiratory diseases | --- | --- | --- | 49.9 | 55.4 | 55.8 | 54.0 | 53.5 | 52.3 |
| Influenza and pneumonia | 55.0 | 65.8 | 54.0 | 42.1 | 47.8 | 28.9 | 26.6 | 27.0 | 26.1 |
| Chronic liver disease and cirrhosis | 15.0 | 18.5 | 24.8 | 21.3 | 15.9 | 13.4 | 13.2 | 12.9 | 13.0 |
| Diabetes mellitus | 18.8 | 19.9 | 23.0 | 18.1 | 21.7 | 27.8 | 28.1 | 28.6 | 28.9 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 18.5 | 7.9 | 7.5 | 7.4 | 7.1 |
| Unintentional injuries | 101.8 | 85.5 | 87.4 | 69.0 | 52.9 | 49.3 | 50.2 | 51.5 | 51.8 |
| Motor vehicle-related injuries | 38.5 | 35.4 | 41.5 | 33.6 | 26.5 | 21.7 | 21.8 | 22.1 | 21.6 |
| Suicide[8] | 21.2 | 20.0 | 19.8 | 19.9 | 21.5 | 17.7 | 18.2 | 18.4 | 18.0 |
| Homicide[8] | 7.9 | 7.5 | 14.3 | 16.6 | 14.8 | 9.0 | 10.8 | 9.4 | 9.4 |
| **Female** | | | | | | | | | |
| All causes | 1,236.0 | 1,105.3 | 971.4 | 817.9 | 750.9 | 731.4 | 721.8 | 715.2 | 706.2 |
| Diseases of heart | 484.7 | 447.0 | 381.6 | 320.8 | 257.0 | 210.9 | 203.9 | 197.2 | 190.3 |
| Ischemic heart disease | --- | --- | --- | 263.1 | 193.9 | 146.5 | 139.9 | 133.6 | 127.2 |
| Cerebrovascular diseases | 175.8 | 170.7 | 140.0 | 91.7 | 62.6 | 59.1 | 56.4 | 55.2 | 52.3 |
| Malignant neoplasms | 182.3 | 168.7 | 163.2 | 166.7 | 175.7 | 167.6 | 164.7 | 163.1 | 160.9 |
| Trachea, bronchus, and lung | 5.8 | 7.5 | 13.1 | 24.4 | 37.1 | 41.3 | 41.0 | 41.6 | 41.3 |
| Colon, rectum, and anus | --- | 29.1 | 26.5 | 23.8 | 20.6 | 17.7 | 17.2 | 16.7 | 16.2 |
| Breast | 31.9 | 31.7 | 32.1 | 31.9 | 33.3 | 26.8 | 26.0 | 25.6 | 25.3 |
| Chronic lower respiratory diseases | --- | --- | --- | 14.9 | 26.6 | 37.4 | 37.6 | 37.4 | 37.8 |
| Influenza and pneumonia | 41.9 | 43.8 | 32.7 | 25.1 | 30.5 | 20.7 | 19.2 | 19.9 | 19.4 |
| Chronic liver disease and cirrhosis | 7.8 | 8.7 | 11.9 | 9.9 | 7.1 | 6.2 | 6.2 | 6.3 | 6.0 |
| Diabetes mellitus | 27.0 | 24.7 | 25.1 | 18.0 | 19.9 | 23.0 | 23.1 | 23.0 | 22.5 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 2.2 | 2.5 | 2.5 | 2.5 | 2.4 |
| Unintentional injuries | 54.0 | 40.0 | 35.1 | 26.1 | 21.5 | 22.0 | 22.5 | 23.5 | 24.1 |
| Motor vehicle-related injuries | 11.5 | 11.7 | 14.9 | 11.8 | 11.0 | 9.5 | 9.3 | 9.6 | 9.3 |
| Suicide[8] | 5.6 | 5.6 | 7.4 | 5.7 | 4.8 | 4.0 | 4.0 | 4.2 | 4.2 |
| Homicide[8] | 2.4 | 2.6 | 3.7 | 4.4 | 4.0 | 2.8 | 3.3 | 2.8 | 2.6 |

See footnotes at end of table.



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## Table 29 (page 2 of 4). Age-adjusted death rates for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[1] | 1950[2,3] | 1960[2,3] | 1970[3] | 1980[3] | 1990 | 2000[4] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| White[9] | Age-adjusted death rate per 100,000 population[5] | | | | | | | | |
| All causes | 1,410.8 | 1,311.3 | 1,193.3 | 1,012.7 | 909.8 | 849.8 | 836.5 | 829.0 | 817.0 |
| Diseases of heart | 584.8 | 559.0 | 492.2 | 409.4 | 317.0 | 253.4 | 243.5 | 236.7 | 228.2 |
| Ischemic heart disease | --- | --- | --- | 347.6 | 249.7 | 185.6 | 176.5 | 169.8 | 161.7 |
| Cerebrovascular diseases | 175.5 | 172.7 | 143.5 | 93.2 | 62.8 | 58.8 | 55.8 | 54.2 | 51.4 |
| Malignant neoplasms | 194.6 | 193.1 | 196.7 | 204.2 | 211.6 | 197.2 | 193.9 | 191.7 | 188.5 |
| Trachea, bronchus, and lung | 15.2 | 24.0 | 36.7 | 49.2 | 58.6 | 56.2 | 55.6 | 55.3 | 54.5 |
| Colon, rectum, and anus | --- | 30.9 | 29.2 | 27.4 | 24.1 | 20.3 | 19.6 | 19.2 | 18.6 |
| Prostate[6] | 28.4 | 27.7 | 27.4 | 30.5 | 35.5 | 27.8 | 26.6 | 25.7 | 24.4 |
| Breast[7] | 32.4 | 32.0 | 32.5 | 32.1 | 33.2 | 26.3 | 25.5 | 25.0 | 24.7 |
| Chronic lower respiratory diseases | --- | --- | --- | 29.3 | 38.3 | 46.0 | 45.6 | 45.4 | 45.4 |
| Influenza and pneumonia | 44.8 | 50.4 | 39.8 | 30.9 | 36.4 | 23.5 | 21.7 | 22.6 | 21.9 |
| Chronic liver disease and cirrhosis | 11.5 | 13.2 | 16.6 | 13.9 | 10.5 | 9.6 | 9.6 | 9.6 | 9.5 |
| Diabetes mellitus | 22.9 | 21.7 | 22.9 | 16.7 | 18.8 | 22.8 | 23.0 | 23.1 | 23.0 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 8.3 | 2.8 | 2.6 | 2.6 | 2.5 |
| Unintentional injuries | 77.0 | 60.4 | 57.8 | 45.3 | 35.5 | 35.1 | 36.0 | 37.5 | 38.2 |
| Motor vehicle-related injuries | 24.4 | 22.9 | 27.1 | 22.6 | 18.5 | 15.6 | 15.6 | 16.0 | 15.7 |
| Suicide[8] | 13.9 | 13.1 | 13.8 | 13.0 | 13.4 | 11.3 | 11.7 | 12.0 | 11.8 |
| Homicide[8] | 2.6 | 2.7 | 4.7 | 6.7 | 5.5 | 3.6 | 4.9 | 3.7 | 3.7 |
| Black or African American[9] | | | | | | | | | |
| All causes | 1,722.1 | 1,577.5 | 1,518.1 | 1,314.8 | 1,250.3 | 1,121.4 | 1,101.2 | 1,083.3 | 1,065.9 |
| Diseases of heart | 586.7 | 548.3 | 512.0 | 455.3 | 391.5 | 324.8 | 316.9 | 308.4 | 300.2 |
| Ischemic heart disease | --- | --- | --- | 334.5 | 267.0 | 218.3 | 211.6 | 203.0 | 195.0 |
| Cerebrovascular diseases | 233.6 | 235.2 | 197.1 | 129.1 | 91.6 | 81.9 | 78.8 | 76.3 | 74.3 |
| Malignant neoplasms | 176.4 | 199.1 | 225.3 | 256.4 | 279.5 | 248.5 | 243.1 | 238.8 | 233.3 |
| Trachea, bronchus, and lung | 11.1 | 23.7 | 41.3 | 59.7 | 72.4 | 64.0 | 62.5 | 61.9 | 60.8 |
| Colon, rectum, and anus | --- | 22.8 | 26.1 | 28.3 | 30.6 | 28.2 | 27.6 | 26.8 | 26.4 |
| Prostate[6] | 30.9 | 41.2 | 48.5 | 61.1 | 77.0 | 68.1 | 66.1 | 62.0 | 57.4 |
| Breast[7] | 25.3 | 27.9 | 28.9 | 31.7 | 38.1 | 34.5 | 34.4 | 34.0 | 34.0 |
| Chronic lower respiratory diseases | --- | --- | --- | 19.2 | 28.1 | 31.6 | 30.9 | 31.2 | 30.1 |
| Influenza and pneumonia | 76.7 | 81.1 | 57.2 | 34.4 | 39.4 | 25.6 | 24.1 | 24.0 | 23.3 |
| Chronic liver disease and cirrhosis | 9.0 | 13.6 | 28.1 | 25.0 | 16.5 | 9.4 | 9.3 | 8.5 | 8.4 |
| Diabetes mellitus | 23.5 | 30.9 | 38.8 | 32.7 | 40.5 | 49.5 | 49.2 | 49.5 | 49.2 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 26.7 | 23.3 | 22.8 | 22.5 | 21.3 |
| Unintentional injuries | 79.9 | 74.0 | 78.3 | 57.6 | 43.8 | 37.7 | 37.6 | 36.9 | 36.1 |
| Motor vehicle-related injuries | 26.0 | 24.2 | 31.1 | 20.2 | 18.8 | 15.7 | 15.4 | 15.0 | 14.9 |
| Suicide[8] | 4.5 | 5.0 | 6.2 | 6.5 | 7.1 | 5.5 | 5.5 | 5.3 | 5.2 |
| Homicide[8] | 28.3 | 26.0 | 44.0 | 39.0 | 36.3 | 20.5 | 21.2 | 21.0 | 21.0 |
| American Indian or Alaska Native[9] | | | | | | | | | |
| All causes | --- | --- | --- | 867.0 | 716.3 | 709.3 | 686.7 | 677.4 | 685.0 |
| Diseases of heart | --- | --- | --- | 240.6 | 200.6 | 178.2 | 159.6 | 157.4 | 160.2 |
| Ischemic heart disease | --- | --- | --- | 173.6 | 139.1 | 129.1 | 114.0 | 114.0 | 114.1 |
| Cerebrovascular diseases | --- | --- | --- | 57.8 | 40.7 | 45.0 | 41.3 | 37.5 | 34.6 |
| Malignant neoplasms | --- | --- | --- | 113.7 | 121.8 | 127.8 | 131.0 | 125.4 | 119.3 |
| Trachea, bronchus, and lung | --- | --- | --- | 20.7 | 30.9 | 32.3 | 34.2 | 33.1 | 31.3 |
| Colon, rectum, and anus | --- | --- | --- | 9.5 | 12.0 | 13.4 | 12.0 | 14.2 | 11.8 |
| Prostate[6] | --- | --- | --- | 20.7 | 17.8 | 19.6 | 19.0 | 15.2 | 17.8 |
| Breast[7] | --- | --- | --- | 10.8 | 13.7 | 13.6 | 11.8 | 13.8 | 14.0 |
| Chronic lower respiratory diseases | --- | --- | --- | 14.2 | 25.4 | 32.8 | 30.0 | 30.1 | 31.7 |
| Influenza and pneumonia | --- | --- | --- | 44.4 | 36.1 | 22.3 | 22.5 | 20.4 | 24.1 |
| Chronic liver disease and cirrhosis | --- | --- | --- | 45.3 | 24.1 | 24.3 | 22.6 | 22.8 | 22.6 |
| Diabetes mellitus | --- | --- | --- | 29.6 | 34.1 | 41.5 | 40.4 | 43.2 | 43.7 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 1.8 | 2.2 | 2.7 | 2.2 | 2.5 |
| Unintentional injuries | --- | --- | --- | 99.0 | 62.6 | 51.3 | 51.3 | 53.8 | 56.4 |
| Motor vehicle-related injuries | --- | --- | --- | 54.5 | 32.5 | 27.3 | 25.9 | 28.8 | 28.1 |
| Suicide[8] | --- | --- | --- | 11.9 | 11.7 | 9.8 | 10.5 | 10.2 | 10.0 |
| Homicide[8] | --- | --- | --- | 15.5 | 10.4 | 6.8 | 6.8 | 8.4 | 7.3 |

See footnotes at end of table.



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## Table 29 (page 3 of 4). Age-adjusted death rates for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on death certificates] | Age Adjustment Population | Updated March 2006 | Click here for spreadsheet version

| *Sex, race, Hispanic origin, and cause of death*[1] | *1950*[2,3] | *1960*[2,3] | *1970*[3] | *1980*[3] | *1990* | *2000*[4] | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| Asian or Pacific Islander[9] | | | | Age-adjusted death rate per 100,000 population[5] | | | | | |
| All causes | --- | --- | --- | 589.9 | 582.0 | 506.4 | 492.1 | 474.4 | 465.7 |
| Diseases of heart | --- | --- | --- | 202.1 | 181.7 | 146.0 | 137.6 | 134.6 | 127.6 |
| Ischemic heart disease | --- | --- | --- | 168.2 | 139.6 | 109.6 | 103.0 | 98.6 | 92.8 |
| Cerebrovascular diseases | --- | --- | --- | 66.1 | 56.9 | 52.9 | 51.2 | 47.7 | 45.2 |
| Malignant neoplasms | --- | --- | --- | 126.1 | 134.2 | 121.9 | 119.5 | 113.6 | 113.5 |
| Trachea, bronchus, and lung | --- | --- | --- | 28.4 | 30.2 | 28.1 | 28.2 | 25.6 | 26.9 |
| Colon, rectum, and anus | --- | --- | --- | 16.4 | 14.4 | 12.7 | 13.2 | 12.5 | 12.1 |
| Prostate[6] | --- | --- | --- | 10.2 | 16.8 | 12.5 | 11.6 | 10.2 | 10.9 |
| Breast[7] | --- | --- | --- | 11.9 | 13.7 | 12.3 | 12.9 | 12.8 | 12.6 |
| Chronic lower respiratory diseases | --- | --- | --- | 12.9 | 19.4 | 18.6 | 17.7 | 15.8 | 16.2 |
| Influenza and pneumonia | --- | --- | --- | 24.0 | 31.4 | 19.7 | 19.0 | 17.5 | 17.3 |
| Chronic liver disease and cirrhosis | --- | --- | --- | 6.1 | 5.2 | 3.5 | 3.5 | 3.2 | 3.0 |
| Diabetes mellitus | --- | --- | --- | 12.6 | 14.6 | 16.4 | 16.9 | 17.4 | 17.3 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 2.2 | 0.6 | 0.7 | 0.8 | 0.7 |
| Unintentional injuries | --- | --- | --- | 27.0 | 23.9 | 17.9 | 17.4 | 17.9 | 18.0 |
| Motor vehicle-related injuries | --- | --- | --- | 13.9 | 14.0 | 8.6 | 8.1 | 8.4 | 8.4 |
| Suicide[8] | --- | --- | --- | 7.8 | 6.7 | 5.5 | 5.4 | 5.4 | 5.6 |
| Homicide[8] | --- | --- | --- | 5.9 | 5.0 | 3.0 | 4.2 | 2.9 | 2.9 |
| Hispanic or Latino[9,10] | | | | | | | | | |
| All causes | --- | --- | --- | --- | 692.0 | 665.7 | 658.7 | 629.3 | 621.2 |
| Diseases of heart | --- | --- | --- | --- | 217.1 | 196.0 | 192.2 | 180.5 | 173.2 |
| Ischemic heart disease | --- | --- | --- | --- | 173.3 | 153.2 | 149.9 | 138.3 | 130.0 |
| Cerebrovascular diseases | --- | --- | --- | --- | 45.2 | 46.4 | 44.9 | 41.3 | 40.5 |
| Malignant neoplasms | --- | --- | --- | --- | 136.8 | 134.9 | 132.3 | 128.4 | 126.6 |
| Trachea, bronchus, and lung | --- | --- | --- | --- | 26.5 | 24.8 | 23.8 | 23.7 | 23.2 |
| Colon, rectum, and anus | --- | --- | --- | --- | 14.7 | 14.1 | 14.1 | 13.7 | 13.4 |
| Prostate[6] | --- | --- | --- | --- | 23.3 | 21.6 | 23.5 | 21.6 | 20.2 |
| Breast[7] | --- | --- | --- | --- | 19.5 | 16.9 | 16.3 | 15.5 | 16.1 |
| Chronic lower respiratory diseases | --- | --- | --- | --- | 19.3 | 21.1 | 20.7 | 20.6 | 20.2 |
| Influenza and pneumonia | --- | --- | --- | --- | 29.7 | 20.6 | 20.5 | 19.2 | 18.4 |
| Chronic liver disease and cirrhosis | --- | --- | --- | --- | 18.3 | 16.5 | 15.8 | 15.4 | 14.7 |
| Diabetes mellitus | --- | --- | --- | --- | 28.2 | 36.9 | 36.7 | 35.6 | 35.0 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 16.3 | 6.7 | 6.2 | 5.8 | 5.9 |
| Unintentional injuries | --- | --- | --- | --- | 34.6 | 30.1 | 30.7 | 30.7 | 30.6 |
| Motor vehicle-related injuries | --- | --- | --- | --- | 19.5 | 14.7 | 15.0 | 15.2 | 15.1 |
| Suicide[8] | --- | --- | --- | --- | 7.8 | 5.9 | 5.7 | 5.7 | 5.6 |
| Homicide[8] | --- | --- | --- | --- | 16.2 | 7.5 | 8.3 | 7.3 | 7.7 |

See footnotes at end of table.



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## Table 29 (page 4 of 4). Age-adjusted death rates for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[1] | 1950[2,3] | 1960[2,3] | 1970[3] | 1980[3] | 1990 | 2000[4] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino[10] | Age-adjusted death rate per 100,000 population[5] | | | | | | | | |
| All causes | --- | --- | --- | --- | 914.5 | 855.5 | 842.9 | 837.5 | 826.1 |
| Diseases of heart | --- | --- | --- | --- | 319.7 | 255.5 | 245.6 | 239.2 | 230.9 |
| Ischemic heart disease | --- | --- | --- | --- | 251.9 | 186.6 | 177.5 | 171.0 | 163.3 |
| Cerebrovascular diseases | --- | --- | --- | --- | 63.5 | 59.0 | 56.0 | 54.6 | 51.7 |
| Malignant neoplasms | --- | --- | --- | --- | 215.4 | 200.6 | 197.4 | 195.6 | 192.4 |
| Trachea, bronchus, and lung | --- | --- | --- | --- | 60.3 | 58.2 | 57.7 | 57.5 | 56.7 |
| Colon, rectum, and anus | --- | --- | --- | --- | 24.6 | 20.5 | 19.9 | 19.5 | 18.8 |
| Prostate[6] | --- | --- | --- | --- | 36.1 | 28.0 | 26.7 | 25.8 | 24.6 |
| Breast[7] | --- | --- | --- | --- | 33.9 | 26.8 | 26.0 | 25.6 | 25.2 |
| Chronic lower respiratory diseases | --- | --- | --- | --- | 39.2 | 47.2 | 47.0 | 46.9 | 47.0 |
| Influenza and pneumonia | --- | --- | --- | --- | 36.5 | 23.5 | 21.7 | 22.6 | 22.0 |
| Chronic liver disease and cirrhosis | --- | --- | --- | --- | 9.9 | 9.0 | 9.0 | 9.0 | 9.0 |
| Diabetes mellitus | --- | --- | --- | --- | 18.3 | 21.8 | 22.1 | 22.2 | 22.1 |
| Human immunodeficiency virus (HIV) disease | --- | --- | --- | --- | 7.4 | 2.2 | 2.1 | 2.1 | 2.0 |
| Unintentional injuries | --- | --- | --- | --- | 35.0 | 35.3 | 36.2 | 38.0 | 38.8 |
| Motor vehicle-related injuries | --- | --- | --- | --- | 18.2 | 15.6 | 15.5 | 16.0 | 15.5 |
| Suicide[8] | --- | --- | --- | --- | 13.8 | 12.0 | 12.5 | 12.9 | 12.7 |
| Homicide[8] | --- | --- | --- | --- | 4.0 | 2.8 | 4.0 | 2.8 | 2.7 |

--- Data not available.

[1]Underlying cause of death code numbers are based on the applicable revision of the *International Classification of Diseases* (ICD) for data years shown. For the period 1980–98, causes were coded using ICD–9 codes that are most nearly comparable with the 113 cause list for ICD–10. See Appendix II, tables IV and V.

[2]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.

[3]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.

[4]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.

[5]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.

[6]Rate for male population only.

[7]Rate for female population only.

[8]Figures for 2001 include September 11-related deaths for which death certificates were filed as of October 24, 2002. See Appendix II, table V for terrorism-related ICD–10 codes.

[9]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.

[10]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 30 (page 1 of 4). Years of potential life lost before age 75 for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[2] | Crude | Age adjusted[1] | | | | | |
|---|---|---|---|---|---|---|---|
| | 2003 | 1980 | 1990 | 2000[3] | 2001 | 2002 | 2003 |
| **All persons** | Years lost before age 75 per 100,000 population under 75 years of age | | | | | | |
| All causes | 7,562.0 | 10,448.4 | 9,085.5 | 7,578.1 | 7,531.2 | 7,499.6 | 7,466.9 |
| Diseases of heart | 1,214.1 | 2,238.7 | 1,617.7 | 1,253.0 | 1,221.1 | 1,212.7 | 1,187.9 |
| Ischemic heart disease | 785.1 | 1,729.3 | 1,153.6 | 841.8 | 809.7 | 792.0 | 765.1 |
| Cerebrovascular diseases | 207.0 | 357.5 | 259.6 | 223.3 | 211.9 | 208.1 | 203.6 |
| Malignant neoplasms | 1,628.0 | 2,108.8 | 2,003.8 | 1,674.1 | 1,651.7 | 1,622.7 | 1,586.9 |
| Trachea, bronchus, and lung | 425.9 | 548.5 | 561.4 | 443.1 | 431.2 | 423.4 | 412.2 |
| Colorectal | 137.4 | 190.0 | 164.7 | 141.9 | 142.4 | 141.0 | 133.8 |
| Prostate[4] | 56.5 | 84.9 | 96.8 | 63.6 | 61.8 | 60.1 | 58.6 |
| Breast[5] | 328.2 | 463.2 | 451.6 | 332.6 | 328.1 | 316.8 | 313.7 |
| Chronic lower respiratory diseases | 187.8 | 169.1 | 187.4 | 188.1 | 185.8 | 184.5 | 183.9 |
| Influenza and pneumonia | 91.6 | 160.2 | 141.5 | 87.1 | 82.3 | 82.7 | 90.8 |
| Chronic liver disease and cirrhosis | 162.6 | 300.3 | 196.9 | 164.1 | 164.7 | 160.5 | 159.6 |
| Diabetes mellitus | 189.1 | 134.4 | 155.9 | 178.4 | 180.5 | 184.3 | 184.6 |
| Human immunodeficiency virus (HIV) disease | 151.5 | - - - | 383.8 | 174.6 | 167.8 | 161.8 | 153.3 |
| Unintentional injuries | 1,085.8 | 1,543.5 | 1,162.1 | 1,026.5 | 1,036.8 | 1,079.2 | 1,084.6 |
| Motor vehicle-related injuries | 572.1 | 912.9 | 716.4 | 574.3 | 572.5 | 585.8 | 569.6 |
| Suicide[6] | 344.3 | 392.0 | 393.1 | 334.5 | 342.6 | 346.7 | 343.3 |
| Homicide[6] | 275.4 | 425.5 | 417.4 | 266.5 | 311.0 | 274.4 | 274.3 |
| **Male** | | | | | | | |
| All causes | 9,418.1 | 13,777.2 | 11,973.5 | 9,572.2 | 9,507.1 | 9,470.0 | 9,416.4 |
| Diseases of heart | 1,652.4 | 3,352.1 | 2,356.0 | 1,766.0 | 1,708.3 | 1,706.9 | 1,664.2 |
| Ischemic heart disease | 1,130.0 | 2,715.1 | 1,766.3 | 1,255.4 | 1,201.8 | 1,179.6 | 1,138.8 |
| Cerebrovascular diseases | 222.8 | 396.7 | 286.6 | 244.6 | 233.5 | 227.6 | 225.9 |
| Malignant neoplasms | 1,700.8 | 2,360.8 | 2,214.6 | 1,810.8 | 1,782.4 | 1,754.2 | 1,711.4 |
| Trachea, bronchus, and lung | 500.0 | 821.1 | 764.8 | 554.9 | 535.9 | 520.5 | 504.6 |
| Colorectal | 156.4 | 214.9 | 194.3 | 167.3 | 166.6 | 168.2 | 157.7 |
| Prostate | 56.5 | 84.9 | 96.8 | 63.6 | 61.8 | 60.1 | 58.6 |
| Chronic lower respiratory diseases | 194.7 | 235.1 | 224.8 | 206.0 | 200.7 | 200.7 | 199.5 |
| Influenza and pneumonia | 105.4 | 202.5 | 180.0 | 102.8 | 96.9 | 97.3 | 106.4 |
| Chronic liver disease and cirrhosis | 229.5 | 415.0 | 283.9 | 236.9 | 233.6 | 226.6 | 229.4 |
| Diabetes mellitus | 216.6 | 140.4 | 170.4 | 203.8 | 209.6 | 217.2 | 218.2 |
| Human immunodeficiency virus (HIV) disease | 220.1 | - - - | 686.2 | 258.9 | 247.7 | 237.0 | 223.7 |
| Unintentional injuries | 1,554.0 | 2,342.7 | 1,715.1 | 1,475.6 | 1,490.1 | 1,542.2 | 1,537.7 |
| Motor vehicle-related injuries | 809.0 | 1,359.7 | 1,018.4 | 796.4 | 803.5 | 817.2 | 795.0 |
| Suicide[6] | 552.6 | 605.6 | 634.8 | 539.1 | 552.3 | 555.7 | 548.2 |
| Homicide[6] | 440.1 | 675.0 | 658.0 | 410.5 | 480.5 | 425.0 | 430.5 |
| **Female** | | | | | | | |
| All causes | 5,710.7 | 7,350.3 | 6,333.1 | 5,644.6 | 5,609.2 | 5,580.0 | 5,560.5 |
| Diseases of heart | 776.9 | 1,246.0 | 948.5 | 774.6 | 765.4 | 748.8 | 739.5 |
| Ischemic heart disease | 441.0 | 852.1 | 600.3 | 457.6 | 444.3 | 430.2 | 415.0 |
| Cerebrovascular diseases | 191.3 | 324.0 | 235.9 | 203.9 | 192.1 | 190.3 | 183.0 |
| Malignant neoplasms | 1,555.4 | 1,896.8 | 1,826.6 | 1,555.3 | 1,538.4 | 1,507.7 | 1,477.3 |
| Trachea, bronchus, and lung | 352.0 | 310.4 | 382.2 | 342.1 | 336.6 | 335.4 | 328.1 |
| Colorectal | 118.5 | 168.7 | 138.7 | 118.7 | 120.4 | 115.9 | 111.9 |
| Breast | 328.2 | 463.2 | 451.6 | 332.6 | 328.1 | 316.8 | 313.7 |
| Chronic lower respiratory diseases | 180.9 | 114.0 | 155.9 | 172.3 | 172.8 | 170.0 | 169.9 |
| Influenza and pneumonia | 77.8 | 122.0 | 106.2 | 72.3 | 68.7 | 69.1 | 76.0 |
| Chronic liver disease and cirrhosis | 95.9 | 194.5 | 115.1 | 94.5 | 98.8 | 97.4 | 92.6 |
| Diabetes mellitus | 161.6 | 128.5 | 142.3 | 154.4 | 153.0 | 153.1 | 152.9 |
| Human immunodeficiency virus (HIV) disease | 83.0 | - - - | 87.8 | 92.0 | 89.4 | 88.1 | 84.1 |
| Unintentional injuries | 618.9 | 755.3 | 607.4 | 573.2 | 578.3 | 610.3 | 624.6 |
| Motor vehicle-related injuries | 335.8 | 470.4 | 411.6 | 348.5 | 337.2 | 349.8 | 339.2 |
| Suicide[6] | 136.6 | 184.2 | 153.3 | 129.1 | 131.9 | 136.6 | 136.6 |
| Homicide[6] | 111.1 | 181.3 | 174.3 | 118.9 | 137.4 | 119.6 | 112.9 |

See footnotes at end of table.



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## Table 30 (page 2 of 4). Years of potential life lost before age 75 for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[2] | Crude | Age adjusted[1] | | | | | |
|---|---|---|---|---|---|---|---|
| | 2003 | 1980 | 1990 | 2000[3] | 2001 | 2002 | 2003 |
| White[7] | Years lost before age 75 per 100,000 population under 75 years of age | | | | | | |
| All causes | 7,123.2 | 9,554.1 | 8,159.5 | 6,949.5 | 6,941.6 | 6,936.6 | 6,910.6 |
| Diseases of heart | 1,147.5 | 2,100.8 | 1,490.3 | 1,149.4 | 1,115.0 | 1,111.8 | 1,081.3 |
| Ischemic heart disease | 782.6 | 1,682.7 | 1,113.4 | 805.3 | 773.0 | 759.5 | 731.5 |
| Cerebrovascular diseases | 175.7 | 300.7 | 213.1 | 187.1 | 175.6 | 173.5 | 166.7 |
| Malignant neoplasms | 1,647.4 | 2,035.9 | 1,929.3 | 1,627.8 | 1,610.2 | 1,582.8 | 1,546.5 |
| Trachea, bronchus, and lung | 442.1 | 529.9 | 544.2 | 436.3 | 427.5 | 418.5 | 407.9 |
| Colorectal | 134.3 | 186.8 | 157.8 | 134.1 | 135.0 | 134.0 | 125.5 |
| Prostate[4] | 51.6 | 74.8 | 86.6 | 54.3 | 53.1 | 51.3 | 50.5 |
| Breast[5] | 318.7 | 460.2 | 441.7 | 315.6 | 309.6 | 297.5 | 295.0 |
| Chronic lower respiratory diseases | 197.8 | 165.4 | 182.3 | 185.3 | 184.7 | 183.5 | 184.2 |
| Influenza and pneumonia | 84.6 | 130.8 | 116.9 | 77.7 | 72.7 | 75.1 | 82.2 |
| Chronic liver disease and cirrhosis | 170.1 | 257.3 | 175.8 | 162.7 | 164.4 | 162.9 | 162.3 |
| Diabetes mellitus | 170.4 | 115.7 | 133.7 | 155.6 | 156.2 | 160.3 | 160.3 |
| Human immunodeficiency virus (HIV) disease | 81.6 | --- | 309.0 | 94.7 | 88.4 | 84.7 | 82.1 |
| Unintentional injuries | 1,109.6 | 1,520.4 | 1,139.7 | 1,031.8 | 1,049.0 | 1,101.6 | 1,117.7 |
| Motor vehicle-related injuries | 583.7 | 939.9 | 726.7 | 586.1 | 585.1 | 604.0 | 588.5 |
| Suicide[6] | 375.5 | 414.5 | 417.7 | 362.0 | 373.5 | 380.1 | 375.0 |
| Homicide[6] | 157.3 | 271.7 | 234.9 | 156.6 | 204.0 | 159.7 | 159.3 |
| Black or African American[7] | | | | | | | |
| All causes | 11,575.2 | 17,873.4 | 16,593.0 | 12,897.1 | 12,579.7 | 12,401.0 | 12,304.0 |
| Diseases of heart | 1,891.0 | 3,619.9 | 2,891.8 | 2,275.2 | 2,248.9 | 2,212.8 | 2,205.7 |
| Ischemic heart disease | 980.6 | 2,305.1 | 1,676.1 | 1,300.1 | 1,260.6 | 1,218.7 | 1,182.6 |
| Cerebrovascular diseases | 410.3 | 883.2 | 656.4 | 507.0 | 491.3 | 474.1 | 479.6 |
| Malignant neoplasms | 1,835.4 | 2,946.1 | 2,894.8 | 2,294.7 | 2,228.4 | 2,196.6 | 2,163.9 |
| Trachea, bronchus, and lung | 444.1 | 776.0 | 811.3 | 593.0 | 557.5 | 561.9 | 542.1 |
| Colorectal | 179.0 | 232.3 | 241.8 | 222.4 | 219.6 | 213.7 | 214.4 |
| Prostate[4] | 106.0 | 200.3 | 223.5 | 171.0 | 164.1 | 160.3 | 154.3 |
| Breast[5] | 446.0 | 524.2 | 592.9 | 500.0 | 501.7 | 495.9 | 490.6 |
| Chronic lower respiratory diseases | 184.5 | 203.7 | 240.6 | 232.7 | 220.5 | 222.8 | 212.3 |
| Influenza and pneumonia | 144.9 | 384.9 | 330.8 | 161.2 | 152.1 | 146.7 | 157.5 |
| Chronic liver disease and cirrhosis | 138.9 | 644.0 | 371.8 | 185.6 | 181.5 | 161.3 | 158.9 |
| Diabetes mellitus | 334.3 | 305.3 | 361.5 | 383.4 | 392.6 | 396.7 | 396.0 |
| Human immunodeficiency virus (HIV) disease | 620.8 | --- | 1,014.7 | 763.3 | 743.5 | 720.6 | 670.1 |
| Unintentional injuries | 1,100.1 | 1,751.5 | 1,392.7 | 1,152.8 | 1,133.4 | 1,129.3 | 1,082.1 |
| Motor vehicle-related injuries | 554.6 | 750.2 | 699.5 | 580.8 | 571.7 | 558.5 | 536.2 |
| Suicide[6] | 204.0 | 238.0 | 261.4 | 208.7 | 201.5 | 196.5 | 199.5 |
| Homicide[6] | 1,028.1 | 1,580.8 | 1,612.9 | 941.6 | 963.6 | 962.2 | 965.0 |
| American Indian or Alaska Native[7] | | | | | | | |
| All causes | 7,865.7 | 13,390.9 | 9,506.2 | 7,758.2 | 7,991.8 | 8,278.0 | 8,541.6 |
| Diseases of heart | 896.6 | 1,819.9 | 1,391.0 | 1,030.1 | 1,027.7 | 959.9 | 1,099.3 |
| Ischemic heart disease | 559.3 | 1,208.2 | 901.8 | 709.3 | 695.2 | 648.4 | 708.1 |
| Cerebrovascular diseases | 154.9 | 269.3 | 223.3 | 198.1 | 193.5 | 201.7 | 190.7 |
| Malignant neoplasms | 815.1 | 1,101.3 | 1,141.1 | 995.7 | 1,099.5 | 1,066.0 | 997.2 |
| Trachea, bronchus, and lung | 168.0 | 181.1 | 268.1 | 227.8 | 238.7 | 226.3 | 223.9 |
| Colorectal | 67.7 | 78.8 | 82.4 | 93.8 | 87.9 | 115.7 | 85.5 |
| Prostate[4] | 22.2 | 66.7 | 42.0 | 44.5 | 35.2 | 36.3 | 34.7 |
| Breast[5] | 126.0 | 205.5 | 213.4 | 174.1 | 175.2 | 187.1 | 146.8 |
| Chronic lower respiratory diseases | 126.7 | 89.3 | 129.0 | 151.8 | 139.3 | 137.0 | 163.6 |
| Influenza and pneumonia | 152.7 | 307.9 | 206.3 | 124.0 | 141.3 | 100.9 | 171.8 |
| Chronic liver disease and cirrhosis | 441.3 | 1,190.3 | 535.1 | 519.4 | 506.0 | 495.8 | 504.6 |
| Diabetes mellitus | 283.8 | 305.5 | 292.3 | 305.6 | 297.3 | 344.7 | 355.2 |
| Human immunodeficiency virus (HIV) disease | 73.1 | --- | 70.1 | 68.4 | 88.1 | 79.9 | 80.7 |
| Unintentional injuries | 1,894.4 | 3,541.0 | 2,183.9 | 1,700.1 | 1,632.0 | 1,764.6 | 1,818.4 |
| Motor vehicle-related injuries | 1,169.2 | 2,102.4 | 1,301.5 | 1,032.2 | 989.4 | 1,089.3 | 1,081.8 |
| Suicide[6] | 451.9 | 515.0 | 495.9 | 403.1 | 420.6 | 420.8 | 418.2 |
| Homicide[6] | 349.3 | 628.9 | 434.2 | 278.5 | 287.0 | 366.5 | 323.1 |

See footnotes at end of table.



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## Table 30 (page 3 of 4). Years of potential life lost before age 75 for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[2] | Crude | Age adjusted[1] | | | | | |
|---|---|---|---|---|---|---|---|
| | 2003 | 1980 | 1990 | 2000[3] | 2001 | 2002 | 2003 |
| **Asian or Pacific Islander[7]** | Years lost before age 75 per 100,000 population under 75 years of age | | | | | | |
| All causes | 3,498.2 | 5,378.4 | 4,705.2 | 3,811.1 | 3,798.7 | 3,635.5 | 3,657.5 |
| Diseases of heart | 488.4 | 952.8 | 702.2 | 567.9 | 547.1 | 539.4 | 534.3 |
| Ischemic heart disease | 317.5 | 697.7 | 486.6 | 381.1 | 369.4 | 352.0 | 354.7 |
| Cerebrovascular diseases | 175.1 | 266.9 | 233.5 | 199.4 | 198.8 | 186.5 | 192.9 |
| Malignant neoplasms | 889.1 | 1,218.6 | 1,166.4 | 1,033.8 | 1,029.6 | 990.3 | 959.1 |
| Trachea, bronchus, and lung | 154.3 | 238.2 | 204.7 | 185.8 | 180.8 | 173.8 | 173.9 |
| Colorectal | 88.0 | 115.9 | 105.1 | 91.6 | 97.2 | 92.8 | 94.4 |
| Prostate[4] | 10.8 | 17.0 | 32.4 | 18.8 | 13.3 | 20.8 | 14.6 |
| Breast[5] | 189.2 | 222.2 | 216.5 | 200.8 | 205.0 | 188.4 | 192.3 |
| Chronic lower respiratory diseases | 39.4 | 56.4 | 72.8 | 56.5 | 52.1 | 44.8 | 45.1 |
| Influenza and pneumonia | 43.6 | 79.3 | 74.0 | 48.6 | 45.4 | 38.0 | 47.7 |
| Chronic liver disease and cirrhosis | 34.8 | 85.6 | 72.4 | 44.8 | 44.5 | 40.0 | 36.8 |
| Diabetes mellitus | 70.2 | 83.1 | 74.0 | 77.0 | 83.8 | 76.4 | 79.9 |
| Human immunodeficiency virus (HIV) disease | 23.1 | --- | 77.0 | 19.9 | 21.6 | 24.8 | 22.3 |
| Unintentional injuries | 442.4 | 742.7 | 636.6 | 425.7 | 431.4 | 431.1 | 429.6 |
| Motor vehicle-related injuries | 280.1 | 472.6 | 445.5 | 263.4 | 275.9 | 269.7 | 269.6 |
| Suicide[6] | 185.0 | 217.1 | 200.6 | 168.6 | 166.4 | 162.7 | 172.1 |
| Homicide[6] | 126.7 | 201.1 | 205.8 | 113.1 | 165.1 | 127.5 | 120.6 |
| **Hispanic or Latino[7,8]** | | | | | | | |
| All causes | 5,346.5 | --- | 7,963.3 | 6,037.6 | 5,982.2 | 5,865.9 | 5,910.0 |
| Diseases of heart | 514.4 | --- | 1,082.0 | 821.3 | 791.6 | 796.9 | 767.7 |
| Ischemic heart disease | 307.3 | --- | 756.6 | 564.6 | 539.1 | 540.1 | 501.3 |
| Cerebrovascular diseases | 128.9 | --- | 238.0 | 207.8 | 201.4 | 193.4 | 187.3 |
| Malignant neoplasms | 744.2 | --- | 1,232.2 | 1,098.2 | 1,099.1 | 1,052.9 | 1,056.5 |
| Trachea, bronchus, and lung | 86.5 | --- | 193.7 | 152.1 | 154.9 | 150.5 | 144.9 |
| Colorectal | 65.1 | --- | 100.2 | 101.4 | 95.8 | 96.7 | 100.1 |
| Prostate[4] | 20.3 | --- | 47.7 | 42.9 | 49.4 | 44.1 | 43.4 |
| Breast[5] | 161.3 | --- | 299.3 | 230.7 | 233.6 | 205.1 | 218.4 |
| Chronic lower respiratory diseases | 45.8 | --- | 78.8 | 68.5 | 67.6 | 69.0 | 67.1 |
| Influenza and pneumonia | 65.7 | --- | 130.1 | 76.0 | 66.1 | 65.5 | 76.4 |
| Chronic liver disease and cirrhosis | 155.9 | --- | 329.1 | 252.1 | 247.7 | 237.9 | 221.8 |
| Diabetes mellitus | 134.6 | --- | 177.8 | 215.6 | 212.1 | 207.1 | 214.0 |
| Human immunodeficiency virus (HIV) disease | 148.0 | --- | 600.1 | 209.4 | 190.3 | 179.1 | 175.4 |
| Unintentional injuries | 1,028.5 | --- | 1,190.6 | 920.1 | 945.8 | 958.1 | 961.5 |
| Motor vehicle-related injuries | 623.0 | --- | 740.8 | 540.2 | 554.0 | 569.6 | 563.6 |
| Suicide[6] | 196.7 | --- | 256.2 | 188.5 | 185.1 | 185.6 | 188.3 |
| Homicide[6] | 395.9 | --- | 720.8 | 335.1 | 365.2 | 330.2 | 345.0 |

See footnotes at end of table.



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## Table 30 (page 4 of 4). Years of potential life lost before age 75 for selected causes of death, according to sex, race, and Hispanic origin: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated March 2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and cause of death[2] | Crude | Age adjusted[1] | | | | | |
|---|---|---|---|---|---|---|---|
| | 2003 | 1980 | 1990 | 2000[3] | 2001 | 2002 | 2003 |
| White, not Hispanic or Latino[8] | Years lost before age 75 per 100,000 population under 75 years of age | | | | | | |
| All causes | 7,394.8 | - - - | 8,022.5 | 6,960.5 | 6,970.9 | 6,997.9 | 6,961.6 |
| Diseases of heart | 1,263.6 | - - - | 1,504.0 | 1,175.1 | 1,144.4 | 1,143.8 | 1,114.7 |
| Ischemic heart disease | 870.2 | - - - | 1,127.2 | 824.7 | 794.7 | 781.3 | 755.8 |
| Cerebrovascular diseases | 183.1 | - - - | 210.1 | 183.0 | 170.6 | 169.4 | 162.8 |
| Malignant neoplasms | 1,814.0 | - - - | 1,974.1 | 1,668.4 | 1,652.3 | 1,629.7 | 1,590.6 |
| Trachea, bronchus, and lung | 510.4 | - - - | 566.8 | 460.3 | 451.9 | 443.7 | 433.5 |
| Colorectal | 147.0 | - - - | 162.1 | 136.2 | 138.5 | 137.6 | 127.7 |
| Prostate[4] | 57.7 | - - - | 89.2 | 54.9 | 53.2 | 51.7 | 51.0 |
| Breast[5] | 346.3 | - - - | 451.5 | 322.3 | 315.9 | 305.9 | 301.8 |
| Chronic lower respiratory diseases | 226.5 | - - - | 188.1 | 193.8 | 194.3 | 193.3 | 194.2 |
| Influenza and pneumonia | 87.4 | - - - | 112.3 | 76.4 | 72.9 | 75.8 | 82.1 |
| Chronic liver disease and cirrhosis | 170.4 | - - - | 162.4 | 150.9 | 153.0 | 152.1 | 153.2 |
| Diabetes mellitus | 175.4 | - - - | 131.2 | 150.2 | 151.0 | 155.8 | 154.9 |
| Human immunodeficiency virus (HIV) disease | 66.3 | - - - | 271.2 | 76.0 | 71.0 | 67.8 | 65.4 |
| Unintentional injuries | 1,110.3 | - - - | 1,114.7 | 1,041.4 | 1,057.2 | 1,117.4 | 1,135.8 |
| Motor vehicle-related injuries | 567.5 | - - - | 715.7 | 588.8 | 584.1 | 603.3 | 585.3 |
| Suicide[6] | 407.5 | - - - | 433.0 | 389.2 | 405.3 | 413.9 | 408.1 |
| Homicide[6] | 105.5 | - - - | 162.0 | 113.2 | 160.1 | 114.8 | 109.6 |

- - - Data not available.
* Rate based on fewer than 20 deaths is considered unreliable and is not shown.
[1]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[2]Underlying cause of death code numbers are based on the applicable revision of the *International Classification of Diseases* (ICD) for data years shown. For the period 1980–98, causes were coded using ICD–9 codes that are most nearly comparable with the 113 cause list for ICD–10. See Appendix II, tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Rate for male population only.
[5]Rate for female population only.
[6]Figures for 2001 include September 11-related deaths for which death certificates were filed as of October 24, 2002. See Appendix II, table V for terrorism-related ICD–10 codes.
[7]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[8]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on Census 2000. Rates for 2000 were revised based on Census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. See Appendix II, Years of potential life lost (YPLL) for definition and method of calculation. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National vital statistics system; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1990–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census.



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## Table 31 (page 1 of 4). Leading causes of death and numbers of deaths, according to sex, race, and Hispanic origin: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and rank order | 1980 | | 2003 | |
|---|---|---|---|---|
| | Cause of death | Deaths | Cause of death | Deaths |
| **All persons** | | | | |
| . . . | All causes | 1,989,841 | All causes | 2,448,288 |
| 1 | Diseases of heart | 761,085 | Diseases of heart | 685,089 |
| 2 | Malignant neoplasms | 416,509 | Malignant neoplasms | 556,902 |
| 3 | Cerebrovascular diseases | 170,225 | Cerebrovascular diseases | 157,689 |
| 4 | Unintentional injuries | 105,718 | Chronic lower respiratory diseases | 126,382 |
| 5 | Chronic obstructive pulmonary diseases | 56,050 | Unintentional injuries | 109,277 |
| 6 | Pneumonia and influenza | 54,619 | Diabetes mellitus | 74,219 |
| 7 | Diabetes mellitus | 34,851 | Influenza and pneumonia | 65,163 |
| 8 | Chronic liver disease and cirrhosis | 30,583 | Alzheimer's disease | 63,457 |
| 9 | Atherosclerosis | 29,449 | Nephritis, nephrotic syndrome and nephrosis | 42,453 |
| 10 | Suicide | 26,869 | Septicemia | 34,069 |
| **Male** | | | | |
| . . . | All causes | 1,075,078 | All causes | 1,201,964 |
| 1 | Diseases of heart | 405,661 | Diseases of heart | 336,095 |
| 2 | Malignant neoplasms | 225,948 | Malignant neoplasms | 287,990 |
| 3 | Unintentional injuries | 74,180 | Unintentional injuries | 70,532 |
| 4 | Cerebrovascular diseases | 69,973 | Cerebrovascular diseases | 61,426 |
| 5 | Chronic obstructive pulmonary diseases | 38,625 | Chronic lower respiratory diseases | 60,714 |
| 6 | Pneumonia and influenza | 27,574 | Diabetes mellitus | 35,438 |
| 7 | Suicide | 20,505 | Influenza and pneumonia | 28,778 |
| 8 | Chronic liver disease and cirrhosis | 19,768 | Suicide | 25,203 |
| 9 | Homicide | 18,779 | Nephritis, nephrotic syndrome and nephrosis | 20,481 |
| 10 | Diabetes mellitus | 14,325 | Alzheimer's disease | 18,335 |
| **Female** | | | | |
| . . . | All causes | 914,763 | All causes | 1,246,324 |
| 1 | Diseases of heart | 355,424 | Diseases of heart | 348,994 |
| 2 | Malignant neoplasms | 190,561 | Malignant neoplasms | 268,912 |
| 3 | Cerebrovascular diseases | 100,252 | Cerebrovascular diseases | 96,263 |
| 4 | Unintentional injuries | 31,538 | Chronic lower respiratory diseases | 65,668 |
| 5 | Pneumonia and influenza | 27,045 | Alzheimer's disease | 45,122 |
| 6 | Diabetes mellitus | 20,526 | Diabetes mellitus | 38,781 |
| 7 | Atherosclerosis | 17,848 | Unintentional injuries | 38,745 |
| 8 | Chronic obstructive pulmonary diseases | 17,425 | Influenza and pneumonia | 36,385 |
| 9 | Chronic liver disease and cirrhosis | 10,815 | Nephritis, nephrotic syndrome and nephrosis | 21,972 |
| 10 | Certain conditions originating in the perinatal period | 9,815 | Septicemia | 19,082 |
| **White** | | | | |
| . . . | All causes | 1,738,607 | All causes | 2,103,714 |
| 1 | Diseases of heart | 683,347 | Diseases of heart | 594,842 |
| 2 | Malignant neoplasms | 368,162 | Malignant neoplasms | 481,556 |
| 3 | Cerebrovascular diseases | 148,734 | Cerebrovascular diseases | 134,705 |
| 4 | Unintentional injuries | 90,122 | Chronic lower respiratory diseases | 116,917 |
| 5 | Chronic obstructive pulmonary diseases | 52,375 | Unintentional injuries | 93,381 |
| 6 | Pneumonia and influenza | 48,369 | Alzheimer's disease | 59,184 |
| 7 | Diabetes mellitus | 28,868 | Diabetes mellitus | 59,099 |
| 8 | Atherosclerosis | 27,069 | Influenza and pneumonia | 57,645 |
| 9 | Chronic liver disease and cirrhosis | 25,240 | Nephritis, nephrotic syndrome and nephrosis | 33,707 |
| 10 | Suicide | 24,829 | Suicide | 28,485 |
| **Black or African American** | | | | |
| . . . | All causes | 233,135 | All causes | 291,300 |
| 1 | Diseases of heart | 72,956 | Diseases of heart | 77,372 |
| 2 | Malignant neoplasms | 45,037 | Malignant neoplasms | 62,660 |
| 3 | Cerebrovascular diseases | 20,135 | Cerebrovascular diseases | 18,806 |
| 4 | Unintentional injuries | 13,480 | Diabetes mellitus | 12,892 |
| 5 | Homicide | 10,172 | Unintentional injuries | 12,351 |
| 6 | Certain conditions originating in the perinatal period | 6,961 | Homicide | 8,392 |
| 7 | Pneumonia and influenza | 5,648 | Nephritis, nephrotic syndrome and nephrosis | 7,855 |
| 8 | Diabetes mellitus | 5,544 | Chronic lower respiratory diseases | 7,709 |
| 9 | Chronic liver disease and cirrhosis | 4,790 | Human immunodeficiency virus (HIV) disease | 7,479 |
| 10 | Nephritis, nephrotic syndrome, and nephrosis | 3,416 | Septicemia | 6,206 |

See footnotes at end of table.



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## Table 31 (page 2 of 4). Leading causes of death and numbers of deaths, according to sex, race, and Hispanic origin: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and rank order | 1980 | | 2003 | |
|---|---|---|---|---|
| | Cause of death | Deaths | Cause of death | Deaths |
| **American Indian or Alaska Native** | | | | |
| . . . | All causes | 6,923 | All causes | 13,147 |
| 1 | Diseases of heart | 1,494 | Diseases of heart | 2,712 |
| 2 | Unintentional injuries | 1,290 | Malignant neoplasms | 2,154 |
| 3 | Malignant neoplasms | 770 | Unintentional injuries | 1,573 |
| 4 | Chronic liver disease and cirrhosis | 410 | Diabetes mellitus | 783 |
| 5 | Cerebrovascular diseases | 322 | Chronic liver disease and cirrhosis | 570 |
| 6 | Pneumonia and influenza | 257 | Cerebrovascular diseases | 552 |
| 7 | Homicide | 217 | Chronic lower respiratory diseases | 512 |
| 8 | Diabetes mellitus | 210 | Influenza and pneumonia | 390 |
| 9 | Certain conditions originating in the perinatal period | 199 | Suicide | 322 |
| 10 | Suicide | 181 | Nephritis, nephrotic syndrome and nephrosis | 255 |
| **Asian or Pacific Islander** | | | | |
| . . . | All causes | 11,071 | All causes | 40,127 |
| 1 | Diseases of heart | 3,265 | Malignant neoplasms | 10,532 |
| 2 | Malignant neoplasms | 2,522 | Diseases of heart | 10,163 |
| 3 | Cerebrovascular diseases | 1,028 | Cerebrovascular diseases | 3,626 |
| 4 | Unintentional injuries | 810 | Unintentional injuries | 1,972 |
| 5 | Pneumonia and influenza | 342 | Diabetes mellitus | 1,445 |
| 6 | Suicide | 249 | Influenza and pneumonia | 1,256 |
| 7 | Certain conditions originating in the perinatal period | 246 | Chronic lower respiratory diseases | 1,244 |
| 8 | Diabetes mellitus | 227 | Suicide | 722 |
| 9 | Homicide | 211 | Nephritis, nephrotic syndrome and nephrosis | 636 |
| 10 | Chronic obstructive pulmonary diseases | 207 | Septicemia | 456 |
| **Hispanic or Latino** | | | | |
| . . . | --- | --- | All causes | 122,026 |
| 1 | --- | --- | Diseases of heart | 28,298 |
| 2 | --- | --- | Malignant neoplasms | 24,070 |
| 3 | --- | --- | Unintentional injuries | 10,418 |
| 4 | --- | --- | Cerebrovascular diseases | 6,658 |
| 5 | --- | --- | Diabetes mellitus | 6,179 |
| 6 | --- | --- | Chronic liver disease and cirrhosis | 3,382 |
| 7 | --- | --- | Homicide | 3,355 |
| 8 | --- | --- | Chronic lower respiratory diseases | 3,174 |
| 9 | --- | --- | Influenza and pneumonia | 2,948 |
| 10 | --- | --- | Certain conditions originating in the perinatal period | 2,628 |
| **White male** | | | | |
| . . . | All causes | 933,878 | All causes | 1,025,650 |
| 1 | Diseases of heart | 364,679 | Diseases of heart | 291,560 |
| 2 | Malignant neoplasms | 198,188 | Malignant neoplasms | 249,053 |
| 3 | Unintentional injuries | 62,963 | Unintentional injuries | 59,912 |
| 4 | Cerebrovascular diseases | 60,095 | Chronic lower respiratory diseases | 55,397 |
| 5 | Chronic obstructive pulmonary diseases | 35,977 | Cerebrovascular diseases | 51,646 |
| 6 | Pneumonia and influenza | 23,810 | Diabetes mellitus | 28,939 |
| 7 | Suicide | 18,901 | Influenza and pneumonia | 25,009 |
| 8 | Chronic liver disease and cirrhosis | 16,407 | Suicide | 22,830 |
| 9 | Diabetes mellitus | 12,125 | Alzheimer's disease | 17,086 |
| 10 | Atherosclerosis | 10,543 | Nephritis, nephrotic syndrome and nephrosis | 16,408 |
| **Black or African American male** | | | | |
| . . . | All causes | 130,138 | All causes | 148,022 |
| 1 | Diseases of heart | 37,877 | Diseases of heart | 37,466 |
| 2 | Malignant neoplasms | 25,861 | Malignant neoplasms | 32,442 |
| 3 | Unintentional injuries | 9,701 | Unintentional injuries | 8,385 |
| 4 | Cerebrovascular diseases | 9,194 | Cerebrovascular diseases | 7,866 |
| 5 | Homicide | 8,274 | Homicide | 7,083 |
| 6 | Certain conditions originating in the perinatal period | 3,869 | Diabetes mellitus | 5,425 |
| 7 | Pneumonia and influenza | 3,386 | Human immunodeficiency virus (HIV) disease | 5,033 |
| 8 | Chronic liver disease and cirrhosis | 3,020 | Chronic lower respiratory diseases | 4,247 |
| 9 | Chronic obstructive pulmonary diseases | 2,429 | Nephritis, nephrotic syndrome and nephrosis | 3,642 |
| 10 | Diabetes mellitus | 2,010 | Influenza and pneumonia | 2,906 |

See footnotes at end of table.

## Table 31 (page 3 of 4). Leading causes of death and numbers of deaths, according to sex, race, and Hispanic origin: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and rank order | 1980 | | 2003 | |
|---|---|---|---|---|
| | Cause of death | Deaths | Cause of death | Deaths |
| **American Indian or Alaska Native male** | | | | |
| ... | All causes | 4,193 | All causes | 7,106 |
| 1 | Unintentional injuries | 946 | Diseases of heart | 1,529 |
| 2 | Diseases of heart | 917 | Malignant neoplasms | 1,092 |
| 3 | Malignant neoplasms | 408 | Unintentional injuries | 1,043 |
| 4 | Chronic liver disease and cirrhosis | 239 | Diabetes mellitus | 367 |
| 5 | Cerebrovascular diseases | 163 | Chronic liver disease and cirrhosis | 317 |
| 6 | Homicide | 162 | Chronic lower respiratory diseases | 269 |
| 7 | Pneumonia and influenza | 148 | Suicide | 265 |
| 8 | Suicide | 147 | Cerebrovascular diseases | 242 |
| 9 | Certain conditions originating in the perinatal period | 107 | Influenza and pneumonia | 184 |
| 10 | Diabetes mellitus | 86 | Homicide | 175 |
| **Asian or Pacific Islander male** | | | | |
| ... | All causes | 6,809 | All causes | 21,186 |
| 1 | Diseases of heart | 2,174 | Diseases of heart | 5,540 |
| 2 | Malignant neoplasms | 1,485 | Malignant neoplasms | 5,403 |
| 3 | Unintentional injuries | 556 | Cerebrovascular diseases | 1,672 |
| 4 | Cerebrovascular diseases | 521 | Unintentional injuries | 1,192 |
| 5 | Pneumonia and influenza | 227 | Chronic lower respiratory diseases | 801 |
| 6 | Suicide | 159 | Diabetes mellitus | 707 |
| 7 | Chronic obstructive pulmonary diseases | 158 | Influenza and pneumonia | 679 |
| 8 | Homicide | 151 | Suicide | 511 |
| 9 | Certain conditions originating in the perinatal period | 128 | Nephritis, nephrotic syndrome and nephrosis | 304 |
| 10 | Diabetes mellitus | 103 | Homicide | 287 |
| **Hispanic or Latino male** | | | | |
| ... | --- | --- | All causes | 68,119 |
| 1 | --- | --- | Diseases of heart | 14,867 |
| 2 | --- | --- | Malignant neoplasms | 12,671 |
| 3 | --- | --- | Unintentional injuries | 7,899 |
| 4 | --- | --- | Cerebrovascular diseases | 3,070 |
| 5 | --- | --- | Diabetes mellitus | 2,976 |
| 6 | --- | --- | Homicide | 2,809 |
| 7 | --- | --- | Chronic liver disease and cirrhosis | 2,387 |
| 8 | --- | --- | Suicide | 1,711 |
| 9 | --- | --- | Chronic lower respiratory diseases | 1,697 |
| 10 | --- | --- | Human immunodeficiency virus (HIV) disease | 1,465 |
| **White female** | | | | |
| ... | All causes | 804,729 | All causes | 1,078,064 |
| 1 | Diseases of heart | 318,668 | Diseases of heart | 303,282 |
| 2 | Malignant neoplasms | 169,974 | Malignant neoplasms | 232,503 |
| 3 | Cerebrovascular diseases | 88,639 | Cerebrovascular diseases | 83,059 |
| 4 | Unintentional injuries | 27,159 | Chronic lower respiratory diseases | 61,520 |
| 5 | Pneumonia and influenza | 24,559 | Alzheimer's disease | 42,098 |
| 6 | Diabetes mellitus | 16,743 | Unintentional injuries | 33,469 |
| 7 | Atherosclerosis | 16,526 | Influenza and pneumonia | 32,636 |
| 8 | Chronic obstructive pulmonary diseases | 16,398 | Diabetes mellitus | 30,160 |
| 9 | Chronic liver disease and cirrhosis | 8,833 | Nephritis, nephrotic syndrome and nephrosis | 17,299 |
| 10 | Certain conditions originating in the perinatal period | 6,512 | Septicemia | 15,271 |
| **Black or African American female** | | | | |
| ... | All causes | 102,997 | All causes | 143,278 |
| 1 | Diseases of heart | 35,079 | Diseases of heart | 39,906 |
| 2 | Malignant neoplasms | 19,176 | Malignant neoplasms | 30,218 |
| 3 | Cerebrovascular diseases | 10,941 | Cerebrovascular diseases | 10,940 |
| 4 | Unintentional injuries | 3,779 | Diabetes mellitus | 7,467 |
| 5 | Diabetes mellitus | 3,534 | Nephritis, nephrotic syndrome and nephrosis | 4,213 |
| 6 | Certain conditions originating in the perinatal period | 3,092 | Unintentional injuries | 3,966 |
| 7 | Pneumonia and influenza | 2,262 | Chronic lower respiratory diseases | 3,462 |
| 8 | Homicide | 1,898 | Septicemia | 3,431 |
| 9 | Chronic liver disease and cirrhosis | 1,770 | Influenza and pneumonia | 2,966 |
| 10 | Nephritis, nephrotic syndrome, and nephrosis | 1,722 | Alzheimer's disease | 2,631 |

See footnotes at end of table.

## Table 31 (page 4 of 4). Leading causes of death and numbers of deaths, according to sex, race, and Hispanic origin: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and rank order | 1980 | | 2003 | |
|---|---|---|---|---|
| | Cause of death | Deaths | Cause of death | Deaths |
| **American Indian or Alaska Native female** | | | | |
| . . . | All causes | 2,730 | All causes | 6,041 |
| 1 | Diseases of heart | 577 | Diseases of heart | 1,183 |
| 2 | Malignant neoplasms | 362 | Malignant neoplasms | 1,062 |
| 3 | Unintentional injuries | 344 | Unintentional injuries | 530 |
| 4 | Chronic liver disease and cirrhosis | 171 | Diabetes mellitus | 416 |
| 5 | Cerebrovascular diseases | 159 | Cerebrovascular diseases | 310 |
| 6 | Diabetes mellitus | 124 | Chronic liver disease and cirrhosis | 253 |
| 7 | Pneumonia and influenza | 109 | Chronic lower respiratory diseases | 243 |
| 8 | Certain conditions originating in the perinatal period | 92 | Influenza and pneumonia | 206 |
| 9 | Nephritis, nephrotic syndrome, and nephrosis | 56 | Septicemia | 138 |
| 10 | Homicide | 55 | Nephritis, nephrotic syndrome and nephrosis | 128 |
| **Asian or Pacific Islander female** | | | | |
| . . . | All causes | 4,262 | All causes | 18,941 |
| 1 | Diseases of heart | 1,091 | Malignant neoplasms | 5,129 |
| 2 | Malignant neoplasms | 1,037 | Diseases of heart | 4,623 |
| 3 | Cerebrovascular diseases | 507 | Cerebrovascular diseases | 1,954 |
| 4 | Unintentional injuries | 254 | Unintentional injuries | 780 |
| 5 | Diabetes mellitus | 124 | Diabetes mellitus | 738 |
| 6 | Certain conditions originating in the perinatal period | 118 | Influenza and pneumonia | 577 |
| 7 | Pneumonia and influenza | 115 | Chronic lower respiratory diseases | 443 |
| 8 | Congenital anomalies | 104 | Nephritis, nephrotic syndrome and nephrosis | 332 |
| 9 | Suicide | 90 | Alzheimer's disease | 293 |
| 10 | Homicide | 60 | Essential (primary) hypertension and hypertensive renal disease | 265 |
| **Hispanic or Latino female** | | | | |
| . . . | --- | --- | All causes | 53,907 |
| 1 | --- | --- | Diseases of heart | 13,431 |
| 2 | --- | --- | Malignant neoplasms | 11,399 |
| 3 | --- | --- | Cerebrovascular diseases | 3,588 |
| 4 | --- | --- | Diabetes mellitus | 3,203 |
| 5 | --- | --- | Unintentional injuries | 2,519 |
| 6 | --- | --- | Influenza and pneumonia | 1,519 |
| 7 | --- | --- | Chronic lower respiratory diseases | 1,477 |
| 8 | --- | --- | Alzheimer's disease | 1,202 |
| 9 | --- | --- | Certain conditions originating in the perinatal period | 1,169 |
| 10 | --- | --- | Nephritis, nephrotic syndrome and nephrosis | 1,101 |

. . . Category not applicable.
--- Data not available.

NOTES: For cause of death code numbers based on the *International Classification of Diseases, 9th Revision* (ICD–9) in 1980 and ICD–10 in 2002, see Appendix II, tables IV and V. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; *Vital statistics of the United States, vol II, mortality, part A*, 1980. Washington: Public Health Service. 1985; 2003 annual mortality file.



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## Table 32 (page 1 of 2). Leading causes of death and numbers of deaths, according to age: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Age and rank order | 1980 Cause of death | 1980 Deaths | 2003 Cause of death | 2003 Deaths |
|---|---|---|---|---|
| **Under 1 year** | | | | |
| ... | All causes | 45,526 | All causes | 28,025 |
| 1 | Congenital anomalies | 9,220 | Congenital malformations, deformations and chromosomal abnormalities | 5,621 |
| 2 | Sudden infant death syndrome | 5,510 | Disorders related to short gestation and low birth weight, not elsewhere classified | 4,849 |
| 3 | Respiratory distress syndrome | 4,989 | Sudden infant death syndrome | 2,162 |
| 4 | Disorders relating to short gestation and unspecified low birthweight | 3,648 | Newborn affected by maternal complications of pregnancy | 1,710 |
| 5 | Newborn affected by maternal complications of pregnancy | 1,572 | Newborn affected by complications of placenta, cord and membranes | 1,099 |
| 6 | Intrauterine hypoxia and birth asphyxia | 1,497 | Unintentional injuries | 945 |
| 7 | Unintentional injuries | 1,166 | Respiratory distress of newborn | 831 |
| 8 | Birth trauma | 1,058 | Bacterial sepsis of newborn | 772 |
| 9 | Pneumonia and influenza | 1,012 | Neonatal hemorrhage | 649 |
| 10 | Newborn affected by complications of placenta, cord, and membranes | 985 | Diseases of circulatory system | 591 |
| **1–4 years** | | | | |
| ... | All causes | 8,187 | All causes | 4,965 |
| 1 | Unintentional injuries | 3,313 | Unintentional injuries | 1,717 |
| 2 | Congenital anomalies | 1,026 | Congenital malformations, deformations and chromosomal abnormalities | 541 |
| 3 | Malignant neoplasms | 573 | Malignant neoplasms | 392 |
| 4 | Diseases of heart | 338 | Homicide | 376 |
| 5 | Homicide | 319 | Diseases of heart | 186 |
| 6 | Pneumonia and influenza | 267 | Influenza and pneumonia | 163 |
| 7 | Meningitis | 223 | Septicemia | 85 |
| 8 | Meningococcal infection | 110 | Certain conditions originating in the perinatal period | 79 |
| 9 | Certain conditions originating in the perinatal period | 84 | Chronic lower respiratory diseases | 55 |
| 10 | Septicemia | 71 | In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior | 51 |
| **5–14 years** | | | | |
| ... | All causes | 10,689 | All causes | 6,954 |
| 1 | Unintentional injuries | 5,224 | Unintentional injuries | 2,618 |
| 2 | Malignant neoplasms | 1,497 | Malignant neoplasms | 1,076 |
| 3 | Congenital anomalies | 561 | Congenital malformations, deformations and chromosomal abnormalities | 386 |
| 4 | Homicide | 415 | Homicide | 324 |
| 5 | Diseases of heart | 330 | Diseases of heart | 264 |
| 6 | Pneumonia and influenza | 194 | Suicide | 250 |
| 7 | Suicide | 142 | Influenza and pneumonia | 147 |
| 8 | Benign neoplasms | 104 | Chronic lower respiratory diseases | 118 |
| 9 | Cerebrovascular diseases | 95 | In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior | 79 |
| 10 | Chronic obstructive pulmonary diseases | 85 | Septicemia | 77 |
| **15–24 years** | | | | |
| ... | All causes | 49,027 | All causes | 33,568 |
| 1 | Unintentional injuries | 26,206 | Unintentional injuries | 15,272 |
| 2 | Homicide | 6,537 | Homicide | 5,368 |
| 3 | Suicide | 5,239 | uicide | 3,988 |
| 4 | Malignant neoplasms | 2,683 | Malignant neoplasms | 1,651 |
| 5 | Diseases of heart | 1,223 | Diseases of heart | 1,133 |
| 6 | Congenital anomalies | 600 | Congenital malformations, deformations and chromosomal abnormalities | 451 |
| 7 | Cerebrovascular diseases | 418 | Influenza and pneumonia | 224 |
| 8 | Pneumonia and influenza | 348 | Cerebrovascular diseases | 221 |
| 9 | Chronic obstructive pulmonary diseases | 141 | Chronic lower respiratory diseases | 191 |
| 10 | Anemias | 133 | Human immunodeficiency virus (HIV) disease | 178 |

See footnotes at end of table.

## Table 32 (page 2 of 2). Leading causes of death and numbers of deaths, according to age: United States, 1980 and 2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Age and rank order | 1980 | | 2003 | |
|---|---|---|---|---|
| | Cause of death | Deaths | Cause of death | Deaths |
| **25–44 years** | | | | |
| . . . | All causes | 108,658 | All causes | 130,761 |
| 1. . . . . | Unintentional injuries | 26,722 | Unintentional injuries | 29,307 |
| 2. . . . . | Malignant neoplasms | 17,551 | Malignant neoplasms | 19,250 |
| 3. . . . . | Diseases of heart | 14,513 | Diseases of heart | 16,850 |
| 4. . . . . | Homicide | 10,983 | Suicide | 11,667 |
| 5. . . . . | Suicide | 9,855 | Homicide | 7,626 |
| 6. . . . . | Chronic liver disease and cirrhosis | 4,782 | Human immunodeficiency virus (HIV) disease | 6,928 |
| 7. . . . . | Cerebrovascular diseases | 3,154 | Chronic liver disease and cirrhosis | 3,378 |
| 8. . . . . | Diabetes mellitus | 1,472 | Cerebrovascular diseases | 3,043 |
| 9. . . . . | Pneumonia and influenza | 1,467 | Diabetes mellitus | 2,706 |
| 10. . . . . | Congenital anomalies | 817 | Influenza and pneumonia | 1,365 |
| **45–64 years** | | | | |
| . . . | All causes | 425,338 | All causes | 439,300 |
| 1. . . . . | Diseases of heart | 148,322 | Malignant neoplasms | 145,535 |
| 2. . . . . | Malignant neoplasms | 135,675 | Diseases of heart | 102,792 |
| 3. . . . . | Cerebrovascular diseases | 19,909 | Unintentional injuries | 25,007 |
| 4. . . . . | Unintentional injuries | 18,140 | Diabetes mellitus | 16,389 |
| 5. . . . . | Chronic liver disease and cirrhosis | 16,089 | Cerebrovascular diseases | 16,073 |
| 6. . . . . | Chronic obstructive pulmonary diseases | 11,514 | Chronic lower respiratory diseases | 15,614 |
| 7. . . . . | Diabetes mellitus | 7,977 | Chronic liver disease and cirrhosis | 13,894 |
| 8. . . . . | Suicide | 7,079 | Suicide | 10,324 |
| 9. . . . . | Pneumonia and influenza | 5,804 | Human immunodeficiency virus (HIV) disease | 5,959 |
| 10. . . . . | Homicide | 4,019 | Septicemia | 5,808 |
| **65 years and over** | | | | |
| . . . | All causes | 1,341,848 | All causes | 1,804,373 |
| 1. . . . . | Diseases of heart | 595,406 | Diseases of heart | 563,390 |
| 2. . . . . | Malignant neoplasms | 258,389 | Malignant neoplasms | 388,911 |
| 3. . . . . | Cerebrovascular diseases | 146,417 | Cerebrovascular diseases | 138,134 |
| 4. . . . . | Pneumonia and influenza | 45,512 | Chronic lower respiratory diseases | 109,139 |
| 5. . . . . | Chronic obstructive pulmonary diseases | 43,587 | Alzheimer's disease | 62,814 |
| 6. . . . . | Atherosclerosis | 28,081 | Influenza and pneumonia | 57,670 |
| 7. . . . . | Diabetes mellitus | 25,216 | Diabetes mellitus | 54,919 |
| 8. . . . . | Unintentional injuries | 24,844 | Nephritis, nephrotic syndrome and nephrosis | 35,254 |
| 9. . . . . | Nephritis, nephrotic syndrome, and nephrosis | 12,968 | Unintentional injuries | 34,335 |
| 10. . . . . | Chronic liver disease and cirrhosis | 9,519 | Septicemia | 26,445 |

. . . Category not applicable.

NOTES: For cause of death code numbers based on the *International Classification of Diseases, 9th Revision* (ICD–9) in 1980 and ICD–10 in 2002, see Appendix II, tables IV and V.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; *Vital statistics of the United States, vol II, mortality, part A*, 1980. Washington: Public Health Service. 1985; 2003 annual mortality file.



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## Table 33 (page 1 of 3). Age-adjusted death rates, according to race, sex, region, and urbanization level: United States, average annual 1994–96, 1997–99, and 2000–2002

[Data are based on the National Vital Statistics System]

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| Sex, region, and urbanization level[1] | All races | | | White | | | Black or African American | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 |
| Both sexes | Age-adjusted death rate per 100,000 standard population[2] | | | | | | | | |
| All regions: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 902.5 | 860.8 | 833.1 | 870.6 | 836.6 | 813.0 | 1,198.6 | 1,115.7 | 1,079.3 |
| Medium | 881.9 | 857.7 | 844.6 | 860.9 | 839.7 | 829.1 | 1,188.9 | 1,136.7 | 1,114.9 |
| Small | 906.1 | 885.9 | 875.1 | 883.8 | 865.8 | 856.4 | 1,212.6 | 1,167.6 | 1,153.4 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 926.2 | 910.4 | 897.7 | 904.9 | 889.9 | 880.7 | 1,233.9 | 1,200.1 | 1,158.7 |
| Nonmicropolitan | 945.8 | 929.7 | 914.3 | 921.7 | 906.0 | 894.2 | 1,215.4 | 1,190.7 | 1,149.4 |
| Northeast: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 908.8 | 847.6 | 815.0 | 880.2 | 831.5 | 803.9 | 1,135.4 | 1,007.6 | 966.4 |
| Medium | 873.1 | 841.9 | 823.3 | 860.5 | 833.5 | 816.5 | 1,162.1 | 1,048.9 | 1,020.5 |
| Small | 884.8 | 845.5 | 834.3 | 878.8 | 841.6 | 830.9 | 1,195.7 | 1,080.7 | 1,068.6 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 896.6 | 868.6 | 843.9 | 895.6 | 868.1 | 845.4 | * | * | * |
| Nonmicropolitan | 907.5 | 888.0 | 864.1 | 905.9 | 885.5 | 863.4 | * | * | * |
| Midwest: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 934.2 | 902.6 | 878.1 | 885.4 | 859.7 | 838.0 | 1,253.3 | 1,189.9 | 1,162.5 |
| Medium | 894.6 | 876.2 | 861.6 | 874.1 | 857.4 | 845.1 | 1,199.8 | 1,163.0 | 1,131.6 |
| Small | 874.7 | 856.0 | 842.5 | 860.9 | 843.9 | 831.7 | 1,230.3 | 1,148.4 | 1,151.7 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 884.5 | 869.9 | 851.8 | 879.9 | 865.2 | 849.6 | 1,231.8 | 1,212.6 | 1,108.6 |
| Nonmicropolitan | 883.7 | 862.5 | 843.7 | 874.0 | 853.3 | 836.5 | 1,351.3 | 1,377.7 | 1,068.2 |
| South: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 916.6 | 884.1 | 867.6 | 862.7 | 837.9 | 827.2 | 1,223.8 | 1,156.8 | 1,119.4 |
| Medium | 905.1 | 883.1 | 877.0 | 861.3 | 843.8 | 841.1 | 1,201.6 | 1,156.1 | 1,140.4 |
| Small | 962.5 | 946.8 | 940.9 | 925.7 | 913.4 | 910.9 | 1,217.2 | 1,182.1 | 1,163.9 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 983.9 | 971.3 | 967.2 | 940.9 | 931.5 | 935.5 | 1,244.2 | 1,210.0 | 1,175.3 |
| Nonmicropolitan | 1,014.1 | 1,004.7 | 995.1 | 983.1 | 975.3 | 971.7 | 1,213.3 | 1,187.7 | 1,157.2 |
| West: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 848.2 | 809.2 | 771.2 | 854.0 | 819.3 | 783.4 | 1,156.4 | 1,088.3 | 1,051.3 |
| Medium | 832.5 | 807.6 | 789.9 | 843.1 | 820.2 | 805.2 | 1,080.2 | 1,041.3 | 974.7 |
| Small | 838.4 | 816.3 | 800.5 | 837.5 | 816.5 | 800.1 | 1,055.9 | 986.6 | 1,010.4 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 874.3 | 857.2 | 843.2 | 875.6 | 856.8 | 842.4 | * | * | * |
| Nonmicropolitan | 883.6 | 858.6 | 835.5 | 862.3 | 836.6 | 816.9 | * | * | * |

See footnotes at end of table.

**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 33 (page 2 of 3). Age-adjusted death rates, according to race, sex, region, and urbanization level: United States, average annual 1994–96, 1997–99, and 2000–2002

[Data are based on the National Vital Statistics System]

Click here for spreadsheet version

| Sex, region, and urbanization level[1] | All races | | | White | | | Black or African American | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 |
| Male | Age-adjusted death rate per 100,000 standard population[2] | | | | | | | | |
| All regions: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 1,130.6 | 1,050.6 | 999.2 | 1,087.6 | 1,018.7 | 973.0 | 1,567.5 | 1,415.4 | 1,343.6 |
| Medium | 1,103.5 | 1,051.3 | 1,013.1 | 1,076.5 | 1,028.3 | 993.2 | 1,532.4 | 1,435.0 | 1,375.7 |
| Small | 1,141.3 | 1,094.2 | 1,055.3 | 1,113.6 | 1,069.1 | 1,032.2 | 1,555.5 | 1,472.8 | 1,433.8 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 1,169.3 | 1,130.2 | 1,088.1 | 1,142.4 | 1,104.1 | 1,067.4 | 1,604.3 | 1,532.7 | 1,442.7 |
| Nonmicropolitan | 1,201.5 | 1,160.5 | 1,114.7 | 1,171.4 | 1,131.0 | 1,090.4 | 1,577.7 | 1,522.0 | 1,439.2 |
| Northeast: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 1,146.8 | 1,041.9 | 986.2 | 1,107.7 | 1,020.6 | 971.7 | 1,502.6 | 1,284.6 | 1,214.0 |
| Medium | 1,099.0 | 1,039.6 | 995.2 | 1,082.9 | 1,029.5 | 987.7 | 1,485.2 | 1,309.4 | 1,234.7 |
| Small | 1,113.6 | 1,049.8 | 1,002.7 | 1,106.5 | 1,046.2 | 999.1 | 1,500.0 | 1,329.3 | 1,329.6 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 1,123.7 | 1,073.0 | 1,024.2 | 1,122.5 | 1,073.4 | 1,027.7 | * | * | * |
| Nonmicropolitan | 1,132.3 | 1,081.5 | 1,040.0 | 1,131.0 | 1,079.5 | 1,039.6 | * | * | * |
| Midwest: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 1,174.9 | 1,112.6 | 1,058.0 | 1,110.3 | 1,057.9 | 1,007.4 | 1,633.3 | 1,511.0 | 1,447.7 |
| Medium | 1,122.8 | 1,082.6 | 1,038.9 | 1,097.7 | 1,059.9 | 1,020.1 | 1,509.7 | 1,444.0 | 1,369.0 |
| Small | 1,105.9 | 1,064.9 | 1,026.5 | 1,089.5 | 1,050.3 | 1,013.5 | 1,532.1 | 1,420.1 | 1,414.7 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 1,124.6 | 1,086.2 | 1,040.1 | 1,119.4 | 1,080.7 | 1,038.5 | 1,540.2 | 1,501.8 | 1,313.1 |
| Nonmicropolitan | 1,124.6 | 1,081.0 | 1,033.3 | 1,113.0 | 1,069.7 | 1,025.5 | 1,682.3 | 1,735.5 | 1,312.0 |
| South: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 1,153.1 | 1,081.4 | 1,039.2 | 1,080.1 | 1,020.5 | 987.4 | 1,607.3 | 1,475.1 | 1,394.7 |
| Medium | 1,141.2 | 1,085.4 | 1,053.7 | 1,082.7 | 1,032.9 | 1,007.2 | 1,571.5 | 1,481.5 | 1,427.3 |
| Small | 1,227.5 | 1,178.9 | 1,141.0 | 1,180.8 | 1,135.8 | 1,102.1 | 1,579.8 | 1,507.4 | 1,460.4 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 1,256.0 | 1,218.6 | 1,178.2 | 1,199.3 | 1,166.2 | 1,137.2 | 1,635.4 | 1,563.6 | 1,481.6 |
| Nonmicropolitan | 1,302.5 | 1,266.2 | 1,223.6 | 1,263.3 | 1,229.0 | 1,194.6 | 1,582.8 | 1,524.2 | 1,456.4 |
| West: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 1,046.5 | 970.1 | 915.7 | 1,053.2 | 980.4 | 928.4 | 1,459.9 | 1,331.7 | 1,274.1 |
| Medium | 1,020.4 | 972.3 | 934.7 | 1,033.6 | 987.1 | 948.9 | 1,311.5 | 1,216.5 | 1,154.9 |
| Small | 1,026.4 | 982.9 | 945.0 | 1,025.6 | 983.1 | 945.0 | 1,254.8 | 1,127.1 | 1,130.7 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 1,063.1 | 1,029.5 | 996.7 | 1,065.7 | 1,027.2 | 992.9 | * | * | * |
| Nonmicropolitan | 1,079.5 | 1,038.7 | 984.7 | 1,054.4 | 1,011.8 | 959.7 | * | * | * |

See footnotes at end of table.

**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 33 (page 3 of 3). Age-adjusted death rates, according to race, sex, region, and urbanization level: United States, average annual 1994–96, 1997–99, and 2000–2002

[Data are based on the National Vital Statistics System]

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| Sex, region, and urbanization level[1] | All races | | | White | | | Black or African American | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 | 1994–96 | 1997–99 | 2000–2002 |
| Female | Age-adjusted death rate per 100,000 standard population[2] | | | | | | | | |
| All regions: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 737.4 | 722.6 | 707.9 | 714.0 | 703.4 | 691.3 | 944.5 | 912.7 | 896.9 |
| Medium | 721.4 | 715.6 | 715.2 | 705.5 | 701.2 | 702.6 | 946.6 | 930.0 | 928.7 |
| Small | 737.4 | 734.4 | 737.9 | 719.0 | 717.5 | 721.9 | 974.5 | 958.2 | 958.2 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 748.7 | 747.7 | 750.5 | 731.6 | 731.0 | 735.8 | 978.2 | 974.0 | 959.7 |
| Nonmicropolitan | 753.0 | 752.8 | 754.9 | 733.5 | 733.3 | 737.6 | 957.3 | 956.5 | 943.0 |
| Northeast: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 743.0 | 711.9 | 691.1 | 721.9 | 698.8 | 681.2 | 895.1 | 828.8 | 804.3 |
| Medium | 718.8 | 705.3 | 698.5 | 709.6 | 698.2 | 692.8 | 923.7 | 869.3 | 860.0 |
| Small | 725.5 | 704.0 | 709.6 | 720.8 | 699.8 | 706.4 | 977.5 | 924.1 | 908.0 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 737.0 | 721.2 | 710.3 | 736.6 | 720.5 | 710.6 | * | * | * |
| Nonmicropolitan | 740.7 | 741.0 | 725.1 | 739.1 | 738.4 | 724.3 | * | * | * |
| Midwest: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 768.6 | 756.5 | 747.1 | 733.7 | 723.2 | 715.4 | 987.3 | 966.7 | 960.7 |
| Medium | 738.6 | 733.0 | 732.0 | 722.3 | 717.5 | 717.7 | 976.0 | 960.8 | 953.1 |
| Small | 716.0 | 709.3 | 708.7 | 704.5 | 699.6 | 699.7 | 1,005.1 | 940.7 | 955.4 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 716.4 | 716.0 | 712.3 | 712.1 | 711.7 | 709.9 | 1,012.3 | 1,023.1 | 947.8 |
| Nonmicropolitan | 703.9 | 696.3 | 694.5 | 696.0 | 689.0 | 688.2 | 1,124.4 | 1,140.1 | 918.2 |
| South: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 742.8 | 737.8 | 736.0 | 702.4 | 700.8 | 702.3 | 960.5 | 942.7 | 930.7 |
| Medium | 729.9 | 730.6 | 737.3 | 695.9 | 698.9 | 707.1 | 948.6 | 937.1 | 942.9 |
| Small | 775.3 | 780.5 | 789.1 | 744.7 | 752.2 | 763.4 | 972.1 | 966.7 | 962.9 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 786.3 | 790.3 | 804.2 | 751.7 | 757.5 | 776.9 | 979.3 | 973.8 | 965.7 |
| Nonmicropolitan | 801.1 | 809.3 | 817.4 | 775.5 | 784.4 | 796.4 | 952.3 | 951.2 | 945.6 |
| West: | | | | | | | | | |
| Metropolitan counties: | | | | | | | | | |
| Large | 694.8 | 684.7 | 656.9 | 699.6 | 693.7 | 667.7 | 926.5 | 908.9 | 883.1 |
| Medium | 687.4 | 679.1 | 674.4 | 697.8 | 691.1 | 690.1 | 886.6 | 892.8 | 825.1 |
| Small | 689.0 | 683.1 | 682.2 | 688.1 | 683.8 | 681.6 | 881.3 | 838.7 | 894.8 |
| Nonmetropolitan counties: | | | | | | | | | |
| Micropolitan | 716.5 | 712.2 | 710.3 | 717.8 | 714.1 | 711.6 | * | * | * |
| Nonmicropolitan | 715.8 | 702.8 | 702.2 | 699.5 | 686.2 | 689.5 | * | * | * |

* Estimates of death rates for the black population in nonmetropolitan counties in the Northeast and West may be unreliable, possibly due to anomalies in population estimates for the black population in nonmetropolitan counties in these regions.

[1]Urbanization levels are for county of residence of decedent. See Appendix II, Urbanization for definition of urbanization levels.

[2]Average annual death rates, age-adjusted using the year 2000 standard population. See Appendix II, Age adjustment. Denominators for rates are population estimates for the middle year of each 3-year period multiplied by 3. The 1995 and 1998 population estimates used to compute rates for 1994–96 and 1997–99 are intercensal population estimates based on census 2000. See Appendix I, Population Census and Population Estimates.

NOTE: The race groups, white and black, include persons of Hispanic and non-Hispanic origin.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Compressed Mortality File.

**This table will be updated on the Web. Go to** www.cdc.gov/nchs/hus.htm.



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## Table 34 (page 1 of 2). Age-adjusted death rates for persons 25–64 years of age for selected causes of death, according to sex and educational attainment: Selected States, 1994–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Cause of death[2] and year | Both sexes | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | Years of educational attainment[1] | | | Years of educational attainment[1] | | | Years of educational attainment[1] | | |
| | Less than 12 | 12 | 13 or more | Less than 12 | 12 | 13 or more | Less than 12 | 12 | 13 or more |
| | Age-adjusted death rate per 100,000 population[3] | | | | | | | | |
| All causes | | | | | | | | | |
| 1994 | 594.6 | 506.4 | 254.8 | 793.6 | 707.1 | 323.5 | 397.3 | 342.9 | 182.1 |
| 1995 | 604.7 | 512.5 | 251.9 | 801.1 | 713.2 | 316.8 | 408.6 | 348.1 | 183.5 |
| 1996 | 579.6 | 492.5 | 241.8 | 763.9 | 669.6 | 300.7 | 396.6 | 344.2 | 180.3 |
| 1997 | 554.1 | 473.4 | 232.7 | 719.7 | 634.4 | 283.4 | 387.2 | 337.5 | 180.2 |
| 1998 | 561.6 | 465.8 | 223.9 | 727.6 | 627.1 | 271.9 | 395.6 | 330.9 | 174.3 |
| 1999 | 585.3 | 474.5 | 219.1 | 763.7 | 636.7 | 264.2 | 409.9 | 337.3 | 172.6 |
| 2000 | 591.0 | 484.5 | 216.7 | 780.2 | 641.8 | 260.8 | 409.0 | 347.7 | 171.9 |
| 2001 | 576.6 | 480.9 | 214.6 | 745.8 | 631.2 | 257.3 | 407.1 | 348.6 | 171.5 |
| 2002 | 575.1 | 490.9 | 211.3 | 726.1 | 650.2 | 253.5 | 416.6 | 350.7 | 168.8 |
| 2003[4] | 669.9 | 490.9 | 211.7 | 826.8 | 650.9 | 252.5 | 496.8 | 349.4 | 171.0 |
| Chronic and noncommunicable diseases | | | | | | | | | |
| 1994 | 440.5 | 380.7 | 193.7 | 561.9 | 504.4 | 228.4 | 325.0 | 286.8 | 155.5 |
| 1995 | 445.1 | 384.0 | 192.1 | 563.4 | 507.3 | 224.4 | 332.1 | 290.0 | 156.3 |
| 1996 | 432.7 | 375.3 | 189.0 | 550.6 | 486.9 | 222.1 | 321.2 | 287.7 | 153.4 |
| 1997 | 419.0 | 368.8 | 187.4 | 527.0 | 474.1 | 219.0 | 316.0 | 284.6 | 153.8 |
| 1998 | 425.2 | 362.9 | 180.9 | 534.4 | 470.2 | 211.3 | 321.3 | 277.9 | 148.6 |
| 1998 comparability-modified[5] | 429.5 | 366.5 | 182.7 | 539.7 | 474.9 | 213.4 | 324.5 | 280.7 | 150.1 |
| 1999[6] | 447.0 | 369.8 | 177.2 | 563.0 | 477.6 | 205.5 | 337.2 | 283.6 | 147.4 |
| 2000 | 446.2 | 377.6 | 175.7 | 567.2 | 481.5 | 202.9 | 334.3 | 292.3 | 147.2 |
| 2001 | 436.5 | 370.7 | 171.1 | 545.1 | 468.2 | 195.7 | 331.7 | 290.3 | 145.5 |
| 2002 | 432.0 | 374.4 | 168.6 | 528.9 | 478.2 | 193.9 | 334.9 | 288.5 | 142.6 |
| 2003[4] | 502.7 | 373.4 | 167.6 | 603.6 | 478.5 | 191.8 | 396.7 | 286.4 | 142.7 |
| Injuries | | | | | | | | | |
| 1994 | 95.8 | 73.4 | 31.9 | 149.4 | 119.2 | 45.7 | 38.9 | 31.7 | 17.9 |
| 1995 | 96.6 | 74.3 | 31.6 | 149.4 | 120.3 | 45.3 | 40.0 | 32.1 | 17.8 |
| 1996 | 92.3 | 73.0 | 32.0 | 139.8 | 116.2 | 45.7 | 40.6 | 32.7 | 18.4 |
| 1997 | 92.7 | 73.5 | 31.9 | 138.8 | 116.4 | 45.5 | 41.1 | 33.4 | 18.4 |
| 1998 | 93.9 | 73.8 | 31.2 | 139.4 | 116.6 | 44.4 | 43.8 | 33.7 | 18.3 |
| 1998 comparability-modified[5] | 95.4 | 75.0 | 31.7 | 141.6 | 118.4 | 45.1 | 44.5 | 34.2 | 18.6 |
| 1999[6] | 95.5 | 75.5 | 30.6 | 145.1 | 118.9 | 43.3 | 42.6 | 34.4 | 18.1 |
| 2000 | 100.4 | 76.7 | 30.3 | 155.1 | 119.2 | 43.1 | 43.7 | 35.3 | 17.9 |
| 2001[7] | 97.9 | 80.7 | 33.2 | 147.0 | 122.7 | 47.6 | 44.8 | 38.6 | 19.3 |
| 2002 | 99.6 | 85.2 | 32.2 | 143.3 | 129.6 | 45.5 | 49.2 | 41.0 | 19.2 |
| 2003[4] | 116.6 | 88.3 | 33.5 | 162.9 | 133.7 | 46.8 | 60.5 | 42.6 | 20.6 |
| Communicable diseases | | | | | | | | | |
| 1994 | 57.5 | 51.6 | 28.9 | 81.5 | 82.8 | 49.1 | 32.5 | 23.7 | 8.4 |
| 1995 | 62.1 | 53.4 | 27.9 | 87.3 | 84.7 | 46.7 | 35.8 | 25.2 | 8.9 |
| 1996 | 53.7 | 43.3 | 20.2 | 72.5 | 65.6 | 32.6 | 33.8 | 23.0 | 8.0 |
| 1997 | 41.6 | 30.1 | 12.9 | 53.1 | 42.9 | 18.4 | 29.3 | 18.7 | 7.6 |
| 1998 | 41.5 | 28.2 | 11.4 | 52.8 | 39.4 | 15.7 | 29.6 | 18.4 | 7.0 |
| 1998 comparability-modified[5] | 35.6 | 24.2 | 9.8 | 45.3 | 33.8 | 13.5 | 25.4 | 15.8 | 6.0 |
| 1999[6] | 42.1 | 28.5 | 10.8 | 54.8 | 39.5 | 15.1 | 29.4 | 18.8 | 6.6 |
| 2000 | 43.5 | 29.4 | 10.3 | 56.9 | 40.4 | 14.3 | 30.3 | 19.5 | 6.4 |
| 2001 | 41.4 | 28.7 | 9.9 | 52.9 | 39.4 | 13.6 | 29.7 | 19.0 | 6.3 |
| 2002 | 42.7 | 30.5 | 10.2 | 53.0 | 41.6 | 13.8 | 31.8 | 20.4 | 6.7 |
| 2003[4] | 49.6 | 28.3 | 10.2 | 59.3 | 37.8 | 13.5 | 38.7 | 19.8 | 7.2 |
| HIV disease: | | | | | | | | | |
| 1994 | 36.2 | 36.5 | 21.4 | 54.7 | 63.0 | 39.7 | 16.8 | 12.3 | 2.9 |
| 1995 | 39.7 | 38.0 | 20.6 | 59.0 | 64.4 | 37.8 | 19.0 | 13.7 | 3.5 |
| 1996 | 31.9 | 27.7 | 13.1 | 45.4 | 45.4 | 23.8 | 17.2 | 11.2 | 2.4 |
| 1997 | 19.4 | 14.3 | 5.8 | 26.3 | 23.0 | 10.1 | 11.8 | 6.2 | 1.6 |
| 1998 | 17.3 | 11.7 | 4.3 | 23.4 | 18.3 | 7.5 | 10.6 | 5.6 | 1.1 |
| 1998 comparability-modified[5] | 18.7 | 12.7 | 4.7 | 25.3 | 19.8 | 8.1 | 11.5 | 6.1 | 1.2 |
| 1999[6] | 19.0 | 13.1 | 4.6 | 26.1 | 20.1 | 7.9 | 11.7 | 6.6 | 1.4 |
| 2000 | 19.8 | 13.2 | 4.1 | 26.9 | 19.8 | 7.1 | 12.6 | 7.1 | 1.2 |
| 2001 | 18.4 | 12.5 | 3.8 | 25.0 | 18.6 | 6.4 | 11.6 | 6.8 | 1.2 |
| 2002 | 18.2 | 12.6 | 3.8 | 23.4 | 18.6 | 6.3 | 12.6 | 6.9 | 1.3 |
| 2003[4] | 19.6 | 10.6 | 3.4 | 23.9 | 15.5 | 5.8 | 14.5 | 5.8 | 1.2 |

See footnotes at end of table.



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## Table 34 (page 2 of 2). Age-adjusted death rates for persons 25–64 years of age for selected causes of death, according to sex and educational attainment: Selected States, 1994–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Cause of death[2] and year | Both sexes | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | Years of educational attainment[1] | | | Years of educational attainment[1] | | | Years of educational attainment[1] | | |
| | Less than 12 | 12 | 13 or more | Less than 12 | 12 | 13 or more | Less than 12 | 12 | 13 or more |
| Other communicable diseases: | Age-adjusted death rate per 100,000 population[3] | | | | | | | | |
| 1994 | 21.2 | 15.1 | 7.5 | 26.8 | 19.7 | 9.4 | 15.7 | 11.4 | 5.5 |
| 1995 | 22.4 | 15.5 | 7.2 | 28.2 | 20.3 | 8.8 | 16.8 | 11.5 | 5.5 |
| 1996 | 21.8 | 15.7 | 7.2 | 27.2 | 20.2 | 8.8 | 16.7 | 11.9 | 5.6 |
| 1997 | 22.2 | 15.9 | 7.1 | 26.8 | 19.9 | 8.2 | 17.6 | 12.5 | 6.0 |
| 1998 | 24.2 | 16.5 | 7.1 | 29.4 | 21.1 | 8.2 | 19.0 | 12.8 | 5.9 |
| 1998 comparability-modified[5] | 19.4 | 13.2 | 5.7 | 23.5 | 16.9 | 6.6 | 15.2 | 10.2 | 4.7 |
| 1999[6] | 23.1 | 15.4 | 6.2 | 28.8 | 19.4 | 7.2 | 17.6 | 12.2 | 5.3 |
| 2000 | 23.7 | 16.2 | 6.2 | 30.0 | 20.6 | 7.2 | 17.7 | 12.4 | 5.1 |
| 2001 | 22.9 | 16.2 | 6.1 | 27.9 | 20.8 | 7.1 | 18.1 | 12.2 | 5.1 |
| 2002 | 24.5 | 17.9 | 6.4 | 29.6 | 23.0 | 7.5 | 19.1 | 13.5 | 5.4 |
| 2003[4] | 30.1 | 17.8 | 6.8 | 35.4 | 22.3 | 7.7 | 24.2 | 13.9 | 6.0 |

[1]Educational attainment for the numerator is based on the death certificate item "highest grade completed." Educational attainment for the denominator is based on answers to the Current Population Survey question "What is the highest level of school completed or highest degree received?" (Kominski R, Adams A. Educational Attainment in the United States: March 1993 and 1992, U.S. Bureau of the Census, Current Population Reports, P20–476, Washington, DC. 1994.)
[2]Underlying cause of death was coded according to the Ninth Revision of the *International Classification of Diseases* (ICD) in 1994–98 and the Tenth Revision starting in 1999. See Appendix II, tables IV and V.
[3]Age-adjusted rates are calculated using the proportion distribution of the four age groups, 25–34, 35–44, 45–54, and 55–64 from the year 2000 standard population. See Appendix II, Age adjustment and table I.
Death records that are missing information about decedent's education are not included. Percent with not stated education averages 2–9 percent of the deaths comprising the age-adjusted death rates for causes of death in this table. Age-adjusted death rates for 1994–2000 were calculated using 1990-based postcensal population estimates in the denominator. Starting in 2001, rates were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates.
[4]Starting with 2003 data, data from California, Idaho, Montana, and New York are excluded. These States implemented the 2003 revision of the U.S. Standard Certificate of Death. Educational attainment data from the revised death certificate is not comparable with educational attainment data collected using the 1989 revision of the U.S. Standard Certificate of Death. Because of different education profiles of the four excluded States compared with the remaining States and the District of Columbia, 2003 data is not directly comparable to earlier years. See Appendix II, Education.
[5]Calculated by multiplying the 1998 rate by its comparability ratio to adjust for differences between ICD–9 and ICD–10. Comparability-modified 1998 rates were revised in *Health, United States, 2005* and may differ from previous editions. See Appendix II, Comparability ratio and table VI.
[6]Starting with 1999 data, cause of death is coded according to ICD–10. To estimate change between 1998 and 1999, compare the 1999 rate with the comparability-modified rate for 1998. See Appendix II, Comparability ratio and tables V and VI.
[7]Figures include September 11, 2001-related deaths for which death certificates were filed as of October 24, 2002. See Appendix II table V for terrorism-related ICD–10 codes.

NOTES: Based on data from 43–47 States and the District of Columbia. Death rates for age groups 65 years and over are not shown because reporting quality of educational attainment on the death certificate is poorer at older than younger ages. See Appendix II, Education, for information about reporting states and sources of bias in death rates by educational attainment. 1999–2003 injury data were revised and may differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from unpublished population estimates prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census.

## Table 35 (page 1 of 4). Death rates for all causes, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1] | 1960[1] | 1970 | 1980 | 1990 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[2] | 1,446.0 | 1,339.2 | 1,222.6 | 1,039.1 | 938.7 | 869.0 | 845.3 | 832.7 |
| All ages, crude | 963.8 | 954.7 | 945.3 | 878.3 | 863.8 | 854.0 | 847.3 | 841.9 |
| Under 1 year | 3,299.2 | 2,696.4 | 2,142.4 | 1,288.3 | 971.9 | 736.7 | 695.0 | 700.0 |
| 1–4 years | 139.4 | 109.1 | 84.5 | 63.9 | 46.8 | 32.4 | 31.2 | 31.5 |
| 5–14 years | 60.1 | 46.6 | 41.3 | 30.6 | 24.0 | 18.0 | 17.4 | 17.0 |
| 15–24 years | 128.1 | 106.3 | 127.7 | 115.4 | 99.2 | 79.9 | 81.4 | 81.5 |
| 25–34 years | 178.7 | 146.4 | 157.4 | 135.5 | 139.2 | 101.4 | 103.6 | 103.6 |
| 35–44 years | 358.7 | 299.4 | 314.5 | 227.9 | 223.2 | 198.9 | 202.9 | 201.6 |
| 45–54 years | 853.9 | 756.0 | 730.0 | 584.0 | 473.4 | 425.6 | 430.1 | 433.2 |
| 55–64 years | 1,901.0 | 1,735.1 | 1,658.8 | 1,346.3 | 1,196.9 | 992.2 | 952.4 | 940.9 |
| 65–74 years | 4,104.3 | 3,822.1 | 3,582.7 | 2,994.9 | 2,648.6 | 2,399.1 | 2,314.7 | 2,255.0 |
| 75–84 years | 9,331.1 | 8,745.2 | 8,004.4 | 6,692.6 | 6,007.2 | 5,666.5 | 5,556.9 | 5,463.1 |
| 85 years and over | 20,196.9 | 19,857.5 | 16,344.9 | 15,980.3 | 15,327.4 | 15,524.4 | 14,828.3 | 14,593.3 |
| Male | | | | | | | | |
| All ages, age adjusted[2] | 1,674.2 | 1,609.0 | 1,542.1 | 1,348.1 | 1,202.8 | 1,053.8 | 1,013.7 | 994.3 |
| All ages, crude | 1,106.1 | 1,104.5 | 1,090.3 | 976.9 | 918.4 | 853.0 | 846.6 | 840.3 |
| Under 1 year | 3,728.0 | 3,059.3 | 2,410.0 | 1,428.5 | 1,082.8 | 806.5 | 761.5 | 777.4 |
| 1–4 years | 151.7 | 119.5 | 93.2 | 72.6 | 52.4 | 35.9 | 35.2 | 35.1 |
| 5–14 years | 70.9 | 55.7 | 50.5 | 36.7 | 28.5 | 20.9 | 20.0 | 19.8 |
| 15–24 years | 167.9 | 152.1 | 188.5 | 172.3 | 147.4 | 114.9 | 117.3 | 116.5 |
| 25–34 years | 216.5 | 187.9 | 215.3 | 196.1 | 204.3 | 138.6 | 142.2 | 141.4 |
| 35–44 years | 428.8 | 372.8 | 402.6 | 299.2 | 310.4 | 255.2 | 257.5 | 255.0 |
| 45–54 years | 1,067.1 | 992.2 | 958.5 | 767.3 | 610.3 | 542.8 | 547.5 | 552.2 |
| 55–64 years | 2,395.3 | 2,309.5 | 2,282.7 | 1,815.1 | 1,553.4 | 1,230.7 | 1,184.0 | 1,165.5 |
| 65–74 years | 4,931.4 | 4,914.4 | 4,873.8 | 4,105.2 | 3,491.5 | 2,979.6 | 2,855.3 | 2,771.7 |
| 75–84 years | 10,426.0 | 10,178.4 | 10,010.2 | 8,816.7 | 7,888.6 | 6,972.6 | 6,760.5 | 6,641.8 |
| 85 years and over | 21,636.0 | 21,186.3 | 17,821.5 | 18,801.1 | 18,056.6 | 17,501.4 | 16,254.5 | 15,794.0 |
| Female | | | | | | | | |
| All ages, age adjusted[2] | 1,236.0 | 1,105.3 | 971.4 | 817.9 | 750.9 | 731.4 | 715.2 | 706.2 |
| All ages, crude | 823.5 | 809.2 | 807.8 | 785.3 | 812.0 | 855.0 | 848.0 | 843.4 |
| Under 1 year | 2,854.6 | 2,321.3 | 1,863.7 | 1,141.7 | 855.7 | 663.4 | 625.3 | 619.1 |
| 1–4 years | 126.7 | 98.4 | 75.4 | 54.7 | 41.0 | 28.7 | 27.0 | 27.8 |
| 5–14 years | 48.9 | 37.3 | 31.8 | 24.2 | 19.3 | 15.0 | 14.7 | 14.0 |
| 15–24 years | 89.1 | 61.3 | 68.1 | 57.5 | 49.0 | 43.1 | 43.7 | 44.4 |
| 25–34 years | 142.7 | 106.6 | 101.6 | 75.9 | 74.2 | 63.5 | 64.0 | 64.6 |
| 35–44 years | 290.3 | 229.4 | 231.1 | 159.3 | 137.9 | 143.2 | 148.8 | 148.5 |
| 45–54 years | 641.5 | 526.7 | 517.2 | 412.9 | 342.7 | 312.5 | 316.9 | 318.4 |
| 55–64 years | 1,404.8 | 1,196.4 | 1,098.9 | 934.3 | 878.8 | 772.2 | 738.0 | 732.7 |
| 65–74 years | 3,333.2 | 2,871.8 | 2,579.7 | 2,144.7 | 1,991.2 | 1,921.2 | 1,864.7 | 1,823.0 |
| 75–84 years | 8,399.6 | 7,633.1 | 6,677.6 | 5,440.1 | 4,883.1 | 4,814.7 | 4,757.9 | 4,675.5 |
| 85 years and over | 19,194.7 | 19,008.4 | 15,518.0 | 14,746.9 | 14,274.3 | 14,719.2 | 14,209.6 | 14,062.5 |
| White male[3] | | | | | | | | |
| All ages, age adjusted[2] | 1,642.5 | 1,586.0 | 1,513.7 | 1,317.6 | 1,165.9 | 1,029.4 | 992.9 | 973.9 |
| All ages, crude | 1,089.5 | 1,098.5 | 1,086.7 | 983.3 | 930.9 | 887.8 | 884.0 | 877.6 |
| Under 1 year | 3,400.5 | 2,694.1 | 2,113.2 | 1,230.3 | 896.1 | 667.6 | 650.9 | 658.7 |
| 1–4 years | 135.5 | 104.9 | 83.6 | 66.1 | 45.9 | 32.6 | 31.5 | 31.5 |
| 5–14 years | 67.2 | 52.7 | 48.0 | 35.0 | 26.4 | 19.8 | 18.4 | 18.4 |
| 15–24 years | 152.4 | 143.7 | 170.8 | 167.0 | 131.3 | 105.8 | 109.7 | 108.9 |
| 25–34 years | 185.3 | 163.2 | 176.6 | 171.3 | 176.1 | 124.1 | 128.3 | 128.8 |
| 35–44 years | 380.9 | 332.6 | 343.5 | 257.4 | 268.2 | 233.6 | 239.3 | 237.6 |
| 45–54 years | 984.5 | 932.2 | 882.9 | 698.9 | 548.7 | 496.9 | 505.4 | 509.2 |
| 55–64 years | 2,304.4 | 2,225.2 | 2,202.6 | 1,728.5 | 1,467.2 | 1,163.3 | 1,118.6 | 1,102.3 |
| 65–74 years | 4,864.9 | 4,848.4 | 4,810.1 | 4,035.7 | 3,397.7 | 2,905.7 | 2,795.4 | 2,707.3 |
| 75–84 years | 10,526.3 | 10,299.6 | 10,098.8 | 8,829.8 | 7,844.9 | 6,933.1 | 6,738.8 | 6,620.6 |
| 85 years and over | 22,116.3 | 21,750.0 | 18,551.7 | 19,097.3 | 18,268.3 | 17,716.4 | 16,473.2 | 16,037.9 |

See footnotes at end of table.



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## Table 35 (page 2 of 4). Death rates for all causes, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1] | 1960[1] | 1970 | 1980 | 1990 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Black or African American male[3] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[2] | 1,909.1 | 1,811.1 | 1,873.9 | 1,697.8 | 1,644.5 | 1,403.5 | 1,341.4 | 1,319.1 |
| All ages, crude | 1,257.7 | 1,181.7 | 1,186.6 | 1,034.1 | 1,008.0 | 834.1 | 816.7 | 813.7 |
| Under 1 year | --- | 5,306.8 | 4,298.9 | 2,586.7 | 2,112.4 | 1,567.6 | 1,351.5 | 1,410.0 |
| 1–4 years[4] | 1,412.6 | 208.5 | 150.5 | 110.5 | 85.8 | 54.5 | 54.4 | 53.7 |
| 5–14 years | 95.1 | 75.1 | 67.1 | 47.4 | 41.2 | 28.2 | 28.9 | 26.8 |
| 15–24 years | 289.7 | 212.0 | 320.6 | 209.1 | 252.2 | 181.4 | 172.6 | 171.3 |
| 25–34 years | 503.5 | 402.5 | 559.5 | 407.3 | 430.8 | 261.0 | 264.5 | 256.2 |
| 35–44 years | 878.1 | 762.0 | 956.6 | 689.8 | 699.6 | 453.0 | 434.7 | 426.7 |
| 45–54 years | 1,905.0 | 1,624.8 | 1,777.5 | 1,479.9 | 1,261.0 | 1,017.7 | 983.0 | 991.4 |
| 55–64 years | 3,773.2 | 3,316.4 | 3,256.9 | 2,873.0 | 2,618.4 | 2,080.1 | 2,039.2 | 2,011.2 |
| 65–74 years | 5,310.3 | 5,798.7 | 5,803.2 | 5,131.1 | 4,946.1 | 4,253.5 | 4,024.5 | 3,981.3 |
| 75–84 years[5] | 10,101.9 | 8,605.1 | 9,454.9 | 9,231.6 | 9,129.5 | 8,486.0 | 8,169.6 | 8,067.0 |
| 85 years and over | --- | 14,844.8 | 12,222.3 | 16,098.8 | 16,954.9 | 16,791.0 | 15,635.5 | 14,903.4 |
| American Indian or Alaska Native male[3] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | 1,111.5 | 916.2 | 841.5 | 794.2 | 797.0 |
| All ages, crude | --- | --- | --- | 597.1 | 476.4 | 415.6 | 439.6 | 457.6 |
| Under 1 year | --- | --- | --- | 1,598.1 | 1,056.6 | 700.2 | 896.8 | 911.5 |
| 1–4 years | --- | --- | --- | 82.7 | 77.4 | 44.9 | 48.3 | 57.3 |
| 5–14 years | --- | --- | --- | 43.7 | 33.4 | 20.2 | 22.0 | 29.3 |
| 15–24 years | --- | --- | --- | 311.1 | 219.8 | 136.2 | 145.1 | 153.1 |
| 25–34 years | --- | --- | --- | 360.6 | 256.1 | 179.1 | 193.1 | 185.3 |
| 35–44 years | --- | --- | --- | 556.8 | 365.4 | 295.2 | 321.5 | 338.1 |
| 45–54 years | --- | --- | --- | 871.3 | 619.9 | 520.0 | 539.4 | 583.6 |
| 55–64 years | --- | --- | --- | 1,547.5 | 1,211.3 | 1,090.4 | 1,059.2 | 1,058.3 |
| 65–74 years | --- | --- | --- | 2,968.4 | 2,461.7 | 2,478.3 | 2,366.5 | 2,237.3 |
| 75–84 years | --- | --- | --- | 5,607.0 | 5,389.2 | 5,351.2 | 4,748.3 | 4,644.0 |
| 85 years and over | --- | --- | --- | 12,635.2 | 11,243.9 | 10,725.8 | 9,219.2 | 9,583.8 |
| Asian or Pacific Islander male[3] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | 786.5 | 716.4 | 624.2 | 578.4 | 562.7 |
| All ages, crude | --- | --- | --- | 375.3 | 334.3 | 332.9 | 331.4 | 330.0 |
| Under 1 year | --- | --- | --- | 816.5 | 605.3 | 529.4 | 461.9 | 496.9 |
| 1–4 years | --- | --- | --- | 50.9 | 45.0 | 23.3 | 27.1 | 24.8 |
| 5–14 years | --- | --- | --- | 23.4 | 20.7 | 12.9 | 14.4 | 14.6 |
| 15–24 years | --- | --- | --- | 80.8 | 76.0 | 55.2 | 58.6 | 56.3 |
| 25–34 years | --- | --- | --- | 83.5 | 79.6 | 55.0 | 54.5 | 53.8 |
| 35–44 years | --- | --- | --- | 128.3 | 130.8 | 104.9 | 100.0 | 95.9 |
| 45–54 years | --- | --- | --- | 342.3 | 287.1 | 249.7 | 248.4 | 242.6 |
| 55–64 years | --- | --- | --- | 881.1 | 789.1 | 642.4 | 594.5 | 565.5 |
| 65–74 years | --- | --- | --- | 2,236.1 | 2,041.4 | 1,661.0 | 1,487.1 | 1,472.8 |
| 75–84 years | --- | --- | --- | 5,389.5 | 5,008.6 | 4,328.2 | 4,090.8 | 4,041.0 |
| 85 years and over | --- | --- | --- | 13,753.6 | 12,446.3 | 12,125.3 | 10,938.5 | 0,391.7 |
| Hispanic or Latino male[3,6] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | --- | 886.4 | 818.1 | 766.7 | 748.1 |
| All ages, crude | --- | --- | --- | --- | 411.6 | 331.3 | 328.7 | 330.7 |
| Under 1 year | --- | --- | --- | --- | 921.8 | 637.1 | 644.0 | 665.5 |
| 1–4 years | --- | --- | --- | --- | 53.8 | 31.5 | 34.2 | 33.8 |
| 5–14 years | --- | --- | --- | --- | 26.0 | 17.9 | 17.4 | 18.4 |
| 15–24 years | --- | --- | --- | --- | 159.3 | 107.7 | 114.4 | 112.9 |
| 25–34 years | --- | --- | --- | --- | 234.0 | 120.2 | 112.5 | 118.1 |
| 35–44 years | --- | --- | --- | --- | 341.8 | 211.0 | 192.5 | 189.8 |
| 45–54 years | --- | --- | --- | --- | 533.9 | 439.0 | 423.4 | 436.4 |
| 55–64 years | --- | --- | --- | --- | 1,123.7 | 965.7 | 937.4 | 920.8 |
| 65–74 years | --- | --- | --- | --- | 2,368.2 | 2,287.9 | 2,193.4 | 2,115.7 |
| 75–84 years | --- | --- | --- | --- | 5,369.1 | 5,395.3 | 5,043.5 | 4,948.5 |
| 85 years and over | --- | --- | --- | --- | 12,272.1 | 13,086.2 | 11,674.1 | 11,029.2 |

See footnotes at end of table.



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## Table 35 (page 3 of 4). Death rates for all causes, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1] | 1960[1] | 1970 | 1980 | 1990 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino male[6] | | | | | Deaths per 100,000 resident population | | | |
| All ages, age adjusted[2] | --- | --- | --- | --- | 1,170.9 | 1,035.4 | 1,002.2 | 984.0 |
| All ages, crude | --- | --- | --- | --- | 985.9 | 978.5 | 983.9 | 979.1 |
| Under 1 year | --- | --- | --- | --- | 865.4 | 658.7 | 643.5 | 647.2 |
| 1–4 years | --- | --- | --- | --- | 43.8 | 32.4 | 30.3 | 30.2 |
| 5–14 years | --- | --- | --- | --- | 25.7 | 20.0 | 18.3 | 18.1 |
| 15–24 years | --- | --- | --- | --- | 123.4 | 103.5 | 106.7 | 105.9 |
| 25–34 years | --- | --- | --- | --- | 165.3 | 123.0 | 130.9 | 129.9 |
| 35–44 years | --- | --- | --- | --- | 257.1 | 233.9 | 244.9 | 243.8 |
| 45–54 years | --- | --- | --- | --- | 544.5 | 497.7 | 509.9 | 513.2 |
| 55–64 years | --- | --- | --- | --- | 1,479.7 | 1,170.9 | 1,126.5 | 1,110.5 |
| 65–74 years | --- | --- | --- | --- | 3,434.5 | 2,930.5 | 2,824.1 | 2,738.5 |
| 75–84 years | --- | --- | --- | --- | 7,920.4 | 6,977.8 | 6,801.7 | 6,692.2 |
| 85 years and over | --- | --- | --- | --- | 18,505.4 | 17,853.2 | 16,641.9 | 16,234.4 |
| White female[3] | | | | | | | | |
| All ages, age adjusted[2] | 1,198.0 | 1,074.4 | 944.0 | 796.1 | 728.8 | 715.3 | 701.3 | 693.1 |
| All ages, crude | 803.3 | 800.9 | 812.6 | 806.1 | 846.9 | 912.3 | 907.0 | 902.3 |
| Under 1 year | 2,566.8 | 2,007.7 | 1,614.6 | 962.5 | 690.0 | 550.5 | 519.4 | 520.7 |
| 1–4 years | 112.2 | 85.2 | 66.1 | 49.3 | 36.1 | 25.5 | 24.5 | 25.5 |
| 5–14 years | 45.1 | 34.7 | 29.9 | 22.9 | 17.9 | 14.1 | 13.7 | 13.1 |
| 15–24 years | 71.5 | 54.9 | 61.6 | 55.5 | 45.9 | 41.1 | 42.4 | 43.2 |
| 25–34 years | 112.8 | 85.0 | 84.1 | 65.4 | 61.5 | 55.1 | 56.9 | 58.0 |
| 35–44 years | 235.8 | 191.1 | 193.3 | 138.2 | 117.4 | 125.7 | 133.2 | 132.9 |
| 45–54 years | 546.4 | 458.8 | 462.9 | 372.7 | 309.3 | 281.4 | 286.8 | 287.2 |
| 55–64 years | 1,293.8 | 1,078.9 | 1,014.9 | 876.2 | 822.7 | 730.9 | 698.7 | 693.7 |
| 65–74 years | 3,242.8 | 2,779.3 | 2,470.7 | 2,066.6 | 1,923.5 | 1,868.3 | 1,819.7 | 1,780.6 |
| 75–84 years | 8,481.5 | 7,696.6 | 6,698.7 | 5,401.7 | 4,839.1 | 4,785.3 | 4,742.5 | 4,671.6 |
| 85 years and over | 19,679.5 | 19,477.7 | 15,980.2 | 14,979.6 | 14,400.6 | 14,890.7 | 14,382.8 | 14,240.6 |
| Black or African American female[3] | | | | | | | | |
| All ages, age adjusted[2] | 1,545.5 | 1,369.7 | 1,228.7 | 1,033.3 | 975.1 | 927.6 | 901.8 | 885.6 |
| All ages, crude | 1,002.0 | 905.0 | 829.2 | 733.3 | 747.9 | 733.0 | 724.4 | 717.9 |
| Under 1 year | --- | 4,162.2 | 3,368.8 | 2,123.7 | 1,735.5 | 1,279.8 | 1,172.0 | 1,132.2 |
| 1–4 years[4] | 1,139.3 | 173.3 | 129.4 | 84.4 | 67.6 | 45.3 | 39.5 | 39.7 |
| 5–14 years | 72.8 | 53.8 | 43.8 | 30.5 | 27.5 | 20.0 | 19.9 | 18.9 |
| 15–24 years | 213.1 | 107.5 | 111.9 | 70.5 | 68.7 | 58.3 | 54.4 | 54.0 |
| 25–34 years | 393.3 | 273.2 | 231.0 | 150.0 | 159.5 | 121.8 | 116.4 | 113.5 |
| 35–44 years | 758.1 | 568.5 | 533.0 | 323.9 | 298.6 | 271.9 | 272.3 | 270.0 |
| 45–54 years | 1,576.4 | 1,177.0 | 1,043.9 | 768.2 | 639.4 | 588.3 | 579.4 | 582.3 |
| 55–64 years | 3,089.4 | 2,510.9 | 1,986.2 | 1,561.0 | 1,452.6 | 1,227.2 | 1,184.2 | 1,178.8 |
| 65–74 years | 4,000.2 | 4,064.2 | 3,860.9 | 3,057.4 | 2,865.7 | 2,689.6 | 2,545.0 | 2,487.2 |
| 75–84 years[5] | 8,347.0 | 6,730.0 | 6,691.5 | 6,212.1 | 5,688.3 | 5,696.5 | 5,584.4 | 5,385.5 |
| 85 years and over | --- | 13,052.6 | 10,706.6 | 12,367.2 | 13,309.5 | 13,941.3 | 13,734.2 | 13,616.7 |
| American Indian or Alaska Native female[3] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | 662.4 | 561.8 | 604.5 | 581.1 | 592.1 |
| All ages, crude | --- | --- | --- | 380.1 | 330.4 | 346.1 | 367.7 | 387.7 |
| Under 1 year | --- | --- | --- | 1,352.6 | 688.7 | 492.2 | 744.1 | 676.2 |
| 1–4 years | --- | --- | --- | 87.5 | 37.8 | 39.8 | 42.0 | 43.0 |
| 5–14 years | --- | --- | --- | 33.5 | 25.5 | 17.7 | 21.2 | 17.9 |
| 15–24 years | --- | --- | --- | 90.3 | 69.0 | 58.9 | 61.7 | 61.5 |
| 25–34 years | --- | --- | --- | 178.5 | 102.3 | 84.8 | 87.5 | 88.7 |
| 35–44 years | --- | --- | --- | 286.0 | 156.4 | 171.9 | 176.8 | 196.0 |
| 45–54 years | --- | --- | --- | 491.4 | 380.9 | 284.9 | 324.7 | 364.4 |
| 55–64 years | --- | --- | --- | 837.1 | 805.9 | 772.1 | 747.5 | 785.0 |
| 65–74 years | --- | --- | --- | 1,765.5 | 1,679.4 | 1,899.8 | 1,828.9 | 1,710.7 |
| 75–84 years | --- | --- | --- | 3,612.9 | 3,073.2 | 3,850.0 | 3,667.4 | 3,834.3 |
| 85 years and over | --- | --- | --- | 8,567.4 | 8,201.1 | 9,118.2 | 7,866.4 | 7,920.2 |

See footnotes at end of table.



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## Table 35 (page 4 of 4). Death rates for all causes, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1] | 1960[1] | 1970 | 1980 | 1990 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Asian or Pacific Islander female[3] | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[2] | --- | --- | --- | 425.9 | 469.3 | 416.8 | 395.9 | 392.7 |
| All ages, crude | --- | --- | --- | 222.5 | 234.3 | 262.3 | 269.7 | 279.2 |
| Under 1 year | --- | --- | --- | 755.8 | 518.2 | 434.3 | 391.4 | 427.5 |
| 1–4 years | --- | --- | --- | 35.4 | 32.0 | 20.0 | 19.6 | 20.1 |
| 5–14 years | --- | --- | --- | 21.5 | 13.0 | 11.7 | 10.4 | 11.5 |
| 15–24 years | --- | --- | --- | 32.3 | 28.8 | 22.4 | 23.8 | 28.8 |
| 25–34 years | --- | --- | --- | 45.4 | 37.5 | 27.6 | 26.6 | 29.9 |
| 35–44 years | --- | --- | --- | 89.7 | 69.9 | 65.6 | 53.9 | 58.2 |
| 45–54 years | --- | --- | --- | 214.1 | 182.7 | 155.5 | 149.5 | 150.8 |
| 55–64 years | --- | --- | --- | 440.8 | 483.4 | 390.9 | 372.0 | 359.2 |
| 65–74 years | --- | --- | --- | 1,027.7 | 1,089.2 | 996.4 | 1,024.7 | 989.9 |
| 75–84 years | --- | --- | --- | 2,833.6 | 3,127.9 | 2,882.4 | 2,713.6 | 2,681.8 |
| 85 years and over | --- | --- | --- | 7,923.3 | 10,254.0 | 9,052.2 | 8,400.6 | 8,329.2 |
| Hispanic or Latino female[3,6] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | --- | 537.1 | 546.0 | 518.3 | 515.8 |
| All ages, crude | --- | --- | --- | --- | 285.4 | 274.6 | 274.0 | 279.3 |
| Under 1 year | --- | --- | --- | --- | 746.6 | 553.6 | 539.1 | 552.4 |
| 1–4 years | --- | --- | --- | --- | 42.1 | 27.5 | 25.3 | 26.3 |
| 5–14 years | --- | --- | --- | --- | 17.3 | 13.4 | 13.5 | 12.8 |
| 15–24 years | --- | --- | --- | --- | 40.6 | 31.7 | 34.1 | 35.5 |
| 25–34 years | --- | --- | --- | --- | 62.9 | 43.4 | 40.0 | 43.0 |
| 35–44 years | --- | --- | --- | --- | 109.3 | 100.5 | 94.9 | 95.5 |
| 45–54 years | --- | --- | --- | --- | 253.3 | 223.8 | 219.8 | 219.1 |
| 55–64 years | --- | --- | --- | --- | 607.5 | 548.4 | 524.3 | 527.9 |
| 65–74 years | --- | --- | --- | --- | 1,453.8 | 1,423.2 | 1,368.7 | 1,342.9 |
| 75–84 years | --- | --- | --- | --- | 3,351.3 | 3,624.5 | 3,526.4 | 3,506.4 |
| 85 years and over | --- | --- | --- | --- | 10,098.7 | 11,202.8 | 10,186.0 | 10,128.1 |
| White, non-Hispanic or Latino female[6] | | | | | | | | |
| All ages, age adjusted[2] | --- | --- | --- | --- | 734.6 | 721.5 | 709.9 | 702.1 |
| All ages, crude | --- | --- | --- | --- | 903.6 | 1,007.3 | 1,010.6 | 1,007.6 |
| Under 1 year | --- | --- | --- | --- | 655.3 | 530.9 | 504.8 | 502.5 |
| 1–4 years | --- | --- | --- | --- | 34.0 | 24.4 | 23.8 | 24.9 |
| 5–14 years | --- | --- | --- | --- | 17.6 | 13.9 | 13.6 | 12.9 |
| 15–24 years | --- | --- | --- | --- | 46.0 | 42.6 | 43.8 | 44.3 |
| 25–34 years | --- | --- | --- | --- | 60.6 | 56.8 | 60.3 | 61.2 |
| 35–44 years | --- | --- | --- | --- | 116.8 | 128.1 | 138.3 | 138.0 |
| 45–54 years | --- | --- | --- | --- | 312.1 | 285.0 | 292.1 | 293.1 |
| 55–64 years | --- | --- | --- | --- | 834.5 | 742.1 | 710.5 | 705.0 |
| 65–74 years | --- | --- | --- | --- | 1,940.2 | 1,891.0 | 1,846.0 | 1,807.9 |
| 75–84 years | --- | --- | --- | --- | 4,887.3 | 4,819.3 | 4,787.9 | 4,720.5 |
| 85 years and over | --- | --- | --- | --- | 14,533.1 | 14,971.7 | 14,504.3 | 14,377.2 |

--- Data not available.

[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.

[2]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.

[3]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.

[4]In 1950 rate is for the age group under 5 years.

[5]In 1950 rate is for the age group 75 years and over.

[6]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. *Vital statistics rates in the United States, 1940–60.* Washington: U.S. Government Printing Office, 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 36 (page 1 of 3). Death rates for diseases of heart, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **All persons** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 586.8 | 559.0 | 492.7 | 412.1 | 321.8 | 257.6 | 240.8 | 232.3 |
| All ages, crude | 355.5 | 369.0 | 362.0 | 336.0 | 289.5 | 252.6 | 241.7 | 235.6 |
| Under 1 year | 3.5 | 6.6 | 13.1 | 22.8 | 20.1 | 13.0 | 12.4 | 11.0 |
| 1–4 years | 1.3 | 1.3 | 1.7 | 2.6 | 1.9 | 1.2 | 1.1 | 1.2 |
| 5–14 years | 2.1 | 1.3 | 0.8 | 0.9 | 0.9 | 0.7 | 0.6 | 0.6 |
| 15–24 years | 6.8 | 4.0 | 3.0 | 2.9 | 2.5 | 2.6 | 2.5 | 2.7 |
| 25–34 years | 19.4 | 15.6 | 11.4 | 8.3 | 7.6 | 7.4 | 7.9 | 8.2 |
| 35–44 years | 86.4 | 74.6 | 66.7 | 44.6 | 31.4 | 29.2 | 30.5 | 30.7 |
| 45–54 years | 308.6 | 271.8 | 238.4 | 180.2 | 120.5 | 94.2 | 93.7 | 92.5 |
| 55–64 years | 808.1 | 737.9 | 652.3 | 494.1 | 367.3 | 261.2 | 241.5 | 233.2 |
| 65–74 years | 1,839.8 | 1,740.5 | 1,558.2 | 1,218.6 | 894.3 | 665.6 | 615.9 | 585.0 |
| 75–84 years | 4,310.1 | 4,089.4 | 3,683.8 | 2,993.1 | 2,295.7 | 1,780.3 | 1,677.2 | 1,611.1 |
| 85 years and over | 9,150.6 | 9,317.8 | 7,891.3 | 7,777.1 | 6,739.9 | 5,926.1 | 5,446.8 | 5,278.4 |
| **Male** | | | | | | | | |
| All ages, age adjusted[4] | 697.0 | 687.6 | 634.0 | 538.9 | 412.4 | 320.0 | 297.4 | 286.6 |
| All ages, crude | 423.4 | 439.5 | 422.5 | 368.6 | 297.6 | 249.8 | 240.7 | 235.0 |
| Under 1 year | 4.0 | 7.8 | 15.1 | 25.5 | 21.9 | 13.3 | 12.9 | 12.1 |
| 1–4 years | 1.4 | 1.4 | 1.9 | 2.8 | 1.9 | 1.4 | 1.1 | 1.1 |
| 5–14 years | 2.0 | 1.4 | 0.9 | 1.0 | 0.9 | 0.8 | 0.7 | 0.7 |
| 15–24 years | 6.8 | 4.2 | 3.7 | 3.7 | 3.1 | 3.2 | 3.3 | 3.4 |
| 25–34 years | 22.9 | 20.1 | 15.2 | 11.4 | 10.3 | 9.6 | 10.5 | 10.5 |
| 35–44 years | 118.4 | 112.7 | 103.2 | 68.7 | 48.1 | 41.4 | 43.1 | 42.8 |
| 45–54 years | 440.5 | 420.4 | 376.4 | 282.6 | 183.0 | 140.2 | 138.4 | 136.2 |
| 55–64 years | 1,104.5 | 1,066.9 | 987.2 | 746.8 | 537.3 | 371.7 | 343.4 | 331.7 |
| 65–74 years | 2,292.3 | 2,291.3 | 2,170.3 | 1,728.0 | 1,250.0 | 898.3 | 827.1 | 785.3 |
| 75–84 years | 4,825.0 | 4,742.4 | 4,534.8 | 3,834.3 | 2,968.2 | 2,248.1 | 2,110.1 | 2,030.3 |
| 85 years and over | 9,659.8 | 9,788.9 | 8,426.2 | 8,752.7 | 7,418.4 | 6,430.0 | 5,823.5 | 5,621.5 |
| **Female** | | | | | | | | |
| All ages, age adjusted[4] | 484.7 | 447.0 | 381.6 | 320.8 | 257.0 | 210.9 | 197.2 | 190.3 |
| All ages, crude | 288.4 | 300.6 | 304.5 | 305.1 | 281.8 | 255.3 | 242.7 | 236.2 |
| Under 1 year | 2.9 | 5.4 | 10.9 | 20.0 | 18.3 | 12.5 | 11.8 | 9.8 |
| 1–4 years | 1.2 | 1.1 | 1.6 | 2.5 | 1.9 | 1.0 | 1.0 | 1.3 |
| 5–14 years | 2.2 | 1.2 | 0.8 | 0.9 | 0.8 | 0.5 | 0.6 | 0.5 |
| 15–24 years | 6.7 | 3.7 | 2.3 | 2.1 | 1.8 | 2.1 | 1.7 | 2.1 |
| 25–34 years | 16.2 | 11.3 | 7.7 | 5.3 | 5.0 | 5.2 | 5.2 | 5.7 |
| 35–44 years | 55.1 | 38.2 | 32.2 | 21.4 | 15.1 | 17.2 | 18.0 | 18.6 |
| 45–54 years | 177.2 | 127.5 | 109.9 | 84.5 | 61.0 | 49.8 | 50.6 | 50.2 |
| 55–64 years | 510.0 | 429.4 | 351.6 | 272.1 | 215.7 | 159.3 | 147.2 | 141.9 |
| 65–74 years | 1,419.3 | 1,261.3 | 1,082.7 | 828.6 | 616.8 | 474.0 | 440.1 | 417.5 |
| 75–84 years | 3,872.0 | 3,582.7 | 3,120.8 | 2,497.0 | 1,893.8 | 1,475.1 | 1,389.7 | 1,331.1 |
| 85 years and over | 8,796.1 | 9,016.8 | 7,591.8 | 7,350.5 | 6,478.1 | 5,720.9 | 5,283.3 | 5,126.7 |
| **White male[5]** | | | | | | | | |
| All ages, age adjusted[4] | 700.2 | 694.5 | 640.2 | 539.6 | 409.2 | 316.7 | 294.1 | 282.9 |
| All ages, crude | 433.0 | 454.6 | 438.3 | 384.0 | 312.7 | 265.8 | 256.0 | 249.5 |
| 45–54 years | 423.6 | 413.2 | 365.7 | 269.8 | 170.6 | 130.7 | 128.6 | 125.3 |
| 55–64 years | 1,081.7 | 1,056.0 | 979.3 | 730.6 | 516.7 | 351.8 | 324.0 | 313.2 |
| 65–74 years | 2,308.3 | 2,297.9 | 2,177.2 | 1,729.7 | 1,230.5 | 877.8 | 807.8 | 761.1 |
| 75–84 years | 4,907.3 | 4,839.9 | 4,617.6 | 3,883.2 | 2,983.4 | 2,247.0 | 2,112.0 | 2,030.1 |
| 85 years and over | 9,950.5 | 10,135.8 | 8,818.0 | 8,958.0 | 7,558.7 | 6,560.8 | 5,939.8 | 5,747.2 |
| **Black or African American male[5]** | | | | | | | | |
| All ages, age adjusted[4] | 639.4 | 615.2 | 607.3 | 561.4 | 485.4 | 392.5 | 371.0 | 364.3 |
| All ages, crude | 346.2 | 330.6 | 330.3 | 301.0 | 256.8 | 211.1 | 206.3 | 206.0 |
| 45–54 years | 622.5 | 514.0 | 512.8 | 433.4 | 328.9 | 247.2 | 246.0 | 248.1 |
| 55–64 years | 1,433.1 | 1,236.8 | 1,135.4 | 987.2 | 824.0 | 631.2 | 605.3 | 580.9 |
| 65–74 years | 2,139.1 | 2,281.4 | 2,237.8 | 1,847.2 | 1,632.9 | 1,268.8 | 1,192.7 | 1,195.5 |
| 75–84 years[5] | 4,106.1 | 3,533.6 | 3,783.4 | 3,578.8 | 3,107.1 | 2,597.6 | 2,449.6 | 2,426.6 |
| 85 years and over | --- | 6,037.9 | 5,367.6 | 6,819.5 | 6,479.6 | 5,633.5 | 5,125.7 | 4,850.3 |

See footnotes at end of table.



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## Table 36 (page 2 of 3). Death rates for diseases of heart, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **American Indian or Alaska Native male[5]** | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 320.5 | 264.1 | 222.2 | 201.2 | 203.2 |
| All ages, crude | --- | --- | --- | 130.6 | 108.0 | 90.1 | 92.0 | 98.5 |
| 45–54 years | --- | --- | --- | 238.1 | 173.8 | 108.5 | 104.2 | 116.7 |
| 55–64 years | --- | --- | --- | 496.3 | 411.0 | 285.0 | 273.2 | 293.5 |
| 65–74 years | --- | --- | --- | 1,009.4 | 839.1 | 748.2 | 638.4 | 655.6 |
| 75–84 years | --- | --- | --- | 2,062.2 | 1,788.8 | 1,655.7 | 1,422.7 | 1,309.9 |
| 85 years and over | --- | --- | --- | 4,413.7 | 3,860.3 | 3,318.3 | 3,162.4 | 3,266.5 |
| **Asian or Pacific Islander male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 286.9 | 220.7 | 185.5 | 169.8 | 158.3 |
| All ages, crude | --- | --- | --- | 119.8 | 88.7 | 90.6 | 89.4 | 86.3 |
| 45–54 years | --- | --- | --- | 112.0 | 70.4 | 61.1 | 60.6 | 62.7 |
| 55–64 years | --- | --- | --- | 306.7 | 226.1 | 182.6 | 154.2 | 152.9 |
| 65–74 years | --- | --- | --- | 852.4 | 623.5 | 482.5 | 422.4 | 398.3 |
| 75–84 years | --- | --- | --- | 2,010.9 | 1,642.2 | 1,354.7 | 1,252.4 | 1,145.1 |
| 85 years and over | --- | --- | --- | 5,923.0 | 4,617.8 | 4,154.2 | 3,841.3 | 3,524.6 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 270.0 | 238.2 | 219.8 | 206.8 |
| All ages, crude | --- | --- | --- | --- | 91.0 | 74.7 | 74.0 | 72.2 |
| 45–54 years | --- | --- | --- | --- | 116.4 | 84.3 | 80.5 | 79.6 |
| 55–64 years | --- | --- | --- | --- | 363.0 | 264.8 | 256.0 | 235.6 |
| 65–74 years | --- | --- | --- | --- | 829.9 | 684.8 | 657.7 | 625.0 |
| 75–84 years | --- | --- | --- | --- | 1,971.3 | 1,733.2 | 1,599.5 | 1,543.5 |
| 85 years and over | --- | --- | --- | --- | 4,711.9 | 4,897.5 | 4,301.8 | 3,874.5 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 413.6 | 319.9 | 297.7 | 286.9 |
| All ages, crude | --- | --- | --- | --- | 336.5 | 297.5 | 289.2 | 282.9 |
| 45–54 years | --- | --- | --- | --- | 172.8 | 134.3 | 133.1 | 129.8 |
| 55–64 years | --- | --- | --- | --- | 521.3 | 356.3 | 327.6 | 317.7 |
| 65–74 years | --- | --- | --- | --- | 1,243.4 | 885.1 | 813.5 | 767.3 |
| 75–84 years | --- | --- | --- | --- | 3,007.7 | 2,261.9 | 2,129.9 | 2,049.9 |
| 85 years and over | --- | --- | --- | --- | 7,663.4 | 6,606.6 | 5,994.1 | 5,821.0 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 478.0 | 441.7 | 376.7 | 315.9 | 250.9 | 205.6 | 192.1 | 185.4 |
| All ages, crude | 289.4 | 306.5 | 313.8 | 319.2 | 298.4 | 274.5 | 261.0 | 253.8 |
| 45–54 years | 141.9 | 103.4 | 91.4 | 71.2 | 50.2 | 40.9 | 41.7 | 41.1 |
| 55–64 years | 460.2 | 383.0 | 317.7 | 248.1 | 192.4 | 141.3 | 130.6 | 125.2 |
| 65–74 years | 1,400.9 | 1,229.8 | 1,044.0 | 796.7 | 583.6 | 445.2 | 414.7 | 392.0 |
| 75–84 years | 3,925.2 | 3,629.7 | 3,143.5 | 2,493.6 | 1,874.3 | 1,452.4 | 1,368.2 | 1,315.2 |
| 85 years and over | 9,084.7 | 9,280.8 | 7,839.9 | 7,501.6 | 6,563.4 | 5,801.4 | 5,350.6 | 5,193.6 |
| **Black or African American female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 536.9 | 488.9 | 435.6 | 378.6 | 327.5 | 277.6 | 263.2 | 253.8 |
| All ages, crude | 287.6 | 268.5 | 261.0 | 249.7 | 237.0 | 212.6 | 205.0 | 200.0 |
| 45–54 years | 525.3 | 360.7 | 290.9 | 202.4 | 155.3 | 125.0 | 124.9 | 124.1 |
| 55–64 years | 1,210.2 | 952.3 | 710.5 | 530.1 | 442.0 | 332.8 | 312.3 | 304.7 |
| 65–74 years | 1,659.4 | 1,680.5 | 1,553.2 | 1,210.3 | 1,017.5 | 815.2 | 734.0 | 712.0 |
| 75–84 years[6] | 3,499.3 | 2,926.9 | 2,964.1 | 2,707.2 | 2,250.9 | 1,913.1 | 1,821.9 | 1,699.6 |
| 85 years and over | --- | 5,650.0 | 5,003.8 | 5,796.5 | 5,766.1 | 5,298.7 | 5,111.2 | 4,976.5 |

See footnotes at end of table.



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## Table 36 (page 3 of 3). Death rates for diseases of heart, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| American Indian or Alaska Native female[5] | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 175.4 | 153.1 | 143.6 | 123.6 | 127.5 |
| All ages, crude | --- | --- | --- | 80.3 | 77.5 | 71.9 | 68.5 | 75.9 |
| 45–54 years | --- | --- | --- | 65.2 | 62.0 | 40.2 | 29.7 | 45.4 |
| 55–64 years | --- | --- | --- | 193.5 | 197.0 | 149.4 | 124.3 | 153.4 |
| 65–74 years | --- | --- | --- | 577.2 | 492.8 | 391.8 | 365.8 | 390.3 |
| 75–84 years | --- | --- | --- | 1,364.3 | 1,050.3 | 1,044.1 | 1,002.5 | 950.3 |
| 85 years and over | --- | --- | --- | 2,893.3 | 2,868.7 | 3,146.3 | 2,372.5 | 2,284.1 |
| Asian or Pacific Islander female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 132.3 | 149.2 | 115.7 | 108.1 | 104.2 |
| All ages, crude | --- | --- | --- | 57.0 | 62.0 | 65.0 | 67.4 | 68.2 |
| 45–54 years | --- | --- | --- | 28.6 | 17.5 | 15.9 | 16.4 | 14.8 |
| 55–64 years | --- | --- | --- | 92.9 | 99.0 | 68.8 | 61.8 | 60.3 |
| 65–74 years | --- | --- | --- | 313.3 | 323.9 | 229.6 | 239.9 | 207.2 |
| 75–84 years | --- | --- | --- | 1,053.2 | 1,130.9 | 866.2 | 796.9 | 769.7 |
| 85 years and over | --- | --- | --- | 3,211.0 | 4,161.2 | 3,367.2 | 3,067.4 | 3,020.0 |
| Hispanic or Latino female[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 177.2 | 163.7 | 149.7 | 145.8 |
| All ages, crude | --- | --- | --- | --- | 79.4 | 71.5 | 69.7 | 69.6 |
| 45–54 years | --- | --- | --- | --- | 43.5 | 28.2 | 30.2 | 27.0 |
| 55–64 years | --- | --- | --- | --- | 153.2 | 111.2 | 105.7 | 102.1 |
| 65–74 years | --- | --- | --- | --- | 460.4 | 366.3 | 346.4 | 330.6 |
| 75–84 years | --- | --- | --- | --- | 1,259.7 | 1,169.4 | 1,090.8 | 1,067.0 |
| 85 years and over | --- | --- | --- | --- | 4,440.3 | 4,605.8 | 4,032.8 | 3,962.5 |
| White, not Hispanic or Latino female[7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 252.6 | 206.8 | 193.7 | 187.1 |
| All ages, crude | --- | --- | --- | --- | 320.0 | 304.9 | 292.3 | 285.1 |
| 45–54 years | --- | --- | --- | --- | 50.2 | 41.9 | 42.6 | 42.4 |
| 55–64 years | --- | --- | --- | --- | 193.6 | 142.9 | 132.0 | 126.6 |
| 65–74 years | --- | --- | --- | --- | 584.7 | 448.5 | 417.4 | 394.8 |
| 75–84 years | --- | --- | --- | --- | 1,890.2 | 1,458.9 | 1,377.2 | 1,324.0 |
| 85 years and over | --- | --- | --- | --- | 6,615.2 | 5,822.7 | 5,384.5 | 5,232.2 |

--- Data not available.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. For the period 1980–98, diseases of heart was coded using ICD–9 codes that are most nearly comparable with diseases of heart codes in the 113 cause list for ICD–10. See Appendix II, table V. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/data/hy/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 37 (page 1 of 3). Death rates for cerebrovascular diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 180.7 | 177.9 | 147.7 | 96.2 | 65.3 | 60.9 | 56.2 | 53.5 |
| All ages, crude | 104.0 | 108.0 | 101.9 | 75.0 | 57.8 | 59.6 | 56.4 | 54.2 |
| Under 1 year | 5.1 | 4.1 | 5.0 | 4.4 | 3.8 | 3.3 | 2.9 | 2.5 |
| 1–4 years | 0.9 | 0.8 | 1.0 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 |
| 5–14 years | 0.5 | 0.7 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 15–24 years | 1.6 | 1.8 | 1.6 | 1.0 | 0.6 | 0.5 | 0.4 | 0.5 |
| 25–34 years | 4.2 | 4.7 | 4.5 | 2.6 | 2.2 | 1.5 | 1.4 | 1.5 |
| 35–44 years | 18.7 | 14.7 | 15.6 | 8.5 | 6.4 | 5.8 | 5.4 | 5.5 |
| 45–54 years | 70.4 | 49.2 | 41.6 | 25.2 | 18.7 | 16.0 | 15.1 | 15.0 |
| 55–64 years | 194.2 | 147.3 | 115.8 | 65.1 | 47.9 | 41.0 | 37.2 | 35.6 |
| 65–74 years | 554.7 | 469.2 | 384.1 | 219.0 | 144.2 | 128.6 | 120.3 | 112.9 |
| 75–84 years | 1,499.6 | 1,491.3 | 1,254.2 | 786.9 | 498.0 | 461.3 | 431.0 | 410.7 |
| 85 years and over | 2,990.1 | 3,680.5 | 3,014.3 | 2,283.7 | 1,628.9 | 1,589.2 | 1,445.9 | 1,370.1 |
| Male | | | | | | | | |
| All ages, age adjusted[4] | 186.4 | 186.1 | 157.4 | 102.2 | 68.5 | 62.4 | 56.5 | 54.1 |
| All ages, crude | 102.5 | 104.5 | 94.5 | 63.4 | 46.7 | 46.9 | 44.2 | 42.9 |
| Under 1 year | 6.4 | 5.0 | 5.8 | 5.0 | 4.4 | 3.8 | 3.2 | 2.8 |
| 1–4 years | 1.1 | 0.9 | 1.2 | 0.4 | 0.3 | * | 0.4 | 0.3 |
| 5–14 years | 0.5 | 0.7 | 0.8 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 15–24 years | 1.8 | 1.9 | 1.8 | 1.1 | 0.7 | 0.5 | 0.5 | 0.5 |
| 25–34 years | 4.2 | 4.5 | 4.4 | 2.6 | 2.1 | 1.5 | 1.4 | 1.6 |
| 35–44 years | 17.5 | 14.6 | 15.7 | 8.7 | 6.8 | 5.8 | 5.3 | 5.8 |
| 45–54 years | 67.9 | 52.2 | 44.4 | 27.2 | 20.5 | 17.5 | 16.7 | 16.7 |
| 55–64 years | 205.2 | 163.8 | 138.7 | 74.6 | 54.3 | 47.2 | 42.7 | 40.8 |
| 65–74 years | 589.6 | 530.7 | 449.5 | 258.6 | 166.6 | 145.0 | 135.0 | 127.8 |
| 75–84 years | 1,543.6 | 1,555.9 | 1,361.6 | 866.3 | 551.1 | 490.8 | 445.9 | 431.4 |
| 85 years and over | 3,048.6 | 3,643.1 | 2,895.2 | 2,193.6 | 1,528.5 | 1,484.3 | 1,317.9 | 1,236.0 |
| Female | | | | | | | | |
| All ages, age adjusted[4] | 175.8 | 170.7 | 140.0 | 91.7 | 62.6 | 59.1 | 55.2 | 52.3 |
| All ages, crude | 105.6 | 111.4 | 109.0 | 85.9 | 68.4 | 71.8 | 68.2 | 65.1 |
| Under 1 year | 3.7 | 3.2 | 4.0 | 3.8 | 3.1 | 2.7 | 2.5 | 2.2 |
| 1–4 years | 0.7 | 0.7 | 0.7 | 0.5 | 0.3 | 0.4 | 0.3 | 0.3 |
| 5–14 years | 0.4 | 0.6 | 0.6 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 |
| 15–24 years | 1.5 | 1.6 | 1.4 | 0.8 | 0.6 | 0.5 | 0.3 | 0.5 |
| 25–34 years | 4.3 | 4.9 | 4.7 | 2.6 | 2.2 | 1.5 | 1.4 | 1.4 |
| 35–44 years | 19.9 | 14.8 | 15.6 | 8.4 | 6.1 | 5.7 | 5.5 | 5.3 |
| 45–54 years | 72.9 | 46.3 | 39.0 | 23.3 | 17.0 | 14.5 | 13.6 | 13.4 |
| 55–64 years | 183.1 | 131.8 | 95.3 | 56.8 | 42.2 | 35.3 | 32.1 | 30.9 |
| 65–74 years | 522.1 | 415.7 | 333.3 | 188.7 | 126.7 | 115.1 | 108.1 | 100.5 |
| 75–84 years | 1,462.2 | 1,441.1 | 1,183.1 | 740.1 | 466.2 | 442.1 | 421.2 | 396.8 |
| 85 years and over | 2,949.4 | 3,704.4 | 3,081.0 | 2,323.1 | 1,667.6 | 1,632.0 | 1,501.5 | 1,429.4 |
| White male[5] | | | | | | | | |
| All ages, age adjusted[4] | 182.1 | 181.6 | 153.7 | 98.7 | 65.5 | 59.8 | 54.2 | 51.7 |
| All ages, crude | 100.5 | 102.7 | 93.5 | 63.1 | 46.9 | 48.4 | 45.7 | 44.2 |
| 45–54 years | 53.7 | 40.9 | 35.6 | 21.7 | 15.4 | 13.6 | 12.9 | 12.9 |
| 55–64 years | 182.2 | 139.0 | 119.9 | 64.0 | 45.7 | 39.7 | 35.6 | 33.3 |
| 65–74 years | 569.7 | 501.0 | 420.0 | 239.8 | 152.9 | 133.8 | 123.8 | 117.3 |
| 75–84 years | 1,556.3 | 1,564.8 | 1,361.6 | 852.7 | 539.2 | 480.0 | 437.5 | 422.4 |
| 85 years and over | 3,127.1 | 3,734.8 | 3,018.1 | 2,230.8 | 1,545.4 | 1,490.7 | 1,327.4 | 1,247.0 |
| Black or African American male[5] | | | | | | | | |
| All ages, age adjusted[4] | 228.8 | 238.5 | 206.4 | 142.0 | 102.2 | 89.6 | 81.7 | 79.5 |
| All ages, crude | 122.0 | 122.9 | 108.8 | 73.0 | 53.0 | 46.1 | 43.5 | 43.2 |
| 45–54 years | 211.9 | 166.1 | 136.1 | 82.1 | 68.4 | 49.5 | 46.5 | 46.9 |
| 55–64 years | 522.8 | 439.9 | 343.4 | 189.7 | 141.7 | 115.4 | 110.3 | 112.1 |
| 65–74 years | 783.6 | 899.2 | 780.1 | 472.3 | 326.9 | 268.5 | 262.9 | 237.4 |
| 75–84 years[5] | 1,504.9 | 1,475.2 | 1,445.7 | 1,066.3 | 721.5 | 659.2 | 587.8 | 588.9 |
| 85 years and over | --- | 2,700.0 | 1,963.1 | 1,873.2 | 1,421.5 | 1,458.8 | 1,252.2 | 1,180.3 |

See footnotes at end of table.



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## Table 37 (page 2 of 3). Death rates for cerebrovascular diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **American Indian or Alaska Native male[5]** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 66.4 | 44.3 | 46.1 | 37.1 | 34.9 |
| All ages, crude | --- | --- | --- | 23.1 | 16.0 | 16.8 | 15.4 | 15.6 |
| 45–54 years | --- | --- | --- | * | * | 13.3 | 15.4 | 15.5 |
| 55–64 years | --- | --- | --- | 72.0 | 39.8 | 48.6 | 34.5 | 30.7 |
| 65–74 years | --- | --- | --- | 170.5 | 120.3 | 144.7 | 96.6 | 101.4 |
| 75–84 years | --- | --- | --- | 523.9 | 325.9 | 373.3 | 276.4 | 280.7 |
| 85 years and over | --- | --- | --- | 1,384.7 | 949.8 | 834.9 | 768.3 | 596.9 |
| **Asian or Pacific Islander male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 71.4 | 59.1 | 58.0 | 50.8 | 48.5 |
| All ages, crude | --- | --- | --- | 28.7 | 23.3 | 27.2 | 25.9 | 26.0 |
| 45–54 years | --- | --- | --- | 17.0 | 15.6 | 15.0 | 14.9 | 14.7 |
| 55–64 years | --- | --- | --- | 59.9 | 51.8 | 49.3 | 40.4 | 42.2 |
| 65–74 years | --- | --- | --- | 197.9 | 167.9 | 135.6 | 112.9 | 128.3 |
| 75–84 years | --- | --- | --- | 619.5 | 483.9 | 438.7 | 390.3 | 355.7 |
| 85 years and over | --- | --- | --- | 1,399.0 | 1,196.6 | 1,415.6 | 1,233.6 | 1,093.0 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 46.5 | 50.5 | 44.3 | 43.0 |
| All ages, crude | --- | --- | --- | --- | 15.6 | 15.8 | 15.0 | 14.9 |
| 45–54 years | --- | --- | --- | --- | 20.0 | 18.1 | 18.6 | 18.1 |
| 55–64 years | --- | --- | --- | --- | 49.2 | 48.8 | 45.0 | 43.5 |
| 65–74 years | --- | --- | --- | --- | 126.4 | 136.1 | 124.6 | 113.9 |
| 75–84 years | --- | --- | --- | --- | 356.6 | 392.9 | 338.5 | 337.1 |
| 85 years and over | --- | --- | --- | --- | 866.3 | 1,029.9 | 856.7 | 837.4 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 66.3 | 59.9 | 54.4 | 51.9 |
| All ages, crude | --- | --- | --- | --- | 50.6 | 53.9 | 51.3 | 49.7 |
| 45–54 years | --- | --- | --- | --- | 14.9 | 13.0 | 12.1 | 12.1 |
| 55–64 years | --- | --- | --- | --- | 45.1 | 38.7 | 34.5 | 32.1 |
| 65–74 years | --- | --- | --- | --- | 154.5 | 133.1 | 123.2 | 116.9 |
| 75–84 years | --- | --- | --- | --- | 547.3 | 482.3 | 441.1 | 426.0 |
| 85 years and over | --- | --- | --- | --- | 1,578.7 | 1,505.9 | 1,345.9 | 1,264.2 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 169.7 | 165.0 | 135.5 | 89.0 | 60.3 | 57.3 | 53.4 | 50.5 |
| All ages, crude | 103.3 | 110.1 | 109.8 | 88.6 | 71.6 | 76.9 | 73.0 | 69.5 |
| 45–54 years | 55.0 | 33.8 | 30.5 | 18.6 | 13.5 | 11.2 | 10.4 | 10.0 |
| 55–64 years | 156.9 | 103.0 | 78.1 | 48.6 | 35.8 | 30.2 | 27.4 | 25.8 |
| 65–74 years | 498.1 | 383.3 | 303.2 | 172.5 | 116.1 | 107.3 | 99.5 | 92.1 |
| 75–84 years | 1,471.3 | 1,444.7 | 1,176.8 | 728.8 | 456.5 | 434.2 | 414.1 | 389.9 |
| 85 years and over | 3,017.9 | 3,795.7 | 3,167.6 | 2,362.7 | 1,685.9 | 1,646.7 | 1,516.9 | 1,442.1 |
| **Black or African American female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 238.4 | 232.5 | 189.3 | 119.6 | 84.0 | 76.2 | 71.8 | 69.8 |
| All ages, crude | 128.3 | 127.7 | 112.2 | 77.8 | 60.7 | 58.3 | 55.8 | 54.8 |
| 45–54 years | 248.9 | 166.2 | 119.4 | 61.8 | 44.1 | 38.1 | 35.7 | 36.0 |
| 55–64 years | 567.7 | 452.0 | 272.4 | 138.4 | 96.9 | 76.4 | 70.1 | 71.8 |
| 65–74 years | 754.4 | 830.5 | 673.5 | 361.7 | 236.7 | 190.9 | 181.2 | 175.3 |
| 75–84 years[6] | 1,496.7 | 1,413.1 | 1,338.3 | 917.5 | 595.0 | 549.2 | 532.2 | 498.3 |
| 85 years and over | --- | 2,578.9 | 2,210.5 | 1,891.6 | 1,495.2 | 1,556.5 | 1,434.3 | 1,414.2 |

See footnotes at end of table.



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## Table 37 (page 3 of 3). Death rates for cerebrovascular diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| American Indian or Alaska Native female[5] | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 51.2 | 38.4 | 43.7 | 38.0 | 34.2 |
| All ages, crude | --- | --- | --- | 22.0 | 19.3 | 21.5 | 21.5 | 19.9 |
| 45–54 years | --- | --- | --- | * | * | 14.4 | 13.5 | 14.6 |
| 55–64 years | --- | --- | --- | * | 40.7 | 37.9 | 33.1 | 26.0 |
| 65–74 years | --- | --- | --- | 128.3 | 100.5 | 79.5 | 112.4 | 94.8 |
| 75–84 years | --- | --- | --- | 404.2 | 282.0 | 391.1 | 304.8 | 304.7 |
| 85 years and over | --- | --- | --- | 1,095.5 | 776.2 | 931.5 | 689.9 | 569.1 |
| Asian or Pacific Islander female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 60.8 | 54.9 | 49.1 | 45.4 | 42.6 |
| All ages, crude | --- | --- | --- | 26.4 | 24.3 | 28.7 | 29.2 | 28.8 |
| 45–54 years | --- | --- | --- | 20.3 | 19.7 | 13.3 | 12.6 | 12.6 |
| 55–64 years | --- | --- | --- | 43.7 | 42.1 | 33.3 | 32.1 | 30.8 |
| 65–74 years | --- | --- | --- | 136.1 | 124.0 | 102.8 | 112.5 | 95.6 |
| 75–84 years | --- | --- | --- | 446.6 | 396.6 | 386.0 | 331.7 | 330.2 |
| 85 years and over | --- | --- | --- | 1,545.2 | 1,395.0 | 1,246.6 | 1,149.8 | 1,042.4 |
| Hispanic or Latino female[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 43.7 | 43.0 | 38.6 | 38.1 |
| All ages, crude | --- | --- | --- | --- | 20.1 | 19.4 | 18.4 | 18.6 |
| 45–54 years | --- | --- | --- | --- | 15.2 | 12.4 | 12.0 | 11.7 |
| 55–64 years | --- | --- | --- | --- | 38.5 | 31.9 | 27.6 | 27.8 |
| 65–74 years | --- | --- | --- | --- | 102.6 | 95.2 | 85.6 | 86.0 |
| 75–84 years | --- | --- | --- | --- | 308.5 | 311.3 | 307.2 | 302.8 |
| 85 years and over | --- | --- | --- | --- | 1,055.3 | 1,108.9 | 918.5 | 902.3 |
| White, not Hispanic or Latino female[7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 61.0 | 57.6 | 53.9 | 50.8 |
| All ages, crude | --- | --- | --- | --- | 77.2 | 85.5 | 82.1 | 78.2 |
| 45–54 years | --- | --- | --- | --- | 13.2 | 10.9 | 10.1 | 9.7 |
| 55–64 years | --- | --- | --- | --- | 35.7 | 29.9 | 27.2 | 25.5 |
| 65–74 years | --- | --- | --- | --- | 116.9 | 107.6 | 100.2 | 92.1 |
| 75–84 years | --- | --- | --- | --- | 461.9 | 438.3 | 418.4 | 393.6 |
| 85 years and over | --- | --- | --- | --- | 1,714.7 | 1,661.6 | 1,536.7 | 1,461.3 |

--- Data not available.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. For the period 1980–98, cerebrovascular diseases was coded using ICD–9 codes that are most nearly comparable with cerebrovascular diseases codes in the 113 cause list for ICD–10. See Appendix II, table V. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 38 (page 1 of 4). Death rates for malignant neoplasms, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 193.9 | 193.9 | 198.6 | 207.9 | 216.0 | 199.6 | 193.5 | 190.1 |
| All ages, crude | 139.8 | 149.2 | 162.8 | 183.9 | 203.2 | 196.5 | 193.2 | 191.5 |
| Under 1 year | 8.7 | 7.2 | 4.7 | 3.2 | 2.3 | 2.4 | 1.8 | 1.9 |
| 1–4 years | 11.7 | 10.9 | 7.5 | 4.5 | 3.5 | 2.7 | 2.6 | 2.5 |
| 5–14 years | 6.7 | 6.8 | 6.0 | 4.3 | 3.1 | 2.5 | 2.6 | 2.6 |
| 15–24 years | 8.6 | 8.3 | 8.3 | 6.3 | 4.9 | 4.4 | 4.3 | 4.0 |
| 25–34 years | 20.0 | 19.5 | 16.5 | 13.7 | 12.6 | 9.8 | 9.7 | 9.4 |
| 35–44 years | 62.7 | 59.7 | 59.5 | 48.6 | 43.3 | 36.6 | 35.8 | 35.0 |
| 45–54 years | 175.1 | 177.0 | 182.5 | 180.0 | 158.9 | 127.5 | 123.8 | 122.2 |
| 55–64 years | 390.7 | 396.8 | 423.0 | 436.1 | 449.6 | 366.7 | 351.1 | 343.0 |
| 65–74 years | 698.8 | 713.9 | 754.2 | 817.9 | 872.3 | 816.3 | 792.1 | 770.3 |
| 75–84 years | 1,153.3 | 1,127.4 | 1,169.2 | 1,232.3 | 1,348.5 | 1,335.6 | 1,311.9 | 1,302.5 |
| 85 years and over | 1,451.0 | 1,450.0 | 1,320.7 | 1,594.6 | 1,752.9 | 1,819.4 | 1,723.9 | 1,698.2 |
| Male | | | | | | | | |
| All ages, age adjusted[4] | 208.1 | 225.1 | 247.6 | 271.2 | 280.4 | 248.9 | 238.9 | 233.3 |
| All ages, crude | 142.9 | 162.5 | 182.1 | 205.3 | 221.3 | 207.2 | 203.8 | 201.3 |
| Under 1 year | 9.7 | 7.7 | 4.4 | 3.7 | 2.4 | 2.6 | 2.0 | 1.7 |
| 1–4 years | 12.5 | 12.4 | 8.3 | 5.2 | 3.7 | 3.0 | 2.7 | 2.8 |
| 5–14 years | 7.4 | 7.6 | 6.7 | 4.9 | 3.5 | 2.7 | 2.9 | 2.8 |
| 15–24 years | 9.7 | 10.2 | 10.4 | 7.8 | 5.7 | 5.1 | 4.9 | 4.6 |
| 25–34 years | 17.7 | 18.8 | 16.3 | 13.4 | 12.6 | 9.2 | 9.2 | 8.9 |
| 35–44 years | 45.6 | 48.9 | 53.0 | 44.0 | 38.5 | 32.7 | 31.5 | 30.8 |
| 45–54 years | 156.2 | 170.8 | 183.5 | 188.7 | 162.5 | 130.9 | 128.0 | 127.4 |
| 55–64 years | 413.1 | 459.9 | 511.8 | 520.8 | 532.9 | 415.8 | 399.8 | 386.8 |
| 65–74 years | 791.5 | 890.5 | 1,006.8 | 1,093.2 | 1,122.2 | 1,001.9 | 964.8 | 931.7 |
| 75–84 years | 1,332.6 | 1,389.4 | 1,588.3 | 1,790.5 | 1,914.4 | 1,760.6 | 1,711.3 | 1,695.4 |
| 85 years and over | 1,668.3 | 1,741.2 | 1,720.8 | 2,369.5 | 2,739.9 | 2,710.7 | 2,491.1 | 2,413.8 |
| Female | | | | | | | | |
| All ages, age adjusted[4] | 182.3 | 168.7 | 163.2 | 166.7 | 175.7 | 167.6 | 163.1 | 160.9 |
| All ages, crude | 136.8 | 136.4 | 144.4 | 163.6 | 186.0 | 186.2 | 183.0 | 182.0 |
| Under 1 year | 7.6 | 6.8 | 5.0 | 2.7 | 2.2 | 2.3 | 1.6 | 2.1 |
| 1–4 years | 10.8 | 9.3 | 6.7 | 3.7 | 3.2 | 2.5 | 2.4 | 2.1 |
| 5–14 years | 6.0 | 6.0 | 5.2 | 3.6 | 2.8 | 2.2 | 2.4 | 2.4 |
| 15–24 years | 7.6 | 6.5 | 6.2 | 4.8 | 4.1 | 3.6 | 3.6 | 3.4 |
| 25–34 years | 22.2 | 20.1 | 16.7 | 14.0 | 12.6 | 10.4 | 10.2 | 9.9 |
| 35–44 years | 79.3 | 70.0 | 65.6 | 53.1 | 48.1 | 40.4 | 40.0 | 39.1 |
| 45–54 years | 194.0 | 183.0 | 181.5 | 171.8 | 155.5 | 124.2 | 119.8 | 117.1 |
| 55–64 years | 368.2 | 337.7 | 343.2 | 361.7 | 375.2 | 321.3 | 306.0 | 302.3 |
| 65–74 years | 612.3 | 560.2 | 557.9 | 607.1 | 677.4 | 663.6 | 648.5 | 635.3 |
| 75–84 years | 1,000.7 | 924.1 | 891.9 | 903.1 | 1,010.3 | 1,058.5 | 1,046.7 | 1,040.1 |
| 85 years and over | 1,299.7 | 1,263.9 | 1,096.7 | 1,255.7 | 1,372.1 | 1,456.4 | 1,391.1 | 1,381.9 |
| White male[5] | | | | | | | | |
| All ages, age adjusted[4] | 210.0 | 224.7 | 244.8 | 265.1 | 272.2 | 243.9 | 235.2 | 230.1 |
| All ages, crude | 147.2 | 166.1 | 185.1 | 208.7 | 227.7 | 218.1 | 215.5 | 213.1 |
| 25–34 years | 17.7 | 18.8 | 16.2 | 13.6 | 12.3 | 9.2 | 9.1 | 8.9 |
| 35–44 years | 44.5 | 46.3 | 50.1 | 41.1 | 35.8 | 30.9 | 30.5 | 29.9 |
| 45–54 years | 150.8 | 164.1 | 172.0 | 175.4 | 149.9 | 123.5 | 121.8 | 119.9 |
| 55–64 years | 409.4 | 450.9 | 498.1 | 497.4 | 508.2 | 401.9 | 386.0 | 375.6 |
| 65–74 years | 798.7 | 887.3 | 997.0 | 1,070.7 | 1,090.7 | 984.3 | 954.8 | 922.7 |
| 75–84 years | 1,367.6 | 1,413.7 | 1,592.7 | 1,779.7 | 1,883.2 | 1,736.0 | 1,695.3 | 1,683.6 |
| 85 years and over | 1,732.7 | 1,791.4 | 1,772.2 | 2,375.6 | 2,715.1 | 2,693.7 | 2,486.8 | 2,412.1 |
| Black or African American male[5] | | | | | | | | |
| All ages, age adjusted[4] | 178.9 | 227.6 | 291.9 | 353.4 | 397.9 | 340.3 | 319.6 | 308.8 |
| All ages, crude | 106.6 | 136.7 | 171.6 | 205.5 | 221.9 | 188.5 | 181.5 | 178.3 |
| 25–34 years | 18.0 | 18.4 | 18.8 | 14.1 | 15.7 | 10.1 | 11.2 | 10.3 |
| 35–44 years | 55.7 | 72.9 | 81.3 | 73.8 | 64.3 | 48.4 | 43.0 | 41.7 |
| 45–54 years | 211.7 | 244.7 | 311.2 | 333.0 | 302.6 | 214.2 | 197.3 | 207.0 |
| 55–64 years | 490.8 | 579.7 | 689.2 | 812.5 | 859.2 | 626.4 | 610.3 | 583.8 |
| 65–74 years | 636.5 | 938.5 | 1,168.9 | 1,417.2 | 1,613.9 | 1,363.8 | 1,274.7 | 1,221.5 |
| 75–84 years[6] | 853.5 | 1,053.3 | 1,624.8 | 2,029.6 | 2,478.3 | 2,351.8 | 2,223.0 | 2,144.2 |
| 85 years and over | --- | 1,155.2 | 1,387.0 | 2,393.9 | 3,238.3 | 3,264.8 | 2,976.1 | 2,825.5 |

See footnotes at end of table.



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## Table 38 (page 2 of 4). Death rates for malignant neoplasms, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **American Indian or Alaska Native male[5]** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 140.5 | 145.8 | 155.8 | 141.9 | 139.9 |
| All ages, crude | --- | --- | --- | 58.1 | 61.4 | 67.0 | 70.4 | 70.3 |
| 25–34 years | --- | --- | --- | * | * | * | * | * |
| 35–44 years | --- | --- | --- | * | 22.8 | 21.4 | 18.9 | 19.0 |
| 45–54 years | --- | --- | --- | 86.9 | 86.9 | 70.3 | 76.1 | 81.9 |
| 55–64 years | --- | --- | --- | 213.4 | 246.2 | 255.6 | 261.4 | 222.7 |
| 65–74 years | --- | --- | --- | 613.0 | 530.6 | 648.0 | 604.9 | 565.4 |
| 75–84 years | --- | --- | --- | 936.4 | 1,038.4 | 1,152.5 | 1,069.3 | 995.2 |
| 85 years and over | --- | --- | --- | 1,471.2 | 1,654.4 | 1,584.2 | 1,036.3 | 1,459.1 |
| **Asian or Pacific Islander male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 165.2 | 172.5 | 150.8 | 137.9 | 137.2 |
| All ages, crude | --- | --- | --- | 81.9 | 82.7 | 85.2 | 84.0 | 84.2 |
| 25–34 years | --- | --- | --- | 6.3 | 9.2 | 7.4 | 7.9 | 7.6 |
| 35–44 years | --- | --- | --- | 29.4 | 27.7 | 26.1 | 22.7 | 21.7 |
| 45–54 years | --- | --- | --- | 108.2 | 92.6 | 78.5 | 82.8 | 77.0 |
| 55–64 years | --- | --- | --- | 298.5 | 274.6 | 229.2 | 224.7 | 196.1 |
| 65–74 years | --- | --- | --- | 581.2 | 687.2 | 559.4 | 481.7 | 498.1 |
| 75–84 years | --- | --- | --- | 1,147.6 | 1,229.9 | 1,086.1 | 1,012.7 | 1,056.9 |
| 85 years and over | --- | --- | --- | 1,798.7 | 1,837.0 | 1,823.2 | 1,544.3 | 1,545.6 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 174.7 | 171.7 | 161.4 | 156.5 |
| All ages, crude | --- | --- | --- | --- | 65.5 | 61.3 | 61.2 | 61.5 |
| 25–34 years | --- | --- | --- | --- | 8.0 | 6.9 | 6.3 | 6.8 |
| 35–44 years | --- | --- | --- | --- | 22.5 | 20.1 | 18.4 | 18.2 |
| 45–54 years | --- | --- | --- | --- | 96.6 | 79.4 | 78.4 | 81.1 |
| 55–64 years | --- | --- | --- | --- | 294.0 | 253.1 | 254.3 | 246.5 |
| 65–74 years | --- | --- | --- | --- | 655.5 | 651.2 | 622.3 | 617.6 |
| 75–84 years | --- | --- | --- | --- | 1,233.4 | 1,306.4 | 1,190.8 | 1,163.9 |
| 85 years and over | --- | --- | --- | --- | 2,019.4 | 2,049.7 | 1,869.0 | 1,668.6 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 276.7 | 247.7 | 239.6 | 234.6 |
| All ages, crude | --- | --- | --- | --- | 246.2 | 244.4 | 243.8 | 241.8 |
| 25–34 years | --- | --- | --- | --- | 12.8 | 9.7 | 9.8 | 9.4 |
| 35–44 years | --- | --- | --- | --- | 36.8 | 32.3 | 32.5 | 31.9 |
| 45–54 years | --- | --- | --- | --- | 153.9 | 127.2 | 125.9 | 123.8 |
| 55–64 years | --- | --- | --- | --- | 520.6 | 412.0 | 395.5 | 384.8 |
| 65–74 years | --- | --- | --- | --- | 1,109.0 | 1,002.1 | 975.3 | 942.0 |
| 75–84 years | --- | --- | --- | --- | 1,906.6 | 1,750.2 | 1,716.5 | 1,707.8 |
| 85 years and over | --- | --- | --- | --- | 2,744.4 | 2,714.1 | 2,507.7 | 2,441.7 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 182.0 | 167.7 | 162.5 | 165.2 | 174.0 | 166.9 | 162.4 | 160.2 |
| All ages, crude | 139.9 | 139.8 | 149.4 | 170.3 | 196.1 | 199.4 | 195.8 | 194.6 |
| 25–34 years | 20.9 | 18.8 | 16.3 | 13.5 | 11.9 | 10.1 | 9.9 | 9.4 |
| 35–44 years | 74.5 | 66.6 | 62.4 | 50.9 | 46.2 | 38.2 | 38.5 | 37.3 |
| 45–54 years | 185.8 | 175.7 | 177.3 | 166.4 | 150.9 | 120.1 | 115.3 | 112.1 |
| 55–64 years | 362.5 | 329.0 | 338.6 | 355.5 | 368.5 | 319.7 | 303.1 | 299.8 |
| 65–74 years | 616.5 | 562.1 | 554.7 | 605.2 | 675.1 | 665.6 | 650.4 | 638.9 |
| 75–84 years | 1,026.6 | 939.3 | 903.5 | 905.4 | 1,011.8 | 1,063.4 | 1,053.1 | 1,046.3 |
| 85 years and over | 1,348.3 | 1,304.9 | 1,126.6 | 1,266.8 | 1,372.3 | 1,459.1 | 1,395.1 | 1,386.5 |

See footnotes at end of table.



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## Table 38 (page 3 of 4). Death rates for malignant neoplasms, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Black or African American female[5] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 174.1 | 174.3 | 173.4 | 189.5 | 205.9 | 193.8 | 190.3 | 187.7 |
| All ages, crude | 111.8 | 113.8 | 117.3 | 136.5 | 156.1 | 151.8 | 151.7 | 151.4 |
| 25–34 years | 34.3 | 31.0 | 20.9 | 18.3 | 18.7 | 13.5 | 13.3 | 13.9 |
| 35–44 years | 119.8 | 102.4 | 94.6 | 73.5 | 67.4 | 58.9 | 56.2 | 55.4 |
| 45–54 years | 277.0 | 254.8 | 228.6 | 230.2 | 209.9 | 173.9 | 168.2 | 167.2 |
| 55–64 years | 484.6 | 442.7 | 404.8 | 450.4 | 482.4 | 391.0 | 385.4 | 380.4 |
| 65–74 years | 477.3 | 541.6 | 615.8 | 662.4 | 773.2 | 753.1 | 741.1 | 714.6 |
| 75–84 years[6] | 605.3 | 696.3 | 763.3 | 923.9 | 1,059.9 | 1,124.0 | 1,123.1 | 1,116.9 |
| 85 years and over | --- | 728.9 | 791.5 | 1,159.9 | 1,431.3 | 1,527.7 | 1,468.0 | 1,475.3 |
| American Indian or Alaska Native female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 94.0 | 106.9 | 108.3 | 112.9 | 105.6 |
| All ages, crude | --- | --- | --- | 50.4 | 62.1 | 61.3 | 71.0 | 68.2 |
| 25–34 years | --- | --- | --- | * | * | * | 9.4 | * |
| 35–44 years | --- | --- | --- | 36.9 | 31.0 | 23.7 | 23.6 | 24.3 |
| 45–54 years | --- | --- | --- | 96.9 | 104.5 | 59.7 | 80.6 | 75.7 |
| 55–64 years | --- | --- | --- | 198.4 | 213.3 | 200.9 | 202.5 | 195.8 |
| 65–74 years | --- | --- | --- | 350.8 | 438.9 | 458.3 | 473.2 | 411.2 |
| 75–84 years | --- | --- | --- | 446.4 | 554.3 | 714.0 | 703.9 | 784.4 |
| 85 years and over | --- | --- | --- | 786.5 | 843.7 | 983.2 | 1,001.2 | 686.0 |
| Asian or Pacific Islander female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 93.0 | 103.0 | 100.7 | 95.9 | 96.7 |
| All ages, crude | --- | --- | --- | 54.1 | 60.5 | 72.1 | 72.6 | 75.6 |
| 25–34 years | --- | --- | --- | 9.5 | 7.3 | 8.1 | 6.4 | 7.2 |
| 35–44 years | --- | --- | --- | 38.7 | 29.8 | 28.9 | 23.6 | 25.8 |
| 45–54 years | --- | --- | --- | 99.8 | 93.9 | 78.2 | 78.5 | 77.6 |
| 55–64 years | --- | --- | --- | 174.7 | 196.2 | 176.5 | 171.2 | 166.7 |
| 65–74 years | --- | --- | --- | 301.9 | 346.2 | 357.4 | 358.1 | 361.5 |
| 75–84 years | --- | --- | --- | 522.1 | 641.4 | 650.1 | 606.4 | 616.9 |
| 85 years and over | --- | --- | --- | 800.0 | 971.7 | 988.5 | 910.1 | 907.9 |
| Hispanic or Latino female[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 111.9 | 110.8 | 106.1 | 105.9 |
| All ages, crude | --- | --- | --- | --- | 60.7 | 58.5 | 58.1 | 59.1 |
| 25–34 years | --- | --- | --- | --- | 9.7 | 7.8 | 7.5 | 7.4 |
| 35–44 years | --- | --- | --- | --- | 34.8 | 30.7 | 28.4 | 28.0 |
| 45–54 years | --- | --- | --- | --- | 100.5 | 84.7 | 78.0 | 80.2 |
| 55–64 years | --- | --- | --- | --- | 205.4 | 192.5 | 179.8 | 185.9 |
| 65–74 years | --- | --- | --- | --- | 404.8 | 410.0 | 395.6 | 379.7 |
| 75–84 years | --- | --- | --- | --- | 663.0 | 716.5 | 692.2 | 702.1 |
| 85 years and over | --- | --- | --- | --- | 1,022.7 | 1,056.5 | 1,031.2 | 1,014.8 |

See footnotes at end of table.



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## Table 38 (page 4 of 4). Death rates for malignant neoplasms, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino female[7] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 177.5 | 170.0 | 165.9 | 163.8 |
| All ages, crude | --- | --- | --- | --- | 210.6 | 220.6 | 218.5 | 217.6 |
| 25–34 years | --- | --- | --- | --- | 11.9 | 10.5 | 10.3 | 9.8 |
| 35–44 years | --- | --- | --- | --- | 47.0 | 38.9 | 39.9 | 38.6 |
| 45–54 years | --- | --- | --- | --- | 154.9 | 123.0 | 118.7 | 115.1 |
| 55–64 years | --- | --- | --- | --- | 379.5 | 328.9 | 312.8 | 308.9 |
| 65–74 years | --- | --- | --- | --- | 688.5 | 681.0 | 667.7 | 657.6 |
| 75–84 years | --- | --- | --- | --- | 1,027.2 | 1,075.3 | 1,068.3 | 1,062.4 |
| 85 years and over | --- | --- | --- | --- | 1,385.7 | 1,468.7 | 1,405.4 | 1,399.1 |

--- Data not available.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. See Appendix II, tables IV and V. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 39 (page 1 of 3). Death rates for malignant neoplasms of trachea, bronchus, and lung, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 15.0 | 24.1 | 37.1 | 49.9 | 59.3 | 56.1 | 54.9 | 54.1 |
| All ages, crude | 12.2 | 20.3 | 32.1 | 45.8 | 56.8 | 55.3 | 54.7 | 54.4 |
| Under 25 years | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 25–34 years | 0.8 | 1.0 | 0.9 | 0.6 | 0.7 | 0.5 | 0.4 | 0.4 |
| 35–44 years | 4.5 | 6.8 | 11.0 | 9.2 | 6.8 | 6.1 | 6.0 | 5.6 |
| 45–54 years | 20.4 | 29.6 | 43.4 | 54.1 | 46.8 | 31.6 | 30.3 | 30.3 |
| 55–64 years | 48.7 | 75.3 | 109.1 | 138.2 | 160.6 | 122.4 | 115.3 | 111.0 |
| 65–74 years | 59.7 | 108.1 | 164.5 | 233.3 | 288.4 | 284.2 | 275.0 | 269.3 |
| 75–84 years | 55.8 | 91.5 | 163.2 | 240.5 | 333.3 | 370.8 | 377.6 | 377.8 |
| 85 years and over | 42.3 | 65.6 | 101.7 | 176.0 | 242.5 | 302.1 | 297.2 | 298.9 |
| Male | | | | | | | | |
| All ages, age adjusted[4] | 24.6 | 43.6 | 67.5 | 85.2 | 91.1 | 76.7 | 73.2 | 71.7 |
| All ages, crude | 19.9 | 35.4 | 53.4 | 68.6 | 75.1 | 65.5 | 63.7 | 62.9 |
| Under 25 years | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | * | 0.0 | * |
| 25–34 years | 1.1 | 1.4 | 1.3 | 0.8 | 0.9 | 0.5 | 0.4 | 0.4 |
| 35–44 years | 7.1 | 10.5 | 16.1 | 11.9 | 8.5 | 6.9 | 6.2 | 6.1 |
| 45–54 years | 35.0 | 50.6 | 67.5 | 76.0 | 59.7 | 38.5 | 36.6 | 36.5 |
| 55–64 years | 83.8 | 139.3 | 189.7 | 213.6 | 222.9 | 154.0 | 144.0 | 136.7 |
| 65–74 years | 98.7 | 204.3 | 320.8 | 403.9 | 430.4 | 377.9 | 355.9 | 346.6 |
| 75–84 years | 82.6 | 167.1 | 330.8 | 488.8 | 572.9 | 532.2 | 527.9 | 525.1 |
| 85 years and over | 62.5 | 107.7 | 194.0 | 368.1 | 513.2 | 521.2 | 482.2 | 475.1 |
| Female | | | | | | | | |
| All ages, age adjusted[4] | 5.8 | 7.5 | 13.1 | 24.4 | 37.1 | 41.3 | 41.6 | 41.3 |
| All ages, crude | 4.5 | 6.4 | 11.9 | 24.3 | 39.4 | 45.4 | 46.0 | 46.1 |
| Under 25 years | 0.1 | 0.0 | 0.0 | * | * | * | * | * |
| 25–34 years | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 35–44 years | 1.9 | 3.2 | 6.1 | 6.5 | 5.2 | 5.3 | 5.8 | 5.1 |
| 45–54 years | 5.8 | 9.2 | 21.0 | 33.7 | 34.5 | 25.0 | 24.3 | 24.4 |
| 55–64 years | 13.6 | 15.4 | 36.8 | 72.0 | 105.0 | 93.3 | 88.8 | 87.1 |
| 65–74 years | 23.3 | 24.4 | 43.1 | 102.7 | 177.6 | 206.9 | 207.7 | 204.8 |
| 75–84 years | 32.9 | 32.8 | 52.4 | 94.1 | 190.1 | 265.6 | 277.8 | 279.4 |
| 85 years and over | 28.2 | 38.8 | 50.0 | 91.9 | 138.1 | 212.8 | 217.0 | 221.0 |
| White male[5] | | | | | | | | |
| All ages, age adjusted[4] | 25.1 | 43.6 | 67.1 | 83.8 | 89.0 | 75.7 | 72.5 | 71.1 |
| All ages, crude | 20.8 | 36.4 | 54.6 | 70.2 | 77.8 | 69.4 | 67.7 | 66.9 |
| 45–54 years | 35.1 | 49.2 | 63.3 | 70.9 | 55.2 | 35.7 | 34.2 | 34.1 |
| 55–64 years | 85.4 | 139.2 | 186.8 | 205.6 | 213.7 | 150.8 | 139.3 | 133.1 |
| 65–74 years | 101.5 | 207.5 | 325.0 | 401.0 | 422.1 | 374.9 | 356.4 | 347.1 |
| 75–84 years | 85.5 | 170.4 | 336.7 | 493.5 | 572.2 | 529.9 | 527.8 | 524.6 |
| 85 years and over | 67.4 | 109.4 | 199.6 | 374.1 | 516.3 | 522.4 | 486.6 | 478.5 |
| Black or African American male[5] | | | | | | | | |
| All ages, age adjusted[4] | 17.8 | 42.6 | 75.4 | 107.6 | 125.4 | 101.1 | 95.0 | 92.4 |
| All ages, crude | 12.1 | 28.1 | 47.7 | 66.6 | 73.7 | 58.3 | 56.0 | 54.9 |
| 45–54 years | 34.4 | 68.4 | 115.4 | 133.8 | 114.9 | 70.7 | 64.6 | 63.6 |
| 55–64 years | 68.3 | 146.8 | 234.3 | 321.1 | 358.6 | 223.5 | 223.6 | 210.0 |
| 65–74 years | 53.8 | 168.3 | 300.5 | 472.3 | 585.4 | 488.8 | 444.6 | 427.1 |
| 75–84 years[6] | 36.2 | 107.3 | 271.6 | 472.9 | 645.4 | 642.5 | 626.2 | 622.2 |
| 85 years and over | --- | 82.8 | 137.0 | 311.3 | 499.5 | 562.8 | 484.6 | 502.5 |
| American Indian or Alaska Native male[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 31.7 | 47.5 | 42.9 | 41.3 | 37.6 |
| All ages, crude | --- | --- | --- | 14.2 | 20.0 | 18.1 | 19.8 | 19.4 |
| 45–54 years | --- | --- | --- | * | 26.6 | 14.5 | 14.9 | 17.1 |
| 55–64 years | --- | --- | --- | 72.0 | 97.8 | 86.0 | 92.7 | 79.2 |
| 65–74 years | --- | --- | --- | 202.8 | 194.3 | 184.8 | 185.2 | 186.0 |
| 75–84 years | --- | --- | --- | * | 356.2 | 367.9 | 326.2 | 284.9 |
| 85 years and over | --- | --- | --- | * | * | * | * | * |

See footnotes at end of table.



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## Table 39 (page 2 of 3). Death rates for malignant neoplasms of trachea, bronchus, and lung, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **Asian or Pacific Islander male[5]** | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 43.3 | 44.2 | 40.9 | 36.3 | 37.9 |
| All ages, crude | --- | --- | --- | 22.1 | 20.7 | 22.7 | 21.5 | 22.7 |
| 45–54 years | --- | --- | --- | 33.3 | 18.8 | 17.2 | 15.6 | 17.5 |
| 55–64 years | --- | --- | --- | 94.4 | 74.4 | 61.4 | 64.9 | 50.4 |
| 65–74 years | --- | --- | --- | 174.3 | 215.8 | 183.2 | 137.7 | 157.5 |
| 75–84 years | --- | --- | --- | 301.3 | 307.5 | 323.2 | 301.2 | 333.3 |
| 85 years and over | --- | --- | --- | * | 421.3 | 378.0 | 346.5 | 328.4 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 44.1 | 39.0 | 36.2 | 34.5 |
| All ages, crude | --- | --- | --- | --- | 16.2 | 13.3 | 13.1 | 12.8 |
| 45–54 years | --- | --- | --- | --- | 21.5 | 14.8 | 12.6 | 12.6 |
| 55–64 years | --- | --- | --- | --- | 80.7 | 58.6 | 60.7 | 55.4 |
| 65–74 years | --- | --- | --- | --- | 195.5 | 167.3 | 161.7 | 161.8 |
| 75–84 years | --- | --- | --- | --- | 313.4 | 327.5 | 299.1 | 277.3 |
| 85 years and over | --- | --- | --- | --- | 420.7 | 368.8 | 307.9 | 290.9 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 91.1 | 77.9 | 75.0 | 73.6 |
| All ages, crude | --- | --- | --- | --- | 84.7 | 78.9 | 77.8 | 77.3 |
| 45–54 years | --- | --- | --- | --- | 57.8 | 37.7 | 36.5 | 36.5 |
| 55–64 years | --- | --- | --- | --- | 221.0 | 157.7 | 145.7 | 139.4 |
| 65–74 years | --- | --- | --- | --- | 431.4 | 387.3 | 369.5 | 359.6 |
| 75–84 years | --- | --- | --- | --- | 580.4 | 537.7 | 538.3 | 537.0 |
| 85 years and over | --- | --- | --- | --- | 520.9 | 527.3 | 493.3 | 486.8 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 5.9 | 6.8 | 13.1 | 24.5 | 37.6 | 42.3 | 42.6 | 42.3 |
| All ages, crude | 4.7 | 5.9 | 12.3 | 25.6 | 42.4 | 49.9 | 50.7 | 50.7 |
| 45–54 years | 5.7 | 9.0 | 20.9 | 33.0 | 34.6 | 24.8 | 24.2 | 23.8 |
| 55–64 years | 13.7 | 15.1 | 37.2 | 71.9 | 105.7 | 96.1 | 91.0 | 89.8 |
| 65–74 years | 23.7 | 24.8 | 42.9 | 104.6 | 181.3 | 213.2 | 215.1 | 212.2 |
| 75–84 years | 34.0 | 32.7 | 52.6 | 95.2 | 194.6 | 272.7 | 285.8 | 286.6 |
| 85 years and over | 29.3 | 39.1 | 50.6 | 92.4 | 138.3 | 215.9 | 220.2 | 224.4 |
| **Black or African American female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 4.5 | 6.8 | 13.7 | 24.8 | 36.8 | 39.8 | 40.1 | 40.2 |
| All ages, crude | 2.8 | 4.3 | 9.4 | 18.3 | 28.1 | 30.8 | 31.6 | 32.0 |
| 45–54 years | 7.5 | 11.3 | 23.9 | 43.4 | 41.3 | 32.9 | 31.7 | 33.4 |
| 55–64 years | 12.9 | 17.9 | 33.5 | 79.9 | 117.9 | 95.3 | 95.3 | 91.0 |
| 65–74 years | 14.0 | 18.1 | 46.1 | 88.0 | 164.3 | 194.1 | 189.3 | 190.0 |
| 75–84 years[6] | * | 31.3 | 49.1 | 79.4 | 148.1 | 224.3 | 242.6 | 248.0 |
| 85 years and over | --- | 34.2 | 44.8 | 85.8 | 134.9 | 185.9 | 191.0 | 194.8 |
| **American Indian or Alaska Native female[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 11.7 | 19.3 | 24.8 | 27.1 | 26.4 |
| All ages, crude | --- | --- | --- | 6.0 | 11.2 | 14.0 | 16.4 | 16.4 |
| 45–54 years | --- | --- | --- | * | 22.9 | 12.1 | 11.4 | 15.1 |
| 55–64 years | --- | --- | --- | * | 53.7 | 52.6 | 52.5 | 42.5 |
| 65–74 years | --- | --- | --- | * | 78.5 | 151.5 | 162.8 | 147.8 |
| 75–84 years | --- | --- | --- | * | 111.8 | 136.3 | 163.4 | 190.1 |
| 85 years and over | --- | --- | --- | * | * | * | 168.3 | * |

See footnotes at end of table.



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## Table 39 (page 3 of 3). Death rates for malignant neoplasms of trachea, bronchus, and lung, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Asian or Pacific Islander female[5] | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 15.4 | 18.9 | 18.4 | 17.5 | 18.7 |
| All ages, crude | --- | --- | --- | 8.4 | 10.5 | 12.6 | 12.9 | 14.1 |
| 45–54 years | --- | --- | --- | 13.5 | 11.3 | 9.9 | 9.0 | 11.4 |
| 55–64 years | --- | --- | --- | 24.6 | 38.3 | 30.4 | 28.9 | 28.0 |
| 65–74 years | --- | --- | --- | 62.4 | 71.6 | 77.0 | 79.9 | 76.3 |
| 75–84 years | --- | --- | --- | 117.7 | 137.9 | 135.0 | 116.8 | 142.6 |
| 85 years and over | --- | --- | --- | * | 172.9 | 175.3 | 170.4 | 180.6 |
| Hispanic or Latino female[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 14.1 | 14.7 | 14.6 | 14.8 |
| All ages, crude | --- | --- | --- | --- | 7.2 | 7.2 | 7.6 | 7.8 |
| 45–54 years | --- | --- | --- | --- | 8.7 | 7.1 | 7.3 | 7.9 |
| 55–64 years | --- | --- | --- | --- | 25.1 | 22.2 | 23.2 | 22.4 |
| 65–74 years | --- | --- | --- | --- | 66.8 | 66.0 | 69.5 | 61.2 |
| 75–84 years | --- | --- | --- | --- | 94.3 | 112.3 | 104.6 | 119.6 |
| 85 years and over | --- | --- | --- | --- | 118.2 | 137.5 | 130.1 | 137.5 |
| White, not Hispanic or Latino female[7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 39.0 | 44.1 | 44.6 | 44.3 |
| All ages, crude | --- | --- | --- | --- | 46.2 | 56.4 | 57.9 | 58.1 |
| 45–54 years | --- | --- | --- | --- | 36.6 | 26.4 | 26.0 | 25.6 |
| 55–64 years | --- | --- | --- | --- | 111.3 | 102.2 | 96.8 | 95.7 |
| 65–74 years | --- | --- | --- | --- | 186.4 | 222.9 | 225.9 | 223.9 |
| 75–84 years | --- | --- | --- | --- | 199.1 | 279.2 | 294.3 | 295.1 |
| 85 years and over | --- | --- | --- | --- | 139.0 | 218.0 | 223.4 | 227.4 |

0.0 Quantity more than zero but less than 0.05.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
--- Data not available.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. For the period 1980–98, lung cancer was coded using ICD–9 codes that are most nearly comparable with lung cancer codes in the 113 cause list for ICD–10. See Appendix II, table V. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 40 (page 1 of 2). Death rates for malignant neoplasm of breast for females, according to race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All females | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 31.9 | 31.7 | 32.1 | 31.9 | 33.3 | 26.8 | 25.6 | 25.3 |
| All ages, crude | 24.7 | 26.1 | 28.4 | 30.6 | 34.0 | 29.2 | 28.3 | 28.2 |
| Under 25 years | * | * | * | * | * | * | * | * |
| 25–34 years | 3.8 | 3.8 | 3.9 | 3.3 | 2.9 | 2.3 | 2.1 | 2.1 |
| 35–44 years | 20.8 | 20.2 | 20.4 | 17.9 | 17.8 | 12.4 | 12.0 | 12.2 |
| 45–54 years | 46.9 | 51.4 | 52.6 | 48.1 | 45.4 | 33.0 | 31.4 | 30.4 |
| 55–64 years | 69.9 | 70.8 | 77.6 | 80.5 | 78.6 | 59.3 | 56.2 | 56.6 |
| 65–74 years | 95.0 | 90.0 | 93.8 | 101.1 | 111.7 | 88.3 | 84.4 | 82.6 |
| 75–84 years | 139.8 | 129.9 | 127.4 | 126.4 | 146.3 | 128.9 | 125.9 | 123.7 |
| 85 years and over | 195.5 | 191.9 | 157.1 | 169.3 | 196.8 | 205.7 | 191.5 | 189.4 |
| White[5] | | | | | | | | |
| All ages, age adjusted[4] | 32.4 | 32.0 | 32.5 | 32.1 | 33.2 | 26.3 | 25.0 | 24.7 |
| All ages, crude | 25.7 | 27.2 | 29.9 | 32.3 | 35.9 | 30.7 | 29.5 | 29.3 |
| 35–44 years | 20.8 | 19.7 | 20.2 | 17.3 | 17.1 | 11.3 | 10.7 | 11.1 |
| 45–54 years | 47.1 | 51.2 | 53.0 | 48.1 | 44.3 | 31.2 | 29.4 | 28.4 |
| 55–64 years | 70.9 | 71.8 | 79.3 | 81.3 | 78.5 | 57.9 | 55.0 | 54.9 |
| 65–74 years | 96.3 | 91.6 | 95.9 | 103.7 | 113.3 | 89.3 | 84.6 | 82.6 |
| 75–84 years | 143.6 | 132.8 | 129.6 | 128.4 | 148.2 | 130.2 | 126.5 | 124.6 |
| 85 years and over | 204.2 | 199.7 | 161.9 | 171.7 | 198.0 | 205.5 | 192.6 | 189.4 |
| Black or African American[5] | | | | | | | | |
| All ages, age adjusted[4] | 25.3 | 27.9 | 28.9 | 31.7 | 38.1 | 34.5 | 34.0 | 34.0 |
| All ages, crude | 16.4 | 18.7 | 19.7 | 22.9 | 29.0 | 27.9 | 28.2 | 28.5 |
| 35–44 years | 21.0 | 24.8 | 24.4 | 24.1 | 25.8 | 20.9 | 22.0 | 20.8 |
| 45–54 years | 46.5 | 54.4 | 52.0 | 52.7 | 60.5 | 51.5 | 49.8 | 48.9 |
| 55–64 years | 64.3 | 63.2 | 64.7 | 79.9 | 93.1 | 80.9 | 76.6 | 81.1 |
| 65–74 years | 67.0 | 72.3 | 77.3 | 84.3 | 112.2 | 98.6 | 101.1 | 100.1 |
| 75–84 years[6] | 81.0 | 87.5 | 101.8 | 114.1 | 140.5 | 139.8 | 145.0 | 141.0 |
| 85 years and over | --- | 92.1 | 112.1 | 149.9 | 201.5 | 238.7 | 209.1 | 222.4 |
| American Indian or Alaska Native[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 10.8 | 13.7 | 13.6 | 13.8 | 14.0 |
| All ages, crude | --- | --- | --- | 6.1 | 8.6 | 8.7 | 9.6 | 9.4 |
| 35–44 years | --- | --- | --- | * | * | * | * | * |
| 45–54 years | --- | --- | --- | * | 23.9 | 14.4 | 18.7 | 14.1 |
| 55–64 years | --- | --- | --- | * | * | 40.0 | 28.5 | 31.2 |
| 65–74 years | --- | --- | --- | * | * | 42.5 | 48.7 | 38.5 |
| 75–84 years | --- | --- | --- | * | * | 71.8 | * | 96.5 |
| 85 years and over | --- | --- | --- | * | * | * | * | * |
| Asian or Pacific Islander[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 11.9 | 13.7 | 12.3 | 12.8 | 12.6 |
| All ages, crude | --- | --- | --- | 8.2 | 9.3 | 10.2 | 10.8 | 11.0 |
| 35–44 years | --- | --- | --- | 10.4 | 8.4 | 8.1 | 6.8 | 7.6 |
| 45–54 years | --- | --- | --- | 23.4 | 26.4 | 22.3 | 21.3 | 20.1 |
| 55–64 years | --- | --- | --- | 35.7 | 33.8 | 31.3 | 33.1 | 33.8 |
| 65–74 years | --- | --- | --- | * | 38.5 | 34.7 | 38.3 | 40.7 |
| 75–84 years | --- | --- | --- | * | 48.0 | 37.5 | 48.7 | 41.4 |
| 85 years and over | --- | --- | --- | * | * | 68.2 | 69.3 | 64.7 |
| Hispanic or Latino[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 19.5 | 16.9 | 15.5 | 16.1 |
| All ages, crude | --- | --- | --- | --- | 11.5 | 9.7 | 9.2 | 9.8 |
| 35–44 years | --- | --- | --- | --- | 11.7 | 8.7 | 7.8 | 9.1 |
| 45–54 years | --- | --- | --- | --- | 32.8 | 23.9 | 21.6 | 21.0 |
| 55–64 years | --- | --- | --- | --- | 45.8 | 39.1 | 33.5 | 38.8 |
| 65–74 years | --- | --- | --- | --- | 64.8 | 54.9 | 48.7 | 48.4 |
| 75–84 years | --- | --- | --- | --- | 67.2 | 74.9 | 73.1 | 70.8 |
| 85 years and over | --- | --- | --- | --- | 102.8 | 105.8 | 105.3 | 114.8 |

See footnotes at end of table.



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## Table 40 (page 2 of 2). Death rates for malignant neoplasm of breast for females, according to race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| *Race, Hispanic origin, and age* | *1950*[1,2] | *1960*[1,2] | *1970*[2] | *1980*[2] | *1990* | *2000*[3] | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino[7] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 33.9 | 26.8 | 25.6 | 25.2 |
| All ages, crude | --- | --- | --- | --- | 38.5 | 33.8 | 32.9 | 32.6 |
| 35–44 years | --- | --- | --- | --- | 17.5 | 11.6 | 11.1 | 11.3 |
| 45–54 years | --- | --- | --- | --- | 45.2 | 31.7 | 30.0 | 29.1 |
| 55–64 years | --- | --- | --- | --- | 80.6 | 59.2 | 56.7 | 56.0 |
| 65–74 years | --- | --- | --- | --- | 115.7 | 91.4 | 87.0 | 85.1 |
| 75–84 years | --- | --- | --- | --- | 151.4 | 132.2 | 128.9 | 127.1 |
| 85 years and over | --- | --- | --- | --- | 201.5 | 208.3 | 195.8 | 192.3 |

* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
0.0 Quantity more than zero but less than 0.05.
--- Data not available.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and 2002 were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 41 (page 1 of 3). Death rates for chronic lower respiratory diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1980[1] | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| **All persons** | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[3] | 28.3 | 37.2 | 40.1 | 44.2 | 43.7 | 43.5 | 43.3 |
| All ages, crude | 24.7 | 34.9 | 38.6 | 43.4 | 43.2 | 43.3 | 43.5 |
| Under 1 year | 1.6 | 1.4 | 1.1 | 0.9 | 1.0 | 1.0 | 0.8 |
| 1–4 years | 0.4 | 0.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 |
| 5–14 years | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| 15–24 years | 0.3 | 0.5 | 0.7 | 0.5 | 0.4 | 0.5 | 0.5 |
| 25–34 years | 0.5 | 0.7 | 0.9 | 0.7 | 0.7 | 0.8 | 0.7 |
| 35–44 years | 1.6 | 1.6 | 1.9 | 2.1 | 2.2 | 2.2 | 2.1 |
| 45–54 years | 9.8 | 9.1 | 8.7 | 8.6 | 8.5 | 8.7 | 8.7 |
| 55–64 years | 42.7 | 48.9 | 46.8 | 44.2 | 44.1 | 42.4 | 43.3 |
| 65–74 years | 129.1 | 152.5 | 159.6 | 169.4 | 167.9 | 163.0 | 163.2 |
| 75–84 years | 224.4 | 321.1 | 349.3 | 386.1 | 379.8 | 386.7 | 383.0 |
| 85 years and over | 274.0 | 433.3 | 520.1 | 648.6 | 644.7 | 637.6 | 635.1 |
| **Male** | | | | | | | |
| All ages, age adjusted[3] | 49.9 | 55.5 | 54.8 | 55.8 | 54.0 | 53.5 | 52.3 |
| All ages, crude | 35.1 | 40.8 | 41.4 | 43.5 | 42.7 | 42.9 | 42.4 |
| Under 1 year | 1.9 | 1.6 | 1.4 | 1.2 | 1.1 | 1.1 | 1.1 |
| 1–4 years | 0.5 | 0.5 | 0.2 | 0.4 | 0.4 | 0.6 | 0.5 |
| 5–14 years | 0.2 | 0.4 | 0.5 | 0.4 | 0.3 | 0.4 | 0.4 |
| 15–24 years | 0.4 | 0.5 | 0.7 | 0.6 | 0.5 | 0.6 | 0.5 |
| 25–34 years | 0.6 | 0.7 | 0.9 | 0.8 | 0.7 | 0.8 | 0.8 |
| 35–44 years | 1.7 | 1.7 | 1.7 | 1.9 | 2.0 | 2.2 | 1.9 |
| 45–54 years | 12.1 | 9.4 | 8.8 | 9.0 | 8.8 | 9.1 | 9.1 |
| 55–64 years | 59.9 | 58.6 | 52.3 | 47.8 | 46.9 | 45.2 | 46.5 |
| 65–74 years | 210.0 | 204.0 | 195.6 | 195.2 | 191.3 | 184.8 | 183.6 |
| 75–84 years | 437.4 | 500.0 | 483.8 | 488.5 | 475.1 | 480.8 | 464.9 |
| 85 years and over | 583.4 | 815.1 | 889.8 | 967.9 | 916.9 | 894.8 | 865.9 |
| **Female** | | | | | | | |
| All ages, age adjusted[3] | 14.9 | 26.6 | 31.8 | 37.4 | 37.6 | 37.4 | 37.8 |
| All ages, crude | 15.0 | 29.2 | 36.0 | 43.2 | 43.7 | 43.7 | 44.4 |
| Under 1 year | 1.3 | 1.2 | * | * | * | * | * |
| 1–4 years | * | * | * | 0.3 | * | 0.3 | * |
| 5–14 years | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 |
| 15–24 years | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 |
| 25–34 years | 0.5 | 0.7 | 0.9 | 0.7 | 0.7 | 0.7 | 0.6 |
| 35–44 years | 1.5 | 1.5 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 |
| 45–54 years | 7.7 | 8.8 | 8.7 | 8.3 | 8.1 | 8.2 | 8.2 |
| 55–64 years | 27.6 | 40.3 | 41.9 | 41.0 | 41.5 | 39.8 | 40.3 |
| 65–74 years | 67.1 | 112.3 | 130.8 | 148.2 | 148.5 | 144.9 | 146.0 |
| 75–84 years | 98.7 | 214.2 | 265.3 | 319.2 | 317.3 | 324.1 | 328.3 |
| 85 years and over | 138.7 | 286.0 | 377.7 | 518.5 | 530.8 | 526.0 | 533.0 |
| **White male[4]** | | | | | | | |
| All ages, age adjusted[3] | 51.6 | 56.6 | 55.9 | 57.2 | 55.5 | 54.9 | 53.8 |
| All ages, crude | 37.9 | 44.3 | 45.5 | 48.3 | 47.6 | 47.8 | 47.4 |
| 35–44 years | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | 1.8 | 1.7 |
| 45–54 years | 11.4 | 8.6 | 8.1 | 8.4 | 8.6 | 8.8 | 8.9 |
| 55–64 years | 60.0 | 58.7 | 52.7 | 48.6 | 48.0 | 46.0 | 47.6 |
| 65–74 years | 218.4 | 208.1 | 200.0 | 201.4 | 198.3 | 192.3 | 191.6 |
| 75–84 years | 459.8 | 513.5 | 497.9 | 503.6 | 489.4 | 495.2 | 478.5 |
| 85 years and over | 611.2 | 847.0 | 918.3 | 997.4 | 943.6 | 923.4 | 894.4 |
| **Black or African American male[4]** | | | | | | | |
| All ages, age adjusted[3] | 34.0 | 47.6 | 47.4 | 47.5 | 46.3 | 46.3 | 44.4 |
| All ages, crude | 19.3 | 25.2 | 24.4 | 24.3 | 23.6 | 24.1 | 23.3 |
| 35–44 years | 5.8 | 5.3 | 4.3 | 4.8 | 4.7 | 5.7 | 4.0 |
| 45–54 years | 19.7 | 18.8 | 16.9 | 15.0 | 13.3 | 14.4 | 13.3 |
| 55–64 years | 66.6 | 67.4 | 60.5 | 54.6 | 49.8 | 52.3 | 50.5 |
| 65–74 years | 142.0 | 184.5 | 178.7 | 176.9 | 168.0 | 158.0 | 155.1 |
| 75–84 years | 229.8 | 390.9 | 370.0 | 370.3 | 380.8 | 392.2 | 382.2 |
| 85 years and over | 271.6 | 498.0 | 624.1 | 693.1 | 671.7 | 645.4 | 601.6 |

See footnotes at end of table.



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## Table 41 (page 2 of 3). Death rates for chronic lower respiratory diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1980[1] | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| American Indian or Alaska Native male[4] | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[3] | 23.0 | 38.3 | 35.6 | 43.7 | 35.0 | 35.9 | 40.3 |
| All ages, crude | 8.4 | 13.8 | 12.3 | 15.3 | 13.1 | 14.3 | 17.3 |
| 35–44 years | * | * | * | * | * | * | * |
| 45–54 years | * | * | * | * | * | * | * |
| 55–64 years | * | * | 36.5 | 46.4 | 35.7 | 34.5 | 43.8 |
| 65–74 years | * | 135.7 | 132.1 | 111.3 | 115.1 | 126.1 | 125.9 |
| 75–84 years | * | 363.8 | 307.3 | 416.6 | 306.0 | 348.9 | 387.0 |
| 85 years and over | * | * | * | 770.7 | 614.8 | 500.3 | 563.8 |
| Asian or Pacific Islander male[4] | | | | | | | |
| All ages, age adjusted[3] | 21.5 | 29.8 | 28.9 | 28.3 | 27.0 | 25.0 | 25.2 |
| All ages, crude | 8.7 | 11.3 | 11.8 | 12.6 | 12.7 | 12.0 | 12.5 |
| 35–44 years | * | * | * | * | * | * | * |
| 45–54 years | * | * | * | 4.8 | 3.6 | 2.6 | * |
| 55–64 years | * | 22.1 | 15.7 | 8.8 | 14.4 | 11.5 | 12.7 |
| 65–74 years | 70.6 | 91.4 | 87.9 | 71.3 | 65.5 | 58.5 | 58.4 |
| 75–84 years | 155.7 | 258.6 | 240.6 | 254.3 | 239.3 | 235.9 | 234.9 |
| 85 years and over | 472.4 | 615.2 | 650.4 | 670.7 | 640.4 | 582.5 | 590.7 |
| Hispanic or Latino male[4,5] | | | | | | | |
| All ages, age adjusted[3] | --- | 28.6 | 31.8 | 28.8 | 27.6 | 27.2 | 27.1 |
| All ages, crude | --- | 8.4 | 8.9 | 8.0 | 7.8 | 8.1 | 8.2 |
| 35–44 years | --- | * | 1.1 | 0.9 | 0.7 | 1.0 | 1.0 |
| 45–54 years | --- | 4.1 | 3.9 | 3.4 | 3.2 | 3.8 | 3.2 |
| 55–64 years | --- | 17.2 | 19.1 | 18.2 | 16.1 | 17.5 | 16.6 |
| 65–74 years | --- | 81.0 | 82.4 | 72.4 | 75.5 | 69.2 | 68.1 |
| 75–84 years | --- | 252.4 | 292.0 | 250.3 | 224.0 | 243.3 | 231.2 |
| 85 years and over | --- | 613.9 | 689.0 | 671.1 | 676.1 | 602.4 | 646.5 |
| White, not Hispanic or Latino male[5] | | | | | | | |
| All ages, age adjusted[3] | --- | 57.9 | 56.6 | 58.5 | 56.9 | 56.5 | 55.4 |
| All ages, crude | --- | 48.5 | 50.2 | 55.1 | 54.6 | 55.1 | 54.9 |
| 35–44 years | --- | 1.4 | 1.4 | 1.7 | 1.9 | 2.0 | 1.8 |
| 45–54 years | --- | 9.0 | 8.4 | 8.9 | 9.1 | 9.3 | 9.5 |
| 55–64 years | --- | 61.3 | 54.6 | 50.8 | 50.5 | 48.3 | 50.0 |
| 65–74 years | --- | 213.4 | 204.3 | 208.8 | 206.1 | 200.4 | 200.2 |
| 75–84 years | --- | 523.7 | 501.7 | 513.6 | 500.9 | 506.7 | 491.0 |
| 85 years and over | --- | 860.6 | 922.6 | 1,008.6 | 951.5 | 935.4 | 903.6 |
| White female[4] | | | | | | | |
| All ages, age adjusted[3] | 15.5 | 27.8 | 33.3 | 39.5 | 39.8 | 39.7 | 40.3 |
| All ages, crude | 16.4 | 32.8 | 40.8 | 49.7 | 50.3 | 50.5 | 51.5 |
| 35–44 years | 1.3 | 1.2 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 |
| 45–54 years | 7.6 | 8.3 | 8.4 | 7.9 | 8.0 | 8.1 | 8.1 |
| 55–64 years | 28.7 | 41.9 | 44.0 | 43.2 | 44.1 | 42.4 | 42.9 |
| 65–74 years | 71.0 | 118.8 | 139.0 | 159.6 | 160.4 | 157.0 | 158.6 |
| 75–84 years | 104.0 | 226.3 | 279.5 | 339.1 | 338.3 | 345.4 | 352.0 |
| 85 years and over | 144.2 | 298.4 | 395.5 | 544.8 | 557.9 | 554.5 | 562.8 |
| Black or African American female[4] | | | | | | | |
| All ages, age adjusted[3] | 9.1 | 16.6 | 20.2 | 22.7 | 22.4 | 22.6 | 22.0 |
| All ages, crude | 6.8 | 12.6 | 15.5 | 17.6 | 17.5 | 17.7 | 17.3 |
| 35–44 years | 3.4 | 3.8 | 5.4 | 4.7 | 4.9 | 4.6 | 4.6 |
| 45–54 years | 9.3 | 14.0 | 12.8 | 13.4 | 11.7 | 11.6 | 11.9 |
| 55–64 years | 20.8 | 33.4 | 34.7 | 35.3 | 33.3 | 31.5 | 32.4 |
| 65–74 years | 32.7 | 64.7 | 78.7 | 82.9 | 84.3 | 82.0 | 83.3 |
| 75–84 years | 41.1 | 96.0 | 132.7 | 158.4 | 151.7 | 167.4 | 153.2 |
| 85 years and over | 63.2 | 133.0 | 185.8 | 255.0 | 266.1 | 262.0 | 256.4 |

See footnotes at end of table.



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## Table 41 (page 3 of 3). Death rates for chronic lower respiratory diseases, according to sex, race, Hispanic origin, and age: United States, selected years 1980–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1980[1] | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| American Indian or Alaska Native female[4] | | | | Deaths per 100,000 resident population | | | |
| All ages, age adjusted[3] | 7.7 | 16.8 | 22.8 | 26.2 | 27.3 | 26.4 | 26.1 |
| All ages, crude | 3.8 | 8.7 | 11.5 | 13.4 | 14.8 | 15.1 | 15.6 |
| 35–44 years | * | * | * | * | * | * | * |
| 45–54 years | * | * | * | * | * | * | * |
| 55–64 years | * | * | 38.8 | 31.6 | 37.3 | 34.1 | 39.0 |
| 65–74 years | * | 56.4 | 79.5 | 136.8 | 114.2 | 119.1 | 101.2 |
| 75–84 years | * | 116.7 | 191.3 | 175.8 | 217.9 | 194.8 | 217.2 |
| 85 years and over | * | * | * | 362.2 | 345.3 | 353.4 | 296.2 |
| Asian or Pacific Islander female[4] | | | | | | | |
| All ages, age adjusted[3] | 5.8 | 11.0 | 12.1 | 11.7 | 11.1 | 9.3 | 9.9 |
| All ages, crude | 2.6 | 5.2 | 6.3 | 6.8 | 6.8 | 6.0 | 6.5 |
| 35–44 years | * | * | * | * | * | * | * |
| 45–54 years | * | * | 3.6 | * | * | * | * |
| 55–64 years | * | 15.2 | 9.6 | 6.2 | 7.0 | 4.9 | 6.0 |
| 65–74 years | * | 26.5 | 29.2 | 29.2 | 30.2 | 24.6 | 24.8 |
| 75–84 years | * | 80.6 | 113.2 | 88.9 | 79.4 | 77.0 | 77.2 |
| 85 years and over | * | 232.5 | 227.8 | 299.5 | 288.5 | 219.1 | 253.8 |
| Hispanic or Latino female[4,5] | | | | | | | |
| All ages, age adjusted[3] | --- | 13.4 | 16.9 | 16.3 | 16.5 | 16.2 | 15.8 |
| All ages, crude | --- | 6.3 | 7.7 | 7.2 | 7.5 | 7.6 | 7.7 |
| 35–44 years | --- | * | 1.4 | 1.3 | 1.2 | 1.4 | 1.0 |
| 45–54 years | --- | 4.9 | 4.6 | 3.3 | 4.1 | 3.1 | 3.8 |
| 55–64 years | --- | 14.4 | 12.9 | 10.8 | 12.1 | 10.6 | 9.3 |
| 65–74 years | --- | 36.6 | 43.1 | 38.0 | 40.3 | 41.5 | 41.5 |
| 75–84 years | --- | 101.1 | 125.0 | 136.0 | 132.7 | 129.8 | 129.6 |
| 85 years and over | --- | 269.0 | 402.6 | 387.8 | 384.4 | 385.5 | 365.6 |
| White, not Hispanic or Latino female[5] | | | | | | | |
| All ages, age adjusted[3] | --- | 28.5 | 34.0 | 40.7 | 41.1 | 41.2 | 41.8 |
| All ages, crude | --- | 35.7 | 44.7 | 56.2 | 57.2 | 57.7 | 59.0 |
| 35–44 years | --- | 1.2 | 1.7 | 1.9 | 2.0 | 2.1 | 2.2 |
| 45–54 years | --- | 8.5 | 8.5 | 8.3 | 8.3 | 8.6 | 8.5 |
| 55–64 years | --- | 43.7 | 46.2 | 45.8 | 46.8 | 45.1 | 45.7 |
| 65–74 years | --- | 122.8 | 143.0 | 167.6 | 168.8 | 165.5 | 167.6 |
| 75–84 years | --- | 231.9 | 284.5 | 347.2 | 347.3 | 355.7 | 363.5 |
| 85 years and over | --- | 302.1 | 393.7 | 548.7 | 562.7 | 559.8 | 569.5 |

* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
--- Data not available.
[1]For the period 1980–98, underlying cause of death was coded according to the Ninth Revision of the International Classification of Diseases (ICD), using ICD–9 codes for chronic lower respiratory diseases (CLRD) that are most nearly comparable with CLRD codes in the 113 cause list for ICD–10. See Appendix II, Cause of death; tables IV and V.
[2]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[3]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[4]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[5]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 42 (page 1 of 2). Death rates for human immunodeficiency virus (HIV) disease, according to sex, race, Hispanic origin, and age: United States, selected years 1987–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age[1] | 1987[2] | 1990 | 1995 | 2000[3] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| All persons | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | 5.6 | 10.2 | 16.2 | 5.2 | 5.0 | 4.9 | 4.7 |
| All ages, crude | 5.6 | 10.1 | 16.2 | 5.1 | 5.0 | 4.9 | 4.7 |
| Under 1 year | 2.3 | 2.7 | 1.5 | * | * | * | * |
| 1–4 years | 0.7 | 0.8 | 1.3 | * | * | * | * |
| 5–14 years | 0.1 | 0.2 | 0.5 | 0.1 | 0.1 | 0.1 | 0.1 |
| 15–24 years | 1.3 | 1.5 | 1.7 | 0.5 | 0.6 | 0.4 | 0.4 |
| 25–34 years | 11.7 | 19.7 | 28.3 | 6.1 | 5.3 | 4.6 | 4.0 |
| 35–44 years | 14.0 | 27.4 | 44.2 | 13.1 | 13.0 | 12.7 | 12.0 |
| 45–54 years | 8.0 | 15.2 | 26.0 | 11.0 | 10.5 | 11.2 | 10.9 |
| 55–64 years | 3.5 | 6.2 | 10.9 | 5.1 | 5.2 | 5.1 | 5.4 |
| 65–74 years | 1.3 | 2.0 | 3.6 | 2.2 | 2.1 | 2.2 | 2.4 |
| 75–84 years | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 |
| 85 years and over | * | * | * | * | * | * | * |
| Male | | | | | | | |
| All ages, age adjusted[4] | 10.4 | 18.5 | 27.3 | 7.9 | 7.5 | 7.4 | 7.1 |
| All ages, crude | 10.2 | 18.5 | 27.6 | 7.9 | 7.6 | 7.4 | 7.1 |
| Under 1 year | 2.2 | 2.4 | 1.7 | * | * | * | * |
| 1–4 years | 0.7 | 0.8 | 1.2 | * | * | * | * |
| 5–14 years | 0.2 | 0.3 | 0.5 | 0.1 | 0.1 | * | * |
| 15–24 years | 2.2 | 2.2 | 2.0 | 0.5 | 0.5 | 0.4 | 0.4 |
| 25–34 years | 20.7 | 34.5 | 45.5 | 8.0 | 7.1 | 5.9 | 5.1 |
| 35–44 years | 26.3 | 50.2 | 75.5 | 19.8 | 19.5 | 18.8 | 17.5 |
| 45–54 years | 15.5 | 29.1 | 46.2 | 17.8 | 16.8 | 17.7 | 17.2 |
| 55–64 years | 6.8 | 12.0 | 19.7 | 8.7 | 8.6 | 8.5 | 9.1 |
| 65–74 years | 2.4 | 3.7 | 6.4 | 3.8 | 3.5 | 3.9 | 4.0 |
| 75–84 years | 1.2 | 1.1 | 1.3 | 1.3 | 1.5 | 1.4 | 1.5 |
| 85 years and over | * | * | * | * | * | * | * |
| Female | | | | | | | |
| All ages, age adjusted[4] | 1.1 | 2.2 | 5.3 | 2.5 | 2.5 | 2.5 | 2.4 |
| All ages, crude | 1.1 | 2.2 | 5.3 | 2.5 | 2.5 | 2.5 | 2.4 |
| Under 1 year | 2.5 | 3.0 | 1.2 | * | * | * | * |
| 1–4 years | 0.7 | 0.8 | 1.5 | * | * | * | * |
| 5–14 years | * | 0.2 | 0.5 | 0.1 | * | * | * |
| 15–24 years | 0.3 | 0.7 | 1.4 | 0.4 | 0.6 | 0.4 | 0.4 |
| 25–34 years | 2.8 | 4.9 | 10.9 | 4.2 | 3.5 | 3.3 | 2.8 |
| 35–44 years | 2.1 | 5.2 | 13.3 | 6.5 | 6.7 | 6.7 | 6.5 |
| 45–54 years | 0.8 | 1.9 | 6.6 | 4.4 | 4.4 | 4.8 | 4.8 |
| 55–64 years | 0.5 | 1.1 | 2.8 | 1.8 | 2.0 | 1.9 | 2.1 |
| 65–74 years | 0.5 | 0.8 | 1.4 | 0.8 | 0.9 | 0.8 | 1.0 |
| 75–84 years | 0.5 | 0.4 | 0.3 | 0.3 | * | 0.3 | 0.3 |
| 85 years and over | * | * | * | * | * | * | * |
| All ages, age adjusted[4] | | | | | | | |
| White male | 8.7 | 15.7 | 20.4 | 4.6 | 4.4 | 4.3 | 4.2 |
| Black or African American male | 26.2 | 46.3 | 89.0 | 35.1 | 33.8 | 33.3 | 31.3 |
| American Indian or Alaska Native male | * | 3.3 | 10.5 | 3.5 | 4.2 | 3.4 | 3.5 |
| Asian or Pacific Islander male | 2.5 | 4.3 | 6.0 | 1.2 | 1.2 | 1.5 | 1.1 |
| Hispanic or Latino male[5] | 18.8 | 28.8 | 40.8 | 10.6 | 9.7 | 9.1 | 9.2 |
| White, not Hispanic or Latino male[5] | 10.7 | 14.1 | 17.9 | 3.8 | 3.6 | 3.5 | 3.4 |
| White female | 0.6 | 1.1 | 2.5 | 1.0 | 0.9 | 0.9 | 0.9 |
| Black or African American female | 4.6 | 10.1 | 24.4 | 13.2 | 13.4 | 13.4 | 12.8 |
| American Indian or Alaska Native female | * | * | 2.5 | 1.0 | * | * | 1.5 |
| Asian or Pacific Islander female | * | * | 0.6 | 0.2 | * | * | * |
| Hispanic or Latino female[5] | 2.1 | 3.8 | 8.8 | 2.9 | 2.7 | 2.6 | 2.7 |
| White, not Hispanic or Latino female[5] | 0.5 | 0.7 | 1.7 | 0.7 | 0.6 | 0.6 | 0.6 |

See footnotes at end of table.



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## Table 42 (page 2 of 2). Death rates for human immunodeficiency virus (HIV) disease, according to sex, race, Hispanic origin, and age: United States, selected years 1987–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age[1] | 1987[2] | 1990 | 1995 | 2000[3] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| Age 25–44 years | | | Deaths per 100,000 resident population | | | | |
| All persons | 12.7 | 23.2 | 36.3 | 9.8 | 9.4 | 8.9 | 8.2 |
| White male | 19.2 | 35.0 | 46.1 | 8.8 | 8.3 | 7.7 | 7.2 |
| Black or African American male | 60.2 | 102.0 | 179.4 | 55.4 | 53.5 | 49.9 | 44.8 |
| American Indian or Alaska Native male | * | 7.7 | 28.5 | 5.5 | 7.3 | 8.3 | 6.4 |
| Asian or Pacific Islander male | 4.1 | 8.1 | 12.1 | 1.9 | 2.1 | 1.8 | 1.9 |
| Hispanic or Latino male[5] | 36.8 | 59.3 | 73.9 | 14.3 | 12.4 | 11.5 | 10.3 |
| White, not Hispanic or Latino male[5] | 23.3 | 31.6 | 41.2 | 7.4 | 7.2 | 6.6 | 6.2 |
| White female | 1.2 | 2.3 | 5.9 | 2.1 | 1.9 | 1.8 | 1.8 |
| Black or African American female | 11.6 | 23.6 | 53.6 | 26.7 | 26.0 | 25.9 | 23.6 |
| American Indian or Alaska Native female | * | * | * | * | * | * | * |
| Asian or Pacific Islander female | * | * | 1.2 | * | * | * | * |
| Hispanic or Latino female[5] | 4.9 | 8.9 | 17.2 | 4.6 | 4.3 | 3.8 | 3.8 |
| White, not Hispanic or Latino female[5] | 1.0 | 1.5 | 4.2 | 1.6 | 1.3 | 1.3 | 1.3 |
| Age 45–64 years | | | | | | | |
| All persons | 5.8 | 11.1 | 19.9 | 8.7 | 8.4 | 8.7 | 8.7 |
| White male | 9.9 | 18.6 | 26.0 | 8.1 | 7.7 | 7.8 | 7.9 |
| Black or African American male | 27.3 | 53.0 | 133.2 | 71.6 | 68.8 | 70.7 | 68.1 |
| American Indian or Alaska Native male | * | * | * | * | 7.8 | * | * |
| Asian or Pacific Islander male | * | 6.5 | 9.1 | 2.1 | 1.9 | 3.4 | 2.1 |
| Hispanic or Latino male[5] | 25.8 | 37.9 | 67.1 | 23.3 | 21.5 | 20.3 | 22.5 |
| White, not Hispanic or Latino male[5] | 12.6 | 16.9 | 22.4 | 6.5 | 6.1 | 6.4 | 6.2 |
| White female | 0.5 | 0.9 | 2.4 | 1.3 | 1.2 | 1.4 | 1.4 |
| Black or African American female | 2.6 | 7.5 | 27.0 | 19.6 | 20.8 | 21.4 | 21.8 |
| American Indian or Alaska Native female | * | * | * | * | * | * | * |
| Asian or Pacific Islander female | * | * | * | * | * | * | * |
| Hispanic or Latino female[5] | * | 3.1 | 12.6 | 5.8 | 5.4 | 5.7 | 5.3 |
| White, not Hispanic or Latino female[5] | 0.5 | 0.7 | 1.5 | 0.9 | 0.8 | 0.9 | 0.9 |

* Rates based on fewer than 20 deaths are considered unreliable and are not shown.

[1]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.

[2]Categories for the coding and classification of human immunodeficiency virus (HIV) disease were introduced in the United States in 1987. For the period 1987–98, underlying cause of death was coded according to the Ninth Revision of the International Classification of Diseases (ICD). See Appendix II , Cause of death; Human immunodeficiency virus (HIV) disease; tables IV and V.

[3]Starting with 1999 data, cause of death is coded according to ICD–10. To estimate change between 1998 and 1999, compare the 1999 rate with the comparability-modified rate for 1998. See Appendix II, Comparability ratio and tables V and VI.

[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.

[5]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and 2002 were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1987–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 43. Maternal mortality for complications of pregnancy, childbirth, and the puerperium, according to race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2001 | 2002 | 2003[4] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Number of deaths | | | | | |
| All persons | 2,960 | 1,579 | 803 | 334 | 343 | 396 | 399 | 357 | 495 |
| White | 1,873 | 936 | 445 | 193 | 177 | 240 | 228 | 190 | 280 |
| Black or African American | 1,041 | 624 | 342 | 127 | 153 | 137 | 150 | 148 | 183 |
| American Indian or Alaska Native | --- | --- | --- | 3 | 4 | 6 | 5 | – | 7 |
| Asian or Pacific Islander | --- | --- | --- | 11 | 9 | 13 | 16 | 19 | 25 |
| Hispanic or Latino[5] | --- | --- | --- | --- | 47 | 81 | 81 | 62 | 92 |
| White, not Hispanic or Latino[5] | --- | --- | --- | --- | 125 | 160 | 151 | 128 | 188 |
| All persons | | | | Deaths per 100,000 live births | | | | | |
| All ages, age adjusted[6] | 73.7 | 32.1 | 21.5 | 9.4 | 7.6 | 8.2 | 8.8 | 7.6 | 9.7 |
| All ages, crude | 83.3 | 37.1 | 21.5 | 9.2 | 8.2 | 9.8 | 9.9 | 8.9 | 12.1 |
| Under 20 years | 70.7 | 22.7 | 18.9 | 7.6 | 7.5 | * | 8.8 | 6.7 | 6.2 |
| 20–24 years | 47.6 | 20.7 | 13.0 | 5.8 | 6.1 | 7.4 | 6.9 | 5.8 | 7.7 |
| 25–29 years | 63.5 | 29.8 | 17.0 | 7.7 | 6.0 | 7.9 | 8.5 | 7.5 | 8.7 |
| 30–34 years | 107.7 | 50.3 | 31.6 | 13.6 | 9.5 | 10.0 | 10.1 | 9.3 | 10.9 |
| 35 years and over[7] | 222.0 | 104.3 | 81.9 | 36.3 | 20.7 | 22.7 | 18.9 | 18.4 | 33.1 |
| White | | | | | | | | | |
| All ages, age adjusted[6] | 53.1 | 22.4 | 14.4 | 6.7 | 5.1 | 6.2 | 6.5 | 4.8 | 6.9 |
| All ages, crude | 61.1 | 26.0 | 14.3 | 6.6 | 5.4 | 7.5 | 7.2 | 6.0 | 8.7 |
| Under 20 years | 44.9 | 14.8 | 13.8 | 5.8 | * | * | 7.4 | * | * |
| 20–24 years | 35.7 | 15.3 | 8.4 | 4.2 | 3.9 | 5.6 | 5.3 | 3.4 | 5.3 |
| 25–29 years | 45.0 | 20.3 | 11.1 | 5.4 | 4.8 | 5.9 | 5.8 | 4.6 | 6.9 |
| 30–34 years | 75.9 | 34.3 | 18.7 | 9.3 | 5.0 | 7.1 | 8.1 | 6.7 | 6.8 |
| 35 years and over[7] | 174.1 | 73.9 | 59.3 | 25.5 | 12.6 | 18.0 | 11.4 | 13.3 | 23.8 |
| Black or African American | | | | | | | | | |
| All ages, age adjusted[6] | --- | 92.0 | 65.5 | 24.9 | 21.7 | 20.1 | 22.4 | 22.9 | 25.5 |
| All ages, crude | --- | 103.6 | 60.9 | 22.4 | 22.4 | 22.0 | 24.7 | 24.9 | 30.5 |
| Under 20 years | --- | 54.8 | 32.3 | 13.1 | * | * | * | * | * |
| 20–24 years | --- | 56.9 | 41.9 | 13.9 | 14.7 | 15.3 | 14.6 | 14.9 | 15.8 |
| 25–29 years | --- | 92.8 | 65.2 | 22.4 | 14.9 | 21.8 | 24.7 | 27.1 | 20.7 |
| 30–34 years | --- | 150.6 | 117.8 | 44.0 | 44.2 | 34.8 | 30.6 | 28.4 | 46.1 |
| 35 years and over[7] | --- | 299.5 | 207.5 | 100.6 | 79.7 | 62.8 | 71.0 | 62.9 | 104.1 |
| Hispanic or Latino[5,8] | | | | | | | | | |
| All ages, age adjusted[6] | --- | --- | --- | --- | 7.4 | 9.0 | 8.8 | 6.0 | 8.6 |
| All ages, crude | --- | --- | --- | --- | 7.9 | 9.9 | 9.5 | 7.1 | 10.1 |
| White, not Hispanic or Latino[5] | | | | | | | | | |
| All ages, age adjusted[6] | --- | --- | --- | --- | 4.4 | 5.5 | 5.8 | 4.4 | 6.3 |
| All ages, crude | --- | --- | --- | --- | 4.8 | 6.8 | 6.5 | 5.6 | 8.1 |

--- Data not available.
– Quantity zero.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. Major changes in the classification and coding of maternal deaths account for a large increase in the number of maternal deaths under ICD–10. See Appendix II, comparability ratio; *International Classification of Diseases* (ICD); Maternal death; tables V and VI.
[4]Increases are due to methodological changes in reporting and data processing. See Appendix II, Maternal death.
[5]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.
[6]Rates are age adjusted to the 1970 distribution of live births by mother's age in the United States. See Appendix II, Age adjustment.
[7]Rates computed by relating deaths of women 35 years and over to live births to women 35–49 years. See Appendix II, Rate: Death and related rates.
[8]Age-specific maternal mortality rates are not calculated because rates based on fewer than 20 deaths are considered unreliable.

NOTES: The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. For 1950 and 1960, rates were based on live births by race of child; for all other years, rates are based on live births by race of mother. See Appendix II, Race. Rates are not calculated for American Indian or Alaska Native and Asian or Pacific Islander mothers because rates based on fewer than 20 deaths are considered unreliable. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from annual natality files; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 44 (page 1 of 4). Death rates for motor vehicle-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 24.6 | 23.1 | 27.6 | 22.3 | 18.5 | 15.4 | 15.7 | 15.3 |
| All ages, crude | 23.1 | 21.3 | 26.9 | 23.5 | 18.8 | 15.4 | 15.7 | 15.4 |
| Under 1 year | 8.4 | 8.1 | 9.8 | 7.0 | 4.9 | 4.4 | 3.0 | 3.6 |
| 1–14 years | 9.8 | 8.6 | 10.5 | 8.2 | 6.0 | 4.3 | 3.9 | 4.0 |
| 1–4 years | 11.5 | 10.0 | 11.5 | 9.2 | 6.3 | 4.2 | 3.9 | 3.9 |
| 5–14 years | 8.8 | 7.9 | 10.2 | 7.9 | 5.9 | 4.3 | 3.9 | 4.0 |
| 15–24 years | 34.4 | 38.0 | 47.2 | 44.8 | 34.1 | 26.9 | 28.2 | 26.6 |
| 15–19 years | 29.6 | 33.9 | 43.6 | 43.0 | 33.1 | 26.0 | 27.6 | 25.7 |
| 20–24 years | 38.8 | 42.9 | 51.3 | 46.6 | 35.0 | 28.0 | 28.8 | 27.5 |
| 25–34 years | 24.6 | 24.3 | 30.9 | 29.1 | 23.6 | 17.3 | 17.8 | 17.1 |
| 35–44 years | 20.3 | 19.3 | 24.9 | 20.9 | 16.9 | 15.3 | 15.8 | 15.7 |
| 45–64 years | 25.2 | 23.0 | 26.5 | 18.0 | 15.7 | 14.3 | 14.5 | 14.6 |
| 45–54 years | 22.2 | 21.4 | 25.5 | 18.6 | 15.6 | 14.2 | 14.8 | 14.9 |
| 55–64 years | 29.0 | 25.1 | 27.9 | 17.4 | 15.9 | 14.4 | 14.1 | 14.2 |
| 65 years and over | 43.1 | 34.7 | 36.2 | 22.5 | 23.1 | 21.4 | 21.5 | 21.0 |
| 65–74 years | 39.1 | 31.4 | 32.8 | 19.2 | 18.6 | 16.5 | 17.0 | 16.2 |
| 75–84 years | 52.7 | 41.8 | 43.5 | 28.1 | 29.1 | 25.7 | 25.7 | 24.9 |
| 85 years and over | 45.1 | 37.9 | 34.2 | 27.6 | 31.2 | 30.4 | 28.0 | 28.8 |
| Male | | | | | | | | |
| All ages, age adjusted[4] | 38.5 | 35.4 | 41.5 | 33.6 | 26.5 | 21.7 | 22.1 | 21.6 |
| All ages, crude | 35.4 | 31.8 | 39.7 | 35.3 | 26.7 | 21.3 | 21.9 | 21.4 |
| Under 1 year | 9.1 | 8.6 | 9.3 | 7.3 | 5.0 | 4.6 | 3.3 | 3.9 |
| 1–14 years | 12.3 | 10.7 | 13.0 | 10.0 | 7.0 | 4.9 | 4.6 | 4.7 |
| 1–4 years | 13.0 | 11.5 | 12.9 | 10.2 | 6.9 | 4.7 | 4.5 | 4.4 |
| 5–14 years | 11.9 | 10.4 | 13.1 | 9.9 | 7.0 | 5.0 | 4.6 | 4.8 |
| 15–24 years | 56.7 | 61.2 | 73.2 | 68.4 | 49.5 | 37.4 | 39.3 | 36.9 |
| 15–19 years | 46.3 | 51.7 | 64.1 | 62.6 | 45.5 | 33.9 | 36.0 | 33.3 |
| 20–24 years | 66.7 | 73.2 | 84.4 | 74.3 | 53.3 | 41.2 | 42.6 | 40.4 |
| 25–34 years | 40.8 | 40.1 | 49.4 | 46.3 | 35.7 | 25.5 | 26.5 | 25.5 |
| 35–44 years | 32.5 | 29.9 | 37.7 | 31.7 | 24.7 | 22.0 | 22.3 | 22.5 |
| 45–64 years | 37.7 | 33.3 | 38.9 | 26.5 | 21.9 | 20.2 | 20.7 | 20.9 |
| 45–54 years | 33.6 | 31.6 | 37.2 | 27.6 | 22.0 | 20.4 | 21.3 | 21.5 |
| 55–64 years | 43.1 | 35.6 | 40.9 | 25.4 | 21.7 | 19.8 | 19.9 | 20.0 |
| 65 years and over | 66.6 | 52.1 | 54.4 | 33.9 | 32.1 | 29.5 | 29.8 | 28.5 |
| 65–74 years | 59.1 | 45.8 | 47.3 | 27.3 | 24.2 | 21.7 | 22.7 | 21.3 |
| 75–84 years | 85.0 | 66.0 | 68.2 | 44.3 | 41.2 | 35.6 | 35.3 | 34.3 |
| 85 years and over | 78.1 | 62.7 | 63.1 | 56.1 | 64.5 | 57.5 | 51.7 | 50.0 |
| Female | | | | | | | | |
| All ages, age adjusted[4] | 11.5 | 11.7 | 14.9 | 11.8 | 11.0 | 9.5 | 9.6 | 9.3 |
| All ages, crude | 10.9 | 11.0 | 14.7 | 12.3 | 11.3 | 9.7 | 9.8 | 9.5 |
| Under 1 year | 7.6 | 7.5 | 10.4 | 6.7 | 4.9 | 4.2 | 2.8 | 3.3 |
| 1–14 years | 7.2 | 6.3 | 7.9 | 6.3 | 4.9 | 3.7 | 3.3 | 3.3 |
| 1–4 years | 10.0 | 8.4 | 10.0 | 8.1 | 5.6 | 3.8 | 3.3 | 3.5 |
| 5–14 years | 5.7 | 5.4 | 7.2 | 5.7 | 4.7 | 3.6 | 3.3 | 3.2 |
| 15–24 years | 12.6 | 15.1 | 21.6 | 20.8 | 17.9 | 15.9 | 16.6 | 15.8 |
| 15–19 years | 12.9 | 16.0 | 22.7 | 22.8 | 20.0 | 17.5 | 18.9 | 17.8 |
| 20–24 years | 12.2 | 14.0 | 20.4 | 18.9 | 16.0 | 14.2 | 14.3 | 13.9 |
| 25–34 years | 9.3 | 9.2 | 13.0 | 12.2 | 11.5 | 8.8 | 8.8 | 8.5 |
| 35–44 years | 8.5 | 9.1 | 12.9 | 10.4 | 9.2 | 8.8 | 9.3 | 8.9 |
| 45–64 years | 12.6 | 13.1 | 15.3 | 10.3 | 10.1 | 8.7 | 8.7 | 8.6 |
| 45–54 years | 10.9 | 11.6 | 14.5 | 10.2 | 9.6 | 8.2 | 8.6 | 8.5 |
| 55–64 years | 14.9 | 15.2 | 16.2 | 10.5 | 10.8 | 9.5 | 8.9 | 8.8 |
| 65 years and over | 21.9 | 20.3 | 23.1 | 15.0 | 17.2 | 15.8 | 15.7 | 15.6 |
| 65–74 years | 20.6 | 19.0 | 21.6 | 13.0 | 14.1 | 12.3 | 12.3 | 11.9 |
| 75–84 years | 25.2 | 23.0 | 27.2 | 18.5 | 21.9 | 19.2 | 19.3 | 18.7 |
| 85 years and over | 22.1 | 22.0 | 18.0 | 15.2 | 18.3 | 19.3 | 17.7 | 19.5 |
| White male[5] | | | | | | | | |
| All ages, age adjusted[4] | 37.9 | 34.8 | 40.4 | 33.8 | 26.3 | 21.8 | 22.4 | 21.9 |
| All ages, crude | 35.1 | 31.5 | 39.1 | 35.9 | 26.7 | 21.6 | 22.4 | 22.0 |
| Under 1 year | 9.1 | 8.8 | 9.1 | 7.0 | 4.8 | 4.2 | 2.9 | 3.9 |
| 1–14 years | 12.4 | 10.6 | 12.5 | 9.8 | 6.6 | 4.8 | 4.5 | 4.7 |
| 15–24 years | 58.3 | 62.7 | 75.2 | 73.8 | 52.5 | 39.6 | 41.9 | 39.2 |
| 25–34 years | 39.1 | 38.6 | 47.0 | 46.6 | 35.4 | 25.1 | 26.6 | 25.9 |
| 35–44 years | 30.9 | 28.4 | 35.2 | 30.7 | 23.7 | 21.8 | 22.3 | 22.6 |
| 45–64 years | 36.2 | 31.7 | 36.5 | 25.2 | 20.6 | 19.7 | 20.6 | 20.6 |
| 65 years and over | 67.1 | 52.1 | 54.2 | 32.7 | 31.4 | 29.4 | 29.8 | 28.8 |

See footnotes at end of table.



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## Table 44 (page 2 of 4). Death rates for motor vehicle-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Black or African American male[5] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 34.8 | 39.6 | 51.0 | 34.2 | 29.9 | 24.4 | 23.2 | 22.7 |
| All ages, crude | 37.2 | 33.1 | 44.3 | 31.1 | 28.1 | 22.5 | 21.5 | 21.1 |
| Under 1 year | --- | * | 10.6 | 7.8 | * | 6.7 | * | * |
| 1–14 years[6] | 10.4 | 11.2 | 16.3 | 11.4 | 8.9 | 5.5 | 5.3 | 4.8 |
| 15–24 years | 42.5 | 46.4 | 58.1 | 34.9 | 36.1 | 30.2 | 29.6 | 27.9 |
| 25–34 years | 54.4 | 51.0 | 70.4 | 44.9 | 39.5 | 32.6 | 31.7 | 29.0 |
| 35–44 years | 46.7 | 43.6 | 59.5 | 41.2 | 33.5 | 27.2 | 25.3 | 26.4 |
| 45–64 years | 54.6 | 47.8 | 61.7 | 39.5 | 33.3 | 27.1 | 24.8 | 26.1 |
| 65 years and over | 52.6 | 48.2 | 53.4 | 42.4 | 36.3 | 32.1 | 30.4 | 28.9 |
| American Indian or Alaska Native male[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 78.9 | 48.3 | 35.8 | 39.0 | 35.2 |
| All ages, crude | --- | --- | --- | 74.6 | 47.6 | 33.6 | 37.3 | 35.9 |
| 1–14 years | --- | --- | --- | 15.1 | 11.6 | 7.8 | 7.1 | 9.8 |
| 15–24 years | --- | --- | --- | 126.1 | 75.2 | 56.8 | 57.2 | 60.2 |
| 25–34 years | --- | --- | --- | 107.0 | 78.2 | 49.8 | 49.9 | 45.5 |
| 35–44 years | --- | --- | --- | 82.8 | 57.0 | 36.3 | 47.2 | 43.6 |
| 45–64 years | --- | --- | --- | 77.4 | 45.9 | 32.0 | 40.7 | 36.0 |
| 65 years and over | --- | --- | --- | 97.0 | 43.0 | 48.5 | 45.9 | 25.4 |
| Asian or Pacific Islander male[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 19.0 | 17.9 | 10.6 | 10.8 | 10.3 |
| All ages, crude | --- | --- | --- | 17.1 | 15.8 | 9.8 | 10.0 | 9.4 |
| 1–14 years | --- | --- | --- | 8.2 | 6.3 | 2.5 | 2.5 | 2.4 |
| 15–24 years | --- | --- | --- | 27.2 | 25.7 | 17.0 | 20.0 | 18.3 |
| 25–34 years | --- | --- | --- | 18.8 | 17.0 | 10.4 | 8.9 | 8.2 |
| 35–44 years | --- | --- | --- | 13.1 | 12.2 | 6.9 | 7.8 | 6.8 |
| 45–64 years | --- | --- | --- | 13.7 | 15.1 | 10.1 | 8.7 | 9.7 |
| 65 years and over | --- | --- | --- | 37.3 | 33.6 | 21.1 | 23.3 | 20.1 |
| Hispanic or Latino male[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 29.5 | 21.3 | 22.2 | 22.0 |
| All ages, crude | --- | --- | --- | --- | 29.2 | 20.1 | 21.3 | 21.1 |
| 1–14 years | --- | --- | --- | --- | 7.2 | 4.4 | 5.1 | 4.9 |
| 15–24 years | --- | --- | --- | --- | 48.2 | 34.7 | 38.9 | 37.2 |
| 25–34 years | --- | --- | --- | --- | 41.0 | 24.9 | 26.4 | 27.6 |
| 35–44 years | --- | --- | --- | --- | 28.0 | 21.6 | 22.6 | 22.1 |
| 45–64 years | --- | --- | --- | --- | 28.9 | 21.7 | 19.9 | 20.4 |
| 65 years and over | --- | --- | --- | --- | 35.3 | 28.9 | 30.7 | 29.2 |
| White, not Hispanic or Latino male[7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 25.7 | 21.7 | 22.2 | 21.6 |
| All ages, crude | --- | --- | --- | --- | 26.0 | 21.5 | 22.3 | 21.8 |
| 1–14 years | --- | --- | --- | --- | 6.4 | 4.9 | 4.2 | 4.6 |
| 15–24 years | --- | --- | --- | --- | 52.3 | 40.3 | 42.1 | 39.1 |
| 25–34 years | --- | --- | --- | --- | 34.0 | 24.7 | 26.1 | 24.9 |
| 35–44 years | --- | --- | --- | --- | 23.1 | 21.6 | 22.0 | 22.4 |
| 45–64 years | --- | --- | --- | --- | 19.8 | 19.3 | 20.4 | 20.4 |
| 65 years and over | --- | --- | --- | --- | 31.1 | 29.3 | 29.6 | 28.6 |
| White female[5] | | | | | | | | |
| All ages, age adjusted[4] | 11.4 | 11.7 | 14.9 | 12.2 | 11.2 | 9.8 | 9.8 | 9.5 |
| All ages, crude | 10.9 | 11.2 | 14.8 | 12.8 | 11.6 | 10.0 | 10.1 | 9.8 |
| Under 1 year | 7.8 | 7.5 | 10.2 | 7.1 | 4.7 | 3.5 | 2.2 | 3.0 |
| 1–14 years | 7.2 | 6.2 | 7.5 | 6.2 | 4.8 | 3.7 | 3.2 | 3.2 |
| 15–24 years | 12.6 | 15.6 | 22.7 | 23.0 | 19.5 | 17.1 | 17.9 | 17.2 |
| 25–34 years | 9.0 | 9.0 | 12.7 | 12.2 | 11.6 | 8.9 | 9.0 | 8.6 |
| 35–44 years | 8.1 | 8.9 | 12.3 | 10.6 | 9.2 | 8.9 | 9.4 | 9.0 |
| 45–64 years | 12.7 | 13.1 | 15.1 | 10.4 | 9.9 | 8.7 | 8.7 | 8.5 |
| 65 years and over | 22.2 | 20.8 | 23.7 | 15.3 | 17.4 | 16.2 | 16.3 | 15.8 |

See footnotes at end of table.



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## Table 44 (page 3 of 4). Death rates for motor vehicle-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Black or African American female[5] | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 9.3 | 10.4 | 14.1 | 8.5 | 9.6 | 8.4 | 8.2 | 8.3 |
| All ages, crude | 10.2 | 9.7 | 13.4 | 8.3 | 9.4 | 8.2 | 8.0 | 8.0 |
| Under 1 year | --- | 8.1 | 11.9 | * | 7.0 | * | * | * |
| 1–14 years[6] | 7.2 | 6.9 | 10.2 | 6.3 | 5.3 | 3.9 | 3.5 | 3.5 |
| 15–24 years | 11.6 | 9.9 | 13.4 | 8.0 | 9.9 | 11.7 | 11.6 | 9.6 |
| 25–34 years | 10.8 | 9.8 | 13.3 | 10.6 | 11.1 | 9.4 | 8.8 | 8.7 |
| 35–44 years | 11.1 | 11.0 | 16.1 | 8.3 | 9.4 | 8.2 | 9.4 | 8.9 |
| 45–64 years | 11.8 | 12.7 | 16.7 | 9.2 | 10.7 | 9.0 | 8.4 | 8.9 |
| 65 years and over | 14.3 | 13.2 | 15.7 | 9.5 | 13.5 | 10.4 | 9.5 | 12.4 |
| American Indian or Alaska Native female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 32.0 | 17.5 | 19.5 | 19.3 | 20.8 |
| All ages, crude | --- | --- | --- | 32.0 | 17.3 | 18.6 | 19.1 | 19.8 |
| 1–14 years | --- | --- | --- | 15.0 | 8.1 | 6.5 | 6.8 | 6.3 |
| 15–24 years | --- | --- | --- | 42.3 | 31.4 | 30.3 | 29.2 | 27.7 |
| 25–34 years | --- | --- | --- | 52.5 | 18.8 | 22.3 | 21.1 | 24.5 |
| 35–44 years | --- | --- | --- | 38.1 | 18.2 | 22.0 | 24.4 | 18.7 |
| 45–64 years | --- | --- | --- | 32.6 | 17.6 | 17.8 | 20.9 | 22.6 |
| 65 years and over | --- | --- | --- | * | * | 24.0 | * | 32.3 |
| Asian or Pacific Islander female[5] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 9.3 | 10.4 | 6.7 | 6.2 | 6.8 |
| All ages, crude | --- | --- | --- | 8.2 | 9.0 | 5.9 | 5.7 | 6.4 |
| 1–14 years | --- | --- | --- | 7.4 | 3.6 | 2.3 | 1.9 | 1.7 |
| 15–24 years | --- | --- | --- | 7.4 | 11.4 | 6.0 | 7.3 | 9.7 |
| 25–34 years | --- | --- | --- | 7.3 | 7.3 | 4.5 | 4.4 | 4.5 |
| 35–44 years | --- | --- | --- | 8.6 | 7.5 | 4.9 | 3.7 | 4.5 |
| 45–64 years | --- | --- | --- | 8.5 | 11.8 | 6.4 | 7.3 | 7.5 |
| 65 years and over | --- | --- | --- | 18.6 | 24.3 | 18.5 | 15.6 | 16.2 |
| Hispanic or Latino female[5,7] | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 9.6 | 7.9 | 8.1 | 8.0 |
| All ages, crude | --- | --- | --- | --- | 8.9 | 7.2 | 7.4 | 7.3 |
| 1–14 years | --- | --- | --- | --- | 4.8 | 3.9 | 3.2 | 3.0 |
| 15–24 years | --- | --- | --- | --- | 11.6 | 10.6 | 12.4 | 11.9 |
| 25–34 years | --- | --- | --- | --- | 9.4 | 6.5 | 7.2 | 6.6 |
| 35–44 years | --- | --- | --- | --- | 8.0 | 7.3 | 7.3 | 8.0 |
| 45–64 years | --- | --- | --- | --- | 11.4 | 8.3 | 8.4 | 8.4 |
| 65 years and over | --- | --- | --- | --- | 14.9 | 13.4 | 13.1 | 13.1 |

See footnotes at end of table.



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## Table 44 (page 4 of 4). Death rates for motor vehicle-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| *Sex, race, Hispanic origin, and age* | *1950*[1,2] | *1960*[1,2] | *1970*[2] | *1980*[2] | *1990* | *2000*[3] | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|
| White, not Hispanic or Latino female[7] | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 11.3 | 10.0 | 10.1 | 9.7 |
| All ages, crude | --- | --- | --- | --- | 11.7 | 10.3 | 10.5 | 10.2 |
| 1–14 years | --- | --- | --- | --- | 4.7 | 3.5 | 3.2 | 3.2 |
| 15–24 years | --- | --- | --- | --- | 20.4 | 18.4 | 19.0 | 18.3 |
| 25–34 years | --- | --- | --- | --- | 11.7 | 9.3 | 9.4 | 9.0 |
| 35–44 years | --- | --- | --- | --- | 9.3 | 9.0 | 9.7 | 9.1 |
| 45–64 years | --- | --- | --- | --- | 9.7 | 8.7 | 8.6 | 8.5 |
| 65 years and over | --- | --- | --- | --- | 17.5 | 16.3 | 16.5 | 15.9 |

--- Data not available.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group under 15 years.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. For additional injury-related statistics, see www.cdc.gov/ncipc/wisqars, a Web-based interactive database for injury data. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/data/hv/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 45 (page 1 of 3). Death rates for homicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **All persons** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 5.1 | 5.0 | 8.8 | 10.4 | 9.4 | 5.9 | 6.1 | 6.0 |
| All ages, crude | 5.0 | 4.6 | 8.1 | 10.6 | 9.9 | 6.0 | 6.1 | 6.1 |
| Under 1 year | 4.4 | 4.8 | 4.3 | 5.9 | 8.4 | 9.2 | 7.5 | 8.5 |
| 1–14 years | 0.6 | 0.6 | 1.1 | 1.5 | 1.8 | 1.3 | 1.4 | 1.2 |
| 1–4 years | 0.6 | 0.7 | 1.9 | 2.5 | 2.5 | 2.3 | 2.7 | 2.4 |
| 5–14 years | 0.5 | 0.5 | 0.9 | 1.2 | 1.5 | 0.9 | 0.9 | 0.8 |
| 15–24 years | 5.8 | 5.6 | 11.3 | 15.4 | 19.7 | 12.6 | 12.9 | 13.0 |
| 15–19 years | 3.9 | 3.9 | 7.7 | 10.5 | 16.9 | 9.5 | 9.3 | 9.5 |
| 20–24 years | 8.5 | 7.7 | 15.6 | 20.2 | 22.2 | 16.0 | 16.5 | 16.5 |
| 25–44 years | 8.9 | 8.5 | 14.9 | 17.5 | 14.7 | 8.7 | 9.1 | 9.1 |
| 25–34 years | 9.3 | 9.2 | 16.2 | 19.3 | 17.4 | 10.4 | 11.2 | 11.3 |
| 35–44 years | 8.4 | 7.8 | 13.5 | 14.9 | 11.6 | 7.1 | 7.2 | 7.0 |
| 45–64 years | 5.0 | 5.3 | 8.7 | 9.0 | 6.3 | 4.0 | 4.1 | 4.1 |
| 45–54 years | 5.9 | 6.1 | 10.0 | 11.0 | 7.5 | 4.7 | 4.8 | 4.9 |
| 55–64 years | 3.9 | 4.1 | 7.1 | 7.0 | 5.0 | 3.0 | 3.2 | 2.8 |
| 65 years and over | 3.0 | 2.7 | 4.6 | 5.5 | 4.0 | 2.4 | 2.3 | 2.4 |
| 65–74 years | 3.2 | 2.8 | 4.9 | 5.7 | 3.8 | 2.4 | 2.3 | 2.4 |
| 75–84 years | 2.5 | 2.3 | 4.0 | 5.2 | 4.3 | 2.4 | 2.3 | 2.5 |
| 85 years and over | 2.3 | 2.4 | 4.2 | 5.3 | 4.6 | 2.4 | 2.1 | 2.2 |
| **Male** | | | | | | | | |
| All ages, age adjusted[4] | 7.9 | 7.5 | 14.3 | 16.6 | 14.8 | 9.0 | 9.4 | 9.4 |
| All ages, crude | 7.7 | 6.8 | 13.1 | 17.1 | 15.9 | 9.3 | 9.6 | 9.7 |
| Under 1 year | 4.5 | 4.7 | 4.5 | 6.3 | 8.8 | 10.4 | 7.9 | 10.0 |
| 1–14 years | 0.6 | 0.6 | 1.2 | 1.6 | 2.0 | 1.5 | 1.5 | 1.4 |
| 1–4 years | 0.5 | 0.7 | 1.9 | 2.7 | 2.7 | 2.5 | 2.9 | 2.5 |
| 5–14 years | 0.6 | 0.5 | 1.0 | 1.2 | 1.7 | 1.1 | 0.9 | 1.0 |
| 15–24 years | 8.6 | 8.4 | 18.2 | 24.0 | 32.5 | 20.9 | 21.5 | 21.8 |
| 15–19 years | 5.5 | 5.7 | 12.1 | 15.9 | 27.8 | 15.5 | 15.3 | 15.9 |
| 20–24 years | 13.5 | 11.8 | 25.6 | 32.2 | 36.9 | 26.7 | 27.7 | 27.6 |
| 25–44 years | 13.8 | 12.8 | 24.4 | 28.9 | 23.5 | 13.3 | 14.2 | 14.3 |
| 25–34 years | 14.4 | 13.9 | 26.8 | 31.9 | 27.7 | 16.7 | 18.2 | 18.5 |
| 35–44 years | 13.2 | 11.7 | 21.7 | 24.5 | 18.6 | 10.3 | 10.7 | 10.4 |
| 45–64 years | 8.1 | 8.1 | 14.8 | 15.2 | 10.2 | 6.0 | 6.2 | 6.1 |
| 45–54 years | 9.5 | 9.4 | 16.8 | 18.4 | 11.9 | 6.9 | 7.1 | 7.4 |
| 55–64 years | 6.3 | 6.4 | 12.1 | 11.8 | 8.0 | 4.6 | 4.8 | 4.2 |
| 65 years and over | 4.8 | 4.3 | 7.7 | 8.8 | 5.8 | 3.3 | 3.2 | 3.4 |
| 65–74 years | 5.2 | 4.6 | 8.5 | 9.2 | 5.8 | 3.4 | 3.3 | 3.4 |
| 75–84 years | 3.9 | 3.7 | 5.9 | 8.1 | 5.7 | 3.2 | 3.1 | 3.3 |
| 85 years and over | 2.5 | 3.6 | 7.4 | 7.5 | 6.7 | 3.3 | 3.0 | 3.2 |
| **Female** | | | | | | | | |
| All ages, age adjusted[4] | 2.4 | 2.6 | 3.7 | 4.4 | 4.0 | 2.8 | 2.8 | 2.6 |
| All ages, crude | 2.4 | 2.4 | 3.4 | 4.5 | 4.2 | 2.8 | 2.7 | 2.6 |
| Under 1 year | 4.2 | 4.9 | 4.1 | 5.6 | 8.0 | 7.9 | 7.1 | 6.9 |
| 1–14 years | 0.6 | 0.5 | 1.0 | 1.4 | 1.6 | 1.1 | 1.3 | 1.0 |
| 1–4 years | 0.7 | 0.7 | 1.9 | 2.2 | 2.3 | 2.1 | 2.5 | 2.3 |
| 5–14 years | 0.5 | 0.4 | 0.7 | 1.1 | 1.2 | 0.7 | 0.8 | 0.5 |
| 15–24 years | 3.0 | 2.8 | 4.6 | 6.6 | 6.2 | 3.9 | 3.8 | 3.7 |
| 15–19 years | 2.4 | 1.9 | 3.2 | 4.9 | 5.4 | 3.1 | 2.9 | 2.6 |
| 20–24 years | 3.7 | 3.8 | 6.2 | 8.2 | 7.0 | 4.7 | 4.6 | 4.8 |
| 25–44 years | 4.2 | 4.3 | 5.8 | 6.4 | 6.0 | 4.0 | 4.0 | 3.8 |
| 25–34 years | 4.5 | 4.6 | 6.0 | 6.9 | 7.1 | 4.1 | 4.2 | 3.9 |
| 35–44 years | 3.8 | 4.0 | 5.7 | 5.7 | 4.8 | 4.0 | 3.8 | 3.6 |
| 45–64 years | 1.9 | 2.5 | 3.1 | 3.4 | 2.8 | 2.1 | 2.2 | 2.1 |
| 45–54 years | 2.3 | 2.9 | 3.7 | 4.1 | 3.2 | 2.5 | 2.6 | 2.5 |
| 55–64 years | 1.4 | 2.0 | 2.5 | 2.8 | 2.3 | 1.6 | 1.6 | 1.5 |
| 65 years and over | 1.4 | 1.3 | 2.3 | 3.3 | 2.8 | 1.8 | 1.6 | 1.7 |
| 65–74 years | 1.3 | 1.3 | 2.2 | 3.0 | 2.2 | 1.6 | 1.4 | 1.5 |
| 75–84 years | 1.4 | 1.3 | 2.7 | 3.5 | 3.4 | 2.0 | 1.8 | 1.9 |
| 85 years and over | 2.1 | 1.6 | 2.5 | 4.3 | 3.8 | 2.0 | 1.7 | 1.8 |
| **White male[5]** | | | | | | | | |
| All ages, age adjusted[4] | 3.8 | 3.9 | 7.2 | 10.4 | 8.3 | 5.2 | 5.3 | 5.3 |
| All ages, crude | 3.6 | 3.6 | 6.6 | 10.7 | 8.8 | 5.2 | 5.4 | 5.4 |
| Under 1 year | 4.3 | 3.8 | 2.9 | 4.3 | 6.4 | 8.2 | 6.2 | 8.1 |
| 1–14 years | 0.4 | 0.5 | 0.7 | 1.2 | 1.3 | 1.2 | 1.0 | 0.9 |
| 15–24 years | 3.2 | 5.0 | 7.6 | 15.1 | 15.2 | 9.9 | 10.6 | 10.6 |
| 25–44 years | 5.4 | 5.5 | 11.6 | 17.2 | 13.0 | 7.4 | 7.7 | 7.7 |
| 25–34 years | 4.9 | 5.7 | 12.5 | 18.5 | 14.7 | 8.4 | 8.9 | 9.2 |
| 35–44 years | 6.1 | 5.2 | 10.8 | 15.2 | 11.1 | 6.5 | 6.8 | 6.3 |
| 45–64 years | 4.8 | 4.6 | 8.3 | 9.8 | 6.9 | 4.1 | 4.2 | 4.2 |
| 65 years and over | 3.8 | 3.1 | 5.4 | 6.7 | 4.1 | 2.5 | 2.6 | 2.7 |

See footnotes at end of table.



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## Table 45 (page 2 of 3). Death rates for homicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **Black or African American male[5]** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 47.0 | 42.3 | 78.2 | 69.4 | 63.1 | 35.4 | 36.4 | 36.7 |
| All ages, crude | 44.7 | 35.0 | 66.0 | 65.7 | 68.5 | 37.2 | 38.4 | 38.9 |
| Under 1 year | --- | 10.3 | 14.3 | 18.6 | 21.4 | 23.3 | 16.3 | 17.8 |
| 1–14 years[6] | 1.8 | 1.5 | 4.4 | 4.1 | 5.8 | 3.1 | 3.8 | 4.1 |
| 15–24 years | 53.8 | 43.2 | 98.3 | 82.6 | 137.1 | 85.3 | 83.1 | 84.6 |
| 25–44 years | 92.8 | 80.5 | 140.2 | 130.0 | 105.4 | 55.8 | 60.0 | 61.0 |
| 25–34 years | 104.3 | 86.4 | 154.5 | 142.9 | 123.7 | 73.9 | 82.2 | 82.5 |
| 35–44 years | 80.0 | 74.4 | 124.0 | 109.3 | 81.2 | 38.5 | 38.8 | 40.2 |
| 45–64 years | 46.0 | 44.6 | 82.3 | 70.6 | 41.4 | 21.9 | 22.9 | 22.2 |
| 65 years and over | 16.5 | 17.3 | 33.3 | 30.9 | 25.7 | 12.8 | 11.2 | 10.9 |
| **American Indian or Alaska Native male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 23.3 | 16.7 | 10.7 | 11.6 | 10.5 |
| All ages, crude | --- | --- | --- | 23.1 | 16.6 | 10.7 | 12.0 | 11.3 |
| 15–24 years | --- | --- | --- | 35.4 | 25.1 | 17.0 | 18.8 | 19.7 |
| 25–44 years | --- | --- | --- | 39.2 | 25.7 | 17.0 | 18.3 | 14.8 |
| 45–64 years | --- | --- | --- | 22.1 | 14.8 | * | 9.9 | 9.5 |
| **Asian or Pacific Islander male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 9.1 | 7.3 | 4.3 | 4.2 | 4.2 |
| All ages, crude | --- | --- | --- | 8.3 | 7.9 | 4.4 | 4.5 | 4.5 |
| 15–24 years | --- | --- | --- | 9.3 | 14.9 | 7.8 | 9.7 | 9.8 |
| 25–44 years | --- | --- | --- | 11.3 | 9.6 | 4.6 | 4.9 | 4.5 |
| 45–64 years | --- | --- | --- | 10.4 | 7.0 | 6.1 | 4.1 | 4.3 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 27.4 | 11.8 | 11.6 | 12.1 |
| All ages, crude | --- | --- | --- | --- | 31.0 | 13.4 | 13.2 | 13.6 |
| Under 1 year | --- | --- | --- | --- | 8.7 | 6.6 | 6.6 | 7.9 |
| 1–14 years | --- | --- | --- | --- | 3.1 | 1.7 | 1.6 | 1.3 |
| 15–24 years | --- | --- | --- | --- | 55.4 | 28.5 | 29.6 | 30.3 |
| 25–44 years | --- | --- | --- | --- | 46.4 | 17.2 | 16.5 | 17.6 |
| 25–34 years | --- | --- | --- | --- | 50.9 | 19.9 | 19.8 | 21.2 |
| 35–44 years | --- | --- | --- | --- | 39.3 | 13.5 | 12.1 | 12.9 |
| 45–64 years | --- | --- | --- | --- | 20.5 | 9.1 | 8.6 | 8.7 |
| 65 years and over | --- | --- | --- | --- | 9.4 | 4.4 | 4.4 | 6.0 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 5.6 | 3.6 | 3.7 | 3.6 |
| All ages, crude | --- | --- | --- | --- | 5.8 | 3.6 | 3.8 | 3.6 |
| Under 1 year | --- | --- | --- | --- | 5.4 | 8.3 | 5.8 | 8.0 |
| 1–14 years | --- | --- | --- | --- | 0.9 | 1.0 | 0.8 | 0.8 |
| 15–24 years | --- | --- | --- | --- | 7.5 | 4.7 | 5.2 | 5.0 |
| 25–44 years | --- | --- | --- | --- | 8.7 | 5.2 | 5.5 | 5.1 |
| 25–34 years | --- | --- | --- | --- | 9.3 | 5.2 | 5.3 | 5.2 |
| 35–44 years | --- | --- | --- | --- | 8.0 | 5.2 | 5.6 | 4.9 |
| 45–64 years | --- | --- | --- | --- | 5.7 | 3.6 | 3.7 | 3.7 |
| 65 years and over | --- | --- | --- | --- | 3.7 | 2.3 | 2.4 | 2.4 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 1.4 | 1.5 | 2.3 | 3.2 | 2.7 | 2.1 | 2.0 | 2.0 |
| All ages, crude | 1.4 | 1.4 | 2.1 | 3.2 | 2.8 | 2.1 | 2.0 | 2.0 |
| Under 1 year | 3.9 | 3.5 | 2.9 | 4.3 | 5.1 | 5.0 | 4.6 | 5.7 |
| 1–14 years | 0.4 | 0.4 | 0.7 | 1.1 | 1.0 | 0.8 | 0.9 | 0.7 |
| 15–24 years | 1.3 | 1.5 | 2.7 | 4.7 | 4.0 | 2.7 | 2.5 | 2.5 |
| 25–44 years | 2.0 | 2.1 | 3.3 | 4.2 | 3.8 | 2.9 | 2.8 | 2.8 |
| 45–64 years | 1.5 | 1.7 | 2.1 | 2.6 | 2.3 | 1.8 | 1.9 | 1.8 |
| 65 years and over | 1.2 | 1.2 | 1.9 | 2.9 | 2.2 | 1.6 | 1.4 | 1.5 |
| **Black or African American female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 11.1 | 11.4 | 14.7 | 13.2 | 12.5 | 7.1 | 6.9 | 6.4 |
| All ages, crude | 11.5 | 10.4 | 13.2 | 13.5 | 13.4 | 7.2 | 7.0 | 6.6 |
| Under 1 year | --- | 13.8 | 10.7 | 12.8 | 22.8 | 22.2 | 18.5 | 14.2 |
| 1–14 years[6] | 1.8 | 1.2 | 3.1 | 3.3 | 4.7 | 2.7 | 2.6 | 2.4 |
| 15–24 years | 16.5 | 11.9 | 17.7 | 18.4 | 18.9 | 10.7 | 10.3 | 10.1 |
| 25–44 years | 22.5 | 22.7 | 25.3 | 22.6 | 21.0 | 11.0 | 11.1 | 9.8 |
| 45–64 years | 6.8 | 10.3 | 13.4 | 10.8 | 6.5 | 4.5 | 4.5 | 4.8 |
| 65 years and over | 3.6 | 3.0 | 7.4 | 8.0 | 9.4 | 3.5 | 3.1 | 3.3 |

See footnotes at end of table.



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## Table 45 (page 3 of 3). Death rates for homicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **American Indian or Alaska Native female[5]** | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 8.1 | 4.6 | 3.0 | 5.2 | 3.9 |
| All ages, crude | --- | --- | --- | 7.7 | 4.8 | 2.9 | 5.3 | 4.0 |
| 15–24 years | --- | --- | --- | * | * | * | * | 7.2 |
| 25–44 years | --- | --- | --- | 13.7 | 6.9 | 5.9 | 6.3 | 5.4 |
| 45–64 years | --- | --- | --- | * | * | * | * | * |
| **Asian or Pacific Islander female[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 3.1 | 2.8 | 1.7 | 1.8 | 1.6 |
| All ages, crude | --- | --- | --- | 3.1 | 2.8 | 1.7 | 1.8 | 1.6 |
| 15–24 years | --- | --- | --- | * | * | * | 2.1 | * |
| 25–44 years | --- | --- | --- | 4.6 | 3.8 | 2.2 | 2.4 | 1.9 |
| 45–64 years | --- | --- | --- | * | * | 2.0 | 1.6 | 1.5 |
| **Hispanic or Latino female[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 4.3 | 2.8 | 2.5 | 2.7 |
| All ages, crude | --- | --- | --- | --- | 4.7 | 2.8 | 2.6 | 2.8 |
| Under 1 year | --- | --- | --- | --- | * | 7.4 | 5.9 | 5.9 |
| 1–14 years | --- | --- | --- | --- | 1.9 | 1.0 | 1.2 | 1.2 |
| 15–24 years | --- | --- | --- | --- | 8.1 | 3.7 | 3.8 | 4.5 |
| 25–44 years | --- | --- | --- | --- | 6.1 | 3.7 | 3.4 | 3.6 |
| 45–64 years | --- | --- | --- | --- | 3.3 | 2.9 | 2.3 | 2.3 |
| 65 years and over | --- | --- | --- | --- | * | 2.4 | * | 1.9 |
| **White, not Hispanic or Latino female[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 2.5 | 1.9 | 1.9 | 1.8 |
| All ages, crude | --- | --- | --- | --- | 2.5 | 1.9 | 1.9 | 1.8 |
| Under 1 year | --- | --- | --- | --- | 4.4 | 4.1 | 4.1 | 5.5 |
| 1–14 years | --- | --- | --- | --- | 0.8 | 0.8 | 0.9 | 0.6 |
| 15–24 years | --- | --- | --- | --- | 3.3 | 2.3 | 2.2 | 1.9 |
| 25–44 years | --- | --- | --- | --- | 3.5 | 2.7 | 2.6 | 2.6 |
| 45–64 years | --- | --- | --- | --- | 2.2 | 1.6 | 1.8 | 1.7 |
| 65 years and over | --- | --- | --- | --- | 2.2 | 1.6 | 1.4 | 1.4 |

--- Data not available.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group under 15 years.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Figures for 2001 include September 11-related deaths for which death certificates were filed as of October 24, 2002. For the period 1980–98, homicide was coded using ICD–9 codes that are most nearly comparable with homicide codes in the 113 cause list for ICD–10. See Appendix II, table V for terrorism-related ICD–10 codes. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. For additional injury-related statistics, see www.cdc.gov/ncipc/wisqars, a Web-based interactive database for injury data. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/data/vsrt/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 46 (page 1 of 3). Death rates for suicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | 13.2 | 12.5 | 13.1 | 12.2 | 12.5 | 10.4 | 10.9 | 10.8 |
| All ages, crude | 11.4 | 10.6 | 11.6 | 11.9 | 12.4 | 10.4 | 11.0 | 10.8 |
| Under 1 year | ... | ... | ... | ... | ... | ... | ... | * |
| 1–4 years | ... | ... | ... | ... | ... | ... | ... | * |
| 5–14 years | 0.2 | 0.3 | 0.3 | 0.4 | 0.8 | 0.7 | 0.6 | 0.6 |
| 15–24 years | 4.5 | 5.2 | 8.8 | 12.3 | 13.2 | 10.2 | 9.9 | 9.7 |
| 15–19 years | 2.7 | 3.6 | 5.9 | 8.5 | 11.1 | 8.0 | 7.4 | 7.3 |
| 20–24 years | 6.2 | 7.1 | 12.2 | 16.1 | 15.1 | 12.5 | 12.4 | 12.1 |
| 25–44 years | 11.6 | 12.2 | 15.4 | 15.6 | 15.2 | 13.4 | 14.0 | 13.8 |
| 25–34 years | 9.1 | 10.0 | 14.1 | 16.0 | 15.2 | 12.0 | 12.6 | 12.7 |
| 35–44 years | 14.3 | 14.2 | 16.9 | 15.4 | 15.3 | 14.5 | 15.3 | 14.9 |
| 45–64 years | 23.5 | 22.0 | 20.6 | 15.9 | 15.3 | 13.5 | 14.9 | 15.0 |
| 45–54 years | 20.9 | 20.7 | 20.0 | 15.9 | 14.8 | 14.4 | 15.7 | 15.9 |
| 55–64 years | 26.8 | 23.7 | 21.4 | 15.9 | 16.0 | 12.1 | 13.6 | 13.8 |
| 65 years and over | 30.0 | 24.5 | 20.8 | 17.6 | 20.5 | 15.2 | 15.6 | 14.6 |
| 65–74 years | 29.6 | 23.0 | 20.8 | 16.9 | 17.9 | 12.5 | 13.5 | 12.7 |
| 75–84 years | 31.1 | 27.9 | 21.2 | 19.1 | 24.9 | 17.6 | 17.7 | 16.4 |
| 85 years and over | 28.8 | 26.0 | 19.0 | 19.2 | 22.2 | 19.6 | 18.0 | 16.9 |
| Male | | | | | | | | |
| All ages, age adjusted[4] | 21.2 | 20.0 | 19.8 | 19.9 | 21.5 | 17.7 | 18.4 | 18.0 |
| All ages, crude | 17.8 | 16.5 | 16.8 | 18.6 | 20.4 | 17.1 | 17.9 | 17.6 |
| Under 1 year | ... | ... | ... | ... | ... | ... | ... | * |
| 1–4 years | ... | ... | ... | ... | ... | ... | ... | * |
| 5–14 years | 0.3 | 0.4 | 0.5 | 0.6 | 1.1 | 1.2 | 0.9 | 0.9 |
| 15–24 years | 6.5 | 8.2 | 13.5 | 20.2 | 22.0 | 17.1 | 16.5 | 16.0 |
| 15–19 years | 3.5 | 5.6 | 8.8 | 13.8 | 18.1 | 13.0 | 12.2 | 11.6 |
| 20–24 years | 9.3 | 11.5 | 19.3 | 26.8 | 25.7 | 21.4 | 20.8 | 20.2 |
| 25–44 years | 17.2 | 17.9 | 20.9 | 24.0 | 24.4 | 21.3 | 22.2 | 21.9 |
| 25–34 years | 13.4 | 14.7 | 19.8 | 25.0 | 24.8 | 19.6 | 20.5 | 20.6 |
| 35–44 years | 21.3 | 21.0 | 22.1 | 22.5 | 23.9 | 22.8 | 23.7 | 23.2 |
| 45–64 years | 37.1 | 34.4 | 30.0 | 23.7 | 24.3 | 21.3 | 23.5 | 23.5 |
| 45–54 years | 32.0 | 31.6 | 27.9 | 22.9 | 23.2 | 22.4 | 24.4 | 24.4 |
| 55–64 years | 43.6 | 38.1 | 32.7 | 24.5 | 25.7 | 19.4 | 22.2 | 22.3 |
| 65 years and over | 52.8 | 44.0 | 38.4 | 35.0 | 41.6 | 31.1 | 31.8 | 29.8 |
| 65–74 years | 50.5 | 39.6 | 36.0 | 30.4 | 32.2 | 22.7 | 24.7 | 23.4 |
| 75–84 years | 58.3 | 52.5 | 42.8 | 42.3 | 56.1 | 38.6 | 38.1 | 35.1 |
| 85 years and over | 58.3 | 57.4 | 42.4 | 50.6 | 65.9 | 57.5 | 50.7 | 47.8 |
| Female | | | | | | | | |
| All ages, age adjusted[4] | 5.6 | 5.6 | 7.4 | 5.7 | 4.8 | 4.0 | 4.2 | 4.2 |
| All ages, crude | 5.1 | 4.9 | 6.6 | 5.5 | 4.8 | 4.0 | 4.3 | 4.3 |
| Under 1 year | ... | ... | ... | ... | ... | ... | ... | * |
| 1–4 years | ... | ... | ... | ... | ... | ... | ... | * |
| 5–14 years | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.3 | 0.3 | 0.3 |
| 15–24 years | 2.6 | 2.2 | 4.2 | 4.3 | 3.9 | 3.0 | 2.9 | 3.0 |
| 15–19 years | 1.8 | 1.6 | 2.9 | 3.0 | 3.7 | 2.7 | 2.4 | 2.7 |
| 20–24 years | 3.3 | 2.9 | 5.7 | 5.5 | 4.1 | 3.2 | 3.5 | 3.4 |
| 25–44 years | 6.2 | 6.6 | 10.2 | 7.7 | 6.2 | 5.4 | 5.8 | 5.7 |
| 25–34 years | 4.9 | 5.5 | 8.6 | 7.1 | 5.6 | 4.3 | 4.6 | 4.6 |
| 35–44 years | 7.5 | 7.7 | 11.9 | 8.5 | 6.8 | 6.4 | 6.9 | 6.6 |
| 45–64 years | 9.9 | 10.2 | 12.0 | 8.9 | 7.1 | 6.2 | 6.7 | 7.0 |
| 45–54 years | 9.9 | 10.2 | 12.6 | 9.4 | 6.9 | 6.7 | 7.4 | 7.7 |
| 55–64 years | 9.9 | 10.2 | 11.4 | 8.4 | 7.3 | 5.4 | 5.7 | 5.9 |
| 65 years and over | 9.4 | 8.4 | 8.1 | 6.1 | 6.4 | 4.0 | 4.1 | 3.8 |
| 65–74 years | 10.1 | 8.4 | 9.0 | 6.5 | 6.7 | 4.0 | 4.1 | 3.8 |
| 75–84 years | 8.1 | 8.9 | 7.0 | 5.5 | 6.3 | 4.0 | 4.2 | 4.0 |
| 85 years and over | 8.2 | 6.0 | 5.9 | 5.5 | 5.4 | 4.2 | 3.8 | 3.3 |
| White male[5] | | | | | | | | |
| All ages, age adjusted[4] | 22.3 | 21.1 | 20.8 | 20.9 | 22.8 | 19.1 | 20.0 | 19.6 |
| All ages, crude | 19.0 | 17.6 | 18.0 | 19.9 | 22.0 | 18.8 | 19.9 | 19.5 |
| 15–24 years | 6.6 | 8.6 | 13.9 | 21.4 | 23.2 | 17.9 | 17.7 | 16.9 |
| 25–44 years | 17.9 | 18.5 | 21.5 | 24.6 | 25.4 | 22.9 | 24.0 | 23.9 |
| 45–64 years | 39.3 | 36.5 | 31.9 | 25.0 | 26.0 | 23.2 | 25.9 | 26.1 |
| 65 years and over | 55.8 | 46.7 | 41.1 | 37.2 | 44.2 | 33.3 | 34.2 | 32.1 |
| 65–74 years | 53.2 | 42.0 | 38.7 | 32.5 | 34.2 | 24.3 | 26.8 | 25.2 |
| 75–84 years | 61.9 | 55.7 | 45.5 | 45.5 | 60.2 | 41.1 | 40.6 | 37.5 |
| 85 years and over | 61.9 | 61.3 | 45.8 | 52.8 | 70.3 | 61.6 | 53.9 | 51.4 |

See footnotes at end of table.



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## Table 46 (page 2 of 3). Death rates for suicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **Black or African American male[5]** | Deaths per 100,000 resident population | | | | | | | |
| All ages, age adjusted[4] | 7.5 | 8.4 | 10.0 | 11.4 | 12.8 | 10.0 | 9.8 | 9.2 |
| All ages, crude | 6.3 | 6.4 | 8.0 | 10.3 | 12.0 | 9.4 | 9.1 | 8.8 |
| 15–24 years | 4.9 | 4.1 | 10.5 | 12.3 | 15.1 | 14.2 | 11.3 | 12.1 |
| 25–44 years | 9.8 | 12.6 | 16.1 | 19.2 | 19.6 | 14.3 | 15.1 | 14.3 |
| 45–64 years | 12.7 | 13.0 | 12.4 | 11.8 | 13.1 | 9.9 | 9.6 | 9.0 |
| 65 years and over | 9.0 | 9.9 | 8.7 | 11.4 | 14.9 | 11.5 | 11.7 | 9.2 |
| 65–74 years | 10.0 | 11.3 | 8.7 | 11.1 | 14.7 | 11.1 | 9.7 | 8.3 |
| 75–84 years[6] | * | * | * | 10.5 | 14.4 | 12.1 | 13.8 | 11.3 |
| 85 years and over | --- | * | * | * | * | * | * | * |
| **American Indian or Alaska Native male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 19.3 | 20.1 | 16.0 | 16.4 | 16.6 |
| All ages, crude | --- | --- | --- | 20.9 | 20.9 | 15.9 | 16.8 | 17.1 |
| 15–24 years | --- | --- | --- | 45.3 | 49.1 | 26.2 | 27.9 | 27.2 |
| 25–44 years | --- | --- | --- | 31.2 | 27.8 | 24.5 | 26.8 | 30.1 |
| 45–64 years | --- | --- | --- | * | * | 15.4 | 14.1 | 9.5 |
| 65 years and over | --- | --- | --- | * | * | * | * | * |
| **Asian or Pacific Islander male[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 10.7 | 9.6 | 8.6 | 8.0 | 8.5 |
| All ages, crude | --- | --- | --- | 8.8 | 8.7 | 7.9 | 7.6 | 8.0 |
| 15–24 years | --- | --- | --- | 10.8 | 13.5 | 9.1 | 8.7 | 9.0 |
| 25–44 years | --- | --- | --- | 11.0 | 10.6 | 9.9 | 9.3 | 9.2 |
| 45–64 years | --- | --- | --- | 13.0 | 9.7 | 9.7 | 9.1 | 10.0 |
| 65 years and over | --- | --- | --- | 18.6 | 16.8 | 15.4 | 14.4 | 17.5 |
| **Hispanic or Latino male[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 13.7 | 10.3 | 9.9 | 9.7 |
| All ages, crude | --- | --- | --- | --- | 11.4 | 8.4 | 8.3 | 8.3 |
| 15–24 years | --- | --- | --- | --- | 14.7 | 10.9 | 10.6 | 11.2 |
| 25–44 years | --- | --- | --- | --- | 16.2 | 11.2 | 10.9 | 10.9 |
| 45–64 years | --- | --- | --- | --- | 16.1 | 12.0 | 11.9 | 12.0 |
| 65 years and over | --- | --- | --- | --- | 23.4 | 19.5 | 17.5 | 15.6 |
| **White, not Hispanic or Latino male[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 23.5 | 20.2 | 21.4 | 21.0 |
| All ages, crude | --- | --- | --- | --- | 23.1 | 20.4 | 21.9 | 21.6 |
| 15–24 years | --- | --- | --- | --- | 24.4 | 19.5 | 19.3 | 18.2 |
| 25–44 years | --- | --- | --- | --- | 26.4 | 25.1 | 26.9 | 26.8 |
| 45–64 years | --- | --- | --- | --- | 26.8 | 24.0 | 27.2 | 27.4 |
| 65 years and over | --- | --- | --- | --- | 45.4 | 33.9 | 35.1 | 33.1 |
| **White female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 6.0 | 5.9 | 7.9 | 6.1 | 5.2 | 4.3 | 4.7 | 4.6 |
| All ages, crude | 5.5 | 5.3 | 7.1 | 5.9 | 5.3 | 4.4 | 4.8 | 4.7 |
| 15–24 years | 2.7 | 2.3 | 4.2 | 4.6 | 4.2 | 3.1 | 3.1 | 3.1 |
| 25–44 years | 6.6 | 7.0 | 11.0 | 8.1 | 6.6 | 6.0 | 6.6 | 6.4 |
| 45–64 years | 10.6 | 10.9 | 13.0 | 9.6 | 7.7 | 6.9 | 7.5 | 7.8 |
| 65 years and over | 9.9 | 8.8 | 8.5 | 6.4 | 6.8 | 4.3 | 4.3 | 4.0 |
| **Black or African American female[5]** | | | | | | | | |
| All ages, age adjusted[4] | 1.8 | 2.0 | 2.9 | 2.4 | 2.4 | 1.8 | 1.6 | 1.9 |
| All ages, crude | 1.5 | 1.6 | 2.6 | 2.2 | 2.3 | 1.7 | 1.5 | 1.8 |
| 15–24 years | 1.8 | * | 3.8 | 2.3 | 2.3 | 2.2 | 1.7 | 2.0 |
| 25–44 years | 2.3 | 3.0 | 4.8 | 4.3 | 3.8 | 2.6 | 2.4 | 2.8 |
| 45–64 years | 2.7 | 3.1 | 2.9 | 2.5 | 2.9 | 2.1 | 2.1 | 2.4 |
| 65 years and over | * | * | 2.6 | * | 1.9 | 1.3 | 1.1 | 1.4 |

See footnotes at end of table.



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## Table 46 (page 3 of 3). Death rates for suicide, according to sex, race, Hispanic origin, and age: United States, selected years 1950–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1950[1,2] | 1960[1,2] | 1970[2] | 1980[2] | 1990 | 2000[3] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **American Indian or Alaska Native female[5]** | | | | Deaths per 100,000 resident population | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 4.7 | 3.6 | 3.8 | 4.1 | 3.5 |
| All ages, crude | --- | --- | --- | 4.7 | 3.7 | 4.0 | 4.3 | 3.7 |
| 15–24 years | --- | --- | --- | * | * | * | 7.4 | 8.3 |
| 25–44 years | --- | --- | --- | 10.7 | * | 7.2 | 5.6 | 4.6 |
| 45–64 years | --- | --- | --- | * | * | * | * | * |
| 65 years and over | --- | --- | --- | * | * | * | * | * |
| **Asian or Pacific Islander female[5]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | 5.5 | 4.1 | 2.8 | 3.0 | 3.1 |
| All ages, crude | --- | --- | --- | 4.7 | 3.4 | 2.7 | 2.9 | 3.1 |
| 15–24 years | --- | --- | --- | * | 3.9 | 2.7 | * | 3.4 |
| 25–44 years | --- | --- | --- | 5.4 | 3.8 | 3.3 | 3.3 | 3.4 |
| 45–64 years | --- | --- | --- | 7.9 | 5.0 | 3.2 | 3.8 | 4.3 |
| 65 years and over | --- | --- | --- | * | 8.5 | 5.2 | 6.8 | 4.6 |
| **Hispanic or Latino female[5,7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 2.3 | 1.7 | 1.8 | 1.7 |
| All ages, crude | --- | --- | --- | --- | 2.2 | 1.5 | 1.6 | 1.5 |
| 15–24 years | --- | --- | --- | --- | 3.1 | 2.0 | 2.1 | 2.2 |
| 25–44 years | --- | --- | --- | --- | 3.1 | 2.1 | 2.0 | 2.0 |
| 45–64 years | --- | --- | --- | --- | 2.5 | 2.5 | 2.5 | 2.4 |
| 65 years and over | --- | --- | --- | --- | * | * | 1.9 | * |
| **White, not Hispanic or Latino female[7]** | | | | | | | | |
| All ages, age adjusted[4] | --- | --- | --- | --- | 5.4 | 4.7 | 5.1 | 5.0 |
| All ages, crude | --- | --- | --- | --- | 5.6 | 4.9 | 5.3 | 5.3 |
| 15–24 years | --- | --- | --- | --- | 4.3 | 3.3 | 3.4 | 3.3 |
| 25–44 years | --- | --- | --- | --- | 7.0 | 6.7 | 7.5 | 7.2 |
| 45–64 years | --- | --- | --- | --- | 8.0 | 7.3 | 8.0 | 8.3 |
| 65 years and over | --- | --- | --- | --- | 7.0 | 4.4 | 4.5 | 4.2 |

. . . Category not applicable.
* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
- - - Data not available.
[1]Includes deaths of persons who were not residents of the 50 States and the District of Columbia.
[2]Underlying cause of death was coded according to the Sixth Revision of the International Classification of Diseases (ICD) in 1950, Seventh Revision in 1960, Eighth Revision in 1970, and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[3]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[4]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[5]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[6]In 1950 rate is for the age group 75 years and over.
[7]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Figures for 2001 include September 11-related deaths for which death certificates were filed as of October 24, 2002. See Appendix II, table V for terrorism-related ICD–10 codes. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. For additional injury-related statistics, see www.cdc.gov/ncipc/wisqars, a Web-based interactive database for injury data. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–1960. Washington: U.S. Government Printing Office. 1968; numerator data from National Vital Statistics System, annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/data/hus/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 47 (page 1 of 3). Death rates for firearm-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1970–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1970[1] | 1980[1] | 1990 | 1995 | 2000[2] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| All persons | | | Deaths per 100,000 resident population | | | | | |
| All ages, age adjusted[3] | 14.3 | 14.8 | 14.6 | 13.4 | 10.2 | 10.3 | 10.4 | 10.3 |
| All ages, crude | 13.1 | 14.9 | 14.9 | 13.5 | 10.2 | 10.4 | 10.5 | 10.4 |
| Under 1 year | * | * | * | * | * | * | * | * |
| 1–14 years | 1.6 | 1.4 | 1.5 | 1.6 | 0.7 | 0.7 | 0.7 | 0.7 |
| 1–4 years | 1.0 | 0.7 | 0.6 | 0.6 | 0.3 | 0.5 | 0.4 | 0.3 |
| 5–14 years | 1.7 | 1.6 | 1.9 | 1.9 | 0.9 | 0.8 | 0.8 | 0.8 |
| 15–24 years | 15.5 | 20.6 | 25.8 | 26.7 | 16.8 | 16.7 | 16.7 | 16.6 |
| 15–19 years | 11.4 | 14.7 | 23.3 | 24.1 | 12.9 | 12.4 | 12.1 | 12.1 |
| 20–24 years | 20.3 | 26.4 | 28.1 | 29.2 | 20.9 | 21.2 | 21.3 | 21.1 |
| 25–44 years | 20.9 | 22.5 | 19.3 | 16.9 | 13.1 | 13.5 | 13.7 | 13.4 |
| 25–34 years | 22.2 | 24.3 | 21.8 | 19.6 | 14.5 | 15.5 | 15.4 | 15.5 |
| 35–44 years | 19.6 | 20.0 | 16.3 | 14.3 | 11.9 | 11.7 | 12.1 | 11.5 |
| 45–64 years | 17.6 | 15.2 | 13.6 | 11.7 | 10.0 | 10.3 | 10.6 | 10.7 |
| 45–54 years | 18.1 | 16.4 | 13.9 | 12.0 | 10.5 | 10.5 | 10.8 | 11.2 |
| 55–64 years | 17.0 | 13.9 | 13.3 | 11.3 | 9.4 | 10.1 | 10.2 | 10.1 |
| 65 years and over | 13.8 | 13.5 | 16.0 | 14.1 | 12.2 | 12.4 | 12.4 | 11.8 |
| 65–74 years | 14.5 | 13.8 | 14.4 | 12.8 | 10.6 | 10.9 | 10.9 | 10.4 |
| 75–84 years | 13.4 | 13.4 | 19.4 | 16.3 | 13.9 | 14.3 | 14.4 | 13.5 |
| 85 years and over | 10.2 | 11.6 | 14.7 | 14.4 | 14.2 | 12.8 | 12.5 | 12.5 |
| Male | | | | | | | | |
| All ages, age adjusted[3] | 24.8 | 25.9 | 26.1 | 23.8 | 18.1 | 18.5 | 18.6 | 18.4 |
| All ages, crude | 22.2 | 25.7 | 26.2 | 23.6 | 17.8 | 18.2 | 18.4 | 18.3 |
| Under 1 year | * | * | * | * | * | * | * | * |
| 1–14 years | 2.3 | 2.0 | 2.2 | 2.3 | 1.1 | 1.0 | 1.0 | 1 |
| 1–4 years | 1.2 | 0.9 | 0.7 | 0.8 | 0.4 | 0.5 | 0.5 | 0.3 |
| 5–14 years | 2.7 | 2.5 | 2.9 | 2.9 | 1.4 | 1.2 | 1.2 | 1.2 |
| 15–24 years | 26.4 | 34.8 | 44.7 | 46.5 | 29.4 | 29.6 | 29.3 | 29.2 |
| 15–19 years | 19.2 | 24.5 | 40.1 | 41.6 | 22.4 | 21.8 | 21.1 | 21.2 |
| 20–24 years | 35.1 | 45.2 | 49.1 | 51.5 | 37.0 | 37.7 | 37.6 | 37.1 |
| 25–44 years | 34.1 | 38.1 | 32.6 | 28.4 | 22.0 | 22.8 | 23.1 | 22.9 |
| 25–34 years | 36.5 | 41.4 | 37.0 | 33.2 | 24.9 | 26.7 | 26.5 | 27.1 |
| 35–44 years | 31.6 | 33.2 | 27.4 | 23.6 | 19.4 | 19.2 | 20.1 | 19.1 |
| 45–64 years | 31.0 | 25.9 | 23.4 | 20.0 | 17.1 | 17.6 | 18.1 | 18.3 |
| 45–54 years | 30.7 | 27.3 | 23.2 | 20.1 | 17.6 | 17.8 | 18.2 | 18.8 |
| 55–64 years | 31.3 | 24.5 | 23.7 | 19.8 | 16.3 | 17.4 | 18.0 | 17.7 |
| 65 years and over | 29.7 | 29.7 | 35.3 | 30.7 | 26.4 | 26.8 | 26.9 | 25.4 |
| 65–74 years | 29.5 | 27.8 | 28.2 | 25.1 | 20.3 | 21.1 | 21.3 | 20.3 |
| 75–84 years | 31.0 | 33.0 | 46.9 | 37.8 | 32.2 | 32.8 | 32.9 | 30.2 |
| 85 years and over | 26.2 | 34.9 | 49.3 | 47.1 | 44.7 | 40.2 | 38.9 | 37.8 |
| Female | | | | | | | | |
| All ages, age adjusted[3] | 4.8 | 4.7 | 4.2 | 3.8 | 2.8 | 2.8 | 2.8 | 2.7 |
| All ages, crude | 4.4 | 4.7 | 4.3 | 3.8 | 2.8 | 2.8 | 2.8 | 2.7 |
| Under 1 year | * | * | * | * | * | * | * | * |
| 1–14 years | 0.8 | 0.7 | 0.8 | 0.8 | 0.3 | 0.4 | 0.5 | 0.3 |
| 1–4 years | 0.9 | 0.5 | 0.5 | 0.5 | * | 0.4 | 0.3 | 0.3 |
| 5–14 years | 0.8 | 0.7 | 1.0 | 0.9 | 0.4 | 0.4 | 0.5 | 0.3 |
| 15–24 years | 4.8 | 6.1 | 6.0 | 5.9 | 3.5 | 3.2 | 3.5 | 3.3 |
| 15–19 years | 3.5 | 4.6 | 5.7 | 5.6 | 2.9 | 2.6 | 2.7 | 2.4 |
| 20–24 years | 6.4 | 7.7 | 6.3 | 6.1 | 4.2 | 3.8 | 4.2 | 4.2 |
| 25–44 years | 8.3 | 7.4 | 6.1 | 5.5 | 4.2 | 4.2 | 4.1 | 3.8 |
| 25–34 years | 8.4 | 7.5 | 6.7 | 5.8 | 4.0 | 4.0 | 4.0 | 3.6 |
| 35–44 years | 8.2 | 7.2 | 5.4 | 5.2 | 4.4 | 4.3 | 4.2 | 4.0 |
| 45–64 years | 5.4 | 5.4 | 4.5 | 3.9 | 3.4 | 3.4 | 3.4 | 3.4 |
| 45–54 years | 6.4 | 6.2 | 4.9 | 4.2 | 3.6 | 3.5 | 3.6 | 3.8 |
| 55–64 years | 4.2 | 4.6 | 4.0 | 3.5 | 3.0 | 3.3 | 3.1 | 2.9 |
| 65 years and over | 2.4 | 2.5 | 3.1 | 2.8 | 2.2 | 2.2 | 2.0 | 2.1 |
| 65–74 years | 2.8 | 3.1 | 3.6 | 3.0 | 2.5 | 2.4 | 2.3 | 2.2 |
| 75–84 years | 1.7 | 1.7 | 2.9 | 2.8 | 2.0 | 2.2 | 2.1 | 2.2 |
| 85 years and over | * | 1.3 | 1.3 | 1.8 | 1.7 | 1.3 | 1.1 | 1.3 |
| White male[4] | | | | | | | | |
| All ages, age adjusted[3] | 19.7 | 22.1 | 22.0 | 20.1 | 15.9 | 16.3 | 16.2 | 16.0 |
| All ages, crude | 17.6 | 21.8 | 21.8 | 19.9 | 15.6 | 16.2 | 16.1 | 16.0 |
| 1–14 years | 1.8 | 1.9 | 1.9 | 1.9 | 1.0 | 0.9 | 0.8 | 0.7 |
| 15–24 years | 16.9 | 28.4 | 29.5 | 30.8 | 19.6 | 19.5 | 19.4 | 19.2 |
| 25–44 years | 24.2 | 29.5 | 25.7 | 23.2 | 18.0 | 18.9 | 18.5 | 18.1 |
| 25–34 years | 24.3 | 31.1 | 27.8 | 25.2 | 18.1 | 19.9 | 18.5 | 18.8 |
| 35–44 years | 24.1 | 27.1 | 23.3 | 21.2 | 17.9 | 18.0 | 18.5 | 17.5 |
| 45–64 years | 27.4 | 23.3 | 22.8 | 19.5 | 17.4 | 18.3 | 18.7 | 19.0 |
| 65 years and over | 29.9 | 30.1 | 36.8 | 32.2 | 28.2 | 28.6 | 28.9 | 27.4 |

See footnotes at end of table.



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## Table 47 (page 2 of 3). Death rates for firearm-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1970–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1970[1] | 1980[1] | 1990 | 1995 | 2000[2] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **Black or African American male[4]** | | | Deaths per 100,000 resident population | | | | | |
| All ages, age adjusted[3] | 70.8 | 60.1 | 56.3 | 49.2 | 34.2 | 34.5 | 36.0 | 35.6 |
| All ages, crude | 60.8 | 57.7 | 61.9 | 52.9 | 36.1 | 36.4 | 37.8 | 37.8 |
| 1–14 years | 5.3 | 3.0 | 4.4 | 4.4 | 1.8 | 1.6 | 1.8 | 2.1 |
| 15–24 years | 97.3 | 77.9 | 138.0 | 138.7 | 89.3 | 90.3 | 87.1 | 87.6 |
| 25–44 years | 126.2 | 114.1 | 90.3 | 70.2 | 54.1 | 54.8 | 60.6 | 60.5 |
| 25–34 years | 145.6 | 128.4 | 108.6 | 92.3 | 74.8 | 77.7 | 85.6 | 87.2 |
| 35–44 years | 104.2 | 92.3 | 66.1 | 46.3 | 34.3 | 33.2 | 36.9 | 34.8 |
| 45–64 years | 71.1 | 55.6 | 34.5 | 28.3 | 18.4 | 17.2 | 18.6 | 18.1 |
| 65 years and over | 30.6 | 29.7 | 23.9 | 21.8 | 13.8 | 14.9 | 14.2 | 12.1 |
| **American Indian or Alaska Native male[4]** | | | | | | | | |
| All ages, age adjusted[3] | --- | 24.0 | 19.4 | 19.4 | 13.1 | 13.0 | 14.8 | 14.1 |
| All ages, crude | --- | 27.5 | 20.5 | 20.9 | 13.2 | 12.9 | 15.3 | 14.7 |
| 15–24 years | --- | 55.3 | 49.1 | 40.9 | 26.9 | 24.3 | 30.0 | 27.6 |
| 25–44 years | --- | 43.9 | 25.4 | 31.2 | 16.6 | 18.8 | 21.7 | 21.8 |
| 45–64 years | --- | * | * | 14.2 | 12.2 | 9.6 | 12.4 | 10.5 |
| 65 years and over | --- | * | * | * | * | * | * | * |
| **Asian or Pacific Islander male[4]** | | | | | | | | |
| All ages, age adjusted[3] | --- | 7.8 | 8.8 | 9.2 | 6.0 | 5.2 | 5.5 | 5.4 |
| All ages, crude | --- | 8.2 | 9.4 | 10.0 | 6.2 | 5.4 | 5.7 | 5.7 |
| 15–24 years | --- | 10.8 | 21.0 | 24.3 | 9.3 | 9.6 | 11.7 | 10.5 |
| 25–44 years | --- | 12.8 | 10.9 | 10.6 | 8.1 | 6.6 | 6.3 | 6.9 |
| 45–64 years | --- | 10.4 | 8.1 | 8.2 | 7.4 | 5.7 | 5.8 | 5.7 |
| 65 years and over | --- | * | * | * | * | 5.3 | * | * |
| **Hispanic or Latino male[4,5]** | | | | | | | | |
| All ages, age adjusted[3] | --- | --- | 27.6 | 23.8 | 13.6 | 13.7 | 13.4 | 13.6 |
| All ages, crude | --- | --- | 29.9 | 26.2 | 14.2 | 14.6 | 14.2 | 14.6 |
| 1–14 years | --- | --- | 2.6 | 2.8 | 1.0 | 0.7 | 0.9 | 0.8 |
| 15–24 years | --- | --- | 55.5 | 61.7 | 30.8 | 31.4 | 32.1 | 32.8 |
| 25–44 years | --- | --- | 42.7 | 31.4 | 17.3 | 19.1 | 17.6 | 18.6 |
| 25–34 years | --- | --- | 47.3 | 36.4 | 20.3 | 22.7 | 21.2 | 22.8 |
| 35–44 years | --- | --- | 35.4 | 24.2 | 13.2 | 14.4 | 12.9 | 13.3 |
| 45–64 years | --- | --- | 21.4 | 17.2 | 12.0 | 10.0 | 9.9 | 10.3 |
| 65 years and over | --- | --- | 19.1 | 16.5 | 12.2 | 12.0 | 12.3 | 10.6 |
| **White, not Hispanic or Latino male[4]** | | | | | | | | |
| All ages, age adjusted[3] | --- | --- | 20.6 | 18.6 | 15.5 | 16.0 | 16.0 | 15.6 |
| All ages, crude | --- | --- | 20.4 | 18.5 | 15.7 | 16.3 | 16.3 | 16.0 |
| 1–14 years | --- | --- | 1.6 | 1.6 | 1.0 | 1.0 | 0.7 | 0.7 |
| 15–24 years | --- | --- | 24.1 | 23.5 | 16.2 | 16.0 | 15.6 | 15.2 |
| 25–44 years | --- | --- | 23.3 | 21.4 | 17.9 | 18.6 | 18.4 | 17.7 |
| 25–34 years | --- | --- | 24.7 | 22.5 | 17.2 | 18.9 | 17.4 | 17.3 |
| 35–44 years | --- | --- | 21.6 | 20.4 | 18.4 | 18.4 | 19.3 | 18.1 |
| 45–64 years | --- | --- | 22.7 | 19.5 | 17.8 | 19.0 | 19.4 | 19.8 |
| 65 years and over | --- | --- | 37.4 | 32.5 | 29.0 | 29.4 | 29.8 | 28.4 |
| **White female[4]** | | | | | | | | |
| All ages, age adjusted[3] | 4.0 | 4.2 | 3.8 | 3.5 | 2.7 | 2.7 | 2.7 | 2.6 |
| All ages, crude | 3.7 | 4.1 | 3.8 | 3.5 | 2.7 | 2.7 | 2.7 | 2.6 |
| 15–24 years | 3.4 | 5.1 | 4.8 | 4.5 | 2.8 | 2.7 | 2.6 | 2.5 |
| 25–44 years | 6.9 | 6.2 | 5.3 | 4.9 | 3.9 | 3.9 | 3.8 | 3.6 |
| 45–64 years | 5.0 | 5.1 | 4.5 | 4.0 | 3.5 | 3.7 | 3.6 | 3.7 |
| 65 years and over | 2.2 | 2.5 | 3.1 | 2.8 | 2.4 | 2.3 | 2.2 | 2.1 |

See footnotes at end of table.



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## Table 47 (page 3 of 3). Death rates for firearm-related injuries, according to sex, race, Hispanic origin, and age: United States, selected years 1970–2003

[Data are based on death certificates] Age Adjustment Population Updated MarcÜ2006 Click here for spreadsheet version

| Sex, race, Hispanic origin, and age | 1970[1] | 1980[1] | 1990 | 1995 | 2000[2] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| **Black or African American female[4]** | | | Deaths per 100,000 resident population | | | | | |
| All ages, age adjusted[3] | 11.1 | 8.7 | 7.3 | 6.2 | 3.9 | 3.8 | 4.1 | 3.8 |
| All ages, crude | 10.0 | 8.8 | 7.8 | 6.5 | 4.0 | 3.8 | 4.2 | 3.9 |
| 15–24 years | 15.2 | 12.3 | 13.3 | 13.2 | 7.6 | 6.1 | 8.1 | 7.4 |
| 25–44 years | 19.4 | 16.1 | 12.4 | 9.8 | 6.5 | 6.9 | 6.7 | 6.1 |
| 45–64 years | 10.2 | 8.2 | 4.8 | 4.1 | 3.1 | 2.6 | 3.0 | 2.7 |
| 65 years and over | 4.3 | 3.1 | 3.1 | 2.6 | 1.3 | 1.4 | 1.2 | 1.8 |
| **American Indian or Alaska Native female[4]** | | | | | | | | |
| All ages, age adjusted[3] | --- | 5.8 | 3.3 | 3.8 | 2.9 | 2.8 | 3.1 | 2.4 |
| All ages, crude | --- | 5.8 | 3.4 | 4.1 | 2.9 | 2.9 | 3.4 | 2.6 |
| 15–24 years | --- | * | * | * | * | * | * | * |
| 25–44 years | --- | 10.2 | * | 7.0 | 5.5 | 5.0 | * | * |
| 45–64 years | --- | * | * | * | * | * | * | * |
| 65 years and over | --- | * | * | * | * | * | * | * |
| **Asian or Pacific Islander female[4]** | | | | | | | | |
| All ages, age adjusted[3] | --- | 2.0 | 1.9 | 2.0 | 1.1 | 1.0 | 1.1 | 1.1 |
| All ages, crude | --- | 2.1 | 2.1 | 2.1 | 1.2 | 1.1 | 1.2 | 1.2 |
| 15–24 years | --- | * | * | 3.9 | * | * | * | 2.1 |
| 25–44 years | --- | 3.2 | 2.7 | 2.7 | 1.5 | 1.5 | 1.7 | 1.3 |
| 45–64 years | --- | * | * | * | * | * | * | 1.5 |
| 65 years and over | --- | * | * | * | * | * | * | * |
| **Hispanic or Latino female[4,5]** | | | | | | | | |
| All ages, age adjusted[3] | --- | --- | 3.3 | 3.1 | 1.8 | 1.7 | 1.6 | 1.6 |
| All ages, crude | --- | --- | 3.6 | 3.3 | 1.8 | 1.7 | 1.6 | 1.7 |
| 15–24 years | --- | --- | 6.9 | 6.1 | 2.9 | 3.3 | 2.8 | 3.5 |
| 25–44 years | --- | --- | 5.1 | 4.7 | 2.5 | 2.5 | 2.4 | 2.2 |
| 45–64 years | --- | --- | 2.4 | 2.4 | 2.2 | 1.6 | 1.6 | 1.5 |
| 65 years and over | --- | --- | * | * | * | * | * | * |
| **White, not Hispanic or Latino female[5]** | | | | | | | | |
| All ages, age adjusted[3] | --- | --- | 3.7 | 3.4 | 2.8 | 2.8 | 2.8 | 2.7 |
| All ages, crude | --- | --- | 3.7 | 3.5 | 2.9 | 2.9 | 2.8 | 2.7 |
| 15–24 years | --- | --- | 4.3 | 4.1 | 2.7 | 2.5 | 2.5 | 2.2 |
| 25–44 years | --- | --- | 5.1 | 4.8 | 4.2 | 4.1 | 4.1 | 3.9 |
| 45–64 years | --- | --- | 4.6 | 4.1 | 3.6 | 3.8 | 3.8 | 3.9 |
| 65 years and over | --- | --- | 3.2 | 2.8 | 2.4 | 2.4 | 2.3 | 2.2 |

* Rates based on fewer than 20 deaths are considered unreliable and are not shown.
--- Data not available.
[1]Underlying cause of death was coded according to the Eighth Revision in 1970 and Ninth Revision in 1980–98. See Appendix II, Cause of death; tables IV and V.
[2]Starting with 1999 data, cause of death is coded according to ICD–10. See Appendix II, Comparability ratio and tables V and VI.
[3]Age-adjusted rates are calculated using the year 2000 standard population. See Appendix II, Age adjustment.
[4]The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Death rates for the American Indian or Alaska Native and Asian or Pacific Islander populations are known to be underestimated. See Appendix II, Race, for a discussion of sources of bias in death rates by race and Hispanic origin.
[5]Prior to 1997, excludes data from States lacking an Hispanic-origin item on the death certificate. See Appendix II, Hispanic origin.

NOTES: Starting with *Health, United States, 2003*, rates for 1991–99 were revised using intercensal population estimates based on census 2000. Rates for 2000 were revised based on census 2000 counts. Rates for 2001 and later years were computed using 2000-based postcensal estimates. See Appendix I, Population Census and Population Estimates. Age groups were selected to minimize the presentation of unstable age-specific death rates based on small numbers of deaths and for consistency among comparison groups. For additional injury-related statistics, see www.cdc.gov/ncipc/wisqars, a Web-based interactive database for injury data. Beginning in 2003, California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin reported multiple-race data. The multiple-race data for these states were bridged to the single race categories of the 1977 Office of Management and Budget standards for comparability with other States. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; numerator data from annual mortality files; denominator data from national population estimates for race groups from table 1 and unpublished Hispanic population estimates for 1985–96 prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census; additional mortality tables are available at www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm; Hoyert DL, Heron M, Murphy SL, Kung HC. Deaths: Final data for 2003. National vital statistics reports. Vol 54. Hyattsville, Maryland: National Center for Health Statistics. 2006.



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## Table 48. Deaths from selected occupational diseases for persons 15 years of age and over: United States, selected years 1980–2003

[Data are based on death certificates] Updated MarcÜ2006 Click here for spreadsheet version

| Cause of death[1] | 1980[2] | 1985 | 1990 | 1995 | 2000[3] | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Underlying and nonunderlying cause of death | Number of death certificates with cause-of-death code(s) mentioned | | | | | | | |
| Angiosarcoma of liver[4] | --- | --- | --- | --- | 16 | 25 | 23 | 24 |
| Malignant mesothelioma[5] | 699 | 715 | 874 | 897 | 2,531 | 2,508 | 2,573 | 2,625 |
| Pneumoconiosis[6] | 4,151 | 3,783 | 3,644 | 3,151 | 2,859 | 2,743 | 2,715 | 2,635 |
| Coal workers' pneumoconiosis | 2,576 | 2,615 | 1,990 | 1,413 | 949 | 886 | 858 | 772 |
| Asbestosis | 339 | 534 | 948 | 1,169 | 1,486 | 1,449 | 1,467 | 1,464 |
| Silicosis | 448 | 334 | 308 | 242 | 151 | 163 | 146 | 177 |
| Other (including unspecified) | 814 | 321 | 413 | 343 | 290 | 260 | 263 | 236 |
| Underlying cause of death | Number of deaths | | | | | | | |
| Angiosarcoma of liver[4] | --- | --- | --- | --- | 15 | 22 | 20 | 20 |
| Malignant mesothelioma[5] | 531 | 573 | 725 | 780 | 2,384 | 2,371 | 2,429 | 2,476 |
| Pneumoconiosis | 1,581 | 1,355 | 1,335 | 1,117 | 1,142 | 1,110 | 1,094 | 1,101 |
| Coal workers' pneumoconiosis | 982 | 958 | 734 | 533 | 389 | 367 | 354 | 318 |
| Asbestosis | 101 | 139 | 302 | 355 | 558 | 550 | 529 | 583 |
| Silicosis | 207 | 143 | 150 | 114 | 71 | 82 | 89 | 102 |
| Other (including unspecified) | 291 | 115 | 149 | 115 | 124 | 111 | 122 | 98 |

--- Data not available.

[1]Cause-of-death titles for selected occupational diseases and corresponding code numbers according to the *International Classification of Diseases*, Ninth and Tenth Revisions. See Appendix II, table IV.

| Cause of death | ICD–9 code | ICD–10 code |
|---|---|---|
| Angiosarcoma of liver | --- | C22.3 |
| Malignant mesothelioma | 158.8,158.9,163 | C45 |
| Pneumoconiosis | 500–505 | J60-J66 |
| Coal workers' pneumoconiosis | 500 | J60 |
| Asbestosis | 501 | J61 |
| Silicosis | 502 | J62 |
| Other (including unspecified) | 503–505 | J63-J66 |

[2]For the period 1980–98, underlying cause of death was coded according to the Ninth Revision of the International Classification of Diseases (ICD). See Appendix II, Cause of death; tables IV and V.

[3]Starting with 1999 data, ICD–10 was introduced for coding cause of death. Discontinuities exist between 1998 and 1999 due to ICD–10 coding and classification changes. Caution should be exercised in interpreting trends for the causes of death in this table, especially for those with major ICD–10 changes (e.g., malignant mesothelioma). See Appendix II, *International Classification of Diseases* (ICD).

[4]Prior to 1999 there was no discrete code for this condition.

[5]Prior to 1999 the combined ICD–9 categories of malignant neoplasm of peritoneum and malignant neoplasm of pleura served as a crude surrogate for malignant mesothelioma under ICD–10.

[6]For underlying and nonunderlying cause of death, counts for pneumoconiosis subgroups may sum to slightly more than total pneumoconiosis due to the reporting of more than one type of pneumoconiosis on some death certificates.

NOTES: See Appendix I, National Vital Statistics System, Multiple Cause of Death File for information about tabulating cause-of-death data in this table. Selection of occupational diseases is based on definitions in Mullan RJ, Murthy LI. Occupational sentinel health events: An updated list for physician recognition and public health surveillance. *Am J Ind Med* 19:775–799, 1991. For more detailed information about pneumoconiosis deaths, see *Work-Related Lung Disease Surveillance Report 2002*, DHHS (NIOSH) Publication Number 2003–111 at www.cdc.gov/niosh/publist.html. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System; annual mortality files for underlying and multiple cause of death.



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## Table 49 (page 1 of 2). Occupational injury deaths and rates by industry, sex, age, race, and Hispanic origin: United States, selected years 1992–2003

[Data are compiled from various Federal, State, and local administrative sources]

Click here for spreadsheet version

| Characteristic | 1992[1] | 1995 | 1997 | 1998 | 1999 | 2000 | 2001[2] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Deaths per 100,000 employed workers[3] | | | | |
| Total work force | 5.2 | 4.9 | 4.7 | 4.5 | 4.5 | 4.3 | 4.3 | 4.0 | 4.0 |
| **Sex** | | | | | | | | | |
| Male | --- | 8.3 | 8.1 | 7.7 | 7.7 | 7.4 | 7.4 | 6.9 | 7.0 |
| Female | --- | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| **Age** | | | | | | | | | |
| 16–17 years | --- | 1.6 | 1.5 | 1.2 | 1.6 | 1.6 | 1.3 | 1.1 | 1.2 |
| 18–19 years | --- | 3.3 | 2.8 | 3.1 | 2.7 | 2.7 | 2.8 | 2.2 | 2.3 |
| 20–24 years | --- | 3.8 | 3.9 | 3.3 | 3.4 | 3.3 | 3.2 | 3.2 | 3.4 |
| 25–34 years | --- | 4.3 | 4.1 | 3.9 | 3.8 | 3.8 | 3.8 | 3.3 | 3.4 |
| 35–44 years | --- | 4.6 | 4.2 | 4.2 | 4.1 | 4.0 | 4.1 | 4.0 | 3.8 |
| 45–54 years | --- | 5.2 | 4.9 | 4.6 | 4.6 | 4.4 | 4.5 | 4.0 | 4.1 |
| 55–64 years | --- | 7.2 | 7.1 | 6.5 | 6.1 | 6.1 | 5.5 | 5.0 | 4.8 |
| 65 years and over | --- | 14.0 | 13.8 | 14.5 | 14.6 | 12.0 | 12.7 | 11.5 | 11.3 |
| **Race and Hispanic origin[4]** | | | | | | | | | |
| White | --- | 4.7 | 4.6 | 4.5 | 4.4 | --- | --- | --- | --- |
| Black or African American | --- | 5.1 | 4.8 | 4.0 | 4.1 | --- | --- | --- | --- |
| Hispanic or Latino | --- | 5.5 | 5.1 | 5.2 | 5.2 | 5.6 | 6.0 | 5.0 | 4.5 |
| Not Hispanic or Latino | --- | 4.9 | 4.7 | 4.5 | 4.4 | 4.2 | 4.1 | 3.9 | 4.0 |
| White | --- | --- | --- | --- | --- | 4.2 | 4.2 | 3.9 | 4.0 |
| Black or African American | --- | --- | --- | --- | --- | 3.9 | 3.8 | 3.5 | 3.8 |
| Asian, Native Hawaiian or Other Pacific Islander | --- | --- | --- | --- | --- | --- | --- | --- | 2.8 |
| **Industry[5]** | | | | | | | | | |
| Private sector | ... | ... | ... | ... | ... | ... | ... | ... | 4.7 |
| Goods producing | ... | ... | ... | ... | ... | ... | ... | ... | 9.1 |
| Natural resources and mining | ... | ... | ... | ... | ... | ... | ... | ... | 55.7 |
| Construction | ... | ... | ... | ... | ... | ... | ... | ... | 14.3 |
| Manufacturing | ... | ... | ... | ... | ... | ... | ... | ... | 2.5 |
| Service providing | ... | ... | ... | ... | ... | ... | ... | ... | 3.2 |
| Trade, transportation, and utilities | ... | ... | ... | ... | ... | ... | ... | ... | 5.6 |
| Information | ... | ... | ... | ... | ... | ... | ... | ... | 1.9 |
| Financial activities | ... | ... | ... | ... | ... | ... | ... | ... | 1.5 |
| Professional and business services | ... | ... | ... | ... | ... | ... | ... | ... | 3.9 |
| Educational and health services | ... | ... | ... | ... | ... | ... | ... | ... | 0.8 |
| Leisure and hospitality | ... | ... | ... | ... | ... | ... | ... | ... | 2.6 |
| Other services, except public administration | ... | ... | ... | ... | ... | ... | ... | ... | 3.4 |
| Government[6] | ... | ... | ... | ... | ... | ... | ... | ... | 2.7 |
| | | | | | Number of deaths[7] | | | | |
| Total work force | 6,217 | 6,275 | 6,238 | 6,055 | 6,054 | 5,920 | 5,915 | 5,534 | 5,575 |
| **Sex** | | | | | | | | | |
| Male | 5,774 | 5,736 | 5,761 | 5,569 | 5,612 | 5,471 | 5,442 | 5,092 | 5,129 |
| Female | 443 | 539 | 477 | 486 | 442 | 449 | 473 | 442 | 446 |
| **Age** | | | | | | | | | |
| Under 16 years | 27 | 26 | 21 | 33 | 26 | 29 | 20 | 16 | 25 |
| 16–17 years | 41 | 42 | 41 | 32 | 46 | 44 | 33 | 25 | 28 |
| 18–19 years | 107 | 130 | 113 | 137 | 122 | 127 | 122 | 92 | 84 |
| 20–24 years | 544 | 486 | 503 | 421 | 451 | 446 | 441 | 436 | 462 |
| 25–34 years | 1,556 | 1,409 | 1,325 | 1,238 | 1,175 | 1,163 | 1,142 | 1,023 | 1,018 |
| 35–44 years | 1,538 | 1,571 | 1,524 | 1,525 | 1,510 | 1,473 | 1,478 | 1,403 | 1,329 |
| 45–54 years | 1,167 | 1,256 | 1,302 | 1,279 | 1,333 | 1,313 | 1,368 | 1,253 | 1,301 |
| 55–64 years | 767 | 827 | 875 | 836 | 816 | 831 | 775 | 784 | 802 |
| 65 years and over | 467 | 515 | 520 | 541 | 565 | 488 | 530 | 495 | 523 |
| Unspecified | 3 | 13 | 14 | 13 | 10 | 6 | 6 | 7 | 3 |

See footnotes at end of table.



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## Table 49 (page 2 of 2). Occupational injury deaths and rates by industry, sex, age, race, and Hispanic origin: United States, selected years 1992–2003

[Data are compiled from various Federal, State, and local administrative sources]

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| Characteristic | 1992[1] | 1995 | 1997 | 1998 | 1999 | 2000 | 2001[2] | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Race and Hispanic origin | | | | Number of deaths[8] | | | | | |
| White | 5,173 | 5,120 | 5,108 | 5,041 | 4,990 | --- | --- | --- | --- |
| Black or African American | 624 | 697 | 677 | 594 | 626 | --- | --- | --- | --- |
| Hispanic or Latino | 533 | 619 | 658 | 707 | 730 | 815 | 895 | 841 | 794 |
| Not Hispanic or Latino | 5,684 | 5,656 | 5,580 | 5,348 | 5,324 | 5,105 | 5,020 | 4,693 | 4,781 |
| White | 4,712 | 4,599 | 4,576 | 4,478 | 4,410 | 4,244 | 4,175 | 3,926 | 3,988 |
| Black or African American | 618 | 684 | 661 | 583 | 616 | 575 | 565 | 491 | 543 |
| American Indian or Alaska Native | 36 | 27 | 34 | 28 | 54 | 33 | 48 | 40 | 42 |
| Asian[8] | 192 | 188 | 218 | 164 | 180 | 171 | 173 | 131 | 147 |
| Native Hawaiian or Other Pacific Islander | --- | --- | --- | --- | --- | 14 | 9 | 9 | 11 |
| Multiple races | --- | --- | --- | --- | --- | --- | 6 | 4 | 3 |
| Other races or not reported | 126 | 158 | 91 | 95 | 64 | 68 | 44 | 92 | 47 |
| Industry[5] | | | | | | | | | |
| Private sector | --- | --- | --- | --- | --- | --- | --- | --- | 5,043 |
| Goods producing | --- | --- | --- | --- | --- | --- | --- | --- | 2,401 |
| Natural resources and mining | --- | --- | --- | --- | --- | --- | --- | --- | 850 |
| Construction | --- | --- | --- | --- | --- | --- | --- | --- | 1,131 |
| Manufacturing | --- | --- | --- | --- | --- | --- | --- | --- | 420 |
| Service providing | --- | --- | --- | --- | --- | --- | --- | --- | 2,642 |
| Trade, transportation, and utilities | --- | --- | --- | --- | --- | --- | --- | --- | 1,375 |
| Information | --- | --- | --- | --- | --- | --- | --- | --- | 64 |
| Financial activities | --- | --- | --- | --- | --- | --- | --- | --- | 129 |
| Professional and business services | --- | --- | --- | --- | --- | --- | --- | --- | 453 |
| Educational and health services | --- | --- | --- | --- | --- | --- | --- | --- | 143 |
| Leisure and hospitality | --- | --- | --- | --- | --- | --- | --- | --- | 275 |
| Other services, except public administration | --- | --- | --- | --- | --- | --- | --- | --- | 194 |
| Government[6] | --- | --- | --- | --- | --- | --- | --- | --- | 532 |

--- Data not available.
. . . Data not applicable.
[1]1992 and 1993 employment data by demographic characteristics are not available from the Current Population Survey (CPS) for calculation of rates.
[2]2,871 fatalities due to the September 11 terrorist attacks are not included.
[3]Numerator excludes deaths to workers under the age of 16 years. 2003 employment data in denominators are average annual estimates of employed civilians 16 years of age and over from the CPS; in prior years, also included resident armed forces figures from the Bureau of the Census (1992–98) and Department of Defense (1999–2002).
[4]Employment data for American Indian or Alaska Native workers and, prior to 2003, Asian or Pacific Islander workers were not available for the calculation of rates; employment data for non-Hispanic white and non-Hispanic black workers were not available before the year 2000. In 1999 and earlier years, the race groups white and black included persons of Hispanic and non-Hispanic origin.
[5]Beginning with the 2003 data year, establishments were classified by industry according to the 2002 North American Industry Classification System (NAICS). Prior to 2003, the Standard Industrial Classification (SIC) system was used. Because of substantial differences between these systems, industry data classified by these two systems are not comparable. Industry data for 1992–2002 classified by SIC are available in *Health, United States, 2004*, table 49 at www.cdc.gov/nchs/hus.htm. See Appendix II, industry of employment.
[6]Includes fatalities to workers employed by governmental organizations, regardless of industry.
[7]Includes fatalities to all workers, regardless of age.
[8]In 1999 and earlier years, category also included Native Hawaiian or Other Pacific Islander.

NOTES: Fatalities and rates are based on revised data and may differ from originally published data from the Census of Fatal Occupational Injuries (CFOI). See Appendix I, CFOI. CFOI began collecting fatality data in 1992. For data for prior years, see CDC. Fatal Occupational Injuries—United States, 1980–1997. MMWR 2001; 50(16):317–320, which reports trend data from the National Traumatic Occupational Fatalities (NTOF) surveillance system. NTOF was established at the National Institute of Occupational Safety and Health (NIOSH) to monitor occupational injury deaths through death certificates. Some numbers for 2002 in this table were revised and differ from the previous edition of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCE: Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries. Revised annual data.



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## Table 50. Occupational injuries and illnesses with days away from work, job transfer, or restriction in the private sector, according to industry: United States, 2003

[Data are based on employer records from a sample of business establishments]

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| Industry | Injuries and illnesses with days away from work, job transfer, or restriction | |
|---|---|---|
| | Cases per 100 full-time workers[1] | Number of cases in thousands[2] |
| Total private industry[3] | 2.6 | 2,301.9 |
| Goods producing | 3.7 | 796.5 |
| Natural resources and mining[4] | 2.8 | 40.5 |
| Agriculture, forestry, fishing, and hunting[4] | 3.3 | 29.3 |
| Mining | 2.0 | 11.2 |
| Construction | 3.6 | 218.0 |
| Manufacturing | 3.8 | 538.0 |
| Service providing | 2.3 | 1,505.4 |
| Trade, transportation, and utilities | 3.2 | 683.2 |
| Wholesale trade | 2.8 | 147.4 |
| Retail trade | 2.7 | 319.6 |
| Transportation and warehousing | 5.4 | 204.0 |
| Utilities | 2.2 | 12.2 |
| Information | 1.1 | 30.8 |
| Financial activities | 0.8 | 56.9 |
| Finance and insurance | 0.4 | 21.3 |
| Real estate and rental and leasing | 2.1 | 35.6 |
| Professional and business services | 1.4 | 157.7 |
| Professional, scientific, and technical services | 0.6 | 36.0 |
| Management of companies and enterprises | 1.6 | 25.1 |
| Administrative and support and waste management and remediation services | 2.4 | 96.7 |
| Educational and health services | 2.9 | 355.8 |
| Educational services | 1.2 | 17.9 |
| Health care and social assistance | 3.1 | 337.9 |
| Leisure and hospitality | 2.1 | 169.3 |
| Arts, entertainment, and recreation | 2.9 | 34.1 |
| Accommodation and food services | 2.0 | 135.2 |
| Other services, except public administration | 1.7 | 51.7 |

[1]Incidence rate calculated as (N/EH) x 200,000, where N = total number of injuries and illnesses, EH = total hours worked by all employees during the calendar year, and 200,000 = base for 100 full-time equivalent employees working 40 hours per week, 50 weeks per year.
[2]Because of rounding, components may not add to totals.
[3]Totals include data for industries not shown separately. Excludes self-employed, private households, and employers in Federal, state, and local government agencies.
[4]Excludes farms with fewer than 11 employees.

NOTES: Beginning with the 2003 data year, the Survey of Occupational Injuries and Illnesses began using the 2002 North American Industry Classification System (NAICS) to classify establishments by industry. Prior to 2003, the survey used the Standard Industrial Classification (SIC) system. Because of substantial differences between these systems, the data measured by these surveys are not directly comparable. Data for previous years are available in *Health, United States, 2004*, table 50 at www.cdc.gov/nchs/hus.htm. See Appendix I, Survey of Occupational Injuries and Illnesses.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses: Workplace injuries and illnesses, 2003 edition. Summary News Release. 2004. Internet address: www.bls.gov/iif/home.htm.



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## Table 51. Selected notifiable disease rates, according to disease: United States, selected years 1950–2003

[Data are based on reporting by State health departments]

Click here for spreadsheet version

| Disease | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cases per 100,000 population | | | | |
| Diphtheria | 3.83 | 0.51 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Haemophilus influenzae*, invasive | --- | --- | --- | --- | --- | 0.51 | 0.57 | 0.62 | 0.70 |
| Hepatitis A | --- | --- | 27.87 | 12.84 | 12.64 | 4.91 | 3.77 | 3.13 | 2.66 |
| Hepatitis B | --- | --- | 4.08 | 8.39 | 8.48 | 2.95 | 2.79 | 2.84 | 2.61 |
| Lyme disease | --- | --- | --- | --- | --- | 6.53 | 6.05 | 8.44 | 7.39 |
| Meningococcal disease | --- | --- | 1.23 | 1.25 | 0.99 | 0.83 | 0.83 | 0.64 | 0.61 |
| Mumps | --- | --- | 55.55 | 3.86 | 2.17 | 0.13 | 0.10 | 0.10 | 0.08 |
| Pertussis (whooping cough) | 79.82 | 8.23 | 2.08 | 0.76 | 1.84 | 2.88 | 2.69 | 3.47 | 4.04 |
| Poliomyelitis, total | 22.02 | 1.77 | 0.02 | 0.00 | 0.00 | – | – | – | – |
| Paralytic[1] | --- | 1.40 | 0.02 | 0.00 | 0.00 | – | – | – | – |
| Rocky Mountain spotted fever | --- | --- | 0.19 | 0.52 | 0.26 | 0.18 | 0.25 | 0.39 | 0.38 |
| Rubella (German measles) | --- | --- | 27.75 | 1.72 | 0.45 | 0.06 | 0.01 | 0.01 | 0.00 |
| Rubeola (measles) | 211.01 | 245.42 | 23.23 | 5.96 | 11.17 | 0.03 | 0.04 | 0.02 | 0.02 |
| Salmonellosis, excluding typhoid fever | --- | 3.85 | 10.84 | 14.88 | 19.54 | 14.51 | 14.39 | 15.73 | 15.16 |
| Shigellosis | 15.45 | 6.94 | 6.79 | 8.41 | 10.89 | 8.41 | 7.19 | 8.37 | 8.19 |
| Tuberculosis[2] | --- | 30.83 | 18.28 | 12.25 | 10.33 | 6.01 | 5.68 | 5.36 | 5.17 |
| Sexually transmitted diseases:[3] | | | | | | | | | |
| Syphilis[4] | 146.02 | 68.78 | 45.26 | 30.51 | 54.32 | 11.20 | 11.31 | 11.41 | 11.89 |
| Primary and secondary | 16.73 | 9.06 | 10.89 | 12.06 | 20.26 | 2.12 | 2.14 | 2.38 | 2.49 |
| Early latent | 39.71 | 10.11 | 8.08 | 9.00 | 22.19 | 3.35 | 3.05 | 2.92 | 2.90 |
| Late and late latent[5] | 70.22 | 45.91 | 24.94 | 9.30 | 10.32 | 5.53 | 5.95 | 6.00 | 6.35 |
| Congenital[6] | 8.97 | 2.48 | 0.97 | 0.12 | 1.55 | 0.21 | 0.18 | 0.16 | 0.14 |
| Chlamydia[7] | --- | --- | --- | --- | 160.19 | 251.38 | 274.52 | 289.41 | 304.29 |
| Gonorrhea[8] | 192.50 | 145.40 | 297.22 | 445.10 | 276.43 | 128.67 | 126.77 | 122.01 | 116.21 |
| Chancroid | 3.34 | 0.94 | 0.70 | 0.30 | 1.69 | 0.03 | 0.01 | 0.02 | 0.02 |
| | | | | | Number of cases | | | | |
| Diphtheria | 5,796 | 918 | 435 | 3 | 4 | 1 | 2 | 1 | 1 |
| *Haemophilus influenzae*, invasive | --- | --- | --- | --- | --- | 1,398 | 1,597 | 1,743 | 2,013 |
| Hepatitis A | --- | --- | 56,797 | 29,087 | 31,441 | 13,397 | 10,609 | 8,795 | 7,653 |
| Hepatitis B | --- | --- | 8,310 | 19,015 | 21,102 | 8,036 | 7,843 | 7,996 | 7,526 |
| Lyme disease | --- | --- | --- | --- | --- | 17,730 | 17,029 | 23,763 | 21,273 |
| Meningococcal disease | --- | --- | 2,505 | 2,840 | 2,451 | 2,256 | 2,333 | 1,814 | 1,756 |
| Mumps | --- | --- | 104,953 | 8,576 | 5,292 | 338 | 266 | 270 | 231 |
| Pertussis (whooping cough) | 120,718 | 14,809 | 4,249 | 1,730 | 4,570 | 7,867 | 7,580 | 9,771 | 11,647 |
| Poliomyelitis, total | 33,300 | 3,190 | 33 | 9 | 6 | – | – | – | – |
| Paralytic[1] | --- | 2,525 | 31 | 9 | 6 | – | – | – | – |
| Rocky Mountain spotted fever | --- | --- | 380 | 1,163 | 651 | 495 | 695 | 1,104 | 1,091 |
| Rubella (German measles) | --- | --- | 56,552 | 3,904 | 1,125 | 176 | 23 | 18 | 7 |
| Rubeola (measles) | 319,124 | 441,703 | 47,351 | 13,506 | 27,786 | 86 | 116 | 44 | 56 |
| Salmonellosis, excluding typhoid fever | --- | 6,929 | 22,096 | 33,715 | 48,603 | 39,574 | 40,495 | 44,264 | 43,657 |
| Shigellosis | 23,367 | 12,487 | 13,845 | 19,041 | 27,077 | 22,922 | 20,221 | 23,541 | 23,581 |
| Tuberculosis[2] | --- | 55,494 | 37,137 | 27,749 | 25,701 | 16,377 | 15,989 | 15,075 | 14,874 |
| Sexually transmitted diseases:[3] | | | | | | | | | |
| Syphilis[4] | 217,558 | 122,538 | 91,382 | 68,832 | 135,590 | 31,616 | 32,278 | 32,912 | 34,270 |
| Primary and secondary | 23,939 | 16,145 | 21,982 | 27,204 | 50,578 | 5,979 | 6,103 | 6,862 | 7,177 |
| Early latent | 59,256 | 18,017 | 16,311 | 20,297 | 55,397 | 9,465 | 8,701 | 8,429 | 8,361 |
| Late and late latent[5] | 113,569 | 81,798 | 50,348 | 20,979 | 25,750 | 15,594 | 16,976 | 17,168 | 18,319 |
| Congenital[6] | 13,377 | 4,416 | 1,953 | 277 | 3,865 | 578 | 498 | 453 | 413 |
| Chlamydia[7] | --- | --- | --- | --- | 323,663 | 709,452 | 783,242 | 834,555 | 877,478 |
| Gonorrhea[8] | 286,746 | 258,933 | 600,072 | 1,004,029 | 690,042 | 363,136 | 361,705 | 351,852 | 335,104 |
| Chancroid | 4,977 | 1,680 | 1,416 | 788 | 4,212 | 78 | 38 | 48 | 54 |

0.00 Rate greater than zero but less than 0.005. – Quantity zero. --- Data not available.

[1]Data beginning in 1986 may be updated due to retrospective case evaluations or late reports.

[2]Case reporting for tuberculosis began in 1953. Data prior to 1975 are not comparable with subsequent years' data because of changes in reporting criteria effective in 1975. 2003 data were updated through the Division of Tuberculosis Elimination, NCHSTP, as of April 1, 2004.

[3]Reported civilian cases include military cases beginning in 1991. Adjustments to the number of cases from State health departments were made for hardcopy forms and for electronic data submissions through April 30, 2004. For 1950, data for Alaska and Hawaii were not included.

[4]Includes stage of syphilis not stated.

[5]Includes cases of unknown duration.

[6]Data reported for 1989 and later years reflect change in case definition introduced in 1988. Through 1994, all cases of congenitally acquired syphilis; as of 1995, congenital syphilis less than 1 year of age. See STD Surveillance Report for congenital syphilis rates per 100,000 live births. In 2003 the rate was 10.3 congenital syphilis cases per 100,000 live births.

[7]Chlamydia was nonnotifiable in 1994 and earlier years. In 1994–99, cases for New York based exclusively on those reported by New York City. Starting in 2000, includes cases for New York State.

[8]Data for 1994 do not include cases from Georgia.

NOTES: The total resident population was used to calculate all rates except sexually transmitted diseases (STDs), which used the civilian resident population prior to 1991. For STDs, rates for the period 1990–2002 have been revised and may differ from previous editions of *Health, United States*. Revised rates are due to population estimates revised to incorporate bridged single race estimates. 2002 population estimates were used to calculate 2003 STD rates. Population data from those States where diseases were not notifiable or not available were excluded from the rate calculation. See Appendix I for information on underreporting of notifiable diseases. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention. Summary of notifiable diseases, United States, 2003. Morbidity and mortality weekly report; 52(54). Atlanta, Georgia: Public Health Service. 2005; National Center for HIV, STD, and TB Prevention, Division of STD Prevention. Sexually transmitted disease surveillance, 2003. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2004.



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## Table 52 (page 1 of 2). Acquired immunodeficiency syndrome (AIDS) cases, according to year of diagnosis and selected characteristics of persons: United States, 1999–2003

[Data are based on reporting by State health departments]

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| Sex, race and Hispanic origin, region of residence | All years[1] | Year of diagnosis | | | | |
|---|---|---|---|---|---|---|
| | | 1999 | 2000 | 2001 | 2002 | 2003 |
| | Estimated number of cases[2] | | | | | |
| All persons[3] | 929,985 | 41,356 | 41,267 | 40,833 | 41,289 | 43,171 |
| Sex | | | | | | |
| Male, 13 years and over | 749,887 | 31,159 | 30,387 | 30,074 | 30,517 | 31,614 |
| Female, 13 years and over | 170,679 | 10,010 | 10,763 | 10,639 | 10,666 | 11,498 |
| Children, under 13 years | 9,419 | 187 | 117 | 119 | 105 | 59 |
| Not Hispanic or Latino: | | | | | | |
| White | 376,834 | 12,626 | 12,047 | 11,620 | 11,960 | 12,222 |
| Black or African American | 368,169 | 19,960 | 20,312 | 20,291 | 20,476 | 21,304 |
| American Indian or Alaska Native | 3,026 | 162 | 186 | 179 | 196 | 196 |
| Asian or Pacific Islander | 7,166 | 369 | 373 | 409 | 452 | 497 |
| Hispanic or Latino[4] | 172,993 | 8,141 | 8,233 | 8,204 | 8,021 | 8,757 |
| Age at diagnosis | | | | | | |
| Under 13 years | 9,419 | 187 | 117 | 119 | 105 | 59 |
| 13–14 years | 891 | 57 | 56 | 76 | 68 | 59 |
| 15–24 years | 37,599 | 1,541 | 1,642 | 1,625 | 1,810 | 1,991 |
| 25–34 years | 311,137 | 11,349 | 10,385 | 9,947 | 9,504 | 9,605 |
| 35–44 years | 365,432 | 17,165 | 17,295 | 16,890 | 17,008 | 17,633 |
| 45–54 years | 148,347 | 8,099 | 8,566 | 8,929 | 9,310 | 10,051 |
| 55–64 years | 43,451 | 2,218 | 2,422 | 2,468 | 2,724 | 2,888 |
| 65 years and over | 13,711 | 739 | 783 | 779 | 759 | 886 |
| Region of residence | | | | | | |
| Northeast | 285,040 | 11,885 | 12,516 | 11,350 | 10,551 | 11,461 |
| Midwest | 91,926 | 4,069 | 4,139 | 4,094 | 4,337 | 4,498 |
| South | 337,409 | 17,224 | 16,757 | 17,693 | 18,482 | 19,609 |
| West | 186,100 | 6,892 | 6,661 | 6,468 | 6,843 | 6,667 |
| U.S. dependencies, possessions, and associated nations | 29,511 | 1,286 | 1,194 | 1,228 | 1,075 | 935 |
| | Percent distribution[5] | | | | | |
| All persons[3] | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Sex | | | | | | |
| Male, 13 years and over | 80.6 | 75.3 | 73.6 | 73.7 | 73.9 | 73.2 |
| Female, 13 years and over | 18.4 | 24.2 | 26.1 | 26.1 | 25.8 | 26.6 |
| Children, under 13 years | 1.0 | 0.5 | 0.3 | 0.3 | 0.3 | 0.1 |
| Not Hispanic or Latino: | | | | | | |
| White | 40.5 | 30.5 | 29.2 | 28.5 | 29.0 | 28.3 |
| Black or African American | 39.6 | 48.3 | 49.2 | 49.7 | 49.6 | 49.3 |
| American Indian or Alaska Native | 0.3 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 |
| Asian or Pacific Islander | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.2 |
| Hispanic or Latino[4] | 18.6 | 19.7 | 20.0 | 20.1 | 19.4 | 20.3 |

See footnotes at end of table.



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## Table 52 (page 2 of 2). Acquired immunodeficiency syndrome (AIDS) cases, according to year of diagnosis and selected characteristics of persons: United States, 1999–2003

[Data are based on reporting by State health departments]

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| Sex, race and Hispanic origin, region of residence | All years[1] | Year of diagnosis | | | | |
|---|---|---|---|---|---|---|
| | | 1999 | 2000 | 2001 | 2002 | 2003 |
| Age at diagnosis | | Percent distribution[5] | | | | |
| Under 13 years | 1.0 | 0.5 | 0.3 | 0.3 | 0.3 | 0.1 |
| 13–14 years | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 |
| 15–24 years | 4.0 | 3.7 | 4.0 | 4.0 | 4.4 | 4.6 |
| 25–34 years | 33.5 | 27.4 | 25.2 | 24.4 | 23.0 | 22.2 |
| 35–44 years | 39.3 | 41.5 | 41.9 | 41.4 | 41.2 | 40.8 |
| 45–54 years | 16.0 | 19.6 | 20.8 | 21.9 | 22.5 | 23.3 |
| 55–64 years | 4.7 | 5.4 | 5.9 | 6.0 | 6.6 | 6.7 |
| 65 years and over | 1.5 | 1.8 | 1.9 | 1.9 | 1.8 | 2.1 |
| Region of residence | | | | | | |
| Northeast | 30.6 | 28.7 | 30.3 | 27.8 | 25.6 | 26.5 |
| Midwest | 9.9 | 9.8 | 10.0 | 10.0 | 10.5 | 10.4 |
| South | 36.3 | 41.6 | 40.6 | 43.3 | 44.8 | 45.4 |
| West | 20.0 | 16.7 | 16.1 | 15.8 | 16.6 | 15.4 |
| U.S. dependencies, possessions, and associated nations | 3.2 | 3.1 | 2.9 | 3.0 | 2.6 | 2.2 |

[1]Based on cases reported to the Centers for Disease Control and Prevention from the beginning of the epidemic through 2003.
[2]Numbers are point estimates that result from adjustments for reporting delays to AIDS case counts. The estimates do not include adjustments for incomplete reporting. Data are provisional. See Appendix I, AIDS Surveillance.
[3]Total for all years includes 1,796 persons of unknown race or multiple races and one person of unknown sex. All persons totals were calculated independent of values for subpopulations. Consequently sums of subpopulations may not equal total for all persons.
[4]Persons of Hispanic origin may be of any race.
[5]Percents may not sum to 100 percent due to rounding and because 0.2 percent unknown race and Hispanic origin are included in totals.

NOTES: See Appendix II, AIDS, for discussion of AIDS case reporting definitions and other issues affecting interpretation of trends. This table presents adjusted data (point estimates) by year of diagnosis and replaces surveillance data by year of report in previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for HIV, STD, and TB Prevention, Division of HIV/AIDS Prevention—Surveillance and Epidemiology, AIDS Surveillance; HIV/AIDS Surveillance Report, 2003 (vol. 15) table 3. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, 2004. Also available at www.cdc.gov/hiv/stats/hasrlink.htm.



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## Table 53 (page 1 of 3). Age-adjusted cancer incidence rates for selected cancer sites, according to sex, race, and Hispanic origin: Selected geographic areas, 1990–2002

[Data are based on the Surveillance, Epidemiology, and End Results (SEER) Program's 13 population-based cancer registries]

Updated March 2006

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| Site, sex, race, and Hispanic origin | 1990 | 1995 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 1990–2002 APC[1] |
|---|---|---|---|---|---|---|---|---|---|
| All sites | Number of new cases per 100,000 population[2] | | | | | | | | |
| All persons | 475.7 | 470.3 | 476.8 | 477.6 | 477.7 | 469.3 | 466.4 | 458.2 | –0.5 |
| White | 483.2 | 476.4 | 484.2 | 486.5 | 486.8 | 480.4 | 478.4 | 466.9 | –0.4 |
| Black or African American | 512.7 | 532.2 | 532.1 | 523.7 | 527.7 | 511.8 | 495.4 | 504.3 | –0.6 |
| American Indian or Alaska Native | 265.1 | 272.1 | 272.8 | 253.2 | 269.4 | 224.1 | 230.8 | 199.7 | –2.0 |
| Asian or Pacific Islander | 335.7 | 337.7 | 345.6 | 337.7 | 340.5 | 331.4 | 335.5 | 334.0 | –0.3 |
| Hispanic or Latino | 341.1 | 358.7 | 350.5 | 363.3 | 362.4 | 349.8 | 342.9 | 346.7 | –0.1 |
| White, not Hispanic or Latino | 490.0 | 484.4 | 494.9 | 494.4 | 497.4 | 492.3 | 490.8 | 478.4 | –0.3 |
| Male | 584.2 | 563.1 | 563.7 | 559.8 | 563.6 | 557.3 | 550.1 | 537.2 | –1.2 |
| White | 590.9 | 561.9 | 563.5 | 561.5 | 565.0 | 561.2 | 556.1 | 539.4 | –1.2 |
| Black or African American | 686.9 | 730.4 | 716.4 | 703.5 | 704.2 | 689.1 | 659.3 | 659.8 | –1.1 |
| American Indian or Alaska Native | 314.2 | 321.4 | 317.1 | 263.1 | 315.5 | 234.0 | 261.3 | 212.4 | –3.0 |
| Asian or Pacific Islander | 387.6 | 396.0 | 397.4 | 382.5 | 393.5 | 387.3 | 380.2 | 375.4 | –0.8 |
| Hispanic or Latino | 404.0 | 438.4 | 420.9 | 430.7 | 431.8 | 419.8 | 411.7 | 413.5 | –0.4 |
| White, not Hispanic or Latino | 597.7 | 565.8 | 569.5 | 563.7 | 570.4 | 569.0 | 563.6 | 546.2 | –1.1 |
| Female | 411.3 | 409.8 | 420.2 | 424.4 | 420.9 | 409.7 | 409.0 | 404.4 | 0.0 |
| White | 421.3 | 422.6 | 434.0 | 439.6 | 436.3 | 426.9 | 426.2 | 418.2 | 0.2 |
| Black or African American | 403.3 | 399.7 | 410.6 | 406.9 | 411.2 | 392.5 | 383.5 | 399.5 | –0.2 |
| American Indian or Alaska Native | 231.8 | 240.4 | 242.9 | 247.9 | 239.9 | 222.3 | 211.7 | 189.4 | –1.1 |
| Asian or Pacific Islander | 294.9 | 294.9 | 309.2 | 307.4 | 304.3 | 292.9 | 305.9 | 308.1 | 0.3 |
| Hispanic or Latino | 306.6 | 310.0 | 307.6 | 322.0 | 320.7 | 308.7 | 300.2 | 305.9 | 0.1 |
| White, not Hispanic or Latino | 427.4 | 432.7 | 447.6 | 451.0 | 450.1 | 440.5 | 441.3 | 432.5 | 0.3 |
| Lung and bronchus | | | | | | | | | |
| Male | 95.1 | 87.0 | 82.7 | 83.3 | 80.2 | 77.2 | 75.4 | 73.3 | –2.1 |
| White | 94.4 | 85.1 | 81.1 | 82.2 | 78.8 | 75.9 | 74.6 | 72.5 | –2.1 |
| Black or African American | 133.8 | 136.7 | 125.0 | 123.3 | 119.8 | 110.3 | 110.4 | 107.0 | –2.2 |
| Asian or Pacific Islander | 64.3 | 60.2 | 62.3 | 61.4 | 62.5 | 62.8 | 55.5 | 55.5 | –1.1 |
| Hispanic or Latino | 58.4 | 51.5 | 47.1 | 50.2 | 44.1 | 44.3 | 39.7 | 45.5 | –2.1 |
| White, not Hispanic or Latino | 94.8 | 85.2 | 81.6 | 83.0 | 80.1 | 77.1 | 75.9 | 72.8 | –2.0 |
| Female | 47.3 | 49.3 | 50.3 | 50.9 | 50.3 | 48.4 | 47.6 | 47.7 | 0.0 |
| White | 48.6 | 51.8 | 53.0 | 53.1 | 52.4 | 50.6 | 49.7 | 49.9 | 0.2 |
| Black or African American | 52.8 | 49.9 | 50.6 | 56.8 | 57.7 | 54.0 | 53.2 | 54.3 | 0.3 |
| Asian or Pacific Islander | 28.4 | 27.8 | 29.9 | 28.5 | 28.9 | 27.1 | 28.8 | 28.4 | 0.2 |
| Hispanic or Latino | 24.6 | 24.2 | 25.6 | 25.9 | 24.3 | 23.1 | 22.0 | 21.6 | –1.0 |
| White, not Hispanic or Latino | 49.7 | 54.0 | 55.2 | 54.8 | 54.8 | 52.5 | 51.5 | 52.7 | 0.4 |
| Colon and rectum | | | | | | | | | |
| Male | 72.3 | 63.1 | 66.3 | 65.7 | 63.9 | 62.2 | 60.5 | 58.5 | –1.4 |
| White | 73.0 | 62.5 | 66.2 | 65.5 | 63.9 | 61.9 | 60.1 | 57.4 | –1.5 |
| Black or African American | 72.8 | 74.1 | 74.1 | 77.0 | 73.2 | 71.9 | 69.7 | 70.6 | –0.5 |
| Asian or Pacific Islander | 61.4 | 58.3 | 59.3 | 57.6 | 54.2 | 56.3 | 55.1 | 57.0 | –0.6 |
| Hispanic or Latino | 45.5 | 45.3 | 50.5 | 51.7 | 50.2 | 49.0 | 48.1 | 43.7 | 0.0 |
| White, not Hispanic or Latino | 74.1 | 62.9 | 65.7 | 66.0 | 65.3 | 62.9 | 60.8 | 58.3 | –1.5 |
| Female | 50.2 | 45.9 | 47.2 | 48.5 | 46.9 | 45.8 | 44.7 | 44.2 | –0.8 |
| White | 49.7 | 45.5 | 47.0 | 48.2 | 46.1 | 45.4 | 43.8 | 43.2 | –0.8 |
| Black or African American | 60.7 | 54.6 | 57.4 | 55.9 | 58.0 | 56.9 | 55.0 | 54.2 | –0.4 |
| Asian or Pacific Islander | 38.3 | 38.4 | 35.7 | 40.6 | 40.3 | 36.5 | 40.1 | 40.7 | –0.1 |
| Hispanic or Latino | 32.4 | 32.9 | 32.0 | 34.2 | 34.3 | 33.2 | 30.3 | 30.3 | –0.2 |
| White, not Hispanic or Latino | 50.7 | 46.0 | 48.5 | 49.5 | 47.3 | 46.8 | 44.9 | 44.3 | –0.8 |
| Prostate | | | | | | | | | |
| Male | 166.7 | 165.7 | 170.8 | 168.1 | 178.3 | 175.9 | 175.1 | 171.5 | –1.5 |
| White | 168.2 | 160.4 | 166.0 | 162.4 | 172.8 | 171.1 | 172.1 | 166.3 | –1.8 |
| Black or African American | 218.3 | 271.6 | 271.9 | 276.7 | 280.0 | 281.3 | 257.4 | 265.1 | –0.7 |
| American Indian or Alaska Native | 84.8 | 66.4 | 72.9 | 51.9 | 67.3 | 36.8 | 51.2 | 46.6 | –5.9 |
| Asian or Pacific Islander | 88.8 | 103.2 | 97.3 | 93.2 | 105.8 | 104.4 | 104.8 | 98.7 | –0.9 |
| Hispanic or Latino | 114.7 | 138.4 | 137.8 | 141.5 | 143.9 | 142.2 | 141.2 | 141.0 | 0.2 |
| White, not Hispanic or Latino | 169.2 | 160.0 | 166.2 | 159.2 | 171.4 | 170.3 | 171.7 | 166.0 | –1.8 |
| Breast | | | | | | | | | |
| Female | 129.2 | 130.6 | 135.4 | 138.4 | 137.6 | 133.1 | 133.5 | 129.9 | 0.4 |
| White | 134.3 | 136.2 | 141.2 | 144.7 | 144.3 | 140.1 | 140.6 | 135.8 | 0.5 |
| Black or African American | 116.6 | 121.8 | 123.5 | 122.9 | 122.8 | 118.8 | 113.4 | 119.3 | 0.1 |
| American Indian or Alaska Native | 46.7 | 66.1 | 56.7 | 58.7 | 58.1 | 55.4 | 55.4 | 47.9 | –1.3 |
| Asian or Pacific Islander | 86.9 | 86.6 | 99.0 | 99.0 | 97.1 | 91.6 | 98.5 | 97.4 | 1.4 |
| Hispanic or Latino | 84.5 | 88.8 | 86.1 | 91.3 | 92.0 | 92.6 | 86.0 | 88.5 | 0.5 |
| White, not Hispanic or Latino | 138.4 | 142.2 | 148.5 | 152.2 | 153.0 | 147.7 | 150.1 | 144.2 | 0.7 |

See footnotes at end of table.



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## Table 53 (page 2 of 3). Age-adjusted cancer incidence rates for selected cancer sites, according to sex, race, and Hispanic origin: Selected geographic areas, 1990–2002

[Data are based on the Surveillance, Epidemiology, and End Results (SEER) Program's 13 population-based cancer registries]

Updated March 2006

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| Site, sex, race, and Hispanic origin | 1990 | 1995 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 1990–2002 APC[1] |
|---|---|---|---|---|---|---|---|---|---|
| Cervix uteri | Number of new cases per 100,000 population[2] | | | | | | | | |
| Female | 11.9 | 9.9 | 9.8 | 9.8 | 9.3 | 8.8 | 8.7 | 8.2 | –2.6 |
| White | 11.3 | 9.2 | 9.2 | 9.3 | 9.1 | 8.8 | 8.4 | 8.1 | –2.2 |
| Black or African American | 16.5 | 14.6 | 13.1 | 12.5 | 12.9 | 10.5 | 10.3 | 9.6 | –3.8 |
| Asian or Pacific Islander | 12.1 | 10.9 | 11.1 | 10.8 | 8.2 | 8.0 | 9.7 | 8.1 | –3.6 |
| Hispanic or Latino | 21.1 | 17.9 | 16.3 | 15.8 | 17.3 | 16.8 | 15.1 | 14.4 | –3.0 |
| White, not Hispanic or Latino | 9.5 | 7.7 | 7.8 | 8.0 | 7.5 | 6.8 | 6.7 | 6.6 | –2.5 |
| Corpus uteri | | | | | | | | | |
| Female | 24.7 | 24.9 | 25.2 | 24.9 | 24.6 | 23.8 | 24.4 | 23.6 | –0.1 |
| White | 26.4 | 26.4 | 26.9 | 26.5 | 26.2 | 25.5 | 25.9 | 24.4 | –0.2 |
| Black or African American | 17.0 | 17.7 | 18.0 | 18.3 | 18.0 | 17.0 | 19.8 | 21.9 | 1.6 |
| Asian or Pacific Islander | 13.3 | 17.6 | 17.5 | 17.2 | 17.5 | 16.2 | 17.7 | 18.6 | 1.9 |
| Hispanic or Latino | 16.4 | 17.1 | 17.2 | 18.0 | 16.6 | 15.4 | 17.2 | 17.0 | 0.3 |
| White, not Hispanic or Latino | 27.0 | 27.4 | 27.8 | 27.6 | 27.1 | 26.6 | 26.9 | 25.0 | –0.2 |
| Ovary | | | | | | | | | |
| Female | 15.5 | 14.5 | 14.2 | 14.1 | 14.2 | 14.0 | 13.9 | 13.3 | –1.1 |
| White | 16.4 | 15.4 | 15.0 | 15.0 | 15.1 | 14.9 | 15.0 | 14.0 | –1.0 |
| Black or African American | 11.2 | 10.8 | 10.2 | 10.6 | 10.3 | 10.4 | 9.0 | 9.4 | –1.3 |
| Asian or Pacific Islander | 11.1 | 10.4 | 11.4 | 10.2 | 10.8 | 9.8 | 9.5 | 11.6 | –0.1 |
| Hispanic or Latino | 12.1 | 11.6 | 11.1 | 12.2 | 11.0 | 10.7 | 12.3 | 13.1 | 0.2 |
| White, not Hispanic or Latino | 17.0 | 15.6 | 15.3 | 15.2 | 15.7 | 15.4 | 15.3 | 14.0 | –1.1 |
| Oral cavity and pharynx | | | | | | | | | |
| Male | 18.5 | 16.4 | 16.8 | 16.3 | 15.3 | 15.7 | 14.7 | 15.3 | –1.7 |
| White | 18.0 | 16.3 | 16.6 | 16.1 | 15.2 | 15.6 | 15.0 | 15.3 | –1.5 |
| Black or African American | 25.5 | 22.0 | 19.4 | 21.5 | 19.1 | 19.2 | 17.9 | 17.6 | –2.6 |
| Asian or Pacific Islander | 14.9 | 11.7 | 14.7 | 13.0 | 11.1 | 12.9 | 9.8 | 12.6 | –1.6 |
| Hispanic or Latino | 10.4 | 12.4 | 10.2 | 9.8 | 10.1 | 8.4 | 9.1 | 8.9 | –2.0 |
| White, not Hispanic or Latino | 18.4 | 16.2 | 17.2 | 16.6 | 16.0 | 16.2 | 15.5 | 16.1 | –1.3 |
| Female | 7.3 | 7.0 | 6.9 | 6.6 | 6.3 | 6.2 | 6.5 | 6.3 | –1.2 |
| White | 7.4 | 7.1 | 6.9 | 6.7 | 6.2 | 6.2 | 6.5 | 6.4 | –1.3 |
| Black or African American | 6.4 | 6.7 | 7.1 | 6.6 | 5.8 | 5.3 | 6.4 | 6.1 | –1.2 |
| Asian or Pacific Islander | 6.0 | 5.2 | 6.5 | 4.5 | 6.5 | 6.2 | 5.6 | 5.8 | –0.5 |
| Hispanic or Latino | 3.6 | 3.7 | 3.8 | 3.5 | 4.5 | 3.6 | 3.9 | 3.8 | –0.3 |
| White, not Hispanic or Latino | 7.7 | 7.3 | 7.2 | 7.2 | 6.3 | 6.5 | 6.6 | 6.7 | –1.4 |
| Stomach | | | | | | | | | |
| Male | 14.6 | 13.5 | 13.4 | 12.9 | 12.9 | 12.5 | 11.7 | 11.8 | –1.9 |
| White | 12.8 | 11.9 | 11.3 | 11.1 | 11.2 | 10.6 | 10.2 | 10.2 | –2.0 |
| Black or African American | 21.5 | 18.4 | 21.9 | 20.4 | 17.0 | 18.5 | 17.0 | 15.8 | –2.6 |
| Asian or Pacific Islander | 26.9 | 23.9 | 24.7 | 21.2 | 22.6 | 22.1 | 19.2 | 20.0 | –2.8 |
| Hispanic or Latino | 19.6 | 19.1 | 18.9 | 19.3 | 19.8 | 16.2 | 15.7 | 15.8 | –2.0 |
| White, not Hispanic or Latino | 11.8 | 10.7 | 10.1 | 9.8 | 9.7 | 9.8 | 9.0 | 9.0 | –2.3 |
| Female | 6.7 | 6.2 | 6.2 | 6.4 | 6.6 | 6.1 | 5.7 | 6.0 | –1.0 |
| White | 5.7 | 5.2 | 5.0 | 5.2 | 5.5 | 5.0 | 4.6 | 4.9 | –1.3 |
| Black or African American | 9.9 | 9.9 | 10.8 | 10.8 | 10.4 | 8.5 | 8.8 | 9.6 | –0.6 |
| Asian or Pacific Islander | 15.5 | 13.1 | 12.2 | 12.8 | 12.1 | 12.8 | 11.9 | 10.8 | –2.8 |
| Hispanic or Latino | 10.9 | 11.1 | 10.1 | 10.9 | 9.4 | 10.5 | 9.7 | 9.9 | –0.7 |
| White, not Hispanic or Latino | 5.0 | 4.4 | 4.0 | 4.3 | 4.7 | 4.1 | 3.6 | 4.1 | –2.1 |
| Pancreas | | | | | | | | | |
| Male | 13.1 | 12.8 | 12.9 | 12.9 | 12.5 | 12.7 | 12.4 | 12.2 | –0.3 |
| White | 12.7 | 12.4 | 12.5 | 12.8 | 12.4 | 12.5 | 12.6 | 12.5 | 0.0 |
| Black or African American | 19.3 | 19.1 | 18.1 | 17.3 | 18.3 | 18.1 | 14.6 | 13.5 | –1.9 |
| Asian or Pacific Islander | 11.2 | 10.5 | 12.1 | 10.5 | 9.2 | 10.4 | 9.4 | 9.4 | –1.9 |
| Hispanic or Latino | 10.9 | 12.4 | 11.9 | 9.8 | 9.7 | 11.8 | 9.8 | 10.4 | –0.2 |
| White, not Hispanic or Latino | 12.4 | 12.0 | 12.5 | 13.0 | 12.7 | 12.5 | 12.6 | 12.3 | 0.1 |
| Female | 10.0 | 10.0 | 10.1 | 10.1 | 9.6 | 9.8 | 9.5 | 10.0 | –0.3 |
| White | 9.8 | 9.6 | 9.6 | 9.9 | 9.3 | 9.6 | 9.2 | 9.6 | –0.3 |
| Black or African American | 12.9 | 15.5 | 16.8 | 13.7 | 13.4 | 12.7 | 13.0 | 15.2 | –0.9 |
| Asian or Pacific Islander | 9.9 | 8.1 | 8.4 | 8.5 | 8.6 | 9.0 | 8.9 | 8.7 | 0.6 |
| Hispanic or Latino | 9.7 | 8.7 | 9.9 | 9.8 | 9.9 | 9.2 | 8.8 | 9.8 | –0.2 |
| White, not Hispanic or Latino | 9.6 | 9.6 | 9.2 | 9.8 | 9.0 | 9.5 | 8.9 | 9.4 | –0.4 |

See footnotes at end of table.



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## Table 53 (page 3 of 3). Age-adjusted cancer incidence rates for selected cancer sites, according to sex, race, and Hispanic origin: Selected geographic areas, 1990–2002

[Data are based on the Surveillance, Epidemiology, and End Results (SEER) Program's 13 population-based cancer registries]

Updated March 2006

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| Site, sex, race, and Hispanic origin | 1990 | 1995 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 1990–2002 APC[1] |
|---|---|---|---|---|---|---|---|---|---|
| Urinary bladder | Number of new cases per 100,000 population[2] | | | | | | | | |
| Male | 37.2 | 35.3 | 35.8 | 36.6 | 36.2 | 36.5 | 36.0 | 34.6 | –0.3 |
| White | 40.7 | 38.8 | 39.5 | 40.5 | 39.8 | 40.5 | 40.1 | 37.9 | –0.3 |
| Black or African American | 19.7 | 19.2 | 21.2 | 20.1 | 22.3 | 19.6 | 18.7 | 19.9 | –0.2 |
| Asian or Pacific Islander | 15.6 | 16.7 | 15.3 | 16.1 | 16.9 | 16.4 | 16.8 | 19.5 | 1.5 |
| Hispanic or Latino | 21.3 | 18.5 | 18.3 | 18.5 | 18.3 | 19.3 | 19.5 | 18.9 | –0.5 |
| White, not Hispanic or Latino | 41.8 | 39.8 | 41.0 | 41.7 | 41.3 | 41.7 | 41.6 | 39.0 | –0.2 |
| Female | 9.5 | 9.3 | 9.3 | 9.0 | 9.3 | 9.0 | 9.0 | 9.0 | –0.4 |
| White | 9.9 | 10.1 | 9.9 | 9.8 | 10.0 | 9.8 | 9.8 | 10.0 | –0.1 |
| Black or African American | 8.6 | 7.2 | 8.1 | 6.6 | 8.6 | 7.8 | 7.1 | 8.2 | –0.2 |
| Asian or Pacific Islander | 5.3 | 4.5 | 5.1 | 4.7 | 4.1 | 4.1 | 4.6 | 3.1 | –1.4 |
| Hispanic or Latino | 5.5 | 5.2 | 5.1 | 4.8 | 4.4 | 5.5 | 5.0 | 6.0 | 0.2 |
| White, not Hispanic or Latino | 10.1 | 10.4 | 10.6 | 10.2 | 10.5 | 10.1 | 10.2 | 10.5 | 0.1 |
| Non-Hodgkin's lymphoma | | | | | | | | | |
| Male | 22.7 | 25.0 | 23.9 | 22.9 | 24.0 | 23.2 | 23.3 | 22.9 | –0.1 |
| White | 23.7 | 26.2 | 24.8 | 24.0 | 25.0 | 24.6 | 24.4 | 23.9 | –0.1 |
| Black or African American | 17.5 | 21.3 | 22.7 | 17.4 | 18.0 | 17.2 | 17.5 | 17.8 | –0.3 |
| Asian or Pacific Islander | 16.5 | 16.3 | 16.3 | 15.4 | 19.1 | 15.8 | 17.6 | 16.3 | 0.3 |
| Hispanic or Latino | 16.9 | 21.8 | 17.7 | 19.8 | 17.7 | 19.9 | 17.5 | 19.3 | 0.1 |
| White, not Hispanic or Latino | 24.5 | 26.9 | 25.3 | 24.8 | 26.0 | 24.8 | 25.2 | 24.7 | –0.1 |
| Female | 14.5 | 15.1 | 15.9 | 16.1 | 16.0 | 15.7 | 15.7 | 15.8 | 0.9 |
| White | 15.4 | 15.8 | 16.7 | 17.0 | 17.0 | 16.6 | 16.4 | 16.7 | 0.9 |
| Black or African American | 10.3 | 10.0 | 11.8 | 12.5 | 10.8 | 11.7 | 11.8 | 11.4 | 1.9 |
| Asian or Pacific Islander | 9.0 | 11.8 | 11.0 | 11.0 | 11.3 | 11.1 | 12.7 | 11.5 | 1.6 |
| Hispanic or Latino | 13.1 | 12.7 | 14.1 | 13.3 | 13.8 | 13.1 | 13.9 | 12.8 | 0.7 |
| White, not Hispanic or Latino | 15.4 | 16.1 | 16.9 | 17.3 | 17.2 | 16.8 | 16.9 | 17.0 | 1.0 |
| Leukemia | | | | | | | | | |
| Male | 17.1 | 17.5 | 16.7 | 16.7 | 16.1 | 15.8 | 16.1 | 14.9 | –0.8 |
| White | 17.9 | 18.7 | 17.9 | 17.8 | 17.0 | 16.7 | 17.1 | 15.9 | –0.8 |
| Black or African American | 15.9 | 13.0 | 13.8 | 13.2 | 13.3 | 13.3 | 11.8 | 10.7 | –1.6 |
| Asian or Pacific Islander | 8.5 | 10.0 | 8.8 | 10.0 | 10.7 | 9.8 | 9.9 | 8.9 | –0.2 |
| Hispanic or Latino | 11.7 | 15.6 | 12.5 | 11.7 | 11.4 | 12.2 | 10.3 | 11.5 | –0.3 |
| White, not Hispanic or Latino | 17.8 | 19.0 | 17.9 | 18.0 | 17.2 | 16.8 | 17.5 | 16.2 | –0.6 |
| Female | 9.8 | 10.0 | 9.7 | 9.8 | 9.1 | 9.8 | 9.4 | 8.8 | –0.7 |
| White | 10.2 | 10.6 | 10.4 | 10.4 | 9.6 | 10.4 | 10.0 | 9.3 | –0.5 |
| Black or African American | 8.4 | 8.0 | 7.9 | 7.4 | 7.5 | 8.9 | 8.1 | 7.0 | –1.3 |
| Asian or Pacific Islander | 6.1 | 6.4 | 5.7 | 6.7 | 6.3 | 6.1 | 5.1 | 6.0 | –1.1 |
| Hispanic or Latino | 8.3 | 8.2 | 8.3 | 8.3 | 7.7 | 7.6 | 6.9 | 7.6 | –0.6 |
| White, not Hispanic or Latino | 10.1 | 10.5 | 10.2 | 10.1 | 9.4 | 9.9 | 9.9 | 9.1 | –0.6 |

Annual percent change (APC) is significantly different from 0 ($p < 0.05$).
0.0 APC is greater than –0.05 but less than 0.05.
[1]APC has been calculated by fitting a linear regression model to the natural logarithm of the yearly rates from 1990–2002.
[2]Age adjusted by 5-year age groups to the year 2000 U.S. standard population. Age-adjusted rates are based on at least 25 cases. See Appendix II, Age adjustment.

NOTES: Estimates are based on 13 SEER areas November 2004 submission and differ from published estimates based on 9 SEER areas or other submission dates. In contrast to previous editions of *Health, United States*, the site variable distinguishes Kaposi Sarcoma and Mesothelioma as individual cancer sites. As a result, Kaposi Sarcoma and Mesothelioma cases do not contribute to other cancer sites. Estimates for Hispanic population exclude data from Alaska, Detroit, and Hawaii. See Appendix I, SEER. Numbers have been revised and differ from previous editions of *Health, United States*. The race groups, white, black, Asian or Pacific Islander, and American Indian or Alaska Native, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Estimates for American Indian or Alaska Native are not shown for some sites because of the small number of annual cases.

SOURCE: National Institutes of Health, National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) Program at www.seer.cancer.gov.



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## Table 54. Five-year relative cancer survival rates for selected cancer sites, according to race and sex: Selected geographic areas, 1974–76, 1980–82, 1986–88, 1989–91, 1992–1994, and 1995–2001

[Data are based on the Surveillance, Epidemiology, and End Results (SEER) Program's 9 population-based cancer registries]

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| Sex and site | White | | | | | | Black or African American | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1974–76 | 1980–82 | 1986–88 | 1989–91 | 1992–1994 | 1995–2001 | 1974–76 | 1980–82 | 1986–88 | 1989–91 | 1992–1994 | 1995–2001 |
| Both sexes | Percent of patients | | | | | | | | | | | |
| All sites | 50.6 | 52.1 | 56.8 | 60.3 | 63.9 | 66.4 | 39.2 | 39.9 | 42.8 | 46.3 | 52.1 | 56.0 |
| Oral cavity and pharynx | 55.0 | 55.7 | 57.0 | 58.1 | 60.1 | 61.8 | 36.3 | 31.0 | 35.2 | 34.0 | 35.9 | 39.5 |
| Esophagus | 5.3 | 7.3 | 10.7 | 11.8 | 15.3 | 16.2 | 3.6 | 5.4 | 7.2 | 8.8 | 9.7 | 9.6 |
| Stomach | 14.6 | 16.5 | 19.2 | 18.4 | 21.0 | 21.4 | 16.3 | 19.0 | 19.1 | 24.9 | 19.1 | 22.8 |
| Colon | 50.5 | 55.6 | 61.6 | 63.2 | 63.1 | 64.9 | 46.3 | 49.5 | 53.1 | 54.0 | 51.9 | 54.7 |
| Rectum | 48.8 | 53.1 | 59.3 | 60.7 | 62.1 | 65.1 | 41.8 | 38.3 | 51.2 | 54.7 | 53.2 | 56.0 |
| Pancreas | 2.6 | 2.8 | 3.2 | 4.2 | 4.7 | 4.4 | 2.7 | 4.5 | 6.0 | 4.0 | 3.8 | 4.4 |
| Lung and bronchus | 12.5 | 13.5 | 13.5 | 14.4 | 15.1 | 15.5 | 11.4 | 12.1 | 11.8 | 10.8 | 11.9 | 13.2 |
| Urinary bladder | 73.8 | 78.8 | 80.8 | 82.2 | 82.4 | 82.8 | 47.9 | 58.5 | 62.8 | 61.5 | 64.0 | 64.3 |
| Non-Hodgkin's lymphoma | 47.8 | 51.8 | 52.8 | 52.1 | 54.5 | 61.2 | 48.0 | 50.5 | 50.7 | 43.7 | 42.5 | 52.3 |
| Leukemia | 35.2 | 39.5 | 44.5 | 46.5 | 49.5 | 49.1 | 31.1 | 33.2 | 37.9 | 34.8 | 39.9 | 38.1 |
| Male | | | | | | | | | | | | |
| All sites | 42.1 | 46.7 | 51.9 | 57.9 | 63.9 | 66.5 | 31.6 | 34.4 | 37.9 | 43.5 | 53.4 | 58.4 |
| Oral cavity and pharynx | 54.6 | 54.6 | 54.5 | 55.8 | 59.2 | 61.1 | 31.4 | 26.5 | 29.7 | 29.7 | 30.6 | 34.3 |
| Esophagus | 4.5 | 6.4 | 11.2 | 11.9 | 14.9 | 16.1 | 1.7 | 4.6 | 7.0 | 7.9 | 10.3 | 8.6 |
| Stomach | 13.4 | 15.6 | 16.3 | 15.1 | 19.8 | 19.9 | 15.5 | 18.2 | 15.3 | 22.5 | 18.3 | 21.5 |
| Colon | 49.7 | 55.8 | 62.6 | 63.8 | 63.5 | 66.1 | 45.0 | 47.0 | 52.9 | 53.9 | 50.5 | 56.3 |
| Rectum | 47.9 | 51.6 | 59.1 | 60.7 | 61.2 | 64.5 | 34.5 | 36.3 | 46.5 | 56.5 | 51.8 | 55.0 |
| Pancreas | 3.0 | 2.5 | 3.0 | 4.0 | 4.3 | 4.7 | 2.3 | 3.2 | 6.0 | 3.0 | 4.2 | 2.9 |
| Lung and bronchus | 11.1 | 12.1 | 12.0 | 12.8 | 13.3 | 13.7 | 10.9 | 10.9 | 12.0 | 9.5 | 10.5 | 11.6 |
| Prostate gland | 67.9 | 74.3 | 82.8 | 92.0 | 98.2 | 99.9 | 58.3 | 64.9 | 69.4 | 80.9 | 92.4 | 96.7 |
| Urinary bladder | 74.6 | 79.8 | 82.3 | 84.5 | 84.6 | 84.3 | 54.3 | 63.2 | 67.6 | 65.0 | 68.8 | 69.7 |
| Non-Hodgkin's lymphoma | 48.1 | 50.8 | 50.0 | 48.0 | 50.0 | 59.5 | 43.2 | 47.9 | 47.5 | 38.2 | 37.1 | 47.6 |
| Leukemia | 33.9 | 39.6 | 45.8 | 46.9 | 50.7 | 49.6 | 31.9 | 30.4 | 36.2 | 29.8 | 38.5 | 39.2 |
| Female | | | | | | | | | | | | |
| All sites | 57.8 | 57.1 | 61.5 | 62.9 | 64.0 | 66.3 | 47.1 | 46.2 | 48.0 | 49.3 | 50.5 | 53.2 |
| Colon | 51.2 | 55.4 | 60.7 | 62.6 | 62.7 | 63.9 | 47.3 | 51.2 | 53.3 | 54.1 | 53.0 | 53.6 |
| Rectum | 49.9 | 54.7 | 59.5 | 60.8 | 63.2 | 65.9 | 48.5 | 40.8 | 55.8 | 52.9 | 54.7 | 57.0 |
| Pancreas | 2.1 | 3.0 | 3.3 | 4.4 | 5.1 | 4.2 | 3.0 | 5.7 | 5.9 | 4.8 | 3.3 | 5.6 |
| Lung and bronchus | 16.0 | 16.2 | 15.9 | 16.7 | 17.4 | 17.7 | 13.0 | 15.6 | 11.6 | 12.9 | 14.3 | 15.6 |
| Melanoma of skin | 85.1 | 88.3 | 91.5 | 91.8 | 91.8 | 93.5 | * | * | * | 93.7 | * | 78.2 |
| Breast | 75.3 | 77.1 | 84.0 | 86.2 | 87.6 | 89.5 | 63.1 | 65.8 | 69.3 | 71.3 | 72.6 | 75.9 |
| Cervix uteri | 69.9 | 68.3 | 72.0 | 72.6 | 72.7 | 74.6 | 63.6 | 61.7 | 55.8 | 62.6 | 57.8 | 66.1 |
| Corpus uteri | 88.8 | 82.8 | 84.5 | 85.7 | 86.3 | 86.2 | 61.5 | 55.0 | 57.0 | 57.9 | 55.9 | 61.8 |
| Ovary | 36.5 | 38.7 | 39.4 | 41.2 | 42.2 | 44.4 | 41.1 | 39.4 | 36.6 | 30.6 | 45.9 | 37.7 |
| Non-Hodgkin's lymphoma | 47.5 | 52.9 | 56.1 | 57.4 | 60.1 | 63.3 | 54.0 | 53.5 | 54.6 | 51.1 | 52.5 | 59.1 |

* Data for population groups with fewer than 25 cases are not shown because estimates are considered unreliable.

NOTES: Rates are based on followup of patients through 2002. The rate is the ratio of the observed survival rate for the patient group to the expected survival rate for persons in the general population similar to the patient group with respect to age, sex, race, and calendar year of observation. It estimates the chance of surviving the effects of cancer. In contrast to previous editions of *Health, United States*, the site variable distinguishes Kaposi Sarcoma and Mesothelioma as individual cancer sites. As a result, Kaposi Sarcoma and Mesothelioma cases are excluded from each of the sites shown except all sites combined. The race groups white and black include persons of Hispanic and non-Hispanic origin. Due to death certificate race-ethnicity classification and other methodological issues related to developing life tables, survival rates for race-ethnicity groups other than white and black are not calculated. Numbers have been revised and differ from previous editions of *Health, United States*.

SOURCE: National Institutes of Health, National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) Program at www.seer.cancer.gov.



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## Table 55. Diabetes among adults 20 years of age and over, according to sex, age, and race and Hispanic origin: United States, 1988–94 and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, age, and race and Hispanic origin[3] | Physician-diagnosed and undiagnosed diabetes[1,2] | | Physician-diagnosed diabetes[1] | | Undiagnosed diabetes[2] | |
|---|---|---|---|---|---|---|
| | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 |
| 20 years and over, age adjusted[4] | | | Percent of population | | | |
| All persons[5] | 8.4 | 9.4 | 5.4 | 6.6 | 3.0 | 2.9 |
| Male | 8.8 | 10.7 | 5.4 | 7.1 | 3.5 | 3.8 |
| Female | 8.0 | 8.3 | 5.4 | 6.2 | 2.6 | 2.2 |
| Not Hispanic or Latino: | | | | | | |
| White | 7.5 | 8.0 | 5.0 | 5.3 | 2.6 | 2.8 |
| Black or African American | 12.6 | 14.8 | 8.6 | 11.2 | 4.2 | *3.9 |
| Mexican | 14.1 | 13.6 | 9.7 | 10.5 | 4.7 | 3.5 |
| 20 years and over, crude | | | | | | |
| All persons[5] | 7.8 | 9.3 | 5.1 | 6.5 | 2.7 | 2.8 |
| Male | 7.9 | 10.2 | 4.8 | 6.7 | 3.0 | 3.5 |
| Female | 7.8 | 8.5 | 5.4 | 6.3 | 2.4 | 2.2 |
| Not Hispanic or Latino: | | | | | | |
| White | 7.5 | 8.5 | 5.0 | 5.6 | 2.5 | 2.9 |
| Black or African American | 10.4 | 13.2 | 6.9 | 9.9 | 3.4 | *3.3 |
| Mexican | 9.0 | 8.3 | 5.6 | 6.5 | 3.4 | 1.8 |
| Age | | | | | | |
| 20–39 years | 1.6 | * | 1.1 | 1.7 | 0.6 | * |
| 40–59 years | 8.9 | 9.8 | 5.5 | 6.6 | 3.4 | 3.3 |
| 60 years and over | 18.9 | 20.9 | 12.8 | 15.1 | 6.1 | 5.8 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

[1]Physician-diagnosed diabetes was obtained by self-report and excludes women who reported diabetes only during pregnancy.

[2]Undiagnosed diabetes is defined as a fasting blood glucose of at least 126 mg/dL and no reported physician diagnosis.

[3]Persons of Mexican origin may be of any race. Starting with data year 1999, race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Data for 1988–94 were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[4]Estimates are age adjusted to the year 2000 standard population using three age groups: 20–39 years, 40–59 years, and 60 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[5]Includes all other races and Hispanic origins not shown separately.

NOTE: Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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## Table 56 (page 1 of 2). Respiratory conditions among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Characteristic | Asthma attack[1] | | | Sinusitis[2] | | | Hay fever[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of adults | | | | | | | | |
| Total, age-adjusted[3,4] | 3.7 | 3.7 | 3.3 | 16.3 | 14.1 | 13.9 | 9.2 | 8.8 | 8.6 |
| Total, crude[4] | 3.7 | 3.7 | 3.3 | 16.3 | 14.2 | 14.0 | 9.3 | 8.8 | 8.6 |
| **Age** | | | | | | | | | |
| 18–44 years | 4.0 | 4.0 | 3.4 | 15.3 | 12.3 | 11.9 | 9.9 | 8.4 | 8.5 |
| 18–24 years | 4.8 | 4.6 | 3.5 | 11.0 | 8.2 | 8.3 | 8.1 | 6.2 | 5.1 |
| 25–44 years | 3.8 | 3.8 | 3.4 | 16.6 | 13.7 | 13.2 | 10.5 | 9.2 | 9.7 |
| 45–64 years | 3.6 | 3.7 | 3.7 | 19.3 | 17.8 | 17.3 | 9.7 | 10.8 | 9.8 |
| 45–54 years | 4.1 | 3.9 | 3.7 | 19.7 | 17.4 | 16.9 | 10.4 | 11.7 | 10.4 |
| 55–64 years | 2.9 | 3.4 | 3.7 | 18.5 | 18.4 | 17.7 | 8.7 | 9.6 | 9.0 |
| 65 years and over | 2.7 | 3.0 | 2.3 | 14.5 | 13.2 | 13.9 | 6.3 | 6.1 | 6.6 |
| 65–74 years | 3.1 | 3.4 | 2.8 | 15.6 | 14.2 | 15.4 | 7.2 | 7.0 | 7.6 |
| 75 years and over | 2.2 | 2.4 | 1.7 | 13.2 | 12.0 | 12.2 | 5.2 | 5.0 | 5.3 |
| **Sex[3]** | | | | | | | | | |
| Male | 2.6 | 2.3 | 2.0 | 11.5 | 10.3 | 10.0 | 8.5 | 7.9 | 7.6 |
| Female | 4.7 | 5.0 | 4.5 | 20.8 | 17.6 | 17.5 | 10.0 | 9.6 | 9.5 |
| **Sex and age** | | | | | | | | | |
| Male: | | | | | | | | | |
| 18–44 years | 2.7 | 2.5 | 2.3 | 10.8 | 8.9 | 8.4 | 9.0 | 7.7 | 7.5 |
| 45–54 years | 2.7 | 2.1 | 2.0 | 13.4 | 12.3 | 12.3 | 9.7 | 10.7 | 9.8 |
| 55–64 years | 1.9 | 2.4 | *1.8 | 12.9 | 13.3 | 12.5 | 8.2 | 7.7 | 7.7 |
| 65–74 years | 2.8 | *2.3 | *1.6 | 11.8 | 11.3 | 11.1 | 6.5 | 7.1 | 6.7 |
| 75 years and over | *2.0 | *1.7 | * | 9.4 | 9.6 | 10.0 | 4.4 | 4.3 | 4.4 |
| Female: | | | | | | | | | |
| 18–44 years | 5.3 | 5.4 | 4.5 | 19.7 | 15.6 | 15.4 | 10.8 | 9.2 | 9.5 |
| 45–54 years | 5.4 | 5.5 | 5.4 | 25.8 | 22.3 | 21.3 | 11.1 | 12.6 | 11.0 |
| 55–64 years | 3.9 | 4.4 | 5.4 | 23.6 | 23.1 | 22.6 | 9.1 | 11.3 | 10.3 |
| 65–74 years | 3.4 | 4.4 | 3.7 | 18.6 | 16.7 | 18.9 | 7.7 | 7.0 | 8.4 |
| 75 years and over | 2.3 | 2.9 | 2.3 | 15.6 | 13.5 | 13.5 | 5.7 | 5.5 | 5.9 |
| **Race[3,5]** | | | | | | | | | |
| White only | 3.7 | 3.7 | 3.3 | 16.6 | 14.5 | 14.1 | 9.4 | 9.1 | 8.9 |
| Black or African American only | 3.9 | 4.3 | 3.7 | 16.8 | 14.6 | 14.3 | 8.7 | 7.0 | 6.7 |
| American Indian and Alaska Native only | *6.3 | * | * | 18.3 | *8.3 | 15.4 | *12.0 | * | *9.5 |
| Asian only | *2.2 | *2.5 | * | 9.9 | 7.1 | 5.5 | 10.8 | 8.4 | 6.5 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 9.3 | *5.5 | --- | 19.2 | 14.5 | --- | 8.8 | 12.0 |
| **Hispanic origin and race[3,5]** | | | | | | | | | |
| Hispanic or Latino | 2.8 | 2.3 | 2.8 | 10.0 | 8.6 | 8.5 | 6.3 | 6.8 | 6.2 |
| Mexican | 1.7 | 1.6 | 1.9 | 9.1 | 7.8 | 7.8 | 5.6 | 6.2 | 5.6 |
| Not Hispanic or Latino | 3.8 | 3.9 | 3.4 | 17.0 | 14.9 | 14.7 | 9.6 | 9.1 | 9.0 |
| White only | 3.9 | 3.9 | 3.4 | 17.4 | 15.4 | 15.2 | 9.7 | 9.6 | 9.5 |
| Black or African American only | 3.9 | 4.2 | 3.6 | 16.9 | 14.4 | 14.4 | 8.8 | 6.9 | 6.8 |
| **Education[6,7]** | | | | | | | | | |
| 25 years of age and over: | | | | | | | | | |
| No high school diploma or GED | 4.4 | 3.5 | 3.8 | 15.9 | 12.5 | 11.6 | 7.8 | 6.3 | 6.3 |
| High school diploma or GED | 3.2 | 3.4 | 3.0 | 16.5 | 14.6 | 13.1 | 7.9 | 8.1 | 6.6 |
| Some college or more | 3.4 | 3.7 | 3.2 | 17.9 | 15.8 | 16.5 | 10.9 | 10.5 | 11.3 |

See footnotes at end of table.



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## Table 56 (page 2 of 2). Respiratory conditions among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Asthma attack[1] | | | Sinusitis[2] | | | Hay fever[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Poverty status[3,8] | Percent of adults | | | | | | | | |
| Poor | 5.9 | 5.5 | 5.3 | 16.1 | 14.0 | 12.8 | 8.7 | 7.9 | 6.5 |
| Near poor | 4.4 | 3.9 | 4.1 | 15.5 | 14.7 | 13.5 | 8.6 | 7.7 | 8.2 |
| Nonpoor | 3.1 | 3.4 | 2.9 | 16.7 | 14.0 | 14.1 | 9.6 | 9.2 | 9.1 |
| Hispanic origin and race and poverty status[3,5,8] | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 3.3 | 3.7 | 3.5 | 8.1 | 8.4 | 8.0 | 5.4 | 6.9 | 5.3 |
| Near poor | 3.0 | *2.0 | *2.7 | 8.6 | 7.9 | 7.9 | 6.4 | 7.4 | 6.8 |
| Nonpoor | 2.4 | 1.9 | 2.7 | 11.5 | 9.2 | 9.1 | 6.9 | 6.6 | 6.4 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 7.2 | 6.4 | 6.2 | 18.4 | 16.2 | 14.5 | 9.7 | 9.1 | 7.6 |
| Near poor | 4.6 | 4.7 | 4.4 | 17.0 | 16.8 | 15.4 | 9.4 | 8.5 | 9.0 |
| Nonpoor | 3.4 | 3.5 | 3.0 | 17.4 | 15.0 | 15.2 | 9.9 | 9.9 | 9.8 |
| Black or African American only: | | | | | | | | | |
| Poor | 6.0 | 5.6 | 5.9 | 18.9 | 15.8 | 14.5 | 9.2 | 7.3 | 6.0 |
| Near poor | 5.4 | 4.2 | 4.9 | 16.1 | 17.4 | 14.3 | 8.8 | 6.2 | 7.9 |
| Nonpoor | 2.2 | 3.6 | 2.3 | 16.5 | 12.6 | 14.3 | 8.8 | 6.9 | 6.4 |
| Geographic region[3] | | | | | | | | | |
| Northeast | 3.4 | 4.0 | 3.5 | 15.0 | 13.4 | 13.2 | 9.2 | 9.4 | 9.3 |
| Midwest | 3.7 | 4.0 | 3.5 | 15.7 | 13.0 | 14.1 | 8.6 | 7.7 | 8.0 |
| South | 3.7 | 3.3 | 3.0 | 19.6 | 16.6 | 16.1 | 8.7 | 7.7 | 7.4 |
| West | 3.9 | 4.0 | 3.4 | 12.6 | 11.3 | 10.3 | 11.1 | 11.5 | 10.8 |
| Location of residence[3] | | | | | | | | | |
| Within MSA[9] | 3.7 | 3.6 | 3.3 | 15.8 | 13.6 | 13.4 | 9.3 | 8.8 | 8.6 |
| Outside MSA[9] | 3.5 | 4.1 | 3.3 | 18.4 | 15.9 | 15.7 | 9.0 | 8.5 | 8.6 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Only respondents who had ever been told by a doctor or other health professional that they had asthma were asked, "During the past 12 months, have you had an episode of asthma or an asthma attack?"

[2]Respondents were asked in two separate questions, "During the past 12 months, have you been told by a doctor or other health professional that you had sinusitis? ...hay fever?"

[3]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[4]Includes all other races not shown separately.

[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[6]Estimates are for persons 25 years of age and over and are age adjusted to the year 2000 standard population using five age groups: 25–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[7]GED stands for General Educational Development high school equivalency diploma. See Appendix II, Education.

[8]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 27 percent of persons 18 years of age and over in 1997, 34 percent in 2002, and 36 percent in 2003. See Appendix II, Family income; Poverty level.

[9]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, sample adult questionnaire.



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## Table 57 (page 1 of 2). Severe headache or migraine, low back pain, and neck pain among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Severe headache or migraine[1] | | | Low back pain[1] | | | Neck pain[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of adults with pain during past 3 months | | | | | | | | |
| Total, age-adjusted[2,3] | 15.8 | 15.0 | 15.1 | 28.2 | 26.4 | 27.4 | 14.7 | 13.8 | 14.7 |
| Total, crude[3] | 16.0 | 15.1 | 15.2 | 28.1 | 26.4 | 27.5 | 14.6 | 13.8 | 14.8 |
| **Age** | | | | | | | | | |
| 18–44 years | 18.7 | 17.6 | 17.8 | 26.1 | 23.7 | 24.2 | 13.3 | 11.9 | 12.5 |
| 18–24 years | 18.7 | 17.3 | 16.8 | 21.9 | 20.8 | 19.6 | 9.8 | 7.7 | 9.1 |
| 25–44 years | 18.7 | 17.6 | 18.1 | 27.3 | 24.6 | 25.8 | 14.3 | 13.3 | 13.7 |
| 45–64 years | 15.8 | 15.2 | 15.1 | 31.3 | 29.8 | 31.5 | 17.0 | 16.9 | 18.2 |
| 45–54 years | 17.8 | 17.0 | 16.5 | 31.3 | 29.2 | 30.2 | 17.3 | 17.2 | 17.9 |
| 55–64 years | 12.7 | 12.5 | 13.1 | 31.2 | 30.8 | 33.4 | 16.6 | 16.5 | 18.5 |
| 65 years and over | 7.0 | 6.6 | 6.9 | 29.5 | 28.8 | 29.9 | 15.0 | 14.1 | 15.1 |
| 65–74 years | 8.2 | 7.9 | 7.9 | 30.2 | 28.9 | 30.8 | 15.0 | 14.1 | 15.6 |
| 75 years and over | 5.4 | 5.2 | 5.7 | 28.6 | 28.8 | 28.9 | 15.0 | 14.0 | 14.5 |
| **Sex[2]** | | | | | | | | | |
| Male | 9.9 | 9.2 | 9.2 | 26.5 | 24.3 | 25.1 | 12.6 | 11.7 | 12.0 |
| Female | 21.4 | 20.6 | 20.7 | 29.6 | 28.3 | 29.4 | 16.6 | 15.7 | 17.1 |
| **Sex and age** | | | | | | | | | |
| Male: | | | | | | | | | |
| 18–44 years | 11.9 | 10.7 | 10.8 | 24.8 | 22.1 | 22.4 | 11.6 | 10.4 | 10.3 |
| 45–54 years | 10.3 | 10.3 | 9.7 | 29.4 | 27.6 | 29.3 | 13.9 | 13.8 | 14.7 |
| 55–64 years | 8.8 | 8.4 | 8.5 | 30.7 | 27.9 | 30.5 | 14.6 | 12.7 | 15.2 |
| 65–74 years | 5.0 | 4.1 | 5.8 | 29.0 | 25.9 | 25.6 | 13.6 | 13.2 | 12.5 |
| 75 years and over | *2.4 | 3.6 | 3.2 | 22.5 | 23.8 | 25.1 | 12.6 | 13.0 | 12.6 |
| Female: | | | | | | | | | |
| 18–44 years | 25.4 | 24.3 | 24.6 | 27.3 | 25.2 | 26.0 | 14.9 | 13.4 | 14.7 |
| 45–54 years | 24.9 | 23.5 | 22.9 | 33.1 | 30.7 | 31.1 | 20.6 | 20.4 | 21.0 |
| 55–64 years | 16.3 | 16.3 | 17.5 | 31.7 | 33.4 | 36.1 | 18.4 | 20.0 | 21.6 |
| 65–74 years | 10.7 | 11.0 | 9.6 | 31.1 | 31.3 | 35.0 | 16.1 | 14.9 | 18.2 |
| 75 years and over | 7.4 | 6.1 | 7.4 | 32.4 | 31.9 | 31.4 | 16.5 | 14.7 | 15.8 |
| **Race[2,4]** | | | | | | | | | |
| White only | 15.9 | 15.2 | 15.1 | 28.7 | 26.9 | 27.9 | 15.1 | 14.1 | 15.2 |
| Black or African American only | 16.7 | 14.9 | 15.2 | 26.9 | 24.0 | 25.0 | 13.3 | 11.7 | 12.1 |
| American Indian and Alaska Native only | 18.9 | 24.8 | 28.6 | 33.3 | 34.3 | 32.2 | 16.2 | *18.2 | 17.4 |
| Asian only | 11.7 | 8.4 | 11.9 | 21.0 | 19.2 | 19.7 | 9.2 | 8.1 | 9.1 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 27.0 | 23.2 | --- | 34.0 | 34.9 | --- | 22.3 | 20.5 |
| **Hispanic origin and race[2,4]** | | | | | | | | | |
| Hispanic or Latino | 15.5 | 13.5 | 15.9 | 26.4 | 24.2 | 26.5 | 13.9 | 13.5 | 14.6 |
| Mexican | 14.6 | 12.5 | 15.3 | 25.2 | 23.2 | 24.6 | 12.9 | 12.3 | 12.5 |
| Not Hispanic or Latino | 15.9 | 15.4 | 15.2 | 28.4 | 26.7 | 27.6 | 14.9 | 13.9 | 14.9 |
| White only | 16.1 | 15.6 | 15.3 | 29.1 | 27.4 | 28.4 | 15.4 | 14.4 | 15.6 |
| Black or African American only | 16.8 | 14.9 | 15.2 | 26.9 | 23.9 | 24.9 | 13.3 | 11.6 | 12.0 |
| **Education[5,6]** | | | | | | | | | |
| 25 years of age and over: | | | | | | | | | |
| No high school diploma or GED | 19.2 | 17.9 | 17.7 | 33.6 | 31.6 | 31.6 | 16.5 | 16.4 | 17.0 |
| High school diploma or GED | 16.0 | 15.9 | 15.3 | 30.2 | 28.6 | 29.6 | 15.5 | 15.1 | 14.8 |
| Some college or more | 13.8 | 13.2 | 13.8 | 26.9 | 25.6 | 27.3 | 14.6 | 14.0 | 15.3 |

See footnotes at end of table.



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## Table 57 (page 2 of 2). Severe headache or migraine, low back pain, and neck pain among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Severe headache or migraine[1] | | | Low back pain[1] | | | Neck pain[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Poverty status[2,7] | Percent of adults with pain during the past 3 months | | | | | | | | |
| Poor | 23.3 | 21.3 | 21.0 | 35.4 | 31.3 | 33.2 | 18.6 | 17.0 | 17.9 |
| Near poor | 18.9 | 17.6 | 18.7 | 30.8 | 30.0 | 30.6 | 16.1 | 15.9 | 16.3 |
| Nonpoor | 13.8 | 13.5 | 13.3 | 26.3 | 24.9 | 25.8 | 13.8 | 12.9 | 13.8 |
| Hispanic origin and race and poverty status[2,4,7] | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 18.9 | 19.3 | 19.8 | 29.5 | 28.3 | 29.7 | 16.4 | 18.5 | 16.1 |
| Near poor | 15.7 | 13.8 | 16.4 | 26.8 | 24.3 | 26.6 | 12.9 | 14.6 | 16.9 |
| Nonpoor | 13.4 | 11.5 | 13.8 | 24.3 | 22.7 | 25.3 | 13.3 | 11.3 | 12.9 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 26.2 | 23.3 | 21.7 | 38.9 | 33.7 | 35.9 | 20.5 | 17.3 | 19.7 |
| Near poor | 20.1 | 20.0 | 21.0 | 33.3 | 33.2 | 33.0 | 18.0 | 17.7 | 18.0 |
| Nonpoor | 14.1 | 14.1 | 13.6 | 27.1 | 25.7 | 26.8 | 14.4 | 13.6 | 14.7 |
| Black or African American only: | | | | | | | | | |
| Poor | 22.7 | 20.2 | 21.0 | 34.5 | 30.1 | 31.2 | 17.9 | 14.2 | 16.0 |
| Near poor | 17.6 | 17.3 | 15.9 | 27.7 | 26.9 | 27.6 | 14.0 | 13.6 | 12.7 |
| Nonpoor | 13.4 | 11.9 | 12.5 | 23.1 | 20.6 | 22.0 | 10.9 | 10.1 | 10.3 |
| Geographic region[2] | | | | | | | | | |
| Northeast | 14.5 | 13.9 | 14.1 | 27.1 | 27.4 | 27.3 | 14.0 | 14.0 | 14.3 |
| Midwest | 15.6 | 15.1 | 14.9 | 28.7 | 27.6 | 29.0 | 15.3 | 13.4 | 15.2 |
| South | 17.1 | 15.4 | 15.6 | 27.5 | 24.5 | 25.1 | 13.9 | 13.2 | 13.5 |
| West | 15.3 | 15.2 | 15.6 | 30.0 | 27.6 | 29.5 | 16.1 | 15.2 | 16.5 |
| Location of residence[2] | | | | | | | | | |
| Within MSA[8] | 15.2 | 14.2 | 14.6 | 27.0 | 25.7 | 26.5 | 14.2 | 13.2 | 14.5 |
| Outside MSA[8] | 18.1 | 18.1 | 17.4 | 32.5 | 29.2 | 30.7 | 16.4 | 15.9 | 15.2 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]In three separate questions, respondents were asked, "During the past 3 months, did you have a severe headache or migraine? ...low back pain? ...neck pain?" Respondents were instructed to report pain that had lasted a whole day or more and, conversely, not to report fleeting or minor aches or pains. Persons may be represented in more than one column.

[2]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[3]Includes all other races not shown separately.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Estimates are for persons 25 years of age and over and are age adjusted to the year 2000 standard population using five age groups: 25–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[6]GED stands for General Educational Development high school equivalency diploma. See Appendix II, Education.

[7]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 27 percent of persons 18 years of age and over in 1997, 34 percent in 2002, and 36 percent in 2003. See Appendix II, Family income; Poverty level.

[8]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, sample adult questionnaire.



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## Table 58 (page 1 of 3). Limitation of activity caused by chronic conditions, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1997 | 2001 | 2002 | 2003 |
|---|---|---|---|---|
| All ages | Percent of persons with any activity limitation[1] | | | |
| Total[2,3] | 13.3 | 12.1 | 12.3 | 12.1 |
| **Age** | | | | |
| Under 18 years | 6.6 | 6.8 | 7.1 | 6.9 |
| Under 5 years | 3.5 | 3.3 | 3.2 | 3.6 |
| 5–17 years | 7.8 | 8.0 | 8.5 | 8.1 |
| 18–44 years | 7.0 | 6.0 | 6.2 | 6.0 |
| 18–24 years | 5.1 | 4.6 | 4.3 | 4.1 |
| 25–44 years | 7.6 | 6.5 | 6.8 | 6.6 |
| 45–54 years | 14.2 | 13.1 | 13.8 | 13.0 |
| 55–64 years | 22.2 | 20.7 | 21.1 | 21.1 |
| 65 years and over | 38.7 | 34.6 | 34.5 | 34.6 |
| 65–74 years | 30.0 | 26.0 | 25.2 | 26.3 |
| 75 years and over | 50.2 | 44.7 | 45.2 | 44.0 |
| **Sex[3]** | | | | |
| Male | 13.1 | 12.2 | 12.3 | 11.9 |
| Female | 13.4 | 11.9 | 12.3 | 12.2 |
| **Race[3,4]** | | | | |
| White only | 13.1 | 11.8 | 12.1 | 11.8 |
| Black or African American only | 17.1 | 15.6 | 14.9 | 15.3 |
| American Indian and Alaska Native only | 23.1 | 18.9 | 19.5 | 21.2 |
| Asian only | 7.5 | 6.7 | 6.4 | 6.4 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | * |
| 2 or more races | --- | 19.8 | 22.0 | 20.2 |
| Black or African American; White | --- | 14.8 | *8.3 | *16.8 |
| American Indian and Alaska Native; White | --- | 22.0 | 30.0 | 24.8 |
| **Hispanic origin and race[3,4]** | | | | |
| Hispanic or Latino | 12.8 | 10.5 | 10.7 | 10.2 |
| Mexican | 12.5 | 10.3 | 10.8 | 9.7 |
| Not Hispanic or Latino | 13.5 | 12.4 | 12.6 | 12.4 |
| White only | 13.2 | 12.1 | 12.4 | 12.2 |
| Black or African American only | 17.0 | 15.5 | 15.0 | 15.4 |
| **Poverty status[3,5]** | | | | |
| Poor | 25.4 | 22.3 | 22.9 | 23.1 |
| Near poor | 17.9 | 17.1 | 17.4 | 17.0 |
| Nonpoor | 10.1 | 9.5 | 9.5 | 9.2 |
| **Hispanic origin and race and poverty status[3,4,5]** | | | | |
| Hispanic or Latino: | | | | |
| Poor | 19.2 | 16.2 | 16.3 | 15.5 |
| Near poor | 12.7 | 10.9 | 12.2 | 9.9 |
| Nonpoor | 9.2 | 7.9 | 7.7 | 8.2 |
| Not Hispanic or Latino: | | | | |
| White only: | | | | |
| Poor | 27.8 | 24.8 | 25.4 | 26.2 |
| Near poor | 19.2 | 18.8 | 19.5 | 19.3 |
| Nonpoor | 10.4 | 9.7 | 9.7 | 9.4 |
| Black or African American only: | | | | |
| Poor | 28.2 | 24.8 | 25.0 | 26.1 |
| Near poor | 19.5 | 20.1 | 17.9 | 19.0 |
| Nonpoor | 10.7 | 10.0 | 10.0 | 9.7 |
| **Geographic region[3]** | | | | |
| Northeast | 13.0 | 11.1 | 11.8 | 11.3 |
| Midwest | 13.1 | 13.3 | 13.1 | 13.3 |
| South | 13.9 | 12.3 | 12.6 | 12.4 |
| West | 13.0 | 11.5 | 11.5 | 11.1 |
| **Location of residence[3]** | | | | |
| Within MSA[6] | 12.7 | 11.3 | 11.4 | 11.2 |
| Outside MSA[6] | 15.5 | 15.3 | 15.9 | 15.7 |

See footnotes at end of table.



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## Table 58 (page 2 of 3). Limitation of activity caused by chronic conditions, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1997 | 2001 | 2002 | 2003 | 1997 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| 65 years of age and over | Percent with ADL limitation[7] | | | | Percent with IADL limitation[7] | | | |
| All adults 65 years of age and over[2,8] | 6.7 | 6.4 | 6.1 | 6.4 | 13.7 | 12.6 | 12.2 | 12.2 |
| **Age** | | | | | | | | |
| 65–74 years | 3.4 | 3.4 | 2.7 | 3.1 | 6.9 | 6.7 | 6.0 | 6.5 |
| 75 years and over | 10.4 | 9.6 | 9.8 | 9.9 | 21.2 | 18.9 | 19.1 | 18.4 |
| **Sex[8]** | | | | | | | | |
| Male | 5.2 | 6.0 | 4.7 | 5.2 | 9.1 | 9.6 | 7.8 | 8.6 |
| Female | 7.7 | 6.5 | 7.0 | 7.2 | 16.9 | 14.6 | 15.2 | 14.6 |
| **Race[4,8]** | | | | | | | | |
| White only | 6.3 | 5.7 | 5.6 | 5.9 | 13.1 | 11.8 | 11.5 | 11.5 |
| Black or African American only | 11.7 | 11.8 | 10.0 | 10.5 | 21.3 | 18.8 | 18.5 | 19.2 |
| American Indian and Alaska Native only | * | * | * | * | * | * | * | * |
| Asian only | * | *9.2 | * | * | *9.1 | 15.9 | *11.2 | *11.8 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | * | --- | * | * | * |
| 2 or more races | --- | * | * | * | --- | *16.0 | *20.8 | *20.4 |
| **Hispanic origin and race[4,8]** | | | | | | | | |
| Hispanic or Latino | 10.8 | 11.2 | 9.2 | 10.3 | 16.3 | 17.0 | 13.1 | 13.8 |
| Mexican | 11.4 | 10.6 | 10.2 | 9.8 | 18.8 | 17.0 | 14.0 | 15.1 |
| Not Hispanic or Latino | 6.5 | 6.1 | 5.9 | 6.1 | 13.6 | 12.3 | 12.2 | 12.1 |
| White only | 6.1 | 5.5 | 5.5 | 5.7 | 13.0 | 11.6 | 11.5 | 11.4 |
| Black or African American only | 11.7 | 11.9 | 10.1 | 10.4 | 21.2 | 18.8 | 18.7 | 19.0 |
| **Poverty status[5,8]** | | | | | | | | |
| Poor | 12.5 | 11.2 | 9.5 | 10.4 | 25.3 | 22.9 | 21.1 | 21.6 |
| Near poor | 7.4 | 7.5 | 6.9 | 7.0 | 15.8 | 14.9 | 14.7 | 15.0 |
| Nonpoor | 5.3 | 5.0 | 5.1 | 5.5 | 10.4 | 9.7 | 9.5 | 9.4 |
| **Hispanic origin and race and poverty status[4,5,8]** | | | | | | | | |
| Hispanic or Latino: | | | | | | | | |
| Poor | 16.0 | 13.5 | 12.5 | *15.2 | 25.5 | 24.0 | 17.3 | 20.1 |
| Near poor | 11.1 | 11.3 | 10.0 | *8.4 | 15.5 | 16.4 | 15.6 | 12.3 |
| Nonpoor | *6.6 | 8.8 | *6.7 | *8.5 | 10.2 | 12.2 | 8.7 | *11.1 |
| Not Hispanic or Latino: | | | | | | | | |
| White only: | | | | | | | | |
| Poor | 11.8 | 9.9 | 8.2 | 8.9 | 24.9 | 23.0 | 20.4 | 20.7 |
| Near poor | 6.6 | 6.5 | 6.3 | 6.4 | 15.2 | 14.1 | 14.2 | 14.8 |
| Nonpoor | 5.0 | 4.6 | 4.8 | 5.1 | 10.3 | 9.2 | 9.2 | 9.0 |
| Black or African American only: | | | | | | | | |
| Poor | 13.5 | 15.9 | 13.8 | 14.0 | 27.8 | 25.8 | 26.6 | 28.3 |
| Near poor | 12.4 | 12.3 | *9.8 | 10.4 | 22.4 | 18.6 | 19.3 | 18.9 |
| Nonpoor | 9.8 | 9.3 | 8.1 | 8.4 | 15.1 | 14.9 | 13.4 | 13.9 |

See footnotes at end of table.



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## Table 58 (page 3 of 3). Limitation of activity caused by chronic conditions, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1997 | 2001 | 2002 | 2003 | 1997 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Geographic region[8] | Percent with ADL limitation[7] | | | | Percent with IADL limitation[7] | | | |
| Northeast | 6.1 | 6.5 | 6.3 | 6.6 | 12.2 | 11.3 | 11.0 | 11.4 |
| Midwest | 5.8 | 4.9 | 5.2 | 4.7 | 13.1 | 12.6 | 11.7 | 11.3 |
| South | 8.2 | 7.5 | 6.3 | 7.2 | 15.8 | 13.3 | 13.0 | 13.1 |
| West | 5.9 | 6.0 | 6.5 | 6.5 | 12.4 | 12.6 | 12.7 | 12.1 |
| Location of residence[8] | | | | | | | | |
| Within MSA[6] | 6.6 | 6.1 | 6.2 | 6.3 | 13.5 | 12.2 | 12.1 | 12.0 |
| Outside MSA[6] | 7.2 | 7.3 | 5.6 | 6.7 | 14.4 | 13.8 | 12.6 | 12.8 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Limitation of activity is assessed by asking respondents a series of questions about limitations in their ability to perform activities usual for their age group because of a physical, mental, or emotional problem. The category limitation of activity includes limitations in personal care (ADL), routine needs (IADL), and other limitations due to a chronic condition. See Appendix II, Limitation of activity; Activities of daily living; Condition; Instrumental activities of daily living.

[2]Includes all other races not shown separately.

[3]Estimates for all persons are age adjusted to the year 2000 standard population using six age groups: Under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 25 percent of persons in 1997 and 32–35 percent in 1999–2003. See Appendix II, Family income; Poverty level.

[6]MSA is metropolitan statistical area.

[7]These estimates are for noninstitutionalized older persons. ADL is activities of daily living and IADL is instrumental activities of daily living. Respondents were asked about needing the help of another person with personal care (ADL) and routine needs such as chores and shopping (IADL) because of a physical, mental, or emotional problem. See Appendix II, Activities of daily living; Condition; Instrumental activities of daily living.

[8]Estimates are age adjusted to the year 2000 standard population using two age groups: 65–74 years and 75 years and over. See Appendix II, Age adjustment.

NOTES: Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data for additional years are available. See Appendix III. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core questionnaire.



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## Table 59 (page 1 of 2). Vision and hearing limitations among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | *Any trouble seeing, even with glasses or contacts*[1] | | | | *A lot of trouble hearing or deaf*[2] | | | |
|---|---|---|---|---|---|---|---|---|
| | *1997* | *2000* | *2002* | *2003* | *1997* | *2000* | *2002* | *2003* |
| | Percent of adults | | | | | | | |
| Total, age-adjusted[3,4] | 10.0 | 9.0 | 9.3 | 8.8 | 3.2 | 3.2 | 3.2 | 3.1 |
| Total, crude[4] | 9.8 | 8.9 | 9.3 | 8.7 | 3.1 | 3.1 | 3.1 | 3.0 |
| **Age** | | | | | | | | |
| 18–44 years | 6.2 | 5.3 | 5.6 | 5.2 | 1.0 | 0.9 | 0.9 | 0.9 |
| 18–24 years | 5.4 | 4.2 | 4.4 | 5.1 | *0.5 | *0.7 | * | * |
| 25–44 years | 6.5 | 5.7 | 6.0 | 5.2 | 1.2 | 1.0 | 1.1 | 1.0 |
| 45–64 years | 12.0 | 10.7 | 11.0 | 10.6 | 3.1 | 3.0 | 2.8 | 2.8 |
| 45–54 years | 12.2 | 10.9 | 11.5 | 10.5 | 2.6 | 2.3 | 1.9 | 1.9 |
| 55–64 years | 11.6 | 10.5 | 10.3 | 10.7 | 3.9 | 4.0 | 4.2 | 4.1 |
| 65 years and over | 18.1 | 17.4 | 17.6 | 16.6 | 9.8 | 10.5 | 11.1 | 10.5 |
| 65–74 years | 14.2 | 13.6 | 14.5 | 13.1 | 6.6 | 7.4 | 7.2 | 6.7 |
| 75 years and over | 23.1 | 21.9 | 21.1 | 20.6 | 14.1 | 14.3 | 15.6 | 14.9 |
| **Sex**[3] | | | | | | | | |
| Male | 8.8 | 7.9 | 8.1 | 7.3 | 4.2 | 4.3 | 4.2 | 4.0 |
| Female | 11.1 | 10.1 | 10.4 | 10.1 | 2.4 | 2.3 | 2.4 | 2.3 |
| **Sex and age** | | | | | | | | |
| Male: | | | | | | | | |
| 18–44 years | 5.3 | 4.4 | 4.8 | 4.1 | 1.2 | 1.1 | 1.0 | 1.1 |
| 45–54 years | 10.1 | 8.8 | 10.1 | 8.6 | 3.6 | 2.9 | 2.2 | 2.7 |
| 55–64 years | 10.5 | 9.5 | 8.7 | 8.6 | 5.4 | 6.2 | 5.8 | 5.4 |
| 65–74 years | 13.2 | 12.8 | 13.3 | 11.8 | 9.4 | 10.8 | 10.8 | 10.2 |
| 75 years and over | 21.4 | 20.7 | 18.6 | 18.1 | 17.7 | 18.0 | 19.7 | 17.8 |
| Female: | | | | | | | | |
| 18–44 years | 7.1 | 6.2 | 6.5 | 6.2 | 0.9 | 0.8 | 0.7 | 0.7 |
| 45–54 years | 14.2 | 12.8 | 12.9 | 12.3 | 1.7 | 1.8 | 1.5 | 1.2 |
| 55–64 years | 12.6 | 11.5 | 11.9 | 12.5 | 2.6 | 1.9 | 2.7 | 2.8 |
| 65–74 years | 15.0 | 14.4 | 15.5 | 14.1 | 4.4 | 4.5 | 4.1 | 3.8 |
| 75 years and over | 24.2 | 22.7 | 22.6 | 22.3 | 11.7 | 12.1 | 13.0 | 12.9 |
| **Race**[3,5] | | | | | | | | |
| White only | 9.7 | 8.8 | 9.0 | 8.5 | 3.4 | 3.4 | 3.3 | 3.3 |
| Black or African American only | 12.8 | 10.6 | 11.7 | 10.8 | 2.0 | 1.6 | 1.6 | 1.7 |
| American Indian and Alaska Native only | 19.2 | 16.6 | *11.1 | 18.9 | 14.1 | * | *10.1 | * |
| Asian only | 6.2 | 6.3 | 7.2 | 6.1 | * | *2.4 | *2.3 | * |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | * | --- | * | * | * |
| 2 or more races | --- | 16.2 | 14.9 | 11.6 | --- | *5.7 | *6.3 | * |
| **Hispanic origin and race**[3,5] | | | | | | | | |
| Hispanic or Latino | 10.0 | 9.7 | 9.0 | 9.1 | 1.5 | 2.3 | 2.0 | 2.0 |
| Mexican | 10.2 | 8.3 | 8.6 | 9.0 | 1.8 | 3.0 | 3.0 | 2.6 |
| Not Hispanic or Latino | 10.0 | 9.1 | 9.4 | 8.8 | 3.3 | 3.3 | 3.3 | 3.2 |
| White only | 9.8 | 8.9 | 9.1 | 8.6 | 3.5 | 3.5 | 3.5 | 3.4 |
| Black or African American only | 12.8 | 10.6 | 11.8 | 10.7 | 2.0 | 1.6 | 1.6 | 1.8 |
| **Education**[6,7] | | | | | | | | |
| 25 years of age and over: | | | | | | | | |
| No high school diploma or GED | 15.0 | 12.2 | 14.4 | 12.6 | 4.8 | 4.6 | 4.6 | 4.9 |
| High school diploma or GED | 10.6 | 9.5 | 10.3 | 9.3 | 3.7 | 3.9 | 3.9 | 3.5 |
| Some college or more | 8.9 | 8.9 | 8.7 | 8.1 | 2.9 | 2.8 | 3.3 | 2.8 |

See footnotes at end of table.



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## Table 59 (page 2 of 2). Vision and hearing limitations among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | *Any trouble seeing, even with glasses or contacts*[1] | | | | *A lot of trouble hearing or deaf*[2] | | | |
|---|---|---|---|---|---|---|---|---|
| | *1997* | *2000* | *2002* | *2003* | *1997* | *2000* | *2002* | *2003* |
| Poverty status[3,5] | Percent of adults | | | | | | | |
| Poor | 17.0 | 12.9 | 14.5 | 13.7 | 4.5 | 3.7 | 4.4 | 3.9 |
| Near poor | 12.9 | 11.6 | 12.0 | 11.6 | 3.6 | 4.2 | 3.6 | 3.6 |
| Nonpoor | 8.2 | 7.8 | 8.0 | 7.3 | 3.0 | 2.8 | 3.0 | 2.8 |
| Hispanic origin and race and poverty status[3,5,6] | | | | | | | | |
| Hispanic or Latino: | | | | | | | | |
| Poor | 12.8 | 11.0 | 12.9 | 12.4 | *1.9 | 3.3 | *2.3 | *3.4 |
| Near poor | 11.2 | 9.4 | 9.4 | 10.3 | *1.5 | *2.3 | *1.7 | *1.6 |
| Nonpoor | 7.8 | 9.7 | 7.2 | 6.7 | *1.2 | *1.7 | *1.9 | *1.4 |
| Not Hispanic or Latino: | | | | | | | | |
| White only: | | | | | | | | |
| Poor | 17.9 | 13.1 | 14.7 | 14.3 | 5.8 | 4.5 | 5.2 | 4.7 |
| Near poor | 13.1 | 12.0 | 12.7 | 11.8 | 4.3 | 5.0 | 4.5 | 4.2 |
| Nonpoor | 8.2 | 7.8 | 7.9 | 7.3 | 3.2 | 3.0 | 3.1 | 3.1 |
| Black or African American only: | | | | | | | | |
| Poor | 17.9 | 13.6 | 16.6 | 14.2 | 3.3 | *1.6 | *2.3 | *2.1 |
| Near poor | 16.0 | 12.9 | 14.6 | 13.0 | *2.0 | *2.0 | * | *2.3 |
| Nonpoor | 8.5 | 8.1 | 9.1 | 8.5 | * | * | *1.6 | * |
| Geographic region[3] | | | | | | | | |
| Northeast | 8.6 | 7.4 | 7.8 | 7.5 | 2.2 | 2.4 | 2.7 | 2.9 |
| Midwest | 9.5 | 9.6 | 9.3 | 9.3 | 3.5 | 3.5 | 3.1 | 3.3 |
| South | 11.4 | 9.2 | 9.9 | 9.4 | 3.5 | 3.3 | 3.3 | 3.0 |
| West | 9.7 | 9.9 | 9.7 | 8.1 | 3.4 | 3.5 | 3.8 | 3.2 |
| Location of residence[3] | | | | | | | | |
| Within MSA[9] | 9.5 | 8.5 | 8.7 | 8.2 | 2.9 | 3.0 | 3.0 | 2.7 |
| Outside MSA[9] | 12.0 | 11.1 | 11.5 | 10.7 | 4.5 | 3.9 | 3.8 | 4.4 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Respondents were asked, "Do you have any trouble seeing, even when wearing glasses or contact lenses?" In 2003, 0.4 percent of adults 18 years of age and over identified themselves as blind.

[2]Respondents were asked, "Which statement best describes your hearing without a hearing aid: good, a little trouble, a lot of trouble, or deaf?" For this table, "a lot of trouble" and "deaf" are combined into one category.

In 2003, 0.3 percent of adults 18 years of age and over identified themselves as deaf.

[3]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[4]Includes all other races not shown separately.

[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[6]Estimates are for persons 25 years of age and over and are age adjusted to the year 2000 standard population using five age groups: 25–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[7]GED stands for General Educational Development high school equivalency diploma. See Appendix II, Education.

[8]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 27 percent of persons 18 years of age and over in 1997, 34 percent in 2000 and 2002, and 36 percent in 2003. See Appendix II, Family income; Poverty level.

[9]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, sample adult questionnaire.



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## Table 60 (page 1 of 2). Respondent-assessed health status according to selected characteristics: United States, selected years 1991–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Characteristic | 1991[1] | 1995[1] | 1997 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| | Percent of persons with fair or poor health[2] | | | | | | | |
| Total[3,4] | 10.4 | 10.6 | 9.2 | 8.9 | 9.0 | 9.2 | 9.3 | 9.2 |
| **Age** | | | | | | | | |
| Under 18 years | 2.6 | 2.6 | 2.1 | 1.6 | 1.7 | 1.8 | 1.9 | 1.8 |
| Under 6 years | 2.7 | 2.7 | 1.9 | 1.4 | 1.5 | 1.6 | 1.6 | 1.4 |
| 6–17 years | 2.6 | 2.5 | 2.1 | 1.8 | 1.8 | 1.9 | 2.1 | 2.0 |
| 18–44 years | 6.1 | 6.6 | 5.3 | 5.1 | 5.1 | 5.4 | 5.5 | 5.6 |
| 18–24 years | 4.8 | 4.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.6 | 3.8 |
| 25–44 years | 6.4 | 7.2 | 5.9 | 5.6 | 5.7 | 6.0 | 6.2 | 6.3 |
| 45–54 years | 13.4 | 13.4 | 11.7 | 11.5 | 11.9 | 11.8 | 12.7 | 12.1 |
| 55–64 years | 20.7 | 21.4 | 18.2 | 18.5 | 17.9 | 19.1 | 17.9 | 18.9 |
| 65 years and over | 29.0 | 28.3 | 26.7 | 26.1 | 26.9 | 26.5 | 26.3 | 25.5 |
| 65–74 years | 26.0 | 25.6 | 23.1 | 22.7 | 22.5 | 22.9 | 22.0 | 22.3 |
| 75 years and over | 33.6 | 32.2 | 31.5 | 30.2 | 32.1 | 30.7 | 31.3 | 29.2 |
| **Sex[3]** | | | | | | | | |
| Male | 10.0 | 10.1 | 8.8 | 8.6 | 8.8 | 9.0 | 8.9 | 8.8 |
| Female | 10.8 | 11.1 | 9.7 | 9.2 | 9.3 | 9.5 | 9.6 | 9.5 |
| **Race[3,5]** | | | | | | | | |
| White only | 9.6 | 9.7 | 8.3 | 8.0 | 8.2 | 8.2 | 8.5 | 8.5 |
| Black or African American only | 16.8 | 17.2 | 15.8 | 14.6 | 14.6 | 15.4 | 14.1 | 14.7 |
| American Indian and Alaska Native only | 18.3 | 18.7 | 17.3 | 14.7 | 17.2 | 14.5 | 13.2 | 16.3 |
| Asian only | 7.8 | 9.3 | 7.8 | 8.6 | 7.4 | 8.1 | 6.7 | 7.4 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | * | * | * | * | * |
| 2 or more races | --- | --- | --- | 12.9 | 16.2 | 13.9 | 12.5 | 14.7 |
| Black or African American; White | --- | --- | --- | *20.5 | *14.5 | *10.1 | 13.8 | 21.4 |
| American Indian and Alaska Native; White | --- | --- | --- | 14.5 | 18.7 | 15.0 | 13.5 | 18.1 |
| **Hispanic origin and race[3,5]** | | | | | | | | |
| Hispanic or Latino | 15.6 | 15.1 | 13.0 | 11.9 | 12.8 | 12.6 | 13.1 | 13.9 |
| Mexican | 17.0 | 16.7 | 13.1 | 12.3 | 12.8 | 12.4 | 13.3 | 13.7 |
| Not Hispanic or Latino | # | # | 8.9 | 8.6 | 8.7 | 8.9 | 8.9 | 8.7 |
| White only | 9.1 | 9.1 | 8.0 | 7.7 | 7.9 | 7.9 | 8.2 | 7.9 |
| Black or African American only | 16.8 | 17.3 | 15.8 | 14.6 | 14.6 | 15.5 | 14.0 | 14.6 |
| **Poverty status[3,6]** | | | | | | | | |
| Poor | 22.8 | 23.7 | 20.8 | 20.6 | 19.6 | 20.2 | 20.3 | 20.4 |
| Near poor | 14.7 | 15.5 | 13.9 | 14.0 | 14.1 | 14.5 | 14.6 | 14.4 |
| Nonpoor | 6.8 | 6.7 | 6.1 | 6.0 | 6.3 | 6.4 | 6.4 | 6.1 |
| **Hispanic origin and race and poverty status[3,5,6]** | | | | | | | | |
| Hispanic or Latino: | | | | | | | | |
| Poor | 23.6 | 22.7 | 19.9 | 18.3 | 18.7 | 18.6 | 20.8 | 20.6 |
| Near poor | 18.0 | 16.9 | 13.5 | 13.8 | 15.3 | 14.7 | 15.4 | 15.5 |
| Nonpoor | 9.3 | 8.7 | 8.5 | 8.0 | 8.4 | 8.7 | 8.7 | 9.8 |
| Not Hispanic or Latino: | | | | | | | | |
| White only: | | | | | | | | |
| Poor | 21.9 | 22.8 | 19.7 | 19.4 | 18.8 | 19.1 | 19.1 | 19.5 |
| Near poor | 14.0 | 14.8 | 13.3 | 13.5 | 13.4 | 13.6 | 14.3 | 13.9 |
| Nonpoor | 6.4 | 6.2 | 5.6 | 5.7 | 5.8 | 5.9 | 6.0 | 5.6 |
| Black or African American only: | | | | | | | | |
| Poor | 25.8 | 27.7 | 25.3 | 25.9 | 23.8 | 24.9 | 24.5 | 24.4 |
| Near poor | 17.0 | 19.3 | 19.2 | 17.5 | 18.2 | 19.6 | 17.4 | 18.6 |
| Nonpoor | 10.9 | 9.9 | 9.7 | 8.3 | 9.7 | 9.9 | 8.8 | 9.1 |

See footnotes at end of table.



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## Table 60 (page 2 of 2). Respondent-assessed health status according to selected characteristics: United States, selected years 1991–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1991[1] | 1995[1] | 1997 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Geographic region[3] | Percent of persons with fair or poor health[2] | | | | | | | |
| Northeast | 8.3 | 9.1 | 8.0 | 7.5 | 7.6 | 7.4 | 8.1 | 8.2 |
| Midwest | 9.1 | 9.7 | 8.1 | 8.0 | 8.0 | 8.8 | 8.3 | 8.3 |
| South | 13.1 | 12.3 | 10.8 | 10.5 | 10.7 | 10.8 | 10.9 | 10.7 |
| West | 9.7 | 10.1 | 8.8 | 8.7 | 8.8 | 8.5 | 8.7 | 8.4 |
| Location of residence[3] | | | | | | | | |
| Within MSA[7] | 9.9 | 10.1 | 8.7 | 8.3 | 8.5 | 8.7 | 8.7 | 8.6 |
| Outside MSA[7] | 11.9 | 12.6 | 11.1 | 11.1 | 11.1 | 11.0 | 11.7 | 11.5 |

* Estimates are considered unreliable. Data preceded by an asterisk have an relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.
- - - Data not available.
#Estimates calculated upon request.
[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey.
[2]See Appendix II, Health status, respondent-assessed.
[3]Estimates are age adjusted to the year 2000 standard population using six age groups: Under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.
[4]Includes all other races not shown separately.
[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[6]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 16–18 percent of persons in 1991 and 1995, 25–29 percent of persons in 1997–98, and 32–35 percent in 1999–2003. See Appendix II, Family income; Poverty level.
[7]MSA is metropolitan statistical area.

NOTES: Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data for additional years are available. See Appendix III. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core questionnaire.



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## Table 61 (page 1 of 2). Serious psychological distress among persons 18 years of age and over according to selected characteristics: United States, average annual 1997–98, 2000–2001, and 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1997–98 | 2000–2001 | 2002–03 |
|---|---|---|---|
| | Percent of persons with serious psychological distress[1] | | |
| Total, age adjusted[2,3] | 3.2 | 3.2 | 3.1 |
| Total, crude[3] | 3.2 | 3.2 | 3.1 |
| **Age** | | | |
| 18–44 years | 2.9 | 3.1 | 2.9 |
| 18–24 years | 2.7 | 2.7 | 2.8 |
| 25–44 years | 3.0 | 3.2 | 2.9 |
| 45–64 years | 3.7 | 3.7 | 4.0 |
| 45–54 years | 3.9 | 3.7 | 4.2 |
| 55–64 years | 3.4 | 3.8 | 3.6 |
| 65 years and over | 3.1 | 2.7 | 2.3 |
| 65–74 years | 2.5 | 2.8 | 2.3 |
| 75 years and over | 3.8 | 2.5 | 2.3 |
| **Sex[2]** | | | |
| Male | 2.5 | 2.4 | 2.3 |
| Female | 3.8 | 3.9 | 3.9 |
| **Race[2,4]** | | | |
| White only | 3.1 | 3.1 | 3.0 |
| Black or African American only | 4.0 | 3.5 | 3.4 |
| American Indian and Alaska Native only | 7.8 | *9.3 | *7.1 |
| Asian only | 2.0 | * | *1.9 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * |
| 2 or more races | --- | 5.2 | 7.3 |
| **Hispanic origin and race[2,4]** | | | |
| Hispanic or Latino | 5.0 | 4.2 | 3.9 |
| Mexican | 5.2 | 4.0 | 3.7 |
| Not Hispanic or Latino | 3.0 | 3.1 | 3.1 |
| White only | 2.9 | 3.1 | 3.0 |
| Black or African American only | 3.9 | 3.5 | 3.2 |
| **Poverty status[2,5]** | | | |
| Poor | 9.1 | 8.3 | 8.7 |
| Near poor | 5.0 | 5.3 | 5.4 |
| Nonpoor | 1.8 | 2.0 | 1.8 |
| **Hispanic origin and race and poverty status[2,4,5]** | | | |
| Hispanic or Latino: | | | |
| Poor | 8.6 | 7.2 | 7.4 |
| Near poor | 5.4 | 4.4 | 3.8 |
| Nonpoor | 2.9 | 2.8 | 2.4 |
| Not Hispanic or Latino: | | | |
| White only: | | | |
| Poor | 9.6 | 9.4 | 10.1 |
| Near poor | 5.2 | 6.1 | 6.4 |
| Nonpoor | 1.8 | 2.0 | 1.7 |
| Black or African American only: | | | |
| Poor | 8.7 | 7.3 | 7.3 |
| Near poor | 4.3 | 4.9 | *4.0 |
| Nonpoor | 1.6 | *1.6 | *1.3 |

See footnotes at end of table.



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## Table 61 (page 2 of 2). Serious psychological distress among persons 18 years of age and over according to selected characteristics: United States, average annual 1997–98, 2000–2001, and 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1997–98 | 2000–2001 | 2002–03 |
|---|---|---|---|
| Geographic region[2] | Percent of persons with serious psychological distress[1] | | |
| Northeast | 2.7 | 3.1 | 3.0 |
| Midwest | 2.6 | 3.0 | 2.7 |
| South | 3.8 | 3.4 | 3.5 |
| West | 3.3 | 3.2 | 3.0 |
| Location of residence[2] | | | |
| Within MSA[6] | 3.0 | 3.1 | 2.9 |
| Outside MSA[6] | 3.9 | 3.5 | 3.9 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Serious psychological distress is measured by a six-question scale that asks respondents how often they experience each of six symptoms of psychological distress. See Appendix II, Serious psychological distress.

[2]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[3]Includes all other races not shown separately.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 27 percent of persons 18 years of age and over in 1997, 31 percent in 1998, and 34–36 percent in 2000–2003. See Appendix II, Family income; Poverty level.

[6]MSA is metropolitan statistical area.

NOTES: Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core questionnaire.



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## Table 62 (page 1 of 2). Suicidal ideation, suicide attempts, and injurious suicide attempts among students in grades 9–12, by sex, grade level, race, and Hispanic origin: United States, selected years 1991–2003

[Data are based on a national sample of high school students, grades 9–12]

Click here for spreadsheet version

| Sex, grade level, race, and Hispanic origin | 1991 | 1993 | 1995 | 1997 | 1999 | 2001 | 2003 |
|---|---|---|---|---|---|---|---|
| | | | Percent of students who seriously considered suicide[1] | | | | |
| Total | 29.0 | 24.1 | 24.1 | 20.5 | 19.3 | 19.0 | 16.9 |
| Male | | | | | | | |
| Total | 20.8 | 18.8 | 18.3 | 15.1 | 13.7 | 14.2 | 12.8 |
| 9th grade | 17.6 | 17.7 | 18.2 | 16.1 | 11.9 | 14.7 | 11.9 |
| 10th grade | 19.5 | 18.0 | 16.7 | 14.5 | 13.7 | 13.8 | 13.2 |
| 11th grade | 25.3 | 20.6 | 21.7 | 16.6 | 13.7 | 14.1 | 12.9 |
| 12th grade | 20.7 | 18.3 | 16.3 | 13.5 | 15.6 | 13.7 | 13.2 |
| Not Hispanic or Latino: | | | | | | | |
| White | 21.7 | 19.1 | 19.1 | 14.4 | 12.5 | 14.9 | 12.0 |
| Black or African American | 13.3 | 15.4 | 16.7 | 10.6 | 11.7 | 9.2 | 10.3 |
| Hispanic or Latino | 18.0 | 17.9 | 15.7 | 17.1 | 13.6 | 12.2 | 12.9 |
| Female | | | | | | | |
| Total | 37.2 | 29.6 | 30.4 | 27.1 | 24.9 | 23.6 | 21.3 |
| 9th grade | 40.3 | 30.9 | 34.4 | 28.9 | 24.4 | 26.2 | 22.2 |
| 10th grade | 39.7 | 31.6 | 32.8 | 30.0 | 30.1 | 24.1 | 23.8 |
| 11th grade | 38.4 | 28.9 | 31.1 | 26.2 | 23.0 | 23.6 | 20.0 |
| 12th grade | 30.7 | 27.3 | 23.9 | 23.6 | 21.2 | 18.9 | 18.0 |
| Not Hispanic or Latino: | | | | | | | |
| White | 38.6 | 29.7 | 31.6 | 26.1 | 23.2 | 24.2 | 21.2 |
| Black or African American | 29.4 | 24.5 | 22.2 | 22.0 | 18.8 | 17.2 | 14.7 |
| Hispanic or Latino | 34.6 | 34.1 | 34.1 | 30.3 | 26.1 | 26.5 | 23.4 |
| | | | Percent of students who attempted suicide[1] | | | | |
| Total | 7.3 | 8.6 | 8.7 | 7.7 | 8.3 | 8.8 | 8.5 |
| Male | | | | | | | |
| Total | 3.9 | 5.0 | 5.6 | 4.5 | 5.7 | 6.2 | 5.4 |
| 9th grade | 4.5 | 5.8 | 6.8 | 6.3 | 6.1 | 8.2 | 5.8 |
| 10th grade | 3.3 | 5.9 | 5.4 | 3.8 | 6.2 | 6.7 | 5.5 |
| 11th grade | 4.1 | 3.4 | 5.8 | 4.4 | 4.8 | 4.9 | 4.6 |
| 12th grade | 3.8 | 4.5 | 4.7 | 3.7 | 5.4 | 4.4 | 5.2 |
| Not Hispanic or Latino: | | | | | | | |
| White | 3.3 | 4.4 | 5.2 | 3.2 | 4.5 | 5.3 | 3.7 |
| Black or African American | 3.3 | 5.4 | 7.0 | 5.6 | 7.1 | 7.5 | 7.7 |
| Hispanic or Latino | 3.7 | 7.4 | 5.8 | 7.2 | 6.6 | 8.0 | 6.1 |
| Female | | | | | | | |
| Total | 10.7 | 12.5 | 11.9 | 11.6 | 10.9 | 11.2 | 11.5 |
| 9th grade | 13.8 | 14.4 | 14.9 | 15.1 | 14.0 | 13.2 | 14.7 |
| 10th grade | 12.2 | 13.1 | 15.1 | 14.3 | 14.8 | 12.2 | 12.7 |
| 11th grade | 8.7 | 13.6 | 11.4 | 11.3 | 7.5 | 11.5 | 10.0 |
| 12th grade | 7.8 | 9.1 | 6.6 | 6.2 | 5.8 | 6.5 | 6.9 |
| Not Hispanic or Latino: | | | | | | | |
| White | 10.4 | 11.3 | 10.4 | 10.3 | 9.0 | 10.3 | 10.3 |
| Black or African American | 9.4 | 11.2 | 10.8 | 9.0 | 7.5 | 9.8 | 9.0 |
| Hispanic or Latino | 11.6 | 19.7 | 21.0 | 14.9 | 18.9 | 15.9 | 15.0 |

See footnotes at end of table.



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## Table 62 (page 2 of 2). Suicidal ideation, suicide attempts, and injurious suicide attempts among students in grades 9–12, by sex, grade level, race, and Hispanic origin: United States, selected years 1991–2003

[Data are based on a national sample of high school students, grades 9–12]

Click here for spreadsheet version

| Sex, grade level, race, and Hispanic origin | 1991 | 1993 | 1995 | 1997 | 1999 | 2001 | 2003 |
|---|---|---|---|---|---|---|---|
| | Percent of students with an injurious suicide attempt[1,2] | | | | | | |
| Total | 1.7 | 2.7 | 2.8 | 2.6 | 2.6 | 2.6 | 2.9 |
| **Male** | | | | | | | |
| Total | 1.0 | 1.6 | 2.2 | 2.0 | 2.1 | 2.1 | 2.4 |
| 9th grade | 1.0 | 2.1 | 2.3 | 3.2 | 2.6 | 2.6 | 3.1 |
| 10th grade | 0.5 | 1.3 | 2.4 | 1.4 | 1.8 | 2.5 | 2.1 |
| 11th grade | 1.5 | 1.1 | 2.0 | 2.6 | 2.1 | 1.6 | 2.0 |
| 12th grade | 0.9 | 1.5 | 2.2 | 1.0 | 1.7 | 1.5 | 1.8 |
| Not Hispanic or Latino: | | | | | | | |
| White | 1.0 | 1.4 | 2.1 | 1.5 | 1.6 | 1.7 | 1.1 |
| Black or African American | 0.4 | 2.0 | 2.8 | 1.8 | 3.4 | 3.6 | 5.2 |
| Hispanic or Latino | 0.5 | 2.0 | 2.9 | 2.1 | 1.4 | 2.5 | 4.2 |
| **Female** | | | | | | | |
| Total | 2.5 | 3.8 | 3.4 | 3.3 | 3.1 | 3.1 | 3.2 |
| 9th grade | 2.8 | 3.5 | 6.3 | 5.0 | 3.8 | 3.8 | 3.9 |
| 10th grade | 2.6 | 5.1 | 3.8 | 3.7 | 4.0 | 3.6 | 3.2 |
| 11th grade | 2.1 | 3.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.9 |
| 12th grade | 2.4 | 2.9 | 1.3 | 2.0 | 1.3 | 1.7 | 2.2 |
| Not Hispanic or Latino: | | | | | | | |
| White | 2.3 | 3.6 | 2.9 | 2.6 | 2.3 | 2.9 | 2.4 |
| Black or African American | 2.9 | 4.0 | 3.6 | 3.0 | 2.4 | 3.1 | 2.2 |
| Hispanic or Latino | 2.7 | 5.5 | 6.6 | 3.8 | 4.6 | 4.2 | 5.7 |

[1]Response is for the 12 months preceding the survey.
[2]A suicide attempt that required medical attention.

NOTES: Only youths attending school participated in the survey. Persons of Hispanic origin may be of any race. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, National Youth Risk Behavior Survey (YRBS).



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## Table 63 (page 1 of 2). Current cigarette smoking for adults 18 years of age and over according to sex, race, and age: United States, selected years 1965–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, race, and age | 1965[1] | 1974[1] | 1979[1] | 1985[1] | 1990[1] | 1995[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 years and over, age adjusted[2] | Percent of persons who are current cigarette smokers[3] | | | | | | | | | | | |
| All persons | 41.9 | 37.0 | 33.3 | 29.9 | 25.3 | 24.6 | 24.0 | 23.3 | 23.1 | 22.6 | 22.3 | 21.5 |
| Male | 51.2 | 42.8 | 37.0 | 32.2 | 28.0 | 26.5 | 25.9 | 25.2 | 25.2 | 24.6 | 24.6 | 23.7 |
| Female | 33.7 | 32.2 | 30.1 | 27.9 | 22.9 | 22.7 | 22.1 | 21.6 | 21.1 | 20.7 | 20.0 | 19.4 |
| White male[4] | 50.4 | 41.7 | 36.4 | 31.3 | 27.6 | 26.2 | 26.0 | 25.0 | 25.4 | 24.8 | 24.9 | 23.8 |
| Black or African American male[4] | 58.8 | 53.6 | 43.9 | 40.2 | 32.8 | 29.4 | 29.0 | 28.4 | 25.7 | 27.5 | 26.6 | 25.3 |
| White female[4] | 33.9 | 32.0 | 30.3 | 27.9 | 23.5 | 23.4 | 23.0 | 22.5 | 22.0 | 22.0 | 21.0 | 20.1 |
| Black or African American female[4] | 31.8 | 35.6 | 30.5 | 30.9 | 20.8 | 23.5 | 21.1 | 20.5 | 20.7 | 18.0 | 18.3 | 17.9 |
| 18 years and over, crude | | | | | | | | | | | | |
| All persons | 42.4 | 37.1 | 33.5 | 30.1 | 25.5 | 24.7 | 24.1 | 23.5 | 23.2 | 22.7 | 22.4 | 21.6 |
| Male | 51.9 | 43.1 | 37.5 | 32.6 | 28.4 | 27.0 | 26.4 | 25.7 | 25.6 | 25.1 | 25.1 | 24.1 |
| Female | 33.9 | 32.1 | 29.9 | 27.9 | 22.8 | 22.6 | 22.0 | 21.5 | 20.9 | 20.6 | 19.8 | 19.2 |
| White male[4] | 51.1 | 41.9 | 36.8 | 31.7 | 28.0 | 26.6 | 26.3 | 25.3 | 25.7 | 25.0 | 25.0 | 24.0 |
| Black or African American male[4] | 60.4 | 54.3 | 44.1 | 39.9 | 32.5 | 28.5 | 29.0 | 28.6 | 26.2 | 27.6 | 27.0 | 25.7 |
| White female[4] | 34.0 | 31.7 | 30.1 | 27.7 | 23.4 | 23.1 | 22.6 | 22.1 | 21.4 | 21.5 | 20.6 | 19.7 |
| Black or African American female[4] | 33.7 | 36.4 | 31.1 | 31.0 | 21.2 | 23.5 | 21.1 | 20.6 | 20.8 | 18.1 | 18.5 | 18.1 |
| All males | | | | | | | | | | | | |
| 18–24 years | 54.1 | 42.1 | 35.0 | 28.0 | 26.6 | 27.8 | 31.3 | 29.5 | 28.1 | 30.2 | 32.1 | 26.3 |
| 25–34 years | 60.7 | 50.5 | 43.9 | 38.2 | 31.6 | 29.5 | 28.5 | 29.1 | 28.9 | 26.9 | 27.2 | 28.7 |
| 35–44 years | 58.2 | 51.0 | 41.8 | 37.6 | 34.5 | 31.5 | 30.2 | 30.0 | 30.2 | 27.3 | 29.7 | 28.1 |
| 45–64 years | 51.9 | 42.6 | 39.3 | 33.4 | 29.3 | 27.1 | 27.7 | 25.8 | 26.4 | 26.4 | 24.5 | 23.9 |
| 65 years and over | 28.5 | 24.8 | 20.9 | 19.6 | 14.6 | 14.9 | 10.4 | 10.5 | 10.2 | 11.5 | 10.1 | 10.1 |
| White male[4] | | | | | | | | | | | | |
| 18–24 years | 53.0 | 40.8 | 34.3 | 28.4 | 27.4 | 28.4 | 34.1 | 30.5 | 30.4 | 32.3 | 34.3 | 27.7 |
| 25–34 years | 60.1 | 49.5 | 43.6 | 37.3 | 31.6 | 29.9 | 29.2 | 30.8 | 29.7 | 28.7 | 27.7 | 28.8 |
| 35–44 years | 57.3 | 50.1 | 41.3 | 36.6 | 33.5 | 31.2 | 29.6 | 29.5 | 30.6 | 27.8 | 29.7 | 28.8 |
| 45–64 years | 51.3 | 41.2 | 38.3 | 32.1 | 28.7 | 26.3 | 27.0 | 24.5 | 25.8 | 25.1 | 24.4 | 23.3 |
| 65 years and over | 27.7 | 24.3 | 20.5 | 18.9 | 13.7 | 14.1 | 10.0 | 10.0 | 9.8 | 10.7 | 9.3 | 9.6 |
| Black or African American male[4] | | | | | | | | | | | | |
| 18–24 years | 62.8 | 54.9 | 40.2 | 27.2 | 21.3 | *14.6 | 19.7 | 23.6 | 20.9 | 21.6 | 22.7 | 18.6 |
| 25–34 years | 68.4 | 58.5 | 47.5 | 45.6 | 33.8 | 25.1 | 25.2 | 22.7 | 23.2 | 23.8 | 28.9 | 31.0 |
| 35–44 years | 67.3 | 61.5 | 48.6 | 45.0 | 42.0 | 36.3 | 36.1 | 34.8 | 30.7 | 29.9 | 28.3 | 23.6 |
| 45–64 years | 57.9 | 57.8 | 50.0 | 46.1 | 36.7 | 33.9 | 37.3 | 35.7 | 32.2 | 34.3 | 29.8 | 30.1 |
| 65 years and over | 36.4 | 29.7 | 26.2 | 27.7 | 21.5 | 28.5 | 16.3 | 17.3 | 14.2 | 21.1 | 19.4 | 18.0 |
| All females | | | | | | | | | | | | |
| 18–24 years | 38.1 | 34.1 | 33.8 | 30.4 | 22.5 | 21.8 | 24.5 | 26.3 | 24.9 | 23.2 | 24.5 | 21.5 |
| 25–34 years | 43.7 | 38.8 | 33.7 | 32.0 | 28.2 | 26.4 | 24.6 | 23.5 | 22.3 | 22.7 | 21.3 | 21.3 |
| 35–44 years | 43.7 | 39.8 | 37.0 | 31.5 | 24.8 | 27.1 | 26.4 | 26.5 | 26.2 | 25.7 | 23.7 | 24.2 |
| 45–64 years | 32.0 | 33.4 | 30.7 | 29.9 | 24.8 | 24.0 | 22.5 | 21.0 | 21.7 | 21.4 | 21.1 | 20.2 |
| 65 years and over | 9.6 | 12.0 | 13.2 | 13.5 | 11.5 | 11.5 | 11.2 | 10.7 | 9.3 | 9.1 | 8.6 | 8.3 |
| White female[4] | | | | | | | | | | | | |
| 18–24 years | 38.4 | 34.0 | 34.5 | 31.8 | 25.4 | 24.9 | 28.1 | 29.6 | 28.5 | 27.1 | 26.7 | 23.6 |
| 25–34 years | 43.4 | 38.6 | 34.1 | 32.0 | 28.5 | 27.3 | 26.9 | 25.5 | 24.9 | 25.2 | 23.8 | 22.5 |
| 35–44 years | 43.9 | 39.3 | 37.2 | 31.0 | 25.0 | 27.0 | 26.6 | 26.9 | 26.6 | 26.9 | 24.4 | 25.2 |
| 45–64 years | 32.7 | 33.0 | 30.6 | 29.7 | 25.4 | 24.3 | 22.5 | 21.2 | 21.4 | 21.6 | 21.5 | 20.1 |
| 65 years and over | 9.8 | 12.3 | 13.8 | 13.3 | 11.5 | 11.7 | 11.2 | 10.5 | 9.1 | 9.4 | 8.5 | 8.4 |
| Black or African American female[4] | | | | | | | | | | | | |
| 18–24 years | 37.1 | 35.6 | 31.8 | 23.7 | 10.0 | *8.8 | *8.1 | 14.8 | 14.2 | 10.0 | 17.1 | 10.8 |
| 25–34 years | 47.8 | 42.2 | 35.2 | 36.2 | 29.1 | 26.7 | 21.5 | 18.2 | 15.5 | 16.8 | 13.9 | 17.0 |
| 35–44 years | 42.8 | 46.4 | 37.7 | 40.2 | 25.5 | 31.9 | 30.0 | 28.8 | 30.2 | 24.0 | 24.0 | 23.2 |
| 45–64 years | 25.7 | 38.9 | 34.2 | 33.4 | 22.6 | 27.5 | 25.4 | 22.3 | 25.6 | 22.6 | 22.2 | 23.3 |
| 65 years and over | 7.1 | *8.9 | *8.5 | 14.5 | 11.1 | 13.3 | 11.5 | 13.5 | 10.2 | 9.3 | 9.4 | 8.0 |



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## Table 63 (page 2 of 2). Current cigarette smoking for adults 18 years of age and over according to sex, race, and age: United States, selected years 1965–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey.
[2]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–24 years, 25–34 years, 35–44 years, 45–64 years, 65 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.
[3]Beginning in 1993 current cigarette smokers reported ever smoking 100 cigarettes in their lifetime and smoking now on every day or some days. See Appendix II, Cigarette smoking.
[4]The race groups, white and black, include persons of Hispanic and non-Hispanic origin. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The single race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race. For additional data on cigarette smoking by racial groups, see table 65 of *Health, United States, 2005*.

NOTES: Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. For more data on cigarette smoking see the Early Release reports on the National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the core questionnaire (1965) and the following questionnaire supplements: hypertension (1974), smoking (1979), alcohol and health practices (1983), health promotion and disease prevention (1985, 1990–91), cancer control and cancer epidemiology (1992), and year 2000 objectives (1993–95). Starting with 1997, data are from the family core and sample adult questionnaires.



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## Table 64. Age-adjusted prevalence of current cigarette smoking for adults 25 years of age and over, according to sex, race, and education: United States, selected years 1974–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, race, and education | 1974[1] | 1979[1] | 1985[1] | 1990[1] | 1995[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 years and over, age adjusted[2] | Percent of persons who are current cigarette smokers[3] | | | | | | | | | | |
| All persons[4] | 36.9 | 33.1 | 30.0 | 25.4 | 24.5 | 23.4 | 22.7 | 22.6 | 22.0 | 21.4 | 21.1 |
| No high school diploma or GED | 43.7 | 40.7 | 40.8 | 36.7 | 35.6 | 34.4 | 32.2 | 31.6 | 30.5 | 30.5 | 29.7 |
| High school diploma or GED | 36.2 | 33.6 | 32.0 | 29.1 | 29.1 | 28.9 | 28.0 | 29.2 | 28.1 | 27.9 | 27.8 |
| Some college, no bachelor's degree | 35.9 | 33.2 | 29.5 | 23.4 | 22.6 | 23.5 | 23.3 | 21.7 | 22.2 | 21.5 | 21.1 |
| Bachelor's degree or higher | 27.2 | 22.6 | 18.5 | 13.9 | 13.6 | 10.9 | 11.1 | 10.9 | 10.8 | 10.0 | 10.2 |
| All males[4] | 42.9 | 37.3 | 32.8 | 28.2 | 26.4 | 25.1 | 24.5 | 24.7 | 23.8 | 23.5 | 23.3 |
| No high school diploma or GED | 52.3 | 47.6 | 45.7 | 42.0 | 39.7 | 37.5 | 36.2 | 36.0 | 34.2 | 34.0 | 34.4 |
| High school diploma or GED | 42.4 | 38.9 | 35.5 | 33.1 | 32.7 | 32.0 | 30.4 | 32.1 | 30.2 | 31.0 | 29.9 |
| Some college, no bachelor's degree | 41.8 | 36.5 | 32.9 | 25.9 | 23.7 | 25.4 | 24.8 | 23.3 | 24.3 | 23.2 | 22.7 |
| Bachelor's degree or higher | 28.3 | 22.7 | 19.6 | 14.5 | 13.8 | 11.0 | 11.8 | 11.6 | 11.2 | 11.0 | 11.2 |
| White males[4,5] | 41.9 | 36.7 | 31.7 | 27.6 | 25.9 | 24.8 | 24.2 | 24.7 | 23.7 | 23.5 | 23.2 |
| No high school diploma or GED | 51.5 | 47.6 | 45.0 | 41.8 | 38.7 | 37.4 | 36.3 | 38.2 | 34.8 | 35.6 | 33.6 |
| High school diploma or GED | 42.0 | 38.5 | 34.8 | 32.9 | 32.9 | 32.2 | 30.5 | 32.4 | 30.3 | 31.0 | 29.6 |
| Some college, no bachelor's degree | 41.6 | 36.4 | 32.2 | 25.4 | 23.3 | 25.2 | 24.7 | 23.5 | 24.5 | 23.2 | 23.3 |
| Bachelor's degree or higher | 27.8 | 22.5 | 19.1 | 14.4 | 13.4 | 10.9 | 11.8 | 11.3 | 11.2 | 11.1 | 11.2 |
| Black or African American males[4,5] | 53.4 | 44.4 | 42.1 | 34.5 | 31.6 | 30.4 | 29.1 | 26.4 | 28.4 | 27.2 | 26.3 |
| No high school diploma or GED | 58.1 | 49.7 | 50.5 | 41.6 | 41.9 | 42.9 | 43.8 | 38.2 | 37.9 | 37.2 | 37.4 |
| High school diploma or GED | *50.7 | 48.6 | 41.8 | 37.4 | 36.6 | 32.8 | 32.5 | 29.0 | 33.4 | 31.3 | 33.4 |
| Some college, no bachelor's degree | *45.3 | 39.2 | 41.8 | 28.1 | 26.4 | 28.4 | 23.4 | 19.9 | 24.1 | 25.6 | 19.5 |
| Bachelor's degree or higher | *41.4 | *36.8 | *32.0 | *20.8 | *17.3 | *15.3 | 11.3 | 14.6 | 11.3 | *10.8 | *10.3 |
| All females[4] | 32.0 | 29.5 | 27.5 | 22.9 | 22.9 | 21.7 | 20.9 | 20.5 | 20.4 | 19.3 | 19.1 |
| No high school diploma or GED | 36.6 | 34.8 | 36.5 | 31.8 | 31.7 | 31.3 | 28.2 | 27.1 | 26.9 | 26.9 | 24.9 |
| High school diploma or GED | 32.2 | 29.8 | 29.5 | 26.1 | 26.4 | 26.2 | 25.9 | 26.6 | 26.4 | 25.2 | 25.8 |
| Some college, no bachelor's degree | 30.1 | 30.0 | 26.3 | 21.0 | 21.6 | 21.8 | 21.9 | 20.4 | 20.4 | 20.0 | 19.7 |
| Bachelor's degree or higher | 25.9 | 22.5 | 17.1 | 13.3 | 13.3 | 10.7 | 10.4 | 10.1 | 10.5 | 9.0 | 9.3 |
| White females[4,5] | 31.7 | 29.7 | 27.3 | 23.3 | 23.1 | 22.3 | 21.4 | 21.0 | 21.3 | 20.2 | 19.6 |
| No high school diploma or GED | 36.8 | 35.8 | 36.7 | 33.4 | 32.4 | 33.0 | 29.5 | 28.4 | 29.2 | 29.0 | 25.0 |
| High school diploma or GED | 31.9 | 29.9 | 29.4 | 26.5 | 26.8 | 27.1 | 27.2 | 27.8 | 28.3 | 26.8 | 26.8 |
| Some college, no bachelor's degree | 30.4 | 30.7 | 26.7 | 21.2 | 22.2 | 22.2 | 22.3 | 21.1 | 21.3 | 20.5 | 20.6 |
| Bachelor's degree or higher | 25.5 | 21.9 | 16.5 | 13.4 | 13.5 | 11.5 | 10.5 | 10.2 | 10.9 | 9.6 | 9.4 |
| Black or African American females[4,5] | 35.6 | 30.3 | 32.0 | 22.4 | 25.7 | 23.0 | 21.4 | 21.6 | 19.1 | 18.4 | 18.9 |
| No high school diploma or GED | 36.1 | 31.6 | 39.4 | 26.3 | 32.3 | 32.8 | 30.1 | 31.1 | 26.3 | 27.1 | 26.9 |
| High school diploma or GED | 40.9 | 32.6 | 32.1 | 24.1 | 27.8 | 24.3 | 22.4 | 25.4 | 21.3 | 19.5 | 23.3 |
| Some college, no bachelor's degree | 32.3 | *28.9 | 23.9 | 22.7 | 20.8 | 21.7 | 22.3 | 20.4 | 17.4 | 20.7 | 17.0 |
| Bachelor's degree or higher | *36.3 | *43.3 | 26.6 | 17.0 | 17.3 | 9.0 | 13.4 | 10.8 | 11.6 | *7.7 | 11.4 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.

[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey.

[2]Estimates are age adjusted to the year 2000 standard population using four age groups: 25–34 years, 35–44 years, 45–64 years, 65 years and over. See Appendix II, Age adjustment. For age groups where percent smoking was 0 or 100, the age-adjustment procedure was modified to substitute the percent smoking from the next lower education group.

[3]Beginning in 1993 current cigarette smokers reported ever smoking 100 cigarettes in their lifetime and smoking now on every day or some days. See Appendix II, Cigarette smoking.

[4]Includes unknown education. Education categories shown are for 1997 and subsequent years. GED stands for General Educational Development high school equivalency diploma. In 1974–95 the following categories based on number of years of school completed were used: less than 12 years, 12 years, 13–15 years, 16 years or more. See Appendix II, Education.

[5]The race groups, white and black, include persons of Hispanic and non-Hispanic origin. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The single race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race. For additional data on cigarette smoking by racial groups, see table 65 of *Health, United States, 2005*.

NOTES: Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. For more data on cigarette smoking see the Early Release reports on the National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm.

Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the following questionnaire supplements: hypertension (1974), smoking (1979), alcohol and health practices (1983), health promotion and disease prevention (1985, 1990–91), cancer control and cancer epidemiology (1992), and year 2000 objectives (1993–95). Starting with 1997, data are from the family core and sample adult questionnaires.



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## Table 65 (page 1 of 2). Current cigarette smoking for adults according to sex, race, Hispanic origin, age, and education: United States, average annual 1990–92, 1995–98, and 2001–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | 1990–92[1] | 1995–98[1] | 2001–03 | 1990–92[1] | 1995–98[1] | 2001–03 |
| 18 years of age and over, age adjusted[2] | Percent of persons who are current cigarette smokers[3] | | | | | |
| All persons[4] | 27.9 | 26.5 | 24.3 | 23.7 | 22.1 | 20.0 |
| Race[5] | | | | | | |
| White only | 27.4 | 26.4 | 24.5 | 24.3 | 22.9 | 21.0 |
| Black or African American only | 33.9 | 30.7 | 26.5 | 23.1 | 21.8 | 18.0 |
| American Indian and Alaska Native only | 34.2 | 40.5 | 32.8 | 36.7 | 28.9 | 31.0 |
| Asian only | 24.8 | 18.1 | 17.4 | 6.3 | 11.0 | 6.3 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | * | --- | --- | * |
| 2 or more races | --- | --- | 32.3 | --- | --- | 30.9 |
| American Indian and Alaska Native; White | --- | --- | 39.3 | --- | --- | 38.0 |
| Hispanic origin and race[5] | | | | | | |
| Hispanic or Latino | 25.7 | 24.4 | 21.1 | 15.8 | 13.7 | 10.9 |
| Mexican | 26.2 | 24.5 | 21.3 | 14.8 | 12.0 | 9.6 |
| Not Hispanic or Latino | 28.1 | 26.9 | 24.9 | 24.4 | 23.1 | 21.4 |
| White only | 27.7 | 26.9 | 25.2 | 25.2 | 24.1 | 22.7 |
| Black or African American only | 33.9 | 30.7 | 26.5 | 23.2 | 21.9 | 18.1 |
| 18 years of age and over, crude | | | | | | |
| All persons[4] | 28.4 | 27.0 | 24.8 | 23.6 | 22.0 | 19.9 |
| Race[5] | | | | | | |
| White only | 27.8 | 26.8 | 24.7 | 24.1 | 22.6 | 20.6 |
| Black or African American only | 33.2 | 30.6 | 26.8 | 23.3 | 21.8 | 18.2 |
| American Indian and Alaska Native only | 35.5 | 39.2 | 35.0 | 37.3 | 31.2 | 33.0 |
| Asian only | 24.9 | 20.0 | 18.4 | 6.3 | 11.2 | 6.5 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | * | --- | --- | * |
| 2 or more races | --- | --- | 33.4 | --- | --- | 31.5 |
| American Indian and Alaska Native; White | --- | --- | 39.9 | --- | --- | 37.9 |
| Hispanic origin and race[5] | | | | | | |
| Hispanic or Latino | 26.5 | 25.5 | 22.2 | 16.6 | 13.8 | 11.0 |
| Mexican | 27.1 | 25.2 | 22.3 | 15.0 | 11.6 | 9.4 |
| Not Hispanic or Latino | 28.5 | 27.2 | 25.1 | 24.2 | 22.9 | 21.0 |
| White only | 28.0 | 27.0 | 25.0 | 24.8 | 23.5 | 21.8 |
| Black or African American only | 33.3 | 30.6 | 26.8 | 23.3 | 21.9 | 18.3 |
| 18–24 years: | | | | | | |
| Hispanic or Latino | 19.3 | 26.5 | 23.1 | 12.8 | 12.0 | 9.8 |
| Not Hispanic or Latino: | | | | | | |
| White only | 28.9 | 35.5 | 33.2 | 28.7 | 31.6 | 28.8 |
| Black or African American only | 17.7 | 21.3 | 20.9 | 10.8 | 9.8 | 12.9 |
| 25–34 years: | | | | | | |
| Hispanic or Latino | 29.9 | 25.9 | 21.9 | 19.2 | 12.6 | 10.3 |
| Not Hispanic or Latino: | | | | | | |
| White only | 32.7 | 30.5 | 30.1 | 30.9 | 28.5 | 26.9 |
| Black or African American only | 34.6 | 28.5 | 27.4 | 29.2 | 22.0 | 15.8 |
| 35–44 years: | | | | | | |
| Hispanic or Latino | 32.1 | 26.2 | 24.8 | 19.9 | 17.6 | 12.8 |
| Not Hispanic or Latino: | | | | | | |
| White only | 32.3 | 31.5 | 29.3 | 27.3 | 28.1 | 27.5 |
| Black or African American only | 44.1 | 34.7 | 27.3 | 31.3 | 30.3 | 23.7 |
| 45–64 years: | | | | | | |
| Hispanic or Latino | 26.6 | 26.8 | 22.1 | 17.1 | 14.7 | 13.4 |
| Not Hispanic or Latino: | | | | | | |
| White only | 28.4 | 26.8 | 24.4 | 26.1 | 22.3 | 21.8 |
| Black or African American only | 38.0 | 38.8 | 31.7 | 26.1 | 26.9 | 22.9 |
| 65 years and over: | | | | | | |
| Hispanic or Latino | 16.1 | 14.7 | 12.2 | 6.6 | 9.4 | 5.4 |
| Not Hispanic or Latino: | | | | | | |
| White only | 14.2 | 10.6 | 9.7 | 12.3 | 11.6 | 8.9 |
| Black or African American only | 25.2 | 20.9 | 19.5 | 10.7 | 11.2 | 9.0 |

See footnotes at end of table.



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## Table 65 (page 2 of 2). Current cigarette smoking for adults according to sex, race, Hispanic origin, age, and education: United States, average annual 1990–92, 1995–98, and 2001–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Characteristic | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | 1990–92[1] | 1995–98[1] | 2001–03 | 1990–92[1] | 1995–98[1] | 2001–03 |
| Education, Hispanic origin, and race[5,6] | Percent of persons who are current cigarette smokers[3] | | | | | |
| 25 years of age and over, age adjusted[7] | | | | | | |
| No high school diploma or GED: | | | | | | |
| Hispanic or Latino | 30.2 | 27.6 | 23.6 | 15.8 | 13.3 | 10.5 |
| Not Hispanic or Latino: | | | | | | |
| White only | 46.1 | 43.9 | 43.6 | 40.4 | 40.7 | 41.1 |
| Black or African American only | 45.4 | 44.6 | 37.9 | 31.3 | 30.0 | 26.9 |
| High school diploma or GED: | | | | | | |
| Hispanic or Latino | 29.6 | 26.7 | 21.2 | 18.4 | 16.4 | 12.1 |
| Not Hispanic or Latino: | | | | | | |
| White only | 32.9 | 32.8 | 31.5 | 28.4 | 28.8 | 29.3 |
| Black or African American only | 38.2 | 35.7 | 32.7 | 25.4 | 26.6 | 21.5 |
| Some college or more: | | | | | | |
| Hispanic or Latino | 20.4 | 16.6 | 16.0 | 14.3 | 13.5 | 10.7 |
| Not Hispanic or Latino: | | | | | | |
| White only | 19.3 | 18.3 | 17.3 | 18.1 | 17.2 | 15.9 |
| Black or African American only | 25.6 | 23.3 | 18.7 | 22.8 | 18.9 | 15.4 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey. Cigarette smoking data were not collected in 1996.

[2]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–24 years, 25–34 years, 35–44 years, 45–64 years, and 65 years and over. See Appendix II, Age adjustment. For age groups where percent smoking is 0 or 100, the age-adjustment procedure was modified to substitute the percent smoking from the previous 3-year period.

[3]Beginning in 1993 current cigarette smokers reported ever smoking 100 cigarettes in their lifetime and smoking now on every day or some days. See Appendix II, Cigarette smoking.

[4]Includes all other races not shown separately.

[5]The race groups, white, black, American Indian and Alaska Native (AI/AN), Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. The 2001–03 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data years 2001–03, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 2001–03 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[6]Education categories shown are for 1997 and subsequent years. GED stands for General Educational Development high school equivalency diploma. In years prior to 1997 the following categories based on number of years of school completed were used: less than 12 years, 12 years, 13 years or more. See Appendix II, Education.

[7]Estimates are age adjusted to the year 2000 standard using four age groups: 25–34 years, 35–44 years, 45–64 years, and 65 years and over. See Appendix II, Age adjustment.

NOTES: Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. For more data on cigarette smoking see the Early Release reports on the National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the following questionnaire supplements: health promotion and disease prevention (1990–91), cancer control and cancer epidemiology (1992), and year 2000 objectives (1993–95). Starting with 1997 data are from the family core and sample adult questionnaires.



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## Table 66 (page 1 of 2). Use of selected substances in the past month by persons 12 years of age and over, according to age, sex, race, and Hispanic origin: United States, 2002–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population 12 years of age and over]

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| Age, sex, race, and Hispanic origin | Any illicit drug[1] | | Marijuana | | Nonmedical use of any psychotherapeutic drug[2] | |
|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2002 | 2003 | 2002 | 2003 |
| | Percent of population | | | | | |
| 12 years and over | 8.3 | 8.2 | 6.2 | 6.2 | 2.6 | 2.7 |
| Age | | | | | | |
| 12–13 years | 4.2 | 3.8 | 1.4 | 1.0 | 1.7 | 1.8 |
| 14–15 years | 11.2 | 10.9 | 7.6 | 7.2 | 4.0 | 4.1 |
| 16–17 years | 19.8 | 19.2 | 15.7 | 15.6 | 6.2 | 6.1 |
| 18–25 years | 20.2 | 20.3 | 17.3 | 17.0 | 5.4 | 6.0 |
| 26–34 years | 10.5 | 10.7 | 7.7 | 8.4 | 3.6 | 3.4 |
| 35 years and over | 4.6 | 4.4 | 3.1 | 3.0 | 1.6 | 1.5 |
| Sex | | | | | | |
| Male | 10.3 | 10.0 | 8.1 | 8.1 | 2.7 | 2.7 |
| Female | 6.4 | 6.5 | 4.4 | 4.4 | 2.6 | 2.6 |
| Age and sex | | | | | | |
| 12–17 years | 11.6 | 11.2 | 8.2 | 7.9 | 4.0 | 4.0 |
| Male | 12.3 | 11.4 | 9.1 | 8.6 | 3.6 | 3.7 |
| Female | 10.9 | 11.1 | 7.2 | 7.2 | 4.3 | 4.2 |
| Hispanic origin and race[3] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White only | 8.5 | 8.3 | 6.5 | 6.4 | 2.8 | 2.8 |
| Black or African American only | 9.7 | 8.7 | 7.4 | 6.7 | 2.0 | 1.8 |
| American Indian and Alaska Native only | 10.1 | 12.1 | 6.7 | 10.3 | 3.2 | 4.8 |
| Native Hawaiian and Other Pacific Islander only | 7.9 | 11.1 | 4.4 | 7.3 | 3.8 | 3.2 |
| Asian only | 3.5 | 3.8 | 1.8 | 1.9 | 0.7 | 1.7 |
| 2 or more races | 11.4 | 12.0 | 9.0 | 9.3 | 3.5 | 2.4 |
| Hispanic or Latino | 7.2 | 8.0 | 4.3 | 4.9 | 2.9 | 3.0 |

| Age, sex, race, and Hispanic origin | Alcohol use | | Binge alcohol use[4] | | Heavy alcohol use[5] | |
|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2002 | 2003 | 2002 | 2003 |
| | Percent of population | | | | | |
| 12 years and over | 51.0 | 50.1 | 22.9 | 22.6 | 6.7 | 6.8 |
| Age | | | | | | |
| 12–13 years | 4.3 | 4.5 | 1.8 | 1.6 | 0.3 | 0.1 |
| 14–15 years | 16.6 | 17.0 | 9.2 | 9.4 | 1.9 | 2.2 |
| 16–17 years | 32.6 | 31.8 | 21.4 | 21.2 | 5.6 | 5.5 |
| 18–25 years | 60.5 | 61.4 | 40.9 | 41.6 | 14.9 | 15.1 |
| 26–34 years | 61.4 | 60.2 | 33.1 | 32.9 | 9.0 | 9.4 |
| 35 years and over | 52.1 | 50.7 | 18.6 | 18.1 | 5.2 | 5.1 |
| Sex | | | | | | |
| Male | 57.4 | 57.3 | 31.2 | 30.9 | 10.8 | 10.4 |
| Female | 44.9 | 43.2 | 15.1 | 14.8 | 3.0 | 3.4 |
| Age and sex | | | | | | |
| 12–17 years | 17.6 | 17.7 | 10.7 | 10.6 | 2.5 | 2.6 |
| Male | 17.4 | 17.1 | 11.4 | 11.1 | 3.1 | 2.9 |
| Female | 17.9 | 18.3 | 9.9 | 10.1 | 1.9 | 2.3 |
| Hispanic origin and race[3] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White only | 55.0 | 54.4 | 23.4 | 23.6 | 7.5 | 7.7 |
| Black or African American only | 39.9 | 37.9 | 21.0 | 19.0 | 4.4 | 4.5 |
| American Indian and Alaska Native only | 44.7 | 42.0 | 27.9 | 29.6 | 8.7 | 10.0 |
| Native Hawaiian and Other Pacific Islander only | * | 43.3 | 25.2 | 29.8 | 8.3 | 10.4 |
| Asian only | 37.1 | 39.8 | 12.4 | 11.0 | 2.6 | 2.3 |
| 2 or more races | 49.9 | 44.4 | 19.8 | 21.8 | 7.5 | 6.1 |
| Hispanic or Latino | 42.8 | 41.5 | 24.8 | 24.2 | 5.9 | 5.2 |

See footnotes at end of table.



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## Table 66 (page 2 of 2). Use of selected substances in the past month by persons 12 years of age and over, according to age, sex, race, and Hispanic origin: United States, 2002–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population 12 years of age and over]

Click here for spreadsheet version

| Age, sex, race, and Hispanic origin | Any tobacco[6] | | Cigarettes | | Cigars | |
|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2002 | 2003 | 2002 | 2003 |
| | Percent of population | | | | | |
| 12 years and over | 30.4 | 29.8 | 26.0 | 25.4 | 5.4 | 5.4 |
| **Age** | | | | | | |
| 12–13 years | 3.8 | 3.2 | 3.2 | 2.5 | 0.7 | 0.8 |
| 14–15 years | 13.4 | 13.3 | 11.2 | 11.0 | 3.8 | 3.9 |
| 16–17 years | 29.0 | 27.0 | 24.9 | 23.2 | 9.3 | 8.8 |
| 18–25 years | 45.3 | 44.8 | 40.8 | 40.2 | 11.0 | 11.4 |
| 26–34 years | 38.2 | 38.8 | 32.7 | 33.4 | 6.6 | 6.9 |
| 35 years and over | 27.9 | 27.0 | 23.4 | 22.6 | 4.1 | 3.9 |
| **Sex** | | | | | | |
| Male | 37.0 | 35.9 | 28.7 | 28.1 | 9.4 | 9.0 |
| Female | 24.3 | 24.0 | 23.4 | 23.0 | 1.7 | 2.0 |
| **Age and sex** | | | | | | |
| 12–17 years | 15.2 | 14.4 | 13.0 | 12.2 | 4.5 | 4.5 |
| Male | 16.0 | 15.6 | 12.3 | 11.9 | 6.2 | 6.2 |
| Female | 14.4 | 13.3 | 13.6 | 12.5 | 2.7 | 2.7 |
| **Hispanic origin and race[3]** | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White only | 32.0 | 31.6 | 26.9 | 26.6 | 5.5 | 5.4 |
| Black or African American only | 28.8 | 30.0 | 25.3 | 25.9 | 6.8 | 7.2 |
| American Indian and Alaska Native only | 44.3 | 41.8 | 37.1 | 36.1 | 5.2 | 8.3 |
| Native Hawaiian and Other Pacific Islander only | 28.8 | 37.0 | * | 33.1 | 4.1 | 8.0 |
| Asian only | 18.6 | 13.8 | 17.7 | 12.6 | 1.1 | 1.8 |
| 2 or more races | 38.1 | 34.4 | 35.0 | 30.7 | 5.5 | 6.2 |
| Hispanic or Latino | 25.2 | 23.7 | 23.0 | 21.4 | 5.0 | 4.9 |

* Estimates are considered unreliable; relative standard error greater than 17.5 percent of the log transformation of the proportion or minimum effective sample size less than 68 or minimum nominal sample size less than 100 or prevalence close to 0 or 100 percent. See Appendix I, National Survey on Drug Use & Health (NSDUH).

[1]Any illicit drug includes marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic drug used nonmedically.

[2]Psychotherapeutic drugs include prescription-type pain relievers, tranquilizers, stimulants, or sedatives; does not include over-the-counter drugs.

[3]Persons of Hispanic origin may be of any race. Race and Hispanic origin were collected using the 1997 Standards for Federal data on Race and Ethnicity. Single race categories shown include persons who reported only one racial group. The category, 2 or more races, includes persons who reported more than one racial group. See Appendix II, Race.

[4]Binge alcohol use is defined as drinking five or more drinks on the same occasion on at least 1 day in the past 30 days. Occasion is defined as at the same time or within a couple of hours of each other.

[5]Heavy alcohol use is defined as drinking five or more drinks on the same occasion on each of 5 or more days in the past 30 days; all heavy alcohol users are also "binge" alcohol users.

[6]Any tobacco product includes cigarettes, smokeless tobacco (i.e., chewing tobacco or snuff), cigars, or pipe tobacco.

NOTES: The National Survey on Drug Use & Health (NSDUH), formerly called the National Household Survey on Drug Abuse (NHSDA), began a new baseline in 2002 and cannot be compared with previous years. Because of methodological differences among the National Survey on Drug Use & Health, Monitoring the Future Study (MTF), and Youth Risk Behavior Survey (YRBS), rates of substance use measured by these surveys are not directly comparable. See Appendix I, NSDUH, MTF, and YRBS. Some data for 2002 have been revised and differ from the previous edition of *Health, United States*.

SOURCE: Substance Abuse and Mental Health Services Administration, Office of Applied Studies, National Survey on Drug Use & Health, www.oas.samhsa.gov/nhsda.htm.



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## Table 67 (page 1 of 3). Use of selected substances by high school seniors, tenth-, and eighth-graders, according to sex and race: United States, selected years 1980–2004

[Data are based on a survey of high school seniors, tenth–, and eighth-graders in the coterminous United States]

Click here for spreadsheet version

| Substance, sex, race, and grade in school | 1980 | 1990 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| Cigarettes | | | | Percent using substance in the past month | | | | | |
| All seniors | 30.5 | 29.4 | 28.3 | 33.5 | 31.4 | 29.5 | 26.7 | 24.4 | 25.0 |
| Male | 26.8 | 29.1 | 29.0 | 34.5 | 32.8 | 29.7 | 27.4 | 26.2 | 25.3 |
| Female | 33.4 | 29.2 | 27.5 | 32.0 | 29.7 | 28.7 | 25.5 | 22.1 | 24.1 |
| White | 31.0 | 32.5 | 31.8 | 37.3 | 36.6 | 34.1 | 30.9 | 28.2 | 28.2 |
| Black or African American | 25.2 | 12.0 | 9.4 | 15.0 | 13.6 | 12.9 | 11.3 | 9.0 | 11.3 |
| All tenth-graders | --- | --- | 20.8 | 27.9 | 23.9 | 21.3 | 17.7 | 16.7 | 16.0 |
| Male | --- | --- | 20.8 | 27.7 | 23.8 | 20.9 | 16.7 | 16.2 | 16.2 |
| Female | --- | --- | 20.7 | 27.9 | 23.6 | 21.5 | 18.6 | 17.0 | 15.7 |
| White | --- | --- | 23.9 | 31.2 | 27.3 | 24.0 | 20.8 | 19.3 | 18.1 |
| Black or African American | --- | --- | 6.4 | 12.2 | 11.3 | 10.9 | 9.1 | 8.8 | 9.6 |
| All eighth-graders | --- | --- | 14.3 | 19.1 | 14.6 | 12.2 | 10.7 | 10.2 | 9.2 |
| Male | --- | --- | 15.5 | 18.8 | 14.3 | 12.2 | 11.0 | 9.6 | 8.3 |
| Female | --- | --- | 13.1 | 19.0 | 14.7 | 12.0 | 10.4 | 10.6 | 9.9 |
| White | --- | --- | 15.0 | 21.7 | 16.4 | 12.8 | 11.1 | 10.6 | 9.4 |
| Black or African American | --- | --- | 5.3 | 8.2 | 8.4 | 8.0 | 7.3 | 6.4 | 7.5 |
| Marijuana | | | | | | | | | |
| All seniors | 33.7 | 14.0 | 13.8 | 21.2 | 21.6 | 22.4 | 21.5 | 21.2 | 19.9 |
| Male | 37.8 | 16.1 | 16.1 | 24.6 | 24.7 | 25.6 | 25.3 | 24.7 | 23.0 |
| Female | 29.1 | 11.5 | 11.2 | 17.2 | 18.3 | 19.1 | 17.4 | 17.3 | 16.6 |
| White | 34.2 | 15.6 | 15.0 | 21.5 | 22.0 | 23.9 | 22.8 | 22.8 | 21.5 |
| Black or African American | 26.5 | 5.2 | 6.5 | 17.8 | 17.5 | 16.5 | 16.4 | 16.1 | 14.2 |
| All tenth-graders | --- | --- | 8.7 | 17.2 | 19.7 | 19.8 | 17.8 | 17.0 | 15.9 |
| Male | --- | --- | 10.1 | 19.2 | 23.3 | 22.7 | 19.3 | 19.0 | 17.4 |
| Female | --- | --- | 7.3 | 15.0 | 16.2 | 16.8 | 16.4 | 15.0 | 14.2 |
| White | --- | --- | 9.4 | 17.7 | 20.1 | 20.4 | 19.1 | 17.4 | 15.8 |
| Black or African American | --- | --- | 3.8 | 15.1 | 17.0 | 16.5 | 14.4 | 15.6 | 17.2 |
| All eighth-graders | --- | --- | 3.2 | 9.1 | 9.1 | 9.2 | 8.3 | 7.5 | 6.4 |
| Male | --- | --- | 3.8 | 9.8 | 10.2 | 11.0 | 9.5 | 8.5 | 6.3 |
| Female | --- | --- | 2.6 | 8.2 | 7.8 | 7.3 | 7.1 | 6.4 | 6.3 |
| White | --- | --- | 3.0 | 9.0 | 8.3 | 8.6 | 7.9 | 7.0 | 5.5 |
| Black or African American | --- | --- | 2.1 | 7.0 | 8.5 | 7.7 | 7.1 | 7.4 | 8.1 |
| Cocaine | | | | | | | | | |
| All seniors | 5.2 | 1.9 | 1.4 | 1.8 | 2.1 | 2.1 | 2.3 | 2.1 | 2.3 |
| Male | 6.0 | 2.3 | 1.7 | 2.2 | 2.7 | 2.5 | 2.7 | 2.6 | 2.9 |
| Female | 4.3 | 1.3 | 0.9 | 1.3 | 1.6 | 1.6 | 1.8 | 1.4 | 1.7 |
| White | 5.4 | 1.8 | 1.3 | 1.7 | 2.2 | 2.3 | 2.8 | 2.1 | 2.5 |
| Black or African American | 2.0 | 0.5 | 0.8 | 0.4 | 1.0 | 0.6 | 0.2 | 1.0 | 0.9 |
| All tenth-graders | --- | --- | 0.7 | 1.7 | 1.8 | 1.3 | 1.6 | 1.3 | 1.7 |
| Male | --- | --- | 0.7 | 1.8 | 2.1 | 1.5 | 1.8 | 1.3 | 1.9 |
| Female | --- | --- | 0.6 | 1.5 | 1.4 | 1.2 | 1.4 | 1.3 | 1.4 |
| White | --- | --- | 0.6 | 1.7 | 1.7 | 1.2 | 1.7 | 1.4 | 1.7 |
| Black or African American | --- | --- | 0.2 | 0.4 | 0.4 | 0.3 | 0.4 | 0.5 | 0.4 |
| All eighth-graders | --- | --- | 0.5 | 1.2 | 1.2 | 1.2 | 1.1 | 0.9 | 0.9 |
| Male | --- | --- | 0.7 | 1.1 | 1.3 | 1.1 | 1.1 | 1.0 | 0.8 |
| Female | --- | --- | 0.4 | 1.2 | 1.1 | 1.2 | 1.1 | 0.8 | 1.0 |
| White | --- | --- | 0.4 | 1.0 | 1.1 | 1.1 | 1.0 | 0.8 | 0.8 |
| Black or African American | --- | --- | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.8 |

See footnotes at end of table.



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## Table 67 (page 2 of 3). Use of selected substances by high school seniors, tenth-, and eighth-graders, according to sex and race: United States, selected years 1980–2004

[Data are based on a survey of high school seniors, tenth–, and eighth-graders in the coterminous United States]

Click here for spreadsheet version

| Substance, sex, race, and grade in school | 1980 | 1990 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| Inhalants | | | | Percent using substance in the past month | | | | | |
| All seniors | 1.4 | 2.7 | 2.4 | 3.2 | 2.2 | 1.7 | 1.5 | 1.5 | 1.5 |
| Male | 1.8 | 3.5 | 3.3 | 3.9 | 2.9 | 2.3 | 2.2 | 2.0 | 1.7 |
| Female | 1.0 | 2.0 | 1.6 | 2.5 | 1.7 | 1.1 | 0.8 | 1.1 | 1.3 |
| White | 1.4 | 3.0 | 2.4 | 3.7 | 2.1 | 1.8 | 1.3 | 1.7 | 1.6 |
| Black or African American | 1.0 | 1.5 | 1.5 | 1.1 | 2.1 | 1.3 | 1.2 | 0.7 | 1.0 |
| All tenth-graders | --- | --- | 2.7 | 3.5 | 2.6 | 2.5 | 2.4 | 2.2 | 2.4 |
| Male | --- | --- | 2.9 | 3.8 | 3.0 | 2.5 | 2.3 | 2.3 | 2.4 |
| Female | --- | --- | 2.6 | 3.2 | 2.2 | 2.4 | 2.4 | 2.2 | 2.3 |
| White | --- | --- | 2.9 | 3.9 | 2.8 | 2.5 | 2.6 | 2.6 | 2.6 |
| Black or African American | --- | --- | 2.0 | 1.2 | 1.5 | 0.9 | 1.5 | 0.5 | 1.4 |
| All eighth-graders | --- | --- | 4.4 | 6.1 | 4.5 | 4.0 | 3.8 | 4.1 | 4.5 |
| Male | --- | --- | 4.1 | 5.6 | 4.1 | 3.6 | 3.5 | 3.4 | 4.0 |
| Female | --- | --- | 4.7 | 6.6 | 4.8 | 4.3 | 3.9 | 4.7 | 5.1 |
| White | --- | --- | 4.5 | 7.0 | 4.5 | 4.1 | 3.9 | 4.3 | 4.4 |
| Black or African American | --- | --- | 2.3 | 2.3 | 2.3 | 2.6 | 2.7 | 2.3 | 3.8 |
| MDMA (Ecstasy) | | | | | | | | | |
| All seniors | --- | --- | --- | --- | 3.6 | 2.8 | 2.4 | 1.3 | 1.2 |
| Male | --- | --- | --- | --- | 4.1 | 3.7 | 2.6 | 1.3 | 1.6 |
| Female | --- | --- | --- | --- | 3.1 | 2.0 | 2.1 | 1.2 | 0.9 |
| White | --- | --- | --- | --- | 3.9 | 2.8 | 2.5 | 1.3 | 1.2 |
| Black or African American | --- | --- | --- | --- | 1.9 | 0.9 | 0.5 | 0.6 | 1.1 |
| All tenth-graders | --- | --- | --- | --- | 2.6 | 2.6 | 1.8 | 1.1 | 0.8 |
| Male | --- | --- | --- | --- | 2.5 | 3.5 | 1.6 | 1.2 | 1.0 |
| Female | --- | --- | --- | --- | 2.5 | 1.6 | 1.8 | 1.1 | 0.6 |
| White | --- | --- | --- | --- | 2.5 | 2.6 | 2.3 | 1.2 | 0.9 |
| Black or African American | --- | --- | --- | --- | 1.8 | 1.0 | 0.5 | 0.7 | 0.1 |
| All eighth-graders | --- | --- | --- | --- | 1.4 | 1.8 | 1.4 | 0.7 | 0.8 |
| Male | --- | --- | --- | --- | 1.6 | 1.9 | 1.5 | 0.7 | 0.7 |
| Female | --- | --- | --- | --- | 1.2 | 1.8 | 1.3 | 0.7 | 0.9 |
| White | --- | --- | --- | --- | 1.4 | 2.0 | 1.0 | 0.7 | 0.6 |
| Black or African American | --- | --- | --- | --- | 0.8 | 1.1 | 0.6 | 0.4 | 1.2 |
| Alcohol[1] | | | | | | | | | |
| All seniors | 72.0 | 57.1 | 54.0 | 51.3 | 50.0 | 49.8 | 48.6 | 47.5 | 48.0 |
| Male | 77.4 | 61.3 | 58.4 | 55.7 | 54.0 | 54.7 | 52.3 | 51.7 | 51.1 |
| Female | 66.8 | 52.3 | 49.0 | 47.0 | 46.1 | 45.1 | 45.1 | 43.8 | 45.1 |
| White | 75.8 | 62.2 | 57.7 | 54.8 | 55.3 | 55.3 | 52.7 | 52.0 | 52.5 |
| Black or African American | 47.7 | 32.9 | 34.4 | 37.4 | 29.3 | 29.6 | 30.7 | 29.2 | 29.2 |
| All tenth-graders | --- | --- | 42.8 | 38.8 | 41.0 | 39.0 | 35.4 | 35.4 | 35.2 |
| Male | --- | --- | 45.5 | 39.7 | 43.3 | 41.1 | 35.3 | 35.3 | 36.3 |
| Female | --- | --- | 40.3 | 37.8 | 38.6 | 36.8 | 35.7 | 35.3 | 34.0 |
| White | --- | --- | 45.7 | 41.3 | 44.3 | 41.0 | 39.0 | 38.4 | 37.3 |
| Black or African American | --- | --- | 30.2 | 24.9 | 24.7 | 26.0 | 23.2 | 24.0 | 25.4 |
| All eighth-graders | --- | --- | 25.1 | 24.6 | 22.4 | 21.5 | 19.6 | 19.7 | 18.6 |
| Male | --- | --- | 26.3 | 25.0 | 22.5 | 22.3 | 19.1 | 19.4 | 17.9 |
| Female | --- | --- | 23.8 | 24.0 | 22.0 | 20.6 | 20.0 | 19.8 | 19.0 |
| White | --- | --- | 26.0 | 25.4 | 23.9 | 22.5 | 20.4 | 19.9 | 18.6 |
| Black or African American | --- | --- | 17.8 | 17.3 | 15.1 | 14.9 | 14.7 | 16.5 | 16.0 |

See footnotes at end of table.



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## Table 67 (page 3 of 3). Use of selected substances by high school seniors, tenth-, and eighth-graders, according to sex and race: United States, selected years 1980–2004

[Data are based on a survey of high school seniors, tenth–, and eighth-graders in the coterminous United States]

Click here for spreadsheet version

| Substance, sex, race, and grade in school | 1980 | 1990 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| Binge drinking[2] | | | | Percent in last 2 weeks | | | | | |
| All seniors | 41.2 | 32.2 | 29.8 | 29.8 | 30.0 | 29.7 | 28.6 | 27.9 | 29.2 |
| Male | 52.1 | 39.1 | 37.8 | 36.9 | 36.7 | 36.0 | 34.2 | 34.2 | 34.3 |
| Female | 30.5 | 24.4 | 21.2 | 23.0 | 23.5 | 23.7 | 23.0 | 22.1 | 24.2 |
| White | 44.6 | 36.2 | 32.9 | 32.9 | 34.4 | 34.5 | 32.9 | 31.9 | 33.1 |
| Black or African American | 17.0 | 11.6 | 11.8 | 15.5 | 11.0 | 12.6 | 10.4 | 11.1 | 11.7 |
| All tenth-graders | --- | --- | 22.9 | 24.0 | 26.2 | 24.9 | 22.4 | 22.2 | 22.0 |
| Male | --- | --- | 26.4 | 26.4 | 29.8 | 28.6 | 23.8 | 23.2 | 23.8 |
| Female | --- | --- | 19.5 | 21.5 | 22.5 | 21.4 | 21.0 | 21.2 | 20.2 |
| White | --- | --- | 24.4 | 25.7 | 28.5 | 26.4 | 24.6 | 24.3 | 23.7 |
| Black or African American | --- | --- | 14.4 | 12.3 | 12.9 | 12.3 | 12.4 | 11.7 | 11.5 |
| All eighth-graders | --- | --- | 12.9 | 14.5 | 14.1 | 13.2 | 12.4 | 11.9 | 11.4 |
| Male | --- | --- | 14.3 | 15.1 | 14.4 | 13.7 | 12.5 | 12.2 | 10.8 |
| Female | --- | --- | 11.4 | 13.9 | 13.6 | 12.4 | 12.1 | 11.6 | 11.8 |
| White | --- | --- | 12.6 | 14.5 | 14.6 | 13.1 | 12.3 | 11.4 | 11.2 |
| Black or African American | --- | --- | 9.9 | 10.0 | 9.3 | 8.8 | 9.9 | 10.9 | 8.6 |

--- Data not available.
0.0 Quantity more than zero but less than 0.05.
[1]In 1993 the alcohol question was changed to indicate that a "drink" meant "more than a few sips." 1993 data, available in the spreadsheet version of this table, are based on a half sample.
[2]Five or more alcoholic drinks in a row at least once in the prior 2-week period.

NOTES: Because of methodological differences among the National Survey on Drug Use & Health (NSDUH), Monitoring the Future Study (MTF), and Youth Risk Behavior Survey (YRBS), rates of substance use measured by these surveys are not directly comparable. See Appendix I, NSDUH, MTF, and YRBS. Data for additional years are available. See Appendix III.

SOURCE: National Institutes of Health, National Institute on Drug Abuse (NIDA), Monitoring the Future Study, Annual surveys.



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## Table 68 (page 1 of 3). Alcohol consumption by adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Both sexes | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| **Drinking status[1]** | Percent distribution | | | | | | | | |
| 18 years and over, age adjusted[2] | | | | | | | | | |
| All | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Lifetime abstainer | 21.4 | 22.3 | 24.9 | 14.1 | 14.8 | 17.8 | 27.8 | 28.8 | 31.3 |
| Former drinker[3] | 15.8 | 15.3 | 14.3 | 16.4 | 15.8 | 15.2 | 15.4 | 14.9 | 13.6 |
| Infrequent | 9.0 | 8.4 | 7.7 | 7.8 | 7.4 | 7.1 | 10.2 | 9.3 | 8.4 |
| Regular | 6.8 | 6.8 | 6.5 | 8.6 | 8.3 | 8.0 | 5.3 | 5.5 | 5.2 |
| Current drinker[3] | 62.8 | 62.5 | 60.8 | 69.5 | 69.4 | 67.1 | 56.8 | 56.3 | 55.2 |
| Infrequent | 13.9 | 13.3 | 12.9 | 10.2 | 9.8 | 9.8 | 17.4 | 16.6 | 15.9 |
| Regular | 48.5 | 48.7 | 47.4 | 58.7 | 58.9 | 56.7 | 39.2 | 39.3 | 39.0 |
| 18 years and over, crude | | | | | | | | | |
| All | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Lifetime abstainer | 21.3 | 22.2 | 24.8 | 14.1 | 14.8 | 17.7 | 27.8 | 28.9 | 31.4 |
| Former drinker[3] | 15.6 | 15.2 | 14.3 | 15.7 | 15.3 | 14.9 | 15.5 | 15.1 | 13.7 |
| Infrequent | 8.9 | 8.4 | 7.8 | 7.5 | 7.2 | 7.0 | 10.2 | 9.4 | 8.5 |
| Regular | 6.7 | 6.8 | 6.5 | 8.2 | 8.0 | 7.9 | 5.3 | 5.6 | 5.2 |
| Current drinker[3] | 63.1 | 62.6 | 60.9 | 70.2 | 69.9 | 67.4 | 56.7 | 56.0 | 54.9 |
| Infrequent | 14.0 | 13.3 | 13.0 | 10.2 | 9.8 | 9.8 | 17.4 | 16.6 | 15.9 |
| Regular | 48.8 | 48.8 | 47.5 | 59.4 | 59.4 | 57.1 | 39.1 | 39.1 | 38.7 |
| **Age** | Percent current drinkers among all adults | | | | | | | | |
| All persons: | | | | | | | | | |
| 18–44 years | 68.5 | 68.8 | 66.4 | 73.8 | 75.6 | 72.3 | 63.3 | 62.3 | 60.7 |
| 18–24 years | 61.3 | 63.7 | 59.5 | 65.5 | 70.5 | 64.6 | 57.0 | 56.8 | 54.5 |
| 25–44 years | 70.6 | 70.6 | 68.7 | 76.3 | 77.4 | 74.9 | 65.2 | 64.1 | 62.8 |
| 45–64 years | 62.7 | 62.5 | 60.4 | 69.8 | 67.7 | 65.7 | 55.9 | 57.7 | 55.4 |
| 45–54 years | 66.5 | 65.6 | 63.8 | 73.0 | 70.5 | 68.0 | 60.3 | 60.9 | 59.9 |
| 55–64 years | 56.7 | 57.9 | 55.5 | 64.8 | 63.3 | 62.4 | 49.2 | 53.0 | 49.0 |
| 65 years and over | 42.8 | 40.8 | 42.4 | 52.0 | 51.1 | 51.1 | 36.0 | 33.1 | 36.0 |
| 65–74 years | 47.9 | 44.9 | 46.5 | 56.1 | 55.6 | 53.7 | 41.4 | 36.0 | 40.6 |
| 75 years and over | 36.0 | 35.9 | 37.8 | 45.9 | 45.0 | 47.6 | 29.7 | 30.0 | 31.4 |
| **Race[2,4]** | | | | | | | | | |
| White only | 65.3 | 65.3 | 63.3 | 71.0 | 71.4 | 69.1 | 60.1 | 59.7 | 58.0 |
| Black or African American only | 46.7 | 46.9 | 47.4 | 55.5 | 56.4 | 54.7 | 40.0 | 39.6 | 41.8 |
| American Indian and Alaska Native only | 52.2 | 52.0 | 46.5 | 64.6 | 60.2 | 47.8 | 43.4 | 46.8 | 45.2 |
| Asian only | 45.7 | 47.7 | 39.1 | 59.8 | 58.5 | 49.4 | 31.6 | 35.0 | 30.3 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 62.4 | 54.5 | --- | 62.8 | 62.4 | --- | 61.9 | 48.4 |
| **Hispanic origin and race[2,4]** | | | | | | | | | |
| Hispanic or Latino | 52.9 | 50.5 | 49.5 | 63.9 | 64.2 | 61.7 | 41.9 | 37.8 | 37.3 |
| Mexican | 52.7 | 50.7 | 47.5 | 66.3 | 64.6 | 60.9 | 38.7 | 36.6 | 33.4 |
| Not Hispanic or Latino | 63.3 | 63.7 | 62.1 | 69.3 | 69.8 | 67.4 | 58.0 | 58.3 | 57.4 |
| White only | 66.7 | 67.2 | 65.7 | 71.7 | 72.4 | 70.3 | 62.2 | 62.4 | 61.6 |
| Black or African American only | 46.7 | 46.7 | 47.2 | 55.7 | 55.9 | 54.3 | 39.8 | 39.6 | 41.8 |
| **Geographic region[2]** | | | | | | | | | |
| Northeast | 67.9 | 69.3 | 67.8 | 73.4 | 74.7 | 73.7 | 63.3 | 64.8 | 62.9 |
| Midwest | 65.7 | 66.4 | 64.5 | 71.6 | 73.4 | 68.8 | 60.3 | 60.1 | 60.7 |
| South | 55.5 | 55.7 | 54.3 | 63.0 | 63.5 | 61.7 | 48.7 | 48.6 | 47.6 |
| West | 64.4 | 62.3 | 60.4 | 71.2 | 68.8 | 67.0 | 58.1 | 56.1 | 54.1 |
| **Location of residence[2]** | | | | | | | | | |
| Within MSA[5] | 63.9 | 63.7 | 62.3 | 70.1 | 70.4 | 68.2 | 58.5 | 57.6 | 57.0 |
| Outside MSA[5] | 56.5 | 56.6 | 53.8 | 64.6 | 64.0 | 61.5 | 48.8 | 50.0 | 47.1 |

See footnotes at end of table.



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## Table 68 (page 2 of 3). Alcohol consumption by adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Both sexes | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Level of alcohol consumption in past year for current drinkers[6] | Percent distribution of current drinkers[7] | | | | | | | | |
| 18 years and over, age adjusted[2] | | | | | | | | | |
| All drinking levels | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Light | 69.6 | 68.5 | 68.4 | 59.5 | 58.8 | 58.9 | 81.0 | 79.6 | 78.9 |
| Moderate | 22.5 | 23.4 | 23.7 | 31.8 | 32.7 | 32.8 | 12.0 | 12.8 | 13.7 |
| Heavier | 7.9 | 8.1 | 7.9 | 8.7 | 8.5 | 8.3 | 7.0 | 7.6 | 7.4 |
| 18 years and over, crude | | | | | | | | | |
| All drinking levels | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Light | 69.8 | 68.7 | 68.6 | 59.6 | 58.9 | 59.1 | 81.4 | 79.9 | 79.2 |
| Moderate | 22.3 | 23.2 | 23.5 | 31.7 | 32.6 | 32.5 | 11.7 | 12.5 | 13.5 |
| Heavier | 7.9 | 8.1 | 7.9 | 8.8 | 8.5 | 8.4 | 6.9 | 7.5 | 7.3 |
| Number of days in the past year with 5 or more drinks | Percent distribution of current drinkers | | | | | | | | |
| 18 years and over, crude | | | | | | | | | |
| All current drinkers | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| No days | 65.8 | 67.7 | 68.1 | 54.5 | 57.6 | 58.1 | 78.5 | 79.1 | 79.1 |
| At least 1 day | 34.2 | 32.3 | 31.9 | 45.5 | 42.4 | 41.9 | 21.5 | 20.9 | 20.9 |
| 1–11 days | 18.5 | 16.8 | 17.0 | 22.0 | 19.7 | 19.5 | 14.6 | 13.5 | 14.2 |
| 12 or more days | 15.6 | 15.5 | 14.9 | 23.5 | 22.8 | 22.4 | 6.9 | 7.4 | 6.7 |
| Hispanic origin, race, and age[4] | Percent of adults with five or more drinks on at least 1 day among current drinkers | | | | | | | | |
| All persons: | | | | | | | | | |
| 18 years and over, age adjusted[2] | 32.4 | 31.0 | 30.8 | 43.4 | 40.7 | 40.3 | 20.2 | 20.0 | 20.3 |
| 18 years and over, crude | 34.2 | 32.3 | 31.9 | 45.5 | 42.4 | 41.9 | 21.5 | 20.9 | 20.9 |
| 18–44 years | 42.5 | 42.0 | 41.1 | 54.8 | 53.1 | 52.1 | 28.7 | 29.1 | 28.7 |
| 18–24 years | 51.6 | 53.5 | 51.2 | 61.5 | 63.1 | 59.3 | 40.2 | 41.7 | 41.9 |
| 25–44 years | 40.2 | 38.5 | 38.2 | 53.0 | 50.0 | 50.0 | 25.8 | 25.4 | 24.9 |
| 45–64 years | 25.3 | 22.3 | 23.9 | 36.1 | 31.9 | 33.5 | 12.8 | 12.0 | 13.2 |
| 45–54 years | 28.5 | 25.5 | 26.3 | 40.2 | 35.9 | 37.0 | 15.2 | 14.3 | 14.9 |
| 55–64 years | 19.5 | 16.9 | 19.8 | 28.8 | 25.1 | 28.0 | 8.3 | 8.2 | 10.2 |
| 65 years and over | 11.2 | 9.2 | 8.4 | 17.8 | 14.0 | 12.5 | 4.3 | 3.7 | 4.2 |
| 65–74 years | 13.8 | 12.4 | 10.8 | 21.6 | 17.9 | 16.1 | 5.4 | 5.5 | 5.0 |
| 75 years and over | 6.6 | 4.5 | 5.2 | 10.8 | 7.5 | 7.3 | *2.5 | * | *3.1 |
| Race[2,4] | | | | | | | | | |
| White only | 33.3 | 31.8 | 31.9 | 44.4 | 41.8 | 41.3 | 20.9 | 20.7 | 21.4 |
| Black or African American only | 23.9 | 22.7 | 21.6 | 32.0 | 29.2 | 31.0 | 15.0 | 15.3 | 12.2 |
| American Indian and Alaska Native only | 54.4 | 40.8 | 34.1 | 70.5 | 49.0 | 43.8 | 37.6 | 38.6 | *23.1 |
| Asian only | 25.6 | 20.7 | 15.3 | 30.8 | 26.8 | 20.3 | 16.6 | *9.6 | *8.4 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| Hispanic origin and race[2,4] | | | | | | | | | |
| Hispanic or Latino | 37.0 | 34.3 | 30.2 | 46.6 | 45.0 | 39.1 | 22.4 | 17.5 | 15.4 |
| Mexican | 39.1 | 39.4 | 34.2 | 50.2 | 50.7 | 43.0 | 20.3 | 19.6 | 18.2 |
| Not Hispanic or Latino | 31.9 | 30.3 | 30.6 | 42.8 | 39.7 | 40.1 | 20.0 | 20.0 | 20.6 |
| White only | 33.2 | 31.8 | 32.3 | 44.5 | 41.8 | 41.9 | 21.0 | 21.0 | 22.1 |
| Black or African American only | 23.7 | 22.8 | 21.2 | 32.0 | 29.3 | 30.5 | 14.5 | 15.4 | 11.9 |

See footnotes at end of table.



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## Table 68 (page 3 of 3). Alcohol consumption by adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Both sexes | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of adults with five or more drinks on at least 1 day in the past year among current drinkers | | | | | | | | |
| Geographic region[2] | | | | | | | | | |
| Northeast | 31.4 | 29.1 | 29.1 | 43.3 | 39.2 | 37.2 | 19.0 | 18.9 | 21.0 |
| Midwest | 33.7 | 33.8 | 33.9 | 44.6 | 43.5 | 44.6 | 21.6 | 22.9 | 22.5 |
| South | 30.9 | 28.5 | 28.2 | 40.6 | 37.3 | 36.9 | 19.3 | 17.8 | 17.9 |
| West | 33.5 | 31.7 | 31.5 | 44.7 | 41.9 | 41.7 | 20.7 | 19.8 | 19.6 |
| Location of residence[2] | | | | | | | | | |
| Within MSA[5] | 31.7 | 30.4 | 29.9 | 42.4 | 39.7 | 39.0 | 19.9 | 19.8 | 19.8 |
| Outside MSA[5] | 34.9 | 31.7 | 33.2 | 45.7 | 42.0 | 43.7 | 21.2 | 19.9 | 21.2 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Drinking status categories are based on self-reported responses to questions about alcohol consumption. Lifetime abstainers had fewer than 12 drinks in their lifetime. Former drinkers had at least 12 drinks in their lifetime and none in the past year. Former infrequent drinkers are former drinkers who had fewer than 12 drinks in any one year. Former regular drinkers are former drinkers who had at least 12 drinks in any one year. Current drinkers had 12 drinks in their lifetime and at least one drink in the past year. Current infrequent drinkers are current drinkers who had fewer than 12 drinks in the past year. Current regular drinkers are current drinkers who had at least 12 drinks in the past year. See Appendix II, Alcohol consumption.

[2]Estimates are age adjusted to the year 2000 standard population using four age groups: 18–24 years, 25–44 years, 45–64 years, and 65 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[3]The totals for current and former drinkers include a small number of adults who did not provide sufficient information on frequency or amount of drinking; infrequent or regular drinking status could not be determined for these current and former drinkers.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]MSA is metropolitan statistical area.

[6]Level of alcohol consumption categories are based on self-reported responses to questions about average alcohol consumption and defined as follows: light drinkers: three drinks or fewer per week; moderate drinkers: more than three drinks and up to 14 drinks per week for men and more than three drinks and up to seven drinks per week for women; heavier drinkers: more than 14 drinks per week for men and more than seven drinks per week for women. (Most drinking guidelines consider more than seven drinks per week to be a heavier level of consumption for women. U.S. Department of Agriculture: Dietary Guidelines for Americans, 2000, 5th edition.)

[7]Percent based on current drinkers with known frequency and amount of drinking.

NOTES: Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. For more data on alcohol consumption see the Early Release reports on the National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample adult questionnaires.



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## Table 69 (page 1 of 2). Hypertension (elevated blood pressure) among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1988–94 and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, age, race and Hispanic origin[1], and poverty status | Elevated blood pressure or taking antihypertensive medication[2,3] | | Elevated blood pressure[2] | |
|---|---|---|---|---|
| | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 |
| 20–74 years, age adjusted[4] | Percent of population (standard error) | | | |
| Both sexes[5,6] | 21.7 | 25.6 | 15.4 | 16.4 |
| Male | 23.4 | 25.2 | 18.2 | 16.3 |
| Female[5] | 20.0 | 25.7 | 12.6 | 16.1 |
| Not Hispanic or Latino: | | | | |
| White only, male | 22.6 | 24.0 | 17.3 | 14.8 |
| White only, female[5] | 18.4 | 23.3 | 11.2 | 14.1 |
| Black or African American only, male | 34.3 | 36.9 | 27.9 | 25.6 |
| Black or African American only, female[5] | 35.0 | 39.5 | 23.5 | 25.7 |
| Mexican male | 23.4 | 22.6 | 19.1 | 18.2 |
| Mexican female[5] | 21.0 | 23.4 | 16.5 | 17.2 |
| Poverty status:[7] | | | | |
| Poor | 27.5 | 29.0 | 19.0 | 19.3 |
| Near poor | 22.6 | 29.3 | 15.8 | 19.5 |
| Nonpoor | 20.4 | 24.1 | 14.6 | 14.9 |
| 20 years and over, age adjusted[4] | | | | |
| Both sexes[5,6] | 25.5 | 30.0 | 18.5 | 19.9 |
| Male | 26.4 | 28.8 | 20.6 | 19.1 |
| Female[5] | 24.4 | 30.6 | 16.4 | 20.2 |
| Not Hispanic or Latino: | | | | |
| White only, male | 25.6 | 27.6 | 19.7 | 17.6 |
| White only, female[5] | 23.0 | 28.5 | 15.1 | 18.5 |
| Black or African American only, male | 37.5 | 40.6 | 30.3 | 28.2 |
| Black or African American only, female[5] | 38.3 | 43.5 | 26.4 | 28.9 |
| Mexican male | 26.9 | 26.8 | 22.2 | 21.5 |
| Mexican female[5] | 25.0 | 27.9 | 20.4 | 21.2 |
| Poverty status:[7] | | | | |
| Poor | 31.7 | 33.9 | 22.5 | 23.3 |
| Near poor | 26.6 | 33.5 | 19.3 | 23.0 |
| Nonpoor | 23.9 | 28.2 | 17.5 | 18.2 |
| 20 years and over, crude | | | | |
| Both sexes[5,6] | 24.1 | 30.2 | 17.6 | 19.9 |
| Male | 23.8 | 27.6 | 18.7 | 18.2 |
| Female[5] | 24.4 | 32.7 | 16.5 | 21.6 |
| Not Hispanic or Latino: | | | | |
| White only, male | 24.3 | 28.3 | 18.7 | 17.8 |
| White only, female[5] | 24.6 | 32.9 | 16.4 | 21.6 |
| Black or African American only, male | 31.1 | 35.9 | 25.5 | 25.2 |
| Black or African American only, female[5] | 32.5 | 42.1 | 22.2 | 27.3 |
| Mexican male | 16.4 | 16.5 | 13.9 | 14.1 |
| Mexican female[5] | 15.9 | 18.8 | 12.7 | 13.8 |
| Poverty status:[7] | | | | |
| Poor | 25.7 | 30.3 | 18.7 | 21.1 |
| Near poor | 26.7 | 34.8 | 19.8 | 24.1 |
| Nonpoor | 22.2 | 28.2 | 16.2 | 17.8 |
| Male | | | | |
| 20–34 years | 7.1 | *8.1 | 6.6 | *7.3 |
| 35–44 years | 17.1 | 17.1 | 15.2 | 12.1 |
| 45–54 years | 29.2 | 31.0 | 21.9 | 20.4 |
| 55–64 years | 40.6 | 45.0 | 28.4 | 24.8 |
| 65–74 years | 54.4 | 59.6 | 39.9 | 34.9 |
| 75 years and over | 60.4 | 69.0 | 49.7 | 50.6 |
| Female[5] | | | | |
| 20–34 years | 2.9 | *2.7 | *2.4 | *1.4 |
| 35–44 years | 11.2 | 15.1 | 6.4 | 8.5 |
| 45–54 years | 23.9 | 31.8 | 13.7 | 19.1 |
| 55–64 years | 42.6 | 53.9 | 27.0 | 31.9 |
| 65–74 years | 56.2 | 72.7 | 38.2 | 53.0 |
| 75 years and over | 73.6 | 83.1 | 59.9 | 64.4 |

See footnotes at end of table.

## Table 69 (page 2 of 2). Hypertension (elevated blood pressure) among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1988–94 and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
[1]Persons of Mexican origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[2]Elevated blood pressure is defined as having systolic pressure of at least 140 mmHg or diastolic pressure of at least 90 mmHg. Those with elevated blood pressure may be taking prescribed medicine for high blood pressure.
[3]Respondents were asked, "Are you now taking prescribed medicine for your high blood pressure?"
[4]Age adjusted to the 2000 standard population using five age groups. Age-adjusted estimates may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.
[5]Excludes pregnant women.
[6]Includes persons of all races and Hispanic origins, not just those shown separately.
[7]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Persons with unknown poverty status are excluded. See Appendix II, Family income; Poverty level.

NOTES: Percents are based on the average of blood pressure measurements taken. In 1999–2002, 78 percent of participants had 3 blood pressure readings. See *Health, United States, 2003* table 66 for a longer trend based on a single blood pressure measurement, which provides comparable data across five time periods (1960–62 through 1999–2000). Data have been revised and differ from the previous edition of *Health, United States*. Estimates for persons 20 years and over are used for setting and tracking *Healthy People 2010* objectives. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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## Table 70 (page 1 of 3). Serum cholesterol levels among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| *Sex, age, race and Hispanic origin*[1], and poverty status | *1960–62* | *1971–74* | *1976–80*[2] | *1988–94* | *1999–2002* |
|---|---|---|---|---|---|
| 20–74 years, age adjusted[3] | | | Percent of population with high serum cholesterol | | |
| Both sexes[4] | 33.3 | 28.6 | 27.8 | 19.7 | 17.0 |
| Male | 30.6 | 27.9 | 26.4 | 18.8 | 16.9 |
| Female | 35.6 | 29.1 | 28.8 | 20.5 | 17.0 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | 26.4 | 18.7 | 17.0 |
| White only, female | --- | --- | 29.6 | 20.7 | 17.4 |
| Black or African American only, male | --- | --- | 25.5 | 16.4 | 12.5 |
| Black or African American only, female | --- | --- | 26.3 | 19.9 | 16.6 |
| Mexican male | --- | --- | 20.3 | 18.7 | 17.6 |
| Mexican female | --- | --- | 20.5 | 17.7 | 12.7 |
| Poverty status:[5] | | | | | |
| Poor | --- | 24.4 | 23.5 | 19.3 | 17.8 |
| Near poor | --- | 28.9 | 26.5 | 19.4 | 18.8 |
| Nonpoor | --- | 28.9 | 29.0 | 19.6 | 16.5 |
| 20 years and over, age adjusted[3] | | | | | |
| Both sexes[4] | --- | --- | --- | 20.8 | 17.3 |
| Male | --- | --- | --- | 19.0 | 16.4 |
| Female | --- | --- | --- | 22.0 | 17.8 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 18.8 | 16.5 |
| White only, female | --- | --- | --- | 22.2 | 18.1 |
| Black or African American only, male | --- | --- | --- | 16.9 | 12.4 |
| Black or African American only, female | --- | --- | --- | 21.4 | 17.7 |
| Mexican male | --- | --- | --- | 18.5 | 17.4 |
| Mexican female | --- | --- | --- | 18.7 | 13.8 |
| Poverty status:[5] | | | | | |
| Poor | --- | --- | --- | 20.6 | 18.3 |
| Near poor | --- | --- | --- | 20.6 | 19.1 |
| Nonpoor | --- | --- | --- | 20.4 | 16.5 |
| 20 years and over, crude | | | | | |
| Both sexes[4] | --- | --- | --- | 19.6 | 17.3 |
| Male | --- | --- | --- | 17.7 | 16.6 |
| Female | --- | --- | --- | 21.3 | 18.0 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 18.0 | 16.9 |
| White only, female | --- | --- | --- | 22.5 | 19.1 |
| Black or African American only, male | --- | --- | --- | 14.7 | 12.2 |
| Black or African American only, female | --- | --- | --- | 18.2 | 16.1 |
| Mexican male | --- | --- | --- | 15.4 | 15.0 |
| Mexican female | --- | --- | --- | 14.3 | 10.7 |
| Poverty status:[5] | | | | | |
| Poor | --- | --- | --- | 17.6 | 16.4 |
| Near poor | --- | --- | --- | 19.8 | 18.2 |
| Nonpoor | --- | --- | --- | 19.5 | 16.9 |
| Male | | | | | |
| 20–34 years | 15.1 | 12.4 | 11.9 | 8.2 | 9.8 |
| 35–44 years | 33.9 | 31.8 | 27.9 | 19.4 | 19.8 |
| 45–54 years | 39.2 | 37.5 | 36.9 | 26.6 | 23.6 |
| 55–64 years | 41.6 | 36.2 | 36.8 | 28.0 | 19.9 |
| 65–74 years | 38.0 | 34.7 | 31.7 | 21.9 | 13.7 |
| 75 years and over | --- | --- | --- | 20.4 | 10.2 |
| Female | | | | | |
| 20–34 years | 12.4 | 10.9 | 9.8 | 7.3 | 8.9 |
| 35–44 years | 23.1 | 19.3 | 20.7 | 12.3 | 12.4 |
| 45–54 years | 46.9 | 38.7 | 40.5 | 26.7 | 21.4 |
| 55–64 years | 70.1 | 53.1 | 52.9 | 40.9 | 25.6 |
| 65–74 years | 68.5 | 57.7 | 51.6 | 41.3 | 32.3 |
| 75 years and over | --- | --- | --- | 38.2 | 26.5 |

See footnotes at end of table.



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## Table 70 (page 2 of 3). Serum cholesterol levels among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| *Sex, age, race and Hispanic origin*[1], and poverty status | *1960–62* | *1971–74* | *1976–80*[2] | *1988–94* | *1999–2002* |
|---|---|---|---|---|---|
| 20–74 years, age adjusted[3] | | | Mean serum cholesterol level, mg/dL | | |
| Both sexes[4] | 222 | 216 | 215 | 205 | 203 |
| Male | 220 | 216 | 213 | 204 | 203 |
| Female | 224 | 217 | 216 | 205 | 202 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | 213 | 204 | 202 |
| White only, female | --- | --- | 216 | 206 | 204 |
| Black or African American only, male | --- | --- | 211 | 201 | 195 |
| Black or African American only, female | --- | --- | 216 | 204 | 200 |
| Mexican male | --- | --- | 209 | 206 | 205 |
| Mexican female | --- | --- | 209 | 204 | 198 |
| Poverty status:[5] | | | | | |
| Poor | --- | 211 | 211 | 203 | 200 |
| Near poor | --- | 217 | 213 | 203 | 203 |
| Nonpoor | --- | 217 | 216 | 206 | 203 |
| 20 years and over, age adjusted[3] | | | | | |
| Both sexes[4] | --- | --- | --- | 206 | 203 |
| Male | --- | --- | --- | 204 | 202 |
| Female | --- | --- | --- | 207 | 204 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 205 | 202 |
| White only, female | --- | --- | --- | 208 | 205 |
| Black or African American only, male | --- | --- | --- | 202 | 195 |
| Black or African American only, female | --- | --- | --- | 207 | 202 |
| Mexican male | --- | --- | --- | 206 | 204 |
| Mexican female | --- | --- | --- | 206 | 199 |
| Poverty status:[5] | | | | | |
| Poor | --- | --- | --- | 205 | 201 |
| Near poor | --- | --- | --- | 205 | 204 |
| Nonpoor | --- | --- | --- | 207 | 203 |
| 20 years and over, crude | | | | | |
| Both sexes[4] | --- | --- | --- | 204 | 203 |
| Male | --- | --- | --- | 202 | 202 |
| Female | --- | --- | --- | 206 | 204 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 203 | 203 |
| White only, female | --- | --- | --- | 208 | 206 |
| Black or African American only, male | --- | --- | --- | 198 | 194 |
| Black or African American only, female | --- | --- | --- | 201 | 199 |
| Mexican male | --- | --- | --- | 199 | 200 |
| Mexican female | --- | --- | --- | 198 | 194 |
| Poverty status:[5] | | | | | |
| Poor | --- | --- | --- | 200 | 198 |
| Near poor | --- | --- | --- | 202 | 202 |
| Nonpoor | --- | --- | --- | 205 | 204 |
| Male | | | | | |
| 20–34 years | 198 | 194 | 192 | 186 | 188 |
| 35–44 years | 227 | 221 | 217 | 206 | 207 |
| 45–54 years | 231 | 229 | 227 | 216 | 215 |
| 55–64 years | 233 | 229 | 229 | 216 | 212 |
| 65–74 years | 230 | 226 | 221 | 212 | 202 |
| 75 years and over | --- | --- | --- | 205 | 195 |
| Female | | | | | |
| 20–34 years | 194 | 191 | 189 | 184 | 185 |
| 35–44 years | 214 | 207 | 207 | 195 | 198 |
| 45–54 years | 237 | 232 | 232 | 217 | 211 |
| 55–64 years | 262 | 245 | 249 | 235 | 221 |
| 65–74 years | 266 | 250 | 246 | 233 | 224 |
| 75 years and over | --- | --- | --- | 229 | 217 |

See footnotes at end of table.



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## Table 70 (page 3 of 3). Serum cholesterol levels among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

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* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
- - - Data not available.
[1]Persons of Mexican origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[2]Data for Mexicans are for 1982–84. See Appendix I, National Health and Nutrition Examination Survey (NHANES).
[3]Age adjusted to the 2000 standard population using five age groups. Age-adjusted estimates may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.
[4]Includes persons of all races and Hispanic origins, not just those shown separately.
[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Persons with unknown poverty status are excluded. See Appendix II, Family income; Poverty level.

NOTES: High serum cholesterol is defined as greater than or equal to 240 mg/dL (6.20 mmol/L). Risk levels have been defined by the Second Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults. National Heart, Lung, and Blood Institute, National Institutes of Health. September 1993. (Summarized in *JAMA* 269(23):3015–23. June 16, 1993.) Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982–84), and National Health Examination Survey (1960–62).



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## Table 71. Mean energy and macronutrient intake among persons 20–74 years of age, according to sex and age: United States, 1971–74, 1976–80, 1988–94, and 1999–2000

[Data are based on dietary recall interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex and age | 1971–1974 | 1976–1980 | 1988–1994 | 1999–2000 |
|---|---|---|---|---|
| | | Energy intake in kcals | | |
| Male, age adjusted[1] | 2,450 | 2,439 | 2,666 | 2,618 |
| 20–39 years | 2,784 | 2,753 | 2,965 | 2,828 |
| 40–59 years | 2,303 | 2,315 | 2,568 | 2,590 |
| 60–74 years | 1,918 | 1,906 | 2,105 | 2,123 |
| Female, age adjusted[1] | 1,542 | 1,522 | 1,798 | 1,877 |
| 20–39 years | 1,652 | 1,643 | 1,958 | 2,028 |
| 40–59 years | 1,510 | 1,473 | 1,736 | 1,828 |
| 60–74 years | 1,325 | 1,322 | 1,522 | 1,596 |
| | | Percent kcals from carbohydrate | | |
| Male, age adjusted[1] | 42.4 | 42.6 | 48.2 | 49.0 |
| 20–39 years | 42.2 | 43.1 | 48.1 | 50.0 |
| 40–59 years | 41.6 | 41.5 | 47.8 | 47.5 |
| 60–74 years | 44.8 | 44.1 | 49.7 | 49.7 |
| Female, age adjusted[1] | 45.4 | 46.0 | 50.6 | 51.6 |
| 20–39 years | 45.8 | 46.0 | 50.6 | 52.6 |
| 40–59 years | 44.4 | 45.0 | 50.0 | 50.9 |
| 60–74 years | 46.8 | 48.6 | 52.5 | 51.1 |
| | | Percent kcals from total fat | | |
| Male, age adjusted[1] | 36.9 | 36.8 | 33.9 | 32.8 |
| 20–39 years | 37.0 | 36.2 | 34.0 | 32.1 |
| 40–59 years | 36.9 | 37.3 | 34.2 | 33.4 |
| 60–74 years | 36.4 | 36.9 | 32.9 | 33.0 |
| Female, age adjusted[1] | 36.1 | 36.0 | 33.4 | 32.8 |
| 20–39 years | 36.3 | 36.0 | 33.6 | 32.3 |
| 40–59 years | 36.3 | 36.5 | 34.0 | 33.1 |
| 60–74 years | 34.9 | 34.7 | 31.6 | 33.3 |
| | | Percent kcals from saturated fat | | |
| Male, age adjusted[1] | 13.5 | 13.2 | 11.3 | 10.9 |
| 20–39 years | 13.6 | 13.1 | 11.5 | 10.8 |
| 40–59 years | 13.5 | 13.5 | 11.3 | 11.1 |
| 60–74 years | 13.3 | 13.1 | 10.9 | 10.7 |
| Female, age adjusted[1] | 13.0 | 12.5 | 11.2 | 11.0 |
| 20–39 years | 13.0 | 12.6 | 11.4 | 10.9 |
| 40–59 years | 13.1 | 12.7 | 11.3 | 11.1 |
| 60–74 years | 12.4 | 11.8 | 10.4 | 10.9 |

[1]Age adjusted to the 2000 standard population using three age groups, 20–39 years, 40–59 years, and 60–74 years. See Appendix II, Age adjustment.

NOTES: Estimates of energy intake include kilocalories (kcals) from all foods and beverages, including alcoholic beverages, consumed during the preceding 24 hours. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey. Wright JD, Kennedy-Stephenson J, Wang CY, McDowell MA, Johnson CL. Trends in intake of energy and macronutrients - United States, 1971–2000. MMWR 53(04):80–2, 2004.



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## Table 72 (page 1 of 2). Leisure-time physical activity among adults 18 years of age and over, according to selected characteristics: United States, selected years 1998–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Inactive[1] | | | Some leisure-time activity[1] | | | Regular leisure-time activity[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1998 | 2002 | 2003 | 1998 | 2002 | 2003 | 1998 | 2002 | 2003 |
| | Percent of adults | | | | | | | | |
| Total, age-adjusted[2,3] | 40.5 | 38.2 | 37.6 | 30.0 | 30.1 | 29.5 | 29.5 | 31.7 | 32.8 |
| Total, crude[3] | 40.2 | 38.1 | 37.6 | 30.0 | 30.1 | 29.6 | 29.8 | 31.7 | 32.8 |
| **Age** | | | | | | | | | |
| 18–44 years | 35.2 | 33.1 | 32.9 | 31.4 | 31.0 | 30.3 | 33.5 | 35.9 | 36.8 |
| 18–24 years | 32.8 | 32.9 | 29.6 | 30.1 | 28.3 | 28.2 | 37.1 | 38.8 | 42.3 |
| 25–44 years | 35.9 | 33.2 | 34.0 | 31.8 | 31.9 | 31.0 | 32.4 | 34.9 | 34.9 |
| 45–64 years | 41.2 | 38.4 | 38.2 | 30.6 | 31.5 | 30.5 | 28.2 | 30.1 | 31.3 |
| 45–54 years | 38.9 | 37.5 | 36.5 | 31.4 | 31.2 | 30.8 | 29.8 | 31.3 | 32.8 |
| 55–64 years | 44.9 | 39.7 | 40.8 | 29.3 | 32.0 | 30.1 | 25.8 | 28.3 | 29.2 |
| 65 years and over | 55.4 | 53.6 | 51.4 | 24.7 | 24.8 | 25.3 | 19.9 | 21.6 | 23.3 |
| 65–74 years | 49.1 | 46.9 | 45.8 | 26.5 | 27.1 | 25.8 | 24.4 | 26.0 | 28.4 |
| 75 years and over | 63.3 | 61.3 | 57.5 | 22.4 | 22.2 | 24.8 | 14.3 | 16.6 | 17.7 |
| **Sex[2]** | | | | | | | | | |
| Male | 37.8 | 36.1 | 35.4 | 28.7 | 28.8 | 29.2 | 33.5 | 35.1 | 35.4 |
| Female | 42.9 | 40.1 | 39.5 | 31.1 | 31.3 | 29.9 | 26.0 | 28.7 | 30.6 |
| **Sex and age** | | | | | | | | | |
| Male: | | | | | | | | | |
| 18–44 years | 32.0 | 30.6 | 30.9 | 30.7 | 29.7 | 29.5 | 37.2 | 39.7 | 39.6 |
| 45–54 years | 37.7 | 37.5 | 36.4 | 29.6 | 29.8 | 30.5 | 32.6 | 32.8 | 33.2 |
| 55–64 years | 44.5 | 39.1 | 39.5 | 26.9 | 30.9 | 29.7 | 28.6 | 30.0 | 30.8 |
| 65–74 years | 45.3 | 44.3 | 43.0 | 23.6 | 26.1 | 24.9 | 31.1 | 29.6 | 32.1 |
| 75 years and over | 57.4 | 55.6 | 48.1 | 21.6 | 21.0 | 28.9 | 20.9 | 23.5 | 23.0 |
| Female: | | | | | | | | | |
| 18–44 years | 38.2 | 35.6 | 34.9 | 32.0 | 32.3 | 31.1 | 29.8 | 32.1 | 34.0 |
| 45–54 years | 39.9 | 37.5 | 36.5 | 33.0 | 32.6 | 31.1 | 27.1 | 29.9 | 32.4 |
| 55–64 years | 45.2 | 40.2 | 41.9 | 31.5 | 33.0 | 30.4 | 23.3 | 26.8 | 27.6 |
| 65–74 years | 52.2 | 49.0 | 48.0 | 28.7 | 27.9 | 26.6 | 19.0 | 23.1 | 25.4 |
| 75 years and over | 67.0 | 64.8 | 63.7 | 22.9 | 22.9 | 22.0 | 10.1 | 12.3 | 14.3 |
| **Race[2,4]** | | | | | | | | | |
| White only | 38.8 | 36.5 | 36.3 | 30.5 | 30.4 | 29.8 | 30.7 | 33.1 | 33.9 |
| Black or African American only | 52.2 | 48.5 | 48.5 | 25.2 | 27.1 | 26.1 | 22.6 | 24.4 | 25.5 |
| American Indian and Alaska Native only | 49.2 | 45.4 | 54.7 | 19.0 | 28.9 | 20.0 | 31.8 | 25.7 | 25.2 |
| Asian only | 39.4 | 39.0 | 35.9 | 35.2 | 33.1 | 31.1 | 25.4 | 27.9 | 33.1 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 30.6 | 33.3 | --- | 32.5 | 34.1 | --- | 36.9 | 32.6 |
| **Hispanic origin and race[2,4]** | | | | | | | | | |
| Hispanic or Latino | 55.5 | 53.9 | 51.9 | 23.4 | 23.5 | 23.6 | 21.1 | 22.7 | 24.4 |
| Mexican | 56.7 | 54.9 | 52.0 | 23.9 | 23.1 | 23.7 | 19.4 | 22.0 | 24.3 |
| Not Hispanic or Latino | 38.8 | 36.0 | 35.5 | 30.7 | 30.9 | 30.3 | 30.5 | 33.1 | 34.2 |
| White only | 36.7 | 33.9 | 33.4 | 31.3 | 31.5 | 30.9 | 32.0 | 34.6 | 35.8 |
| Black or African American only | 52.2 | 48.6 | 48.5 | 25.1 | 26.9 | 26.0 | 22.6 | 24.6 | 25.5 |
| **Education[5,6]** | | | | | | | | | |
| No high school diploma or GED | 64.8 | 63.2 | 61.2 | 19.4 | 19.5 | 20.6 | 15.8 | 17.2 | 18.1 |
| High school diploma or GED | 47.6 | 45.4 | 45.5 | 28.7 | 28.5 | 27.5 | 23.7 | 26.2 | 27.0 |
| Some college or more | 30.2 | 28.1 | 28.1 | 34.3 | 34.7 | 33.8 | 35.5 | 37.1 | 38.2 |

See footnotes at end of table.



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## Table 72 (page 2 of 2). Leisure-time physical activity among adults 18 years of age and over, according to selected characteristics: United States, selected years 1998–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Inactive[1] | | | Some leisure-time activity[1] | | | Regular leisure-time activity[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1998 | 2002 | 2003 | 1998 | 2002 | 2003 | 1998 | 2002 | 2003 |
| Poverty status[2,7] | Percent of adults | | | | | | | | |
| Poor | 59.4 | 56.5 | 55.1 | 20.5 | 22.5 | 22.0 | 20.1 | 21.0 | 22.9 |
| Near poor | 52.2 | 50.5 | 50.5 | 26.2 | 25.8 | 24.8 | 21.6 | 23.7 | 24.7 |
| Nonpoor | 34.7 | 32.3 | 31.4 | 32.4 | 32.3 | 32.0 | 33.0 | 35.4 | 36.7 |
| Hispanic origin and race and poverty status[2,4,7] | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 68.6 | 65.5 | 64.2 | 18.0 | 19.0 | 19.1 | 13.4 | 15.5 | 16.7 |
| Near poor | 60.8 | 61.0 | 58.8 | 21.2 | 20.5 | 21.0 | 18.0 | 18.5 | 20.3 |
| Nonpoor | 45.6 | 45.5 | 41.8 | 27.6 | 26.3 | 27.3 | 26.8 | 28.1 | 30.9 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 53.7 | 49.8 | 49.3 | 22.5 | 25.1 | 22.6 | 23.8 | 25.1 | 28.0 |
| Near poor | 49.0 | 46.4 | 45.7 | 27.6 | 27.5 | 27.4 | 23.4 | 26.1 | 27.0 |
| Nonpoor | 32.7 | 29.8 | 29.2 | 32.9 | 32.9 | 32.4 | 34.4 | 37.3 | 38.3 |
| Black or African American only: | | | | | | | | | |
| Poor | 64.3 | 64.6 | 61.3 | 17.4 | 18.5 | 20.9 | 18.3 | 16.8 | 17.8 |
| Near poor | 55.6 | 52.8 | 55.3 | 24.4 | 25.4 | 22.9 | 19.9 | 21.8 | 21.8 |
| Nonpoor | 46.0 | 40.6 | 40.7 | 28.7 | 30.8 | 29.1 | 25.3 | 28.6 | 30.2 |
| Geographic region[2] | | | | | | | | | |
| Northeast | 39.4 | 35.0 | 34.4 | 31.3 | 31.5 | 29.2 | 29.4 | 33.5 | 36.4 |
| Midwest | 37.3 | 35.5 | 34.7 | 31.7 | 32.7 | 32.2 | 31.0 | 31.8 | 33.1 |
| South | 46.9 | 42.5 | 42.6 | 27.1 | 28.2 | 27.7 | 26.0 | 29.2 | 29.7 |
| West | 33.9 | 36.5 | 34.9 | 31.6 | 29.0 | 29.9 | 34.6 | 34.5 | 35.2 |
| Location of residence[2] | | | | | | | | | |
| Within MSA[8] | 39.3 | 36.9 | 36.4 | 30.6 | 30.7 | 29.9 | 30.0 | 32.4 | 33.7 |
| Outside MSA[8] | 44.7 | 43.5 | 42.4 | 27.5 | 27.7 | 28.1 | 27.8 | 28.9 | 29.5 |

* Estimates are considered unreliable. Data not shown have a relative standard error of greater than 30 percent.
- - - Data not available.
[1]Respondents were asked about the frequency and duration of vigorous and light/moderate physical activity during leisure time. Adults classified as inactive reported no sessions of light/moderate or vigorous leisure-time activity of at least 10 minutes duration; adults classified with some leisure-time activity reported at least one session of light/moderate or vigorous physical activity of at least 10 minutes duration but did not meet the definition for regular leisure-time activity; adults classified with regular leisure-time activity reported three or more sessions per week of vigorous activity lasting at least 20 minutes or five or more sessions per week of light/moderate activity lasting at least 30 minutes in duration. See Appendix II, Physical activity, leisure-time.
[2]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.
[3]Includes all other races not shown separately and unknown education.
[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[5]Estimates are for persons 25 years of age and over and are age adjusted to the year 2000 standard population using five age groups: 25–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.
[6]GED stands for General Educational Development high school equivalency diploma. See Appendix II, Education.
[7]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 31–36 percent of adults 18 years of age and over in 1998–2003. See Appendix II, Family income; Poverty level.
[8]MSA is metropolitan statistical area.

NOTES: For more data on leisure-time physical activity, see National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm. Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.
Startingwith *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample adult questionnaires.



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## Table 73 (page 1 of 4). Overweight, obesity, and healthy weight among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on measured height and weight of a sample of the civilian noninstitutionalized population]

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| Sex, age, race and Hispanic origin[1], and poverty status | Overweight[2] | | | | |
|---|---|---|---|---|---|
| | 1960–62 | 1971–74 | 1976–80[3] | 1988–94 | 1999–2002 |
| 20–74 years, age adjusted[4] | Percent of population | | | | |
| Both sexes[5,6] | 44.8 | 47.7 | 47.4 | 56.0 | 65.2 |
| Male | 49.5 | 54.7 | 52.9 | 61.0 | 68.8 |
| Female[5] | 40.2 | 41.1 | 42.0 | 51.2 | 61.7 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | 53.8 | 61.6 | 69.5 |
| White only, female[5] | --- | --- | 38.7 | 47.2 | 57.0 |
| Black or African American only, male | --- | --- | 51.3 | 58.2 | 62.0 |
| Black or African American only, female[5] | --- | --- | 62.6 | 68.5 | 77.5 |
| Mexican male | --- | --- | 61.6 | 69.4 | 74.1 |
| Mexican female[5] | --- | --- | 61.7 | 69.6 | 71.4 |
| Poverty status:[7] | | | | | |
| Poor | --- | 49.3 | 50.0 | 59.8 | 65.2 |
| Near poor | --- | 50.9 | 49.0 | 58.2 | 68.0 |
| Nonpoor | --- | 46.7 | 46.6 | 54.5 | 64.9 |
| 20 years and over, age adjusted[4] | | | | | |
| Both sexes[5,6] | --- | --- | --- | 56.0 | 65.1 |
| Male | --- | --- | --- | 60.9 | 68.8 |
| Female[5] | --- | --- | --- | 51.4 | 61.6 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 61.6 | 69.4 |
| White only, female[5] | --- | --- | --- | 47.5 | 57.2 |
| Black or African American only, male | --- | --- | --- | 57.8 | 62.6 |
| Black or African American only, female[5] | --- | --- | --- | 68.2 | 77.1 |
| Mexican male | --- | --- | --- | 68.9 | 73.2 |
| Mexican female[5] | --- | --- | --- | 68.9 | 71.2 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 59.6 | 64.6 |
| Near poor | --- | --- | --- | 58.0 | 67.3 |
| Nonpoor | --- | --- | --- | 54.8 | 65.1 |
| 20 years and over, crude | | | | | |
| Both sexes[5,6] | --- | --- | --- | 54.9 | 65.2 |
| Male | --- | --- | --- | 59.4 | 68.6 |
| Female[5] | --- | --- | --- | 50.7 | 62.0 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 60.6 | 69.9 |
| White only, female[5] | --- | --- | --- | 47.4 | 58.2 |
| Black or African American only, male | --- | --- | --- | 56.7 | 61.7 |
| Black or African American only, female[5] | --- | --- | --- | 66.0 | 76.8 |
| Mexican male | --- | --- | --- | 63.9 | 70.1 |
| Mexican female[5] | --- | --- | --- | 65.9 | 69.3 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 56.8 | 62.5 |
| Near poor | --- | --- | --- | 55.7 | 66.2 |
| Nonpoor | --- | --- | --- | 54.2 | 65.8 |
| Male | | | | | |
| 20–34 years | 42.7 | 42.8 | 41.2 | 47.5 | 57.4 |
| 35–44 years | 53.5 | 63.2 | 57.2 | 65.5 | 70.5 |
| 45–54 years | 53.9 | 59.7 | 60.2 | 66.1 | 75.7 |
| 55–64 years | 52.2 | 58.5 | 60.2 | 70.5 | 75.4 |
| 65–74 years | 47.8 | 54.6 | 54.2 | 68.5 | 76.2 |
| 75 years and over | --- | --- | --- | 56.5 | 67.4 |
| Female[5] | | | | | |
| 20–34 years | 21.2 | 25.8 | 27.9 | 37.0 | 52.8 |
| 35–44 years | 37.2 | 40.5 | 40.7 | 49.6 | 60.6 |
| 45–54 years | 49.3 | 49.0 | 48.7 | 60.3 | 65.1 |
| 55–64 years | 59.9 | 54.5 | 53.7 | 66.3 | 72.2 |
| 65–74 years | 60.9 | 55.9 | 59.5 | 60.3 | 70.9 |
| 75 years and over | --- | --- | --- | 52.3 | 59.9 |

See footnotes at end of table.



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## Table 73 (page 2 of 4). Overweight, obesity, and healthy weight among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on measured height and weight of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, age, race and Hispanic origin[1], and poverty status | Obesity[8] | | | | |
|---|---|---|---|---|---|
| | 1960–62 | 1971–74 | 1976–80[3] | 1988–94 | 1999–2002 |
| 20–74 years, age adjusted[4] | Percent of population | | | | |
| Both sexes[5,6] | 13.3 | 14.6 | 15.1 | 23.3 | 31.1 |
| Male | 10.7 | 12.2 | 12.8 | 20.6 | 28.1 |
| Female[5] | 15.7 | 16.8 | 17.1 | 26.0 | 34.0 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | 12.4 | 20.7 | 28.7 |
| White only, female[5] | --- | --- | 15.4 | 23.3 | 31.3 |
| Black or African American only, male | --- | --- | 16.5 | 21.3 | 27.9 |
| Black or African American only, female[5] | --- | --- | 31.0 | 39.1 | 49.6 |
| Mexican male | --- | --- | 15.7 | 24.4 | 29.0 |
| Mexican female[5] | --- | --- | 26.6 | 36.1 | 38.9 |
| Poverty status:[7] | | | | | |
| Poor | --- | 20.7 | 21.9 | 29.2 | 36.0 |
| Near poor | --- | 18.4 | 18.7 | 26.6 | 35.4 |
| Nonpoor | --- | 12.4 | 12.9 | 21.4 | 29.2 |
| 20 years and over, age adjusted[4] | | | | | |
| Both sexes[5,6] | --- | --- | --- | 22.9 | 30.4 |
| Male | --- | --- | --- | 20.2 | 27.5 |
| Female[5] | --- | --- | --- | 25.5 | 33.2 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 20.3 | 28.0 |
| White only, female[5] | --- | --- | --- | 22.9 | 30.7 |
| Black or African American only, male | --- | --- | --- | 20.9 | 27.8 |
| Black or African American only, female[5] | --- | --- | --- | 38.3 | 48.8 |
| Mexican male | --- | --- | --- | 23.8 | 27.8 |
| Mexican female[5] | --- | --- | --- | 35.2 | 38.0 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 28.1 | 34.7 |
| Near poor | --- | --- | --- | 26.1 | 34.1 |
| Nonpoor | --- | --- | --- | 21.1 | 28.7 |
| 20 years and over, crude | | | | | |
| Both sexes[5,6] | --- | --- | --- | 22.3 | 30.5 |
| Male | --- | --- | --- | 19.5 | 27.5 |
| Female[5] | --- | --- | --- | 25.0 | 33.4 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 19.9 | 28.4 |
| White only, female[5] | --- | --- | --- | 22.7 | 31.3 |
| Black or African American only, male | --- | --- | --- | 20.7 | 27.5 |
| Black or African American only, female[5] | --- | --- | --- | 36.7 | 48.8 |
| Mexican male | --- | --- | --- | 20.6 | 26.0 |
| Mexican female[5] | --- | --- | --- | 33.3 | 37.0 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 25.9 | 33.0 |
| Near poor | --- | --- | --- | 24.3 | 32.8 |
| Nonpoor | --- | --- | --- | 20.9 | 29.3 |
| Male | | | | | |
| 20–34 years | 9.2 | 9.7 | 8.9 | 14.1 | 21.7 |
| 35–44 years | 12.1 | 13.5 | 13.5 | 21.5 | 28.5 |
| 45–54 years | 12.5 | 13.7 | 16.7 | 23.2 | 30.6 |
| 55–64 years | 9.2 | 14.1 | 14.1 | 27.2 | 35.5 |
| 65–74 years | 10.4 | 10.9 | 13.2 | 24.1 | 31.9 |
| 75 years and over | --- | --- | --- | 13.2 | 18.0 |
| Female[5] | | | | | |
| 20–34 years | 7.2 | 9.7 | 11.0 | 18.5 | 28.4 |
| 35–44 years | 14.7 | 17.7 | 17.8 | 25.5 | 32.1 |
| 45–54 years | 20.3 | 18.9 | 19.6 | 32.4 | 36.9 |
| 55–64 years | 24.4 | 24.1 | 22.9 | 33.7 | 42.1 |
| 65–74 years | 23.2 | 22.0 | 21.5 | 26.9 | 39.3 |
| 75 years and over | --- | --- | --- | 19.2 | 23.6 |

See footnotes at end of table.



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Page 4719

## Table 73 (page 3 of 4). Overweight, obesity, and healthy weight among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on measured height and weight of a sample of the civilian noninstitutionalized population]

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| Sex, age, race and Hispanic origin[1], and poverty status | Healthy weight[9] | | | | |
|---|---|---|---|---|---|
| | 1960–62 | 1971–74 | 1976–80[3] | 1988–94 | 1999–2002 |
| 20–74 years, age adjusted[4] | Percent of population | | | | |
| Both sexes[5,6] | 51.2 | 48.8 | 49.6 | 41.7 | 32.9 |
| Male | 48.3 | 43.0 | 45.4 | 37.9 | 30.2 |
| Female[5] | 54.1 | 54.3 | 53.7 | 45.3 | 35.6 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | 45.3 | 37.4 | 29.5 |
| White only, female[5] | --- | --- | 56.7 | 49.2 | 39.7 |
| Black or African American only, male | --- | --- | 46.6 | 40.0 | 35.5 |
| Black or African American only, female[5] | --- | --- | 35.0 | 28.9 | 21.3 |
| Mexican male | --- | --- | 37.1 | 29.8 | 25.6 |
| Mexican female[5] | --- | --- | 36.4 | 29.0 | 27.5 |
| Poverty status:[7] | | | | | |
| Poor | --- | 45.8 | 45.1 | 37.3 | 32.4 |
| Near poor | --- | 45.1 | 47.6 | 39.2 | 29.7 |
| Nonpoor | --- | 50.2 | 51.0 | 43.4 | 33.5 |
| 20 years and over, age adjusted[4] | | | | | |
| Both sexes[5,6] | --- | --- | --- | 41.6 | 33.0 |
| Male | --- | --- | --- | 37.9 | 30.2 |
| Female[5] | --- | --- | --- | 45.0 | 35.7 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 37.3 | 29.6 |
| White only, female[5] | --- | --- | --- | 48.7 | 39.5 |
| Black or African American only, male | --- | --- | --- | 40.1 | 34.7 |
| Black or African American only, female[5] | --- | --- | --- | 29.2 | 21.7 |
| Mexican male | --- | --- | --- | 30.2 | 26.5 |
| Mexican female[5] | --- | --- | --- | 29.7 | 27.5 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 37.5 | 32.7 |
| Near poor | --- | --- | --- | 39.3 | 30.5 |
| Nonpoor | --- | --- | --- | 43.1 | 33.4 |
| 20 years and over, crude | | | | | |
| Both sexes[5,6] | --- | --- | --- | 42.6 | 32.9 |
| Male | --- | --- | --- | 39.4 | 30.4 |
| Female[5] | --- | --- | --- | 45.7 | 35.4 |
| Not Hispanic or Latino: | | | | | |
| White only, male | --- | --- | --- | 38.2 | 29.2 |
| White only, female[5] | --- | --- | --- | 48.8 | 38.7 |
| Black or African American only, male | --- | --- | --- | 41.5 | 35.9 |
| Black or African American only, female[5] | --- | --- | --- | 31.2 | 21.9 |
| Mexican male | --- | --- | --- | 35.2 | 29.4 |
| Mexican female[5] | --- | --- | --- | 32.4 | 29.4 |
| Poverty status:[7] | | | | | |
| Poor | --- | --- | --- | 39.8 | 34.5 |
| Near poor | --- | --- | --- | 41.5 | 31.5 |
| Nonpoor | --- | --- | --- | 43.6 | 32.8 |
| Male | | | | | |
| 20–34 years | 55.3 | 54.7 | 57.1 | 51.1 | 40.3 |
| 35–44 years | 45.2 | 35.2 | 41.3 | 33.4 | 29.0 |
| 45–54 years | 44.8 | 38.5 | 38.7 | 33.6 | 24.0 |
| 55–64 years | 44.9 | 38.3 | 38.7 | 28.6 | 23.8 |
| 65–74 years | 46.2 | 42.1 | 42.3 | 30.1 | 22.8 |
| 75 years and over | --- | --- | --- | 40.9 | 32.0 |
| Female[5] | | | | | |
| 20–34 years | 67.6 | 65.8 | 65.0 | 57.9 | 42.6 |
| 35–44 years | 58.4 | 56.7 | 55.6 | 47.1 | 37.1 |
| 45–54 years | 47.6 | 49.3 | 48.7 | 37.2 | 33.1 |
| 55–64 years | 38.1 | 41.1 | 43.5 | 31.5 | 27.6 |
| 65–74 years | 36.4 | 40.6 | 37.8 | 37.0 | 26.4 |
| 75 years and over | --- | --- | --- | 43.0 | 36.9 |

See footnotes at end of table.



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## Table 73 (page 4 of 4). Overweight, obesity, and healthy weight among persons 20 years of age and over, according to sex, age, race and Hispanic origin, and poverty status: United States, 1960–62, 1971–74, 1976–80, 1988–94, and 1999–2002

[Data are based on measured height and weight of a sample of the civilian noninstitutionalized population]

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- - - Data not available.
[1]Persons of Mexican origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[2]Body mass index (BMI) greater than or equal to 25. See Appendix II, Body mass index.
[3]Data for Mexicans are for 1982–84. See Appendix I, National Health and Nutrition Examination Survey (NHANES).
[4]Age adjusted to the 2000 standard population using five age groups. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.
[5]Excludes pregnant women.
[6]Includes persons of all races and Hispanic origins, not just those shown separately.
[7]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Persons with unknown poverty status are excluded. See Appendix II, Family income; Poverty level.
[8]Body mass index (BMI) greater than or equal to 30.
[9]BMI of 18.5 to less than 25 kilograms/meter$^2$.

NOTES: Percents do not sum to 100 because the percent of persons with BMI less than 18.5 is not shown and the percent of persons with obesity is a subset of the percent with overweight. Height was measured without shoes; two pounds were deducted from data for 1960–62 to allow for weight of clothing. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982–84), and National Health Examination Survey (1960–62).



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## Table 74. Overweight among children and adolescents 6–19 years of age, according to sex, age, race and Hispanic origin, and poverty status: United States, selected years 1963–65 through 1999–2002

[Data are based on physical examinations of a sample of the civilian noninstitutionalized population]

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| Sex, age, race and Hispanic origin[1], and poverty status | 1963–65 1966–70[2] | 1971–74 | 1976–80[3] | 1988–94 | 1999–2002 |
|---|---|---|---|---|---|
| 6–11 years of age | | | Percent of population | | |
| Both sexes[4] | 4.2 | 4.0 | 6.5 | 11.3 | 15.8 |
| Boys | 4.0 | *4.3 | 6.6 | 11.6 | 16.9 |
| Not Hispanic or Latino: | | | | | |
| White only | --- | --- | 6.1 | 10.7 | 14.0 |
| Black or African American only | --- | --- | 6.8 | 12.3 | 17.0 |
| Mexican | --- | --- | 13.3 | 17.5 | 26.5 |
| Girls[5] | 4.5 | *3.6 | 6.4 | 11.0 | 14.7 |
| Not Hispanic or Latino: | | | | | |
| White only | --- | --- | 5.2 | *9.8 | 13.1 |
| Black or African American only | --- | --- | 11.2 | 17.0 | 22.8 |
| Mexican | --- | --- | 9.8 | 15.3 | 17.1 |
| Poverty status:[6] | | | | | |
| Poor | --- | --- | --- | 11.4 | 19.1 |
| Near poor | --- | --- | --- | 11.1 | 16.4 |
| Nonpoor | --- | --- | --- | 11.1 | 14.3 |
| 12–19 years of age | | | | | |
| Both sexes[4] | 4.6 | 6.1 | 5.0 | 10.5 | 16.1 |
| Boys | 4.5 | 6.1 | 4.8 | 11.3 | 16.7 |
| Not Hispanic or Latino: | | | | | |
| White only | --- | --- | 3.8 | 11.6 | 14.6 |
| Black or African American only | --- | --- | 6.1 | 10.7 | 18.7 |
| Mexican | --- | --- | 7.7 | 14.1 | 24.7 |
| Girls[5] | 4.7 | 6.2 | 5.3 | 9.7 | 15.4 |
| Not Hispanic or Latino: | | | | | |
| White only | --- | --- | 4.6 | 8.9 | 12.7 |
| Black or African American only | --- | --- | 10.7 | 16.3 | 23.6 |
| Mexican | --- | --- | 8.8 | *13.4 | 19.9 |
| Poverty status:[6] | | | | | |
| Poor | --- | --- | --- | 15.8 | 19.9 |
| Near poor | --- | --- | --- | 11.2 | 15.2 |
| Nonpoor | --- | --- | --- | 7.9 | 14.9 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
--- Data not available.
[1]Persons of Mexican origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[2]Data for 1963–65 are for children 6–11 years of age; data for 1966–70 are for adolescents 12–17 years of age, not 12–19 years.
[3]Data for Mexicans are for 1982–84. See Appendix I, National Health and Nutrition Examination Survey (NHANES).
[4]Includes persons of all races and Hispanic origins, not just those shown separately.
[5]Excludes pregnant women starting with 1971–74. Pregnancy status not available for 1963–65 and 1966–70.
[6]Poverty status is based on family income and family size. Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Persons with unknown poverty status are excluded. See Appendix II, Family income; Poverty level.

NOTES: Overweight is defined as body mass index (BMI) at or above the sex- and age-specific 95th percentile BMI cutoff points from the 2000 CDC Growth Charts: United States. Advance data from vital and health statistics; no 314. Hyattsville, Maryland: National Center for Health Statistics. 2000. Age is at time of examination at mobile examination center. Crude rates, not age-adjusted rates, are shown. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982–84), and National Health Examination Survey (1963–65 and 1966–70).



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## Table 75 (page 1 of 3). Health care visits to doctor's offices, emergency departments, and home visits within the past 12 months, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Number of health care visits[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | None | | | 1–3 visits | | | 4–9 visits | | | 10 or more visits | | |
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent distribution | | | | | | | | | | | |
| All persons[2,3] | 16.5 | 15.9 | 15.8 | 46.2 | 45.5 | 45.8 | 23.6 | 25.2 | 24.8 | 13.7 | 13.4 | 13.6 |
| Age | | | | | | | | | | | | |
| Under 18 years | 11.8 | 10.6 | 11.3 | 54.1 | 55.1 | 54.5 | 25.2 | 27.1 | 26.7 | 8.9 | 7.2 | 7.5 |
| Under 6 years | 5.0 | 5.6 | 5.5 | 44.9 | 47.0 | 46.0 | 37.0 | 37.1 | 39.0 | 13.0 | 10.4 | 9.4 |
| 6–17 years | 15.3 | 13.0 | 14.0 | 58.7 | 59.0 | 58.7 | 19.3 | 22.3 | 20.8 | 6.8 | 5.7 | 6.6 |
| 18–44 years | 21.7 | 22.6 | 22.4 | 46.7 | 45.7 | 46.7 | 19.0 | 19.4 | 19.1 | 12.6 | 12.4 | 11.8 |
| 18–24 years | 22.0 | 24.8 | 23.6 | 46.8 | 45.6 | 47.2 | 20.0 | 18.7 | 18.2 | 11.2 | 10.8 | 11.0 |
| 25–44 years | 21.6 | 21.8 | 22.0 | 46.7 | 45.7 | 46.6 | 18.7 | 19.6 | 19.4 | 13.0 | 12.9 | 12.0 |
| 45–64 years | 16.9 | 14.8 | 14.7 | 42.9 | 41.9 | 42.2 | 24.7 | 26.9 | 26.6 | 15.5 | 16.4 | 16.5 |
| 45–54 years | 17.9 | 17.0 | 16.9 | 43.9 | 43.3 | 44.2 | 23.4 | 25.4 | 24.5 | 14.8 | 14.3 | 14.3 |
| 55–64 years | 15.3 | 11.5 | 11.4 | 41.3 | 39.7 | 39.2 | 26.7 | 29.0 | 29.8 | 16.7 | 19.7 | 19.6 |
| 65 years and over | 8.9 | 8.2 | 6.3 | 34.7 | 31.3 | 31.5 | 32.5 | 36.4 | 35.8 | 23.8 | 24.1 | 26.4 |
| 65–74 years | 9.8 | 9.1 | 7.1 | 36.9 | 33.7 | 34.0 | 31.6 | 36.8 | 35.7 | 21.6 | 20.5 | 23.3 |
| 75 years and over | 7.7 | 7.3 | 5.4 | 31.8 | 28.6 | 28.6 | 33.8 | 35.8 | 36.0 | 26.6 | 28.3 | 30.0 |
| Sex[3] | | | | | | | | | | | | |
| Male | 21.3 | 20.6 | 20.6 | 47.1 | 46.5 | 46.8 | 20.6 | 22.2 | 21.9 | 11.0 | 10.7 | 10.7 |
| Female | 11.8 | 11.4 | 11.1 | 45.4 | 44.5 | 44.9 | 26.5 | 28.0 | 27.7 | 16.3 | 16.1 | 16.3 |
| Race[3,4] | | | | | | | | | | | | |
| White only | 16.0 | 15.6 | 15.7 | 46.1 | 45.1 | 45.6 | 23.9 | 25.4 | 25.1 | 14.0 | 13.8 | 13.6 |
| Black or African American only | 16.8 | 15.3 | 14.7 | 46.1 | 45.8 | 45.8 | 23.2 | 26.0 | 25.2 | 13.9 | 13.0 | 14.3 |
| American Indian and Alaska Native only | 17.1 | 18.1 | 23.3 | 38.0 | 43.7 | 41.4 | 24.2 | 21.7 | 20.6 | 20.7 | 16.6 | 14.7 |
| Asian only | 22.8 | 21.2 | 22.6 | 49.1 | 49.7 | 47.8 | 19.7 | 20.3 | 20.7 | 8.3 | 8.8 | 8.9 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 13.5 | 11.1 | --- | 43.7 | 44.9 | --- | 27.3 | 23.0 | --- | 15.4 | 21.0 |
| Hispanic origin and race[3,4] | | | | | | | | | | | | |
| Hispanic or Latino | 24.9 | 25.7 | 25.3 | 42.3 | 41.5 | 42.9 | 20.3 | 21.1 | 20.3 | 12.5 | 11.7 | 11.5 |
| Mexican | 28.9 | 28.8 | 27.8 | 40.8 | 40.5 | 42.5 | 18.5 | 19.3 | 18.8 | 11.8 | 11.5 | 11.0 |
| Not Hispanic or Latino | 15.4 | 14.5 | 14.1 | 46.7 | 46.0 | 46.3 | 24.0 | 25.8 | 25.6 | 13.9 | 13.7 | 14.0 |
| White only | 14.7 | 14.0 | 13.5 | 46.6 | 45.8 | 46.2 | 24.4 | 26.1 | 26.1 | 14.3 | 14.2 | 14.2 |
| Black or African American only | 16.9 | 15.3 | 14.6 | 46.1 | 45.7 | 45.9 | 23.1 | 26.0 | 25.3 | 13.8 | 13.1 | 14.2 |
| Respondent-assessed health status[3] | | | | | | | | | | | | |
| Fair or poor | 7.8 | 10.1 | 8.7 | 23.3 | 22.2 | 23.2 | 29.0 | 29.4 | 28.8 | 39.9 | 38.3 | 39.3 |
| Good to excellent | 17.2 | 16.6 | 16.4 | 48.4 | 47.7 | 48.1 | 23.3 | 24.9 | 24.5 | 11.1 | 10.8 | 10.9 |
| Poverty status[3,5] | | | | | | | | | | | | |
| Poor | 20.6 | 19.9 | 20.9 | 37.8 | 38.3 | 37.8 | 22.7 | 23.9 | 23.7 | 18.9 | 17.9 | 17.6 |
| Near poor | 20.1 | 20.0 | 19.8 | 43.3 | 41.2 | 41.5 | 21.7 | 23.8 | 23.6 | 14.9 | 15.0 | 15.1 |
| Nonpoor | 14.5 | 14.2 | 13.7 | 48.7 | 47.6 | 48.4 | 24.2 | 25.7 | 25.4 | 12.6 | 12.4 | 12.6 |

See footnotes at end of table.



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## Table 75 (page 2 of 3). Health care visits to doctor's offices, emergency departments, and home visits within the past 12 months, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Number of health care visits[1]: None | | | 1–3 visits | | | 4–9 visits | | | 10 or more visits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Hispanic origin and race and poverty status[3,4,5] | Percent distribution | | | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | | | | |
| Poor | 30.2 | 30.0 | 29.9 | 34.8 | 35.4 | 37.0 | 19.9 | 18.9 | 18.5 | 15.0 | 15.7 | 14.6 |
| Near poor | 28.7 | 30.2 | 28.6 | 39.7 | 37.8 | 40.2 | 20.4 | 19.9 | 20.6 | 11.2 | 12.2 | 10.5 |
| Nonpoor | 18.9 | 21.1 | 20.7 | 48.8 | 46.8 | 47.7 | 20.4 | 22.3 | 21.2 | 11.9 | 9.8 | 10.3 |
| Not Hispanic or Latino: | | | | | | | | | | | | |
| White only: | | | | | | | | | | | | |
| Poor | 17.0 | 16.1 | 17.0 | 38.3 | 38.4 | 37.5 | 23.9 | 25.6 | 25.9 | 20.9 | 19.9 | 19.5 |
| Near poor | 17.3 | 16.7 | 16.6 | 44.1 | 41.3 | 41.0 | 22.2 | 25.0 | 24.9 | 16.3 | 17.0 | 17.4 |
| Nonpoor | 13.8 | 13.3 | 12.5 | 48.2 | 47.3 | 48.1 | 24.9 | 26.4 | 26.3 | 13.1 | 13.1 | 13.1 |
| Black or African American only: | | | | | | | | | | | | |
| Poor | 17.4 | 17.3 | 15.7 | 38.5 | 39.7 | 38.1 | 23.4 | 25.9 | 26.5 | 20.7 | 17.1 | 19.6 |
| Near poor | 18.8 | 15.6 | 15.4 | 43.7 | 43.4 | 44.2 | 22.9 | 26.9 | 25.9 | 14.5 | 14.1 | 14.5 |
| Nonpoor | 15.6 | 14.4 | 13.7 | 51.7 | 49.1 | 50.6 | 22.7 | 25.3 | 24.3 | 10.0 | 11.1 | 11.4 |
| Health insurance status[6,7] | | | | | | | | | | | | |
| Under 65 years of age: | | | | | | | | | | | | |
| Insured | 14.3 | 13.3 | 12.8 | 49.0 | 48.7 | 49.1 | 23.6 | 25.1 | 25.2 | 13.1 | 12.9 | 12.9 |
| Private | 14.7 | 13.6 | 13.2 | 50.6 | 50.5 | 51.1 | 23.1 | 24.8 | 24.6 | 11.6 | 11.1 | 11.1 |
| Medicaid | 9.8 | 9.9 | 9.9 | 35.5 | 34.9 | 35.2 | 26.5 | 27.4 | 28.1 | 28.2 | 27.7 | 26.8 |
| Uninsured | 33.7 | 36.3 | 38.1 | 42.8 | 42.1 | 42.4 | 15.3 | 14.7 | 13.4 | 8.2 | 6.9 | 6.1 |
| 65 years of age and over: | | | | | | | | | | | | |
| Medicare HMO | 8.9 | 7.7 | 5.4 | 35.8 | 30.9 | 30.6 | 33.1 | 40.9 | 38.9 | 22.3 | 20.5 | 25.2 |
| Private | 7.3 | 6.1 | 4.8 | 35.9 | 32.0 | 33.5 | 34.0 | 38.1 | 35.9 | 22.7 | 23.8 | 25.8 |
| Medicaid | 9.3 | 9.3 | *4.9 | 19.2 | 15.8 | 21.1 | 27.9 | 34.2 | 29.7 | 43.7 | 40.8 | 44.3 |
| Medicare fee-for-service only | 15.5 | 14.4 | 11.6 | 34.0 | 33.4 | 28.7 | 28.1 | 30.7 | 35.3 | 22.4 | 21.4 | 24.5 |
| Poverty status and health insurance status[5,6,7] | | | | | | | | | | | | |
| Under 65 years of age: | | | | | | | | | | | | |
| Poor: | | | | | | | | | | | | |
| Insured | 14.0 | 12.5 | 13.0 | 39.2 | 41.4 | 40.8 | 25.1 | 26.5 | 25.9 | 21.7 | 19.5 | 20.4 |
| Uninsured | 37.0 | 39.8 | 41.8 | 39.6 | 37.5 | 38.4 | 14.4 | 13.6 | 13.5 | 8.9 | 9.1 | 6.3 |
| Near poor: | | | | | | | | | | | | |
| Insured | 15.8 | 14.9 | 13.8 | 46.2 | 44.1 | 44.4 | 22.3 | 24.5 | 24.8 | 15.8 | 16.6 | 16.8 |
| Uninsured | 34.8 | 38.1 | 37.9 | 42.0 | 39.8 | 40.0 | 15.1 | 16.3 | 15.4 | 8.1 | 5.8 | 6.7 |
| Nonpoor: | | | | | | | | | | | | |
| Insured | 13.8 | 13.1 | 12.5 | 51.0 | 50.3 | 51.0 | 23.6 | 25.1 | 25.2 | 11.7 | 11.5 | 11.4 |
| Uninsured | 29.7 | 32.8 | 35.5 | 46.0 | 46.3 | 47.3 | 16.3 | 14.2 | 11.6 | 8.0 | 6.7 | 5.6 |
| Geographic region[3] | | | | | | | | | | | | |
| Northeast | 13.2 | 11.0 | 10.4 | 45.9 | 45.5 | 47.6 | 26.0 | 27.7 | 27.0 | 14.9 | 15.7 | 15.0 |
| Midwest | 15.9 | 14.4 | 14.2 | 47.7 | 47.7 | 47.2 | 22.8 | 25.0 | 25.4 | 13.6 | 13.0 | 13.2 |
| South | 17.2 | 17.4 | 16.5 | 46.1 | 44.7 | 45.1 | 23.3 | 25.2 | 24.8 | 13.5 | 12.8 | 13.6 |
| West | 19.1 | 19.9 | 21.0 | 44.8 | 44.2 | 44.2 | 22.8 | 23.0 | 22.2 | 13.3 | 12.9 | 12.6 |

See footnotes at end of table.



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## Table 75 (page 3 of 3). Health care visits to doctor's offices, emergency departments, and home visits within the past 12 months, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Number of health care visits[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | None | | | 1–3 visits | | | 4–9 visits | | | 10 or more visits | | |
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Location of residence[3] | Percent distribution | | | | | | | | | | | |
| Within MSA[8] | 16.2 | 15.8 | 16.0 | 46.4 | 45.8 | 45.9 | 23.7 | 25.1 | 24.8 | 13.7 | 13.3 | 13.3 |
| Outside MSA[8] | 17.3 | 16.3 | 15.0 | 45.4 | 44.1 | 45.6 | 23.3 | 25.6 | 24.9 | 13.9 | 14.0 | 14.5 |

* Estimates are considered unreliable. Data not shown have a relative standard error (RSE) of greater than 30 percent. Data preceded by an asterisk have an RSE of 20–30 percent.
- - - Data not available.
[1]This table presents a summary measure of health care visits to doctor's offices, emergency departments, and home visits during a 12-month period. See Appendix II, Health care contact; Emergency department visit; Home visit.
[2]Includes all other races not shown separately and unknown health insurance status.
[3]Estimates are age adjusted to the year 2000 standard population using six age groups: Under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.
[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 25–29 percent of persons in 1997–98 and 32–35 percent in 1999–2003. See Appendix II, Family income; Poverty level.
[6]Estimates for persons under 65 years of age are age adjusted to the year 2000 standard using four age groups: Under 18 years, 18–44 years, 45–54 years, and 55–64 years of age. Estimates for persons 65 years of age and over are age adjusted to the year 2000 standard using two age groups: 65–74 years and 75 years and over. See Appendix II, Age adjustment.
[7]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes State-sponsored health plans and State Children's Health Insurance Program (SCHIP). In addition to private and Medicaid the category "insured" also includes military plans, other government-sponsored health plans, and Medicare, not shown separately. Persons 65 years of age and over who reported Medicare HMO (health maintenance organization) and some other type of health insurance coverage are classified as having Medicare HMO. For persons 65 years of age and over the category "private" includes private and Medicare coverage. See Appendix II, Health insurance coverage.
[8]MSA is metropolitan statistical area.

NOTES: In 1997 the National Health Interview Survey questionnaire was redesigned. See Appendix I, National Health Interview Survey. Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample adult questionnaires.



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## Table 76 (page 1 of 2). Influenza and pneumococcal vaccination among persons 18 years of age and over, according to selected characteristics: United States, selected years 1989–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1989 | 1995 | 2002 | 2003 | 1989 | 1995 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| | Percent receiving influenza vaccination during past 12 months[1] | | | | Percent ever receiving pneumococcal vaccination[2] | | | |
| Total, age-adjusted[3,4] | 9.5 | 23.5 | 28.2 | 29.1 | 4.6 | 11.7 | 16.4 | 16.3 |
| Total, crude[4] | 9.1 | 24.4 | 28.0 | 29.0 | 4.4 | 12.5 | 16.0 | 16.0 |
| **Age** | | | | | | | | |
| 18–44 years | 3.3 | 12.3 | 14.8 | 15.4 | 2.1 | 6.3 | 5.3 | 5.1 |
| 18–24 years | 3.2 | 11.2 | 13.3 | 14.9 | 2.9 | 10.3 | 5.7 | 6.4 |
| 25–44 years | 3.3 | 12.5 | 15.3 | 15.5 | 1.8 | 5.4 | 5.2 | 4.7 |
| 45–64 years | 8.8 | 24.5 | 30.7 | 32.9 | 3.7 | 9.1 | 13.4 | 14.0 |
| 45–54 years | 5.6 | 21.0 | 25.9 | 27.7 | 2.3 | 6.9 | 8.7 | 9.8 |
| 55–64 years | 12.6 | 29.2 | 37.9 | 40.4 | 5.2 | 12.1 | 20.4 | 20.0 |
| 65 years and over | 30.4 | 57.0 | 65.7 | 65.5 | 14.1 | 32.9 | 56.0 | 55.6 |
| 65–74 years | 28.0 | 54.0 | 60.9 | 60.5 | 13.1 | 30.3 | 50.2 | 49.8 |
| 75 years and over | 34.2 | 61.2 | 71.3 | 71.0 | 15.7 | 36.7 | 62.8 | 62.1 |
| 50 years and over | 19.9 | 43.0 | 47.7 | 48.9 | 9.0 | 22.4 | 33.3 | 33.1 |
| **Sex[3]** | | | | | | | | |
| Male | 9.5 | 22.9 | 27.1 | 27.9 | 4.7 | 13.2 | 16.5 | 15.9 |
| Female | 9.6 | 24.2 | 29.4 | 30.3 | 4.5 | 10.7 | 16.3 | 16.6 |
| **Sex and age** | | | | | | | | |
| Male: | | | | | | | | |
| 18–44 years | 3.2 | 12.1 | 13.6 | 14.3 | 2.4 | 8.9 | 5.6 | 5.7 |
| 45–54 years | 4.6 | 18.3 | 22.9 | 25.3 | 2.2 | 7.4 | 8.8 | 8.6 |
| 55–64 years | 11.8 | 25.7 | 35.8 | 37.4 | 4.9 | 11.2 | 19.0 | 18.2 |
| 65–74 years | 28.3 | 54.1 | 62.1 | 60.4 | 12.6 | 28.9 | 49.3 | 47.9 |
| 75 years and over | 37.5 | 65.3 | 74.1 | 73.2 | 16.3 | 39.7 | 65.2 | 61.2 |
| 50 years and over | 19.2 | 40.9 | 45.1 | 46.8 | 8.4 | 21.2 | 31.5 | 30.2 |
| Female: | | | | | | | | |
| 18–44 years | 3.3 | 12.3 | 16.0 | 16.4 | 1.8 | 4.4 | 5.0 | 4.5 |
| 45–54 years | 6.5 | 23.3 | 28.8 | 30.1 | 2.5 | 6.4 | 8.7 | 11.0 |
| 55–64 years | 13.2 | 32.1 | 39.9 | 43.1 | 5.4 | 12.8 | 21.7 | 21.6 |
| 65–74 years | 27.8 | 53.9 | 59.9 | 60.7 | 13.5 | 31.3 | 51.0 | 51.4 |
| 75 years and over | 32.3 | 59.3 | 69.6 | 69.6 | 15.3 | 35.3 | 61.4 | 62.7 |
| 50 years and over | 20.6 | 44.4 | 49.8 | 50.7 | 9.4 | 23.2 | 34.9 | 35.4 |
| **Race[3,5]** | | | | | | | | |
| White only | 9.8 | 24.0 | 28.7 | 29.5 | 4.7 | 11.5 | 16.8 | 16.5 |
| Black or African American only | 7.3 | 20.5 | 23.9 | 24.4 | 3.7 | 12.0 | 13.1 | 14.1 |
| American Indian and Alaska Native only | 12.8 | 22.6 | 29.2 | 24.3 | 9.4 | 20.1 | *16.2 | 16.1 |
| Asian only | 5.7 | 23.8 | 28.4 | 28.9 | * | 8.7 | 11.0 | 11.3 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | * | * | --- | --- | * | * |
| 2 or more races | --- | --- | 30.8 | 34.2 | --- | --- | 21.9 | 18.7 |
| **Hispanic origin and race[3,5]** | | | | | | | | |
| Hispanic or Latino | 8.0 | 21.1 | 21.4 | 21.2 | 3.6 | 9.6 | 9.2 | 10.0 |
| Mexican | 7.3 | 22.4 | 21.0 | 20.8 | 4.0 | 8.9 | 9.3 | 10.1 |
| Not Hispanic or Latino | 9.5 | 23.9 | 28.9 | 30.0 | 4.6 | 11.8 | 16.9 | 16.8 |
| White only | 9.8 | 24.3 | 29.3 | 30.6 | 4.7 | 11.7 | 17.3 | 17.1 |
| Black or African American only | 7.2 | 20.5 | 24.0 | 24.5 | 3.6 | 11.8 | 13.2 | 14.1 |
| **Education[6,7]** | | | | | | | | |
| 25 years of age and over: | | | | | | | | |
| No high school diploma or GED | 9.5 | 22.6 | 24.8 | 24.6 | 4.6 | 12.2 | 16.1 | 15.7 |
| High school diploma or GED | 10.5 | 25.0 | 29.2 | 29.4 | 5.0 | 13.1 | 18.6 | 17.9 |
| Some college or more | 11.9 | 26.9 | 33.3 | 34.4 | 5.8 | 13.3 | 19.1 | 18.9 |

See footnotes at end of table.



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## Table 76 (page 2 of 2). Influenza and pneumococcal vaccination among persons 18 years of age and over, according to selected characteristics: United States, selected years 1989–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1989 | 1995 | 2002 | 2003 | 1989 | 1995 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| | Percent receiving influenza vaccination during past 12 months[1] | | | | Percent ever receiving pneumococcal vaccination[2] | | | |
| Poverty status[3,8] | | | | | | | | |
| Poor | 9.4 | 21.1 | 24.0 | 23.9 | 5.2 | 12.4 | 14.7 | 15.9 |
| Near poor | 9.6 | 22.2 | 24.5 | 25.6 | 5.0 | 12.9 | 15.8 | 17.9 |
| Nonpoor | 10.3 | 25.1 | 29.8 | 30.8 | 4.7 | 11.7 | 16.9 | 16.1 |
| Hispanic or Latino: | | | | | | | | |
| Poor | 7.3 | 19.3 | 20.2 | 18.4 | *3.3 | 9.2 | 8.4 | 8.9 |
| Near poor | 10.3 | 22.5 | 19.7 | 18.1 | 4.3 | 11.0 | 8.5 | 8.1 |
| Nonpoor | 9.2 | 23.3 | 23.3 | 24.5 | 3.8 | 8.9 | 10.4 | 12.1 |
| Not Hispanic or Latino: | | | | | | | | |
| White only: | | | | | | | | |
| Poor | 10.2 | 22.7 | 23.4 | 26.1 | 6.2 | 14.4 | 16.4 | 18.8 |
| Near poor | 9.8 | 22.2 | 25.6 | 26.9 | 5.0 | 13.3 | 17.3 | 19.8 |
| Nonpoor | 10.4 | 25.4 | 30.8 | 31.9 | 4.8 | 11.6 | 17.5 | 16.5 |
| Black or African American only: | | | | | | | | |
| Poor | 7.9 | 20.2 | 26.8 | 23.2 | 4.3 | 9.7 | 12.9 | 14.3 |
| Near poor | 6.7 | 19.0 | 22.5 | 25.2 | 4.2 | 11.9 | 13.8 | 16.3 |
| Nonpoor | 8.3 | 22.8 | 23.7 | 24.4 | 3.2 | 13.7 | 13.1 | 13.3 |
| Geographic region[3] | | | | | | | | |
| Northeast | 8.4 | 21.8 | 28.0 | 29.8 | 3.3 | 9.8 | 15.4 | 14.9 |
| Midwest | 9.3 | 23.6 | 29.2 | 29.6 | 4.4 | 11.0 | 16.9 | 16.4 |
| South | 9.8 | 24.6 | 27.8 | 29.7 | 5.0 | 12.4 | 16.1 | 17.2 |
| West | 10.4 | 23.6 | 28.1 | 26.9 | 5.6 | 13.4 | 17.2 | 15.9 |
| Location of residence[3] | | | | | | | | |
| Within MSA[9] | 9.5 | 23.5 | 28.1 | 29.0 | 4.6 | 11.7 | 16.2 | 16.1 |
| Outside MSA[9] | 9.3 | 26.3 | 28.8 | 29.6 | 4.2 | 12.6 | 17.1 | 17.3 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Respondents were asked, "During the past 12 months, have you had a flu shot? A flu shot is usually given in the fall and protects against influenza for the flu season."

[2]Respondents were asked, "Have you ever had a pneumonia shot? This shot is usually given only once or twice in a person's lifetime and is different from the flu shot. It is also called the pneumococcal vaccine."

[3]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[4]Includes all other races not shown separately and, prior to 1990, unknown poverty status.

[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999, race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[6]Estimates are for persons 25 years of age and over and are age-adjusted to the year 2000 standard population using five age groups: 25–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[7]Education categories shown are for 1998 and subsequent years. GED stands for General Educational Development high school equivalency diploma. In years prior to 1998 the following categories based on number of years of school completed were used: less than 12 years, 12 years, 13 years or more. See Appendix II, Education.

[8]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Poverty status was unknown for 11 percent of persons 18 years of age and over in 1989. Missing family income data were imputed for 16 percent of persons 18 years of age and over in 1995, 34 percent in 2002, and 36 percent in 2003. See Appendix II, Family income; Poverty level.

[9]MSA is metropolitan statistical area.

NOTES: In 2000, the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) recommended universal influenza vaccination for persons 50 years of age and over (CDC. Prevention and Control of Influenza, United States, 2000. Morbidity and mortality weekly report; 49(RR03). Atlanta, Georgia: Public Health Service. 2000). Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, sample adult questionnaire.



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## Table 77 (page 1 of 2). Vaccinations of children 19–35 months of age for selected diseases, according to race, Hispanic origin, poverty status, and residence in metropolitan statistical area (MSA): United States, 1995–2004

[Data are based on telephone interviews of a sample of the civilian noninstitutionalized population supplemented by a survey of immunization providers for interview participants]

Updated March 2006

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| Vaccination and year | All | Race and Hispanic origin[1] | | | | | | Poverty status | | Location of residence | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Not Hispanic or Latino | | | | | | | | Inside MSA[2] | | |
| | | White | Black or African American | American Indian or Alaska Native | Asian[3] | Native Hawaiian or Other Pacific Islander[3] | 2 or more races | Hispanic or Latino | Below poverty | At or above poverty | Central city | Remaining areas | Outside MSA[2] |
| | Percent of children 19–35 months of age | | | | | | | | | | | | |
| Combined series (4:3:1:3):[4] | | | | | | | | | | | | | |
| 1995 | 74 | 76 | 70 | 69 | 76 | --- | --- | 68 | 67 | 77 | 72 | 75 | 75 |
| 1999 | 78 | 81 | 74 | 75 | 77 | --- | --- | 75 | 73 | 81 | 77 | 79 | 80 |
| 2000 | 76 | 79 | 71 | 69 | 75 | --- | --- | 73 | 71 | 78 | 73 | 78 | 79 |
| 2001 | 77 | 79 | 71 | 76 | 77 | --- | --- | 77 | 72 | 79 | 75 | 78 | 79 |
| 2002 | 78 | 80 | 71 | * | 83 | * | 74 | 76 | 72 | 79 | 75 | 80 | 77 |
| 2003 | 81 | 84 | 75 | 77 | 81 | * | 81 | 79 | 76 | 83 | 80 | 82 | 81 |
| 2004 | 83 | 85 | 76 | 75 | 84 | * | 82 | 81 | 78 | 85 | 81 | 84 | 82 |
| DTP/DT/DTaP (4 doses or more):[5] | | | | | | | | | | | | | |
| 1995 | 78 | 80 | 74 | 71 | 84 | --- | --- | 75 | 71 | 81 | 77 | 79 | 78 |
| 1999 | 83 | 86 | 79 | 80 | 87 | --- | --- | 80 | 79 | 85 | 82 | 84 | 83 |
| 2000 | 82 | 84 | 76 | 75 | 85 | --- | --- | 79 | 76 | 84 | 80 | 83 | 83 |
| 2001 | 82 | 84 | 76 | 77 | 84 | --- | --- | 83 | 77 | 84 | 81 | 83 | 82 |
| 2002 | 82 | 84 | 76 | * | 88 | * | 78 | 79 | 75 | 84 | 79 | 84 | 80 |
| 2003 | 85 | 88 | 80 | 80 | 89 | * | 84 | 82 | 80 | 87 | 84 | 86 | 83 |
| 2004 | 86 | 88 | 80 | 77 | 90 | * | 86 | 84 | 81 | 87 | 84 | 87 | 85 |
| Polio (3 doses or more): | | | | | | | | | | | | | |
| 1995 | 88 | 89 | 84 | 86 | 90 | --- | --- | 87 | 85 | 89 | 87 | 88 | 89 |
| 1999 | 90 | 90 | 87 | 88 | 90 | --- | --- | 89 | 87 | 91 | 89 | 90 | 90 |
| 2000 | 90 | 91 | 87 | 90 | 93 | --- | --- | 88 | 87 | 90 | 88 | 90 | 91 |
| 2001 | 89 | 90 | 85 | 88 | 90 | --- | --- | 91 | 87 | 90 | 88 | 90 | 91 |
| 2002 | 90 | 91 | 87 | * | 92 | 95 | 87 | 90 | 88 | 91 | 89 | 91 | 90 |
| 2003 | 92 | 93 | 89 | 91 | 91 | 90 | 91 | 90 | 89 | 93 | 91 | 92 | 92 |
| 2004 | 92 | 92 | 90 | 87 | 93 | * | 92 | 91 | 90 | 92 | 91 | 92 | 92 |
| Measles, Mumps, Rubella: | | | | | | | | | | | | | |
| 1995 | 90 | 91 | 87 | 88 | 95 | --- | --- | 88 | 86 | 91 | 90 | 90 | 89 |
| 1999 | 92 | 92 | 90 | 92 | 93 | --- | --- | 90 | 90 | 92 | 91 | 92 | 90 |
| 2000 | 91 | 92 | 88 | 87 | 90 | --- | --- | 90 | 89 | 91 | 90 | 91 | 91 |
| 2001 | 91 | 92 | 89 | 94 | 90 | --- | --- | 92 | 89 | 92 | 91 | 92 | 91 |
| 2002 | 92 | 93 | 90 | 84 | 95 | 94 | 89 | 91 | 90 | 92 | 90 | 93 | 90 |
| 2003 | 93 | 93 | 92 | 92 | 96 | * | 94 | 93 | 92 | 93 | 93 | 93 | 92 |
| 2004 | 93 | 94 | 91 | 89 | 94 | * | 94 | 93 | 91 | 94 | 93 | 94 | 92 |
| Hib (3 doses or more):[6] | | | | | | | | | | | | | |
| 1995 | 91 | 93 | 88 | 93 | 90 | --- | --- | 89 | 88 | 93 | 91 | 92 | 92 |
| 1999 | 94 | 95 | 92 | 91 | 90 | --- | --- | 92 | 91 | 95 | 92 | 95 | 93 |
| 2000 | 93 | 95 | 93 | 90 | 92 | --- | --- | 91 | 90 | 95 | 92 | 94 | 95 |
| 2001 | 93 | 94 | 90 | 91 | 92 | --- | --- | 93 | 90 | 94 | 91 | 94 | 93 |
| 2002 | 93 | 94 | 92 | * | 95 | 93 | 90 | 92 | 90 | 94 | 92 | 94 | 93 |
| 2003 | 94 | 95 | 92 | 89 | 91 | * | 93 | 93 | 91 | 95 | 94 | 94 | 94 |
| 2004 | 94 | 95 | 91 | 90 | 92 | * | 96 | 93 | 92 | 94 | 93 | 94 | 94 |
| Hepatitis B (3 doses or more): | | | | | | | | | | | | | |
| 1995 | 68 | 68 | 66 | 52 | 80 | --- | --- | 70 | 65 | 69 | 69 | 71 | 59 |
| 1999 | 88 | 89 | 87 | * | 88 | --- | --- | 87 | 87 | 89 | 87 | 89 | 88 |
| 2000 | 90 | 91 | 89 | 91 | 91 | --- | --- | 88 | 87 | 91 | 89 | 90 | 92 |
| 2001 | 89 | 90 | 85 | 86 | 90 | --- | --- | 90 | 87 | 90 | 88 | 90 | 89 |
| 2002 | 90 | 91 | 88 | * | 94 | 94 | 84 | 90 | 88 | 90 | 89 | 91 | 90 |
| 2003 | 92 | 93 | 92 | 90 | 94 | * | 93 | 91 | 91 | 93 | 92 | 93 | 93 |
| 2004 | 92 | 93 | 91 | 91 | 93 | * | 94 | 92 | 91 | 93 | 92 | 93 | 93 |
| Varicella:[7] | | | | | | | | | | | | | |
| 1998 | 43 | 42 | 42 | 28 | 53 | --- | --- | 47 | 41 | 44 | 45 | 45 | 34 |
| 1999 | 58 | 56 | 58 | * | 64 | --- | --- | 61 | 55 | 58 | 59 | 61 | 47 |
| 2000 | 68 | 66 | 67 | 62 | 77 | --- | --- | 70 | 64 | 69 | 69 | 70 | 60 |
| 2001 | 76 | 75 | 75 | 69 | 82 | --- | --- | 80 | 74 | 77 | 78 | 78 | 68 |
| 2002 | 81 | 79 | 83 | 71 | 87 | * | 79 | 82 | 79 | 81 | 81 | 83 | 75 |
| 2003 | 85 | 84 | 85 | 81 | 91 | * | 86 | 86 | 84 | 85 | 86 | 86 | 80 |
| 2004 | 88 | 87 | 86 | 84 | 91 | * | 89 | 89 | 86 | 88 | 88 | 89 | 85 |
| PCV (3 doses or more):[8] | | | | | | | | | | | | | |
| 2002 | 41 | 44 | 34 | 33 | 55 | * | 38 | 37 | 33 | 43 | 41 | 45 | 32 |
| 2003 | 68 | 71 | 62 | 60 | 71 | * | 66 | 66 | 62 | 71 | 68 | 71 | 61 |
| 2004 | 73 | 75 | 68 | 75 | 76 | * | 78 | 70 | 69 | 75 | 72 | 77 | 68 |

See footnotes at end of table.



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## Table 77 (page 2 of 2). Vaccinations of children 19–35 months of age for selected diseases, according to race, Hispanic origin, poverty status, and residence in metropolitan statistical area (MSA): United States, 1995–2004

[Data are based on telephone interviews of a sample of the civilian noninstitutionalized population supplemented by a survey of immunization providers for interview participants]

Updated March 2006

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| Vaccination and year | Not Hispanic or Latino | | | | | |
|---|---|---|---|---|---|---|
| | White | | Black or African American | | Hispanic or Latino | |
| | Below poverty | At or above poverty | Below poverty | At or above poverty | Below poverty | At or above poverty |
| | Percent of children 19–35 months of age | | | | | |
| Combined series (4:3:1:3):[4] | | | | | | |
| 1995 | 69 | 78 | 70 | 73 | 63 | 72 |
| 1999 | 76 | 82 | 72 | 77 | 73 | 78 |
| 2000 | 73 | 80 | 69 | 72 | 70 | 74 |
| 2001 | 71 | 80 | 69 | 74 | 73 | 79 |
| 2002 | 72 | 81 | 68 | 72 | 75 | 76 |
| 2003 | 79 | 85 | 70 | 79 | 78 | 81 |
| 2004 | 78 | 86 | 74 | 80 | 80 | 84 |

--- Data not available.
* Estimates are considered unreliable. Percents not shown if the unweighted sample size for the numerator was less than 30 or relative standard error greater than 50 percent or confidence interval half width greater than 10 percentage points.
[1]Persons of Hispanic origin may be of any race. Starting with data for 2002, estimates were tabulated using the 1997 Standards for Federal data on Race and Ethnicity. Estimates for earlier years were tabulated using the 1977 Standards on Race and Ethnicity. See Appendix II, Race.
[2]Metropolitan statistical area.
[3]Prior to data year 2002, the category "Asian" included "Native Hawaiian and Other Pacific Islander."
[4]The 4:3:1:3 combined series consists of 4 or more doses of diphtheria and tetanus toxoids and pertussis vaccine (DTP), diphtheria and tetanus toxoids (DT), or diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP), 3 or more doses of any poliovirus vaccine, 1 or more doses of a measles-containing vaccine (MCV), and 3 or more doses of *Haemophilus influenzae* type b vaccine (Hib).
[5]Diphtheria and tetanus toxoids and pertussis vaccine, diphtheria and tetanus toxoids, and diphtheria and tetanus toxoids and acellular pertussis vaccine.
[6]*Haemophilus influenzae* type b vaccine (Hib).
[7]Recommended in 1996. Data collection for varicella began in July 1996.
[8]Pneumococcal conjugate vaccine. Recommended in 2000. Data collection for PCV began in July 2001.

NOTES: Final estimates from the National Immunization Survey include an adjustment for children with missing immunization provider data. Poverty status is based on family income and family size using U.S. Bureau of the Census poverty thresholds. Children missing information about poverty status were omitted from analysis by poverty level. In 2004, 12.0 percent of all children, 20.0 percent of Hispanic, 8.4 percent of non-Hispanic white, and 9.8 percent of non-Hispanic black children were missing information about poverty status and were omitted. See Appendix I, National Immunization Survey. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics and National Immunization Program, National Immunization Survey. Data are available on the CDC Web site at www.cdc.gov/nip/coverage/ and www.cdc.gov/nis/.



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## Table 78 (page 1 of 2). Vaccination coverage among children 19–35 months of age according to geographic division, State, and selected urban areas: United States, 1995–2004

[Data are based on telephone interviews of a sample of the civilian noninstitutionalized population supplemented by a survey of immunization providers for interview participants]

Updated March 2006

Click here for spreadsheet version

| Geographic division and State | 1995 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| | Percent of children 19–35 months of age with 4:3:1:3 series[1] | | | | | | | | |
| United States | 74 | 76 | 79 | 78 | 76 | 77 | 78 | 81 | 83 |
| New England: | | | | | | | | | |
| Connecticut | 86 | 86 | 90 | 86 | 85 | 84 | 86 | 95 | 89 |
| Maine | 88 | 87 | 86 | 83 | 83 | 82 | 83 | 82 | 85 |
| Massachusetts | 81 | 88 | 87 | 85 | 85 | 81 | 89 | 92 | 91 |
| New Hampshire | 89 | 85 | 82 | 85 | 83 | 84 | 87 | 88 | 89 |
| Rhode Island | 83 | 82 | 86 | 87 | 82 | 84 | 86 | 87 | 88 |
| Vermont | 87 | 87 | 86 | 91 | 83 | 88 | 87 | 90 | 89 |
| Middle Atlantic: | | | | | | | | | |
| New Jersey | 70 | 76 | 82 | 81 | 76 | 76 | 80 | 76 | 83 |
| New York | 74 | 75 | 85 | 81 | 75 | 81 | 81 | 82 | 83 |
| Pennsylvania | 77 | 79 | 83 | 86 | 78 | 82 | 77 | 87 | 87 |
| East North Central: | | | | | | | | | |
| Illinois | 78 | 74 | 78 | 77 | 75 | 76 | 80 | 85 | 84 |
| Indiana | 74 | 72 | 78 | 74 | 76 | 74 | 78 | 82 | 81 |
| Michigan | 68 | 75 | 78 | 74 | 75 | 74 | 84 | 83 | 81 |
| Ohio | 71 | 72 | 78 | 78 | 72 | 75 | 77 | 84 | 82 |
| Wisconsin | 74 | 81 | 78 | 85 | 80 | 83 | 82 | 83 | 85 |
| West North Central: | | | | | | | | | |
| Iowa | 83 | 77 | 82 | 83 | 83 | 79 | 80 | 83 | 86 |
| Kansas | 70 | 84 | 82 | 79 | 76 | 76 | 73 | 78 | 80 |
| Minnesota | 75 | 78 | 82 | 85 | 86 | 79 | 79 | 84 | 86 |
| Missouri | 75 | 79 | 85 | 75 | 78 | 78 | 77 | 84 | 86 |
| Nebraska | 71 | 74 | 76 | 82 | 79 | 80 | 79 | 82 | 83 |
| North Dakota | 79 | 80 | 79 | 80 | 81 | 83 | 79 | 83 | 84 |
| South Dakota | 79 | 77 | 74 | 82 | 78 | 79 | 81 | 83 | 88 |
| South Atlantic: | | | | | | | | | |
| Delaware | 68 | 80 | 79 | 78 | 75 | 79 | 81 | 80 | 86 |
| District of Columbia | 69 | 71 | 71 | 78 | 71 | 74 | 72 | 77 | 86 |
| Florida | 74 | 74 | 79 | 80 | 74 | 77 | 77 | 83 | 90 |
| Georgia | 77 | 78 | 80 | 82 | 81 | 80 | 82 | 77 | 86 |
| Maryland | 77 | 81 | 77 | 79 | 78 | 78 | 81 | 84 | 81 |
| North Carolina | 80 | 80 | 83 | 82 | 87 | 85 | 87 | 89 | 82 |
| South Carolina | 78 | 81 | 88 | 81 | 80 | 81 | 80 | 85 | 82 |
| Virginia | 69 | 72 | 80 | 80 | 74 | 78 | 77 | 85 | 83 |
| West Virginia | 71 | 81 | 82 | 81 | 76 | 81 | 79 | 77 | 88 |
| East South Central: | | | | | | | | | |
| Alabama | 73 | 87 | 82 | 78 | 81 | 83 | 80 | 82 | 83 |
| Kentucky | 81 | 78 | 82 | 88 | 81 | 79 | 74 | 81 | 80 |
| Mississippi | 79 | 80 | 84 | 82 | 81 | 84 | 78 | 84 | 86 |
| Tennessee | 74 | 79 | 82 | 78 | 81 | 84 | 80 | 81 | 83 |
| West South Central: | | | | | | | | | |
| Arkansas | 73 | 80 | 73 | 77 | 72 | 74 | 74 | 80 | 85 |
| Louisiana | 77 | 77 | 78 | 77 | 75 | 69 | 69 | 72 | 76 |
| Oklahoma | 74 | 70 | 75 | 73 | 71 | 76 | 67 | 72 | 73 |
| Texas | 71 | 74 | 74 | 72 | 69 | 74 | 71 | 77 | 74 |
| Mountain: | | | | | | | | | |
| Arizona | 69 | 71 | 76 | 72 | 72 | 73 | 70 | 79 | 81 |
| Colorado | 75 | 74 | 76 | 76 | 74 | 75 | 64 | 69 | 80 |
| Idaho | 66 | 71 | 76 | 69 | 74 | 74 | 73 | 82 | 83 |
| Montana | 71 | 75 | 82 | 83 | 77 | 82 | 71 | 85 | 82 |
| Nevada | 67 | 70 | 76 | 73 | 74 | 72 | 78 | 78 | 71 |
| New Mexico | 74 | 73 | 71 | 73 | 68 | 71 | 67 | 77 | 85 |
| Utah | 65 | 69 | 76 | 80 | 77 | 74 | 79 | 80 | 75 |
| Wyoming | 71 | 75 | 80 | 83 | 79 | 81 | 77 | 77 | 84 |
| Pacific: | | | | | | | | | |
| Alaska | 74 | 75 | 81 | 80 | 77 | 74 | 78 | 81 | 76 |
| California | 70 | 74 | 76 | 75 | 75 | 75 | 76 | 80 | 83 |
| Hawaii | 75 | 77 | 79 | 82 | 75 | 73 | 81 | 83 | 83 |
| Oregon | 71 | 72 | 76 | 72 | 79 | 73 | 75 | 79 | 81 |
| Washington | 76 | 79 | 81 | 75 | 77 | 76 | 73 | 80 | 81 |

See footnotes at end of table.



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## Table 78 (page 2 of 2). Vaccination coverage among children 19–35 months of age according to geographic division, State, and selected urban areas: United States, 1995–2004

[Data are based on telephone interviews of a sample of the civilian noninstitutionalized population supplemented by a survey of immunization providers for interview participants]

Updated March 2006

Click here for spreadsheet version

| Geographic division and urban areas | 1995 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| | Percent of children 19–35 months of age with 4:3:1:3 series[1] | | | | | | | | |
| New England: | | | | | | | | | |
| Boston, Massachusetts | 85 | 86 | 89 | 84 | 79 | 85 | 80 | 90 | 86 |
| Middle Atlantic: | | | | | | | | | |
| New York City, New York | 72 | 72 | 81 | 78 | 68 | 76 | 81 | 77 | 80 |
| Newark, New Jersey | 67 | 68 | 64 | 67 | 63 | 64 | 60 | 74 | 75 |
| Philadelphia, Pennsylvania | 67 | 81 | 80 | 81 | 74 | 74 | 74 | 80 | 80 |
| East North Central: | | | | | | | | | |
| Chicago, Illinois | 70 | 66 | 64 | 71 | 65 | 69 | 72 | 77 | 81 |
| Cuyahoga County (Cleveland), Ohio | 72 | 70 | 75 | 74 | 73 | 73 | 74 | 75 | 86 |
| Detroit, Michigan | 54 | 60 | 70 | 66 | 59 | 63 | 66 | 71 | 68 |
| Franklin County (Columbus), Ohio | 75 | 73 | 78 | 78 | 77 | 78 | 84 | 83 | 87 |
| Marion County (Indianapolis), Indiana | 77 | 80 | 78 | 79 | 69 | 72 | 75 | 79 | 82 |
| Milwaukee County (Milwaukee), Wisconsin | 69 | 72 | 73 | 74 | 69 | 70 | 70 | 81 | 80 |
| South Atlantic: | | | | | | | | | |
| Baltimore, Maryland | * | 84 | 81 | 72 | 70 | 72 | 75 | 81 | 85 |
| Dade County (Miami), Florida | 78 | 75 | 75 | 84 | 78 | 78 | 73 | 83 | 85 |
| District of Columbia | 67 | 71 | 71 | 78 | 71 | 74 | 72 | 77 | 86 |
| Duval County (Jacksonville), Florida | 69 | 69 | 79 | 78 | 79 | 76 | 77 | 81 | 75 |
| Fulton/DeKalb Counties (Atlanta), Georgia | * | 74 | 71 | 83 | 80 | 75 | 79 | 75 | 86 |
| East South Central: | | | | | | | | | |
| Davidson County (Nashville), Tennessee | 72 | 76 | 80 | 73 | 73 | 82 | 80 | 83 | 90 |
| Shelby County (Memphis), Tennessee | 69 | 70 | 71 | 75 | 77 | 74 | 73 | 77 | 74 |
| Jefferson County (Birmingham), Alabama | 86 | 83 | 85 | 85 | 79 | 87 | 82 | 83 | 84 |
| West South Central: | | | | | | | | | |
| Bexar County (San Antonio), Texas | 76 | 79 | 79 | 70 | 68 | 73 | 76 | 79 | 75 |
| Dallas County (Dallas), Texas | 70 | 75 | 71 | 72 | 67 | 67 | 76 | 75 | 72 |
| El Paso County (El Paso), Texas | 72 | 63 | 78 | 73 | 70 | 69 | 77 | 81 | 71 |
| Houston, Texas | 64 | 62 | 61 | 63 | 65 | 69 | 64 | 75 | 68 |
| Orleans Parish (New Orleans), Louisiana | 78 | 69 | 79 | 72 | 70 | 68 | 63 | 74 | 76 |
| Mountain: | | | | | | | | | |
| Maricopa County (Phoenix), Arizona | 67 | 70 | 77 | 71 | 71 | 72 | 73 | 80 | 81 |
| Pacific: | | | | | | | | | |
| King County (Seattle), Washington | 84 | 81 | 86 | 77 | 75 | 72 | 77 | 83 | 85 |
| Los Angeles County (Los Angeles), California | 68 | 72 | 76 | 76 | 77 | 73 | 77 | 84 | 82 |
| San Diego County (San Diego), California | 72 | 76 | 77 | 75 | 76 | 80 | 78 | 81 | 80 |
| Santa Clara County (Santa Clara), California | 76 | 69 | 84 | 82 | 76 | 77 | 84 | 85 | 88 |

* Estimates are considered unreliable. Percents not shown if the unweighted sample size for the numerator was less than 30 or relative standard error greater than 50 percent or confidence interval half width greater than 10 percentage points.

[1]The 4:3:1:3 combined series consists of 4 or more doses of diphtheria and tetanus toxoids and pertussis vaccine (DTP), diphtheria and tetanus toxoids (DT), or diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP), 3 or more doses of any poliovirus vaccine, 1 or more doses of a measles-containing vaccine (MCV), and 3 or more doses of *Haemophilus influenzae* type b vaccine (Hib).

NOTES: Urban areas were originally selected because they were at risk for undervaccination. Final estimates from the National Immunization Survey include an adjustment for children with missing immunization provider data. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics and National Immunization Program, National Immunization Survey. Data are available on the CDC Web site at www.cdc.gov/nip/coverage/ and www.cdc.gov/nis/.



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## Table 79 (page 1 of 2). No health care visits to an office or clinic within the past 12 months among children under 18 years of age, according to selected characteristics: United States, average annual 1997–98, 2000–01, and 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997–98 | 2000–01 | 2002–03 | 1997–98 | 2000–01 | 2002–03 | 1997–98 | 2000–01 | 2002–03 |
| | Percent of children without a health care visit[1] | | | | | | | | |
| All children[2] | 12.8 | 12.9 | 11.8 | 5.7 | 6.6 | 6.2 | 16.3 | 15.9 | 14.5 |
| **Race[3]** | | | | | | | | | |
| White only | 12.2 | 12.1 | 11.7 | 5.5 | 6.6 | 6.3 | 15.5 | 14.7 | 14.3 |
| Black or African American only | 14.3 | 15.0 | 11.4 | 6.5 | 6.3 | 6.1 | 18.1 | 19.0 | 13.9 |
| American Indian and Alaska Native only | 13.8 | 22.4 | *15.6 | * | * | * | *17.6 | *25.0 | *18.6 |
| Asian only | 16.3 | 15.2 | 17.1 | *5.6 | *8.8 | *7.8 | 22.1 | 18.9 | 21.9 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 8.5 | 8.5 | --- | * | * | --- | 13.5 | 12.4 |
| **Hispanic origin and race[3]** | | | | | | | | | |
| Hispanic or Latino | 19.3 | 19.8 | 18.6 | 9.7 | 10.0 | 10.1 | 25.3 | 25.5 | 23.5 |
| Not Hispanic or Latino | 11.6 | 11.4 | 10.3 | 4.8 | 5.8 | 5.3 | 14.9 | 14.0 | 12.6 |
| White only | 10.7 | 10.4 | 9.7 | 4.3 | 5.5 | 5.0 | 13.7 | 12.6 | 11.8 |
| Black or African American only | 14.5 | 14.7 | 11.4 | 6.5 | 6.5 | 6.0 | 18.3 | 18.4 | 13.9 |
| **Poverty status[4]** | | | | | | | | | |
| Poor | 17.6 | 18.2 | 15.3 | 8.1 | 9.9 | 8.0 | 23.6 | 22.8 | 19.5 |
| Near poor | 16.2 | 17.0 | 14.7 | 7.2 | 9.2 | 8.5 | 20.8 | 21.1 | 18.0 |
| Nonpoor | 9.9 | 9.9 | 9.7 | 4.1 | 4.5 | 4.7 | 12.6 | 12.3 | 11.9 |
| **Hispanic origin and race and poverty status[3,4]** | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 23.2 | 23.6 | 20.6 | 11.7 | 11.6 | 10.5 | 31.1 | 30.8 | 26.9 |
| Near poor | 20.9 | 22.6 | 21.2 | 9.7 | 13.4 | 11.4 | 28.1 | 28.0 | 26.8 |
| Nonpoor | 13.4 | 14.1 | 14.6 | 7.2 | 5.1 | 8.3 | 16.8 | 18.8 | 17.8 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 14.0 | 15.1 | 12.4 | *5.6 | *9.6 | *6.6 | 19.7 | 18.2 | 15.7 |
| Near poor | 14.1 | 14.1 | 12.2 | 6.0 | 7.5 | 7.8 | 18.0 | 17.4 | 14.6 |
| Nonpoor | 9.2 | 8.9 | 8.7 | 3.6 | 4.3 | 3.9 | 11.7 | 10.8 | 10.7 |
| Black or African American only: | | | | | | | | | |
| Poor | 15.8 | 16.1 | 12.6 | 7.6 | *8.2 | *6.9 | 20.5 | 20.1 | 15.4 |
| Near poor | 16.4 | 16.7 | 11.5 | *7.7 | *7.1 | *6.1 | 20.4 | 21.2 | 13.8 |
| Nonpoor | 11.8 | 12.3 | 10.5 | *4.1 | *4.4 | *5.3 | 14.8 | 15.5 | 12.9 |
| **Health insurance status[5]** | | | | | | | | | |
| Insured | 10.4 | 10.6 | 9.5 | 4.5 | 5.2 | 5.1 | 13.4 | 13.2 | 11.7 |
| Private | 10.4 | 10.4 | 9.5 | 4.3 | 4.7 | 4.9 | 13.1 | 12.9 | 11.5 |
| Medicaid | 10.1 | 11.1 | 9.3 | 5.0 | 6.3 | 5.3 | 14.4 | 14.2 | 12.1 |
| Uninsured | 28.8 | 30.8 | 31.8 | 14.6 | 18.8 | 18.5 | 34.9 | 35.9 | 37.0 |
| **Poverty status and health insurance status[4]** | | | | | | | | | |
| Poor: | | | | | | | | | |
| Insured | 13.0 | 13.2 | 11.2 | 6.0 | 7.5 | 6.1 | 17.8 | 16.6 | 14.3 |
| Uninsured | 34.3 | 37.0 | 36.8 | 18.2 | 20.8 | 21.6 | 41.3 | 44.3 | 42.7 |
| Near poor: | | | | | | | | | |
| Insured | 12.6 | 13.4 | 11.0 | 4.9 | 6.5 | 6.4 | 16.7 | 17.2 | 13.6 |
| Uninsured | 28.2 | 31.8 | 33.7 | 16.0 | 21.9 | 21.0 | 33.7 | 36.3 | 39.2 |
| Nonpoor: | | | | | | | | | |
| Insured | 9.0 | 9.1 | 8.6 | 3.8 | 4.1 | 4.3 | 11.4 | 11.3 | 10.6 |
| Uninsured | 22.7 | 23.0 | 26.0 | *7.8 | 11.8 | *12.8 | 28.7 | 27.1 | 30.5 |

See footnotes at end of table.



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## Table 79 (page 2 of 2). No health care visits to an office or clinic within the past 12 months among children under 18 years of age, according to selected characteristics: United States, average annual 1997–98, 2000–01, and 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997–98 | 2000–01 | 2002–03 | 1997–98 | 2000–01 | 2002–03 | 1997–98 | 2000–01 | 2002–03 |
| Geographic region | Percent of children without a health care visit[1] | | | | | | | | |
| Northeast | 7.0 | 6.5 | 5.1 | 3.1 | 4.6 | 3.1 | 8.9 | 7.4 | 6.1 |
| Midwest | 12.2 | 10.5 | 10.5 | 5.9 | 5.3 | 4.8 | 15.3 | 12.9 | 13.3 |
| South | 14.3 | 15.2 | 13.1 | 5.6 | 7.4 | 7.1 | 18.5 | 19.0 | 16.1 |
| West | 16.3 | 17.0 | 16.5 | 7.9 | 8.2 | 8.9 | 20.7 | 21.5 | 20.3 |
| Location of residence | | | | | | | | | |
| Within MSA[6] | 12.3 | 12.4 | 11.4 | 5.4 | 6.6 | 6.0 | 15.9 | 15.3 | 14.1 |
| Outside MSA[6] | 14.6 | 14.8 | 13.3 | 6.9 | 6.8 | 7.4 | 17.9 | 18.2 | 16.0 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Respondents were asked how many times a doctor or other health care professional was seen in the past 12 months at a doctor's office, clinic, or some other place. Excluded are visits to emergency rooms, hospitalizations, home visits, and telephone calls. Beginning in 2000 dental visits were also excluded. See Appendix II, Health care contact.

[2]Includes all other races not shown separately and unknown health insurance status.

[3]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[4]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 21–25 percent of children under 18 years of age in 1997–98 and 28–31 percent in 1999–2003. See Appendix II, Family income; Poverty level.

[5]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes state-sponsored health plans and State Children's Health Insurance Program (SCHIP). The category "insured" also includes military, other government, and Medicare coverage. See Appendix II, Health insurance coverage.

[6]MSA is metropolitan statistical area.

NOTES: In 1997 the National Health Interview Survey questionnaire was redesigned. See Appendix I, National Health Interview Survey. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample child questionnaires.



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## Table 80 (page 1 of 2). No usual source of health care among children under 18 years of age, according to selected characteristics: United States, average annual selected years 1993–94 through 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1993–94[1] | 2000–01 | 2002–03 | 1993–94[1] | 2000–01 | 2002–03 | 1993–94[1] | 2000–01 | 2002–03 |
| | Percent of children without a usual source of health care[2] | | | | | | | | |
| All children[3] | 7.7 | 6.5 | 5.7 | 5.2 | 4.4 | 4.1 | 9.0 | 7.4 | 6.5 |
| **Race[4]** | | | | | | | | | |
| White only | 7.0 | 5.7 | 5.2 | 4.7 | 4.2 | 3.9 | 8.3 | 6.4 | 5.8 |
| Black or African American only | 10.3 | 7.4 | 6.7 | 7.6 | 4.0 | 3.3 | 11.9 | 8.9 | 8.2 |
| American Indian and Alaska Native only | *9.3 | *6.8 | * | * | * | * | *8.7 | * | * |
| Asian only | 9.7 | 9.9 | 10.3 | *3.4 | *7.4 | * | 13.5 | 11.3 | 13.3 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 6.0 | 6.3 | --- | * | *6.7 | --- | *7.9 | *6.0 |
| **Hispanic origin and race[4]** | | | | | | | | | |
| Hispanic or Latino | 14.3 | 14.2 | 12.1 | 9.3 | 9.3 | 8.3 | 17.7 | 17.0 | 14.3 |
| Not Hispanic or Latino | 6.7 | 4.8 | 4.3 | 4.4 | 3.2 | 3.0 | 7.8 | 5.6 | 5.0 |
| White only | 5.7 | 3.9 | 3.4 | 3.7 | 2.8 | 2.7 | 6.7 | 4.4 | 3.7 |
| Black or African American only | 10.2 | 7.4 | 6.7 | 7.7 | 4.0 | 3.3 | 11.6 | 8.9 | 8.2 |
| **Poverty status[5]** | | | | | | | | | |
| Poor | 13.9 | 12.5 | 10.6 | 9.4 | 7.6 | 7.1 | 16.8 | 15.2 | 12.6 |
| Near poor | 9.8 | 9.9 | 8.4 | 6.7 | 7.3 | 6.6 | 11.6 | 11.3 | 9.5 |
| Nonpoor | 3.7 | 3.5 | 3.3 | 1.8 | 2.2 | 1.9 | 4.6 | 4.1 | 3.9 |
| **Hispanic origin and race and poverty status[4,5]** | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 19.6 | 20.0 | 15.0 | 12.7 | 12.3 | 10.1 | 24.8 | 24.7 | 18.1 |
| Near poor | 15.3 | 16.4 | 15.0 | 9.9 | 11.6 | 10.6 | 18.9 | 19.2 | 17.6 |
| Nonpoor | 5.0 | 7.1 | 7.0 | *2.7 | 4.2 | *4.4 | 6.5 | 8.6 | 8.3 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 10.2 | 9.2 | 7.2 | 6.5 | * | *6.2 | 12.7 | 11.0 | 7.7 |
| Near poor | 8.7 | 6.5 | 5.2 | 6.3 | 5.1 | *4.8 | 10.1 | 7.2 | 5.5 |
| Nonpoor | 3.4 | 2.6 | 2.4 | 1.6 | 1.7 | 1.4 | 4.2 | 3.0 | 2.8 |
| Black or African American only: | | | | | | | | | |
| Poor | 13.7 | 9.1 | 9.6 | 10.9 | *4.7 | * | 15.5 | 11.3 | 12.7 |
| Near poor | 9.1 | 9.3 | 6.7 | *6.0 | *5.8 | * | 10.8 | 11.0 | 7.6 |
| Nonpoor | 4.6 | 4.7 | 4.3 | * | * | *2.7 | 5.8 | 5.7 | 5.1 |
| **Health insurance status[6]** | | | | | | | | | |
| Insured | 5.0 | 3.5 | 3.1 | 3.3 | 2.5 | 2.0 | 5.9 | 4.0 | 3.6 |
| Private | 3.8 | 2.9 | 2.4 | 1.9 | 1.9 | 1.3 | 4.6 | 3.4 | 2.8 |
| Medicaid | 8.9 | 5.1 | 5.0 | 6.4 | 3.9 | 3.3 | 11.3 | 5.9 | 6.1 |
| Uninsured | 23.5 | 29.3 | 29.2 | 18.0 | 20.9 | 25.5 | 26.0 | 32.9 | 30.6 |
| **Poverty status and health insurance status[5]** | | | | | | | | | |
| Poor: | | | | | | | | | |
| Insured | 9.1 | 5.7 | 5.1 | 6.0 | 3.4 | 3.2 | 11.5 | 7.1 | 6.2 |
| Uninsured | 29.4 | 37.6 | 39.0 | 25.0 | 26.2 | 34.4 | 31.5 | 42.9 | 40.8 |
| Near poor: | | | | | | | | | |
| Insured | 6.0 | 5.2 | 4.2 | 4.0 | 4.2 | 3.1 | 7.2 | 5.8 | 4.8 |
| Uninsured | 22.9 | 29.0 | 30.3 | 18.0 | 21.2 | 27.6 | 25.3 | 32.6 | 31.5 |
| Nonpoor: | | | | | | | | | |
| Insured | 2.9 | 2.4 | 2.2 | 1.5 | 1.6 | 1.2 | 3.6 | 2.8 | 2.7 |
| Uninsured | 14.5 | 20.6 | 19.9 | 6.4 | 13.8 | 15.0 | 18.1 | 23.0 | 21.5 |

See footnotes at end of table.



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## Table 80 (page 2 of 2). No usual source of health care among children under 18 years of age, according to selected characteristics: United States, average annual selected years 1993–94 through 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1993–94[1] | 2000–01 | 2002–03 | 1993–94[1] | 2000–01 | 2002–03 | 1993–94[1] | 2000–01 | 2002–03 |
| Geographic region | Percent of children without a usual source of health care[2] | | | | | | | | |
| Northeast | 4.1 | 2.4 | 2.6 | 2.9 | 2.1 | *2.2 | 4.8 | 2.5 | 2.7 |
| Midwest | 5.2 | 4.8 | 3.6 | 4.1 | 3.6 | 3.5 | 5.9 | 5.4 | 3.7 |
| South | 10.9 | 7.7 | 7.2 | 7.3 | 4.9 | 4.4 | 12.7 | 9.1 | 8.6 |
| West | 8.6 | 9.6 | 8.1 | 5.3 | 6.3 | 5.5 | 10.6 | 11.3 | 9.4 |
| Location of residence | | | | | | | | | |
| Within MSA[7] | 7.7 | 6.5 | 5.6 | 5.0 | 4.6 | 4.0 | 9.2 | 7.4 | 6.4 |
| Outside MSA[7] | 7.8 | 6.4 | 6.1 | 6.0 | 3.5 | 4.2 | 8.7 | 7.6 | 6.9 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey.

[2]Persons who report the emergency department as the place of their usual source of care are defined as having no usual source of care. See Appendix II, Usual source of care.

[3]Includes all other races not shown separately and unknown health insurance status.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 14 percent of children in 1993–96, 21–25 percent in 1997–98, and 28–31 percent in 1999–2003. See Appendix II, Family income; Poverty level.

[6]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Medicaid includes other public assistance through 1996. Starting in 1997 Medicaid includes state-sponsored health plans and State Children's Health Insurance Program (SCHIP). The category "insured" also includes military, other government, and Medicare coverage. Health insurance status was unknown for 8–9 percent of children in the sample in 1993–96 and 1 percent in 1997–2003. See Appendix II, Health insurance coverage.

[7]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. For more data on usual source of care, see National Health Interview Survey home page: www.cdc.gov/nchs/nhis/htm. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.
Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, access to care and health insurance supplements (1993–96). Starting in 1997 data are from the family core and sample child questionnaires.



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## Table 81 (page 1 of 3). Emergency department visits within the past 12 months among children under 18 years of age, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population] Revised March 2006 Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of children with 1 or more emergency department visits[1] | | | | | | | | |
| All children[2] | 19.9 | 22.4 | 20.9 | 24.3 | 28.0 | 26.5 | 17.7 | 19.7 | 18.2 |
| **Race[3]** | | | | | | | | | |
| White only | 19.4 | 21.3 | 20.3 | 22.6 | 26.1 | 25.2 | 17.8 | 19.1 | 17.9 |
| Black or African American only | 24.0 | 27.9 | 23.9 | 33.1 | 36.6 | 32.0 | 19.4 | 23.8 | 20.2 |
| American Indian and Alaska Native only | *24.1 | * | *22.7 | *24.3 | * | * | *24.0 | * | *21.0 |
| Asian only | 12.6 | 14.4 | 14.2 | 20.8 | *19.5 | *20.7 | 8.6 | *11.5 | *11.0 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 28.4 | 26.1 | --- | 37.5 | 34.0 | --- | 20.3 | 20.3 |
| **Hispanic origin and race[3]** | | | | | | | | | |
| Hispanic or Latino | 21.1 | 20.6 | 20.3 | 25.7 | 26.8 | 27.9 | 18.1 | 17.1 | 16.0 |
| Not Hispanic or Latino | 19.7 | 22.8 | 21.0 | 24.0 | 28.3 | 26.1 | 17.6 | 20.3 | 18.7 |
| White only | 19.2 | 21.7 | 20.4 | 22.2 | 26.3 | 24.6 | 17.7 | 19.7 | 18.5 |
| Black or African American only | 23.6 | 27.8 | 23.8 | 32.7 | 36.3 | 31.9 | 19.2 | 23.9 | 20.1 |
| **Poverty status[4]** | | | | | | | | | |
| Poor | 25.1 | 26.7 | 26.9 | 29.5 | 34.3 | 34.5 | 22.2 | 22.3 | 22.6 |
| Near poor | 22.0 | 26.6 | 22.8 | 28.0 | 32.8 | 28.8 | 19.0 | 23.4 | 19.3 |
| Nonpoor | 17.3 | 19.6 | 18.4 | 20.5 | 23.9 | 22.5 | 15.8 | 17.7 | 16.5 |
| **Hispanic origin and race and poverty status[3,4]** | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 21.9 | 22.3 | 23.3 | 25.0 | 30.3 | 31.5 | 19.6 | 17.2 | 18.4 |
| Near poor | 20.8 | 21.5 | 19.6 | 28.8 | 25.4 | 27.0 | 15.6 | 19.5 | 15.0 |
| Nonpoor | 20.4 | 18.4 | 18.1 | 23.4 | 24.8 | 25.0 | 18.7 | 15.0 | 14.7 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 25.5 | 27.1 | 28.4 | 27.2 | 36.2 | 33.8 | 24.4 | 22.1 | 25.3 |
| Near poor | 22.3 | 27.9 | 23.4 | 25.8 | 33.8 | 27.4 | 20.7 | 25.0 | 21.0 |
| Nonpoor | 17.2 | 19.4 | 18.5 | 20.1 | 22.6 | 22.1 | 15.9 | 18.1 | 17.0 |
| Black or African American only: | | | | | | | | | |
| Poor | 29.3 | 30.3 | 27.2 | 39.5 | 38.6 | 33.5 | 23.0 | 26.2 | 24.2 |
| Near poor | 22.5 | 32.2 | 27.0 | 31.7 | 40.8 | 44.1 | 18.5 | 27.8 | 20.7 |
| Nonpoor | 17.7 | 23.0 | 19.0 | 22.6 | 30.9 | 24.1 | 15.9 | 19.6 | 16.7 |
| **Health insurance status[5]** | | | | | | | | | |
| Insured | 19.8 | 22.9 | 21.4 | 24.4 | 28.7 | 26.7 | 17.5 | 20.1 | 18.7 |
| Private | 17.5 | 20.0 | 18.1 | 20.9 | 24.5 | 21.6 | 15.9 | 18.1 | 16.6 |
| Medicaid | 28.2 | 30.7 | 28.9 | 33.0 | 37.6 | 35.1 | 24.1 | 26.2 | 24.5 |
| Uninsured | 20.2 | 18.2 | 17.1 | 23.0 | 22.0 | 23.9 | 18.9 | 16.6 | 14.7 |
| **Poverty status and health insurance status[4]** | | | | | | | | | |
| Poor: | | | | | | | | | |
| Insured | 26.6 | 28.3 | 29.1 | 31.3 | 36.5 | 36.4 | 23.1 | 23.5 | 24.6 |
| Uninsured | 19.9 | 17.7 | 16.2 | 19.8 | *21.5 | *21.4 | 20.0 | 15.9 | 14.5 |
| Near poor: | | | | | | | | | |
| Insured | 22.2 | 28.0 | 23.8 | 28.5 | 34.7 | 29.6 | 18.9 | 24.5 | 20.4 |
| Uninsured | 21.3 | 19.3 | 17.2 | 26.2 | 23.2 | 24.1 | 19.2 | 17.4 | 14.5 |
| Nonpoor: | | | | | | | | | |
| Insured | 17.1 | 19.8 | 18.5 | 20.2 | 24.0 | 22.4 | 15.7 | 17.9 | 16.7 |
| Uninsured | 18.9 | 17.6 | 17.6 | 22.6 | *20.9 | 26.0 | 17.3 | 16.3 | 15.1 |
| **Geographic region** | | | | | | | | | |
| Northeast | 18.5 | 23.3 | 21.8 | 20.7 | 27.4 | 26.3 | 17.4 | 21.4 | 19.7 |
| Midwest | 19.5 | 22.7 | 21.4 | 26.0 | 28.4 | 27.2 | 16.4 | 20.0 | 18.7 |
| South | 21.8 | 24.4 | 21.7 | 25.6 | 31.4 | 27.8 | 19.9 | 21.0 | 18.6 |
| West | 18.5 | 17.9 | 18.3 | 23.5 | 22.4 | 23.6 | 15.9 | 15.6 | 15.8 |
| **Location of residence** | | | | | | | | | |
| Within MSA[6] | 19.7 | 21.7 | 20.2 | 23.9 | 27.1 | 25.2 | 17.4 | 19.0 | 17.8 |
| Outside MSA[6] | 20.8 | 25.4 | 23.6 | 26.2 | 32.3 | 31.8 | 18.6 | 22.4 | 19.7 |

See footnotes at end of table.



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## Table 81 (page 2 of 3). Emergency department visits within the past 12 months among children under 18 years of age, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population] Revised March 2006 Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of children with 2 or more emergency department visits[1] | | | | | | | | |
| All children[2] | 7.1 | 7.5 | 7.0 | 9.6 | 10.2 | 8.7 | 5.8 | 6.2 | 6.2 |
| **Race[3]** | | | | | | | | | |
| White only | 6.6 | 6.6 | 6.3 | 8.4 | 8.8 | 7.6 | 5.7 | 5.6 | 5.7 |
| Black or African American only | 9.6 | 11.1 | 10.4 | 14.9 | 17.4 | 13.9 | 6.9 | 8.1 | 8.8 |
| American Indian and Alaska Native only | * | * | * | * | * | * | * | * | * |
| Asian only | *5.7 | * | *6.7 | *12.9 | * | * | * | * | * |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 12.5 | 8.7 | --- | 17.2 | *10.1 | --- | *8.2 | *7.6 |
| **Hispanic origin and race[3]** | | | | | | | | | |
| Hispanic or Latino | 8.9 | 8.0 | 7.4 | 11.8 | 11.7 | 10.8 | 7.0 | 5.9 | 5.5 |
| Not Hispanic or Latino | 6.8 | 7.4 | 6.9 | 9.2 | 9.8 | 8.2 | 5.7 | 6.2 | 6.4 |
| White only | 6.2 | 6.3 | 6.0 | 7.8 | 7.8 | 6.6 | 5.5 | 5.7 | 5.8 |
| Black or African American only | 9.3 | 11.2 | 10.6 | 14.6 | 17.5 | 14.4 | 6.8 | 8.2 | 8.9 |
| **Poverty status[4]** | | | | | | | | | |
| Poor | 11.1 | 12.3 | 11.6 | 14.5 | 17.2 | 12.9 | 8.9 | 9.5 | 10.8 |
| Near poor | 8.3 | 8.8 | 8.6 | 12.2 | 11.2 | 10.6 | 6.3 | 7.6 | 7.4 |
| Nonpoor | 5.3 | 5.5 | 5.1 | 6.5 | 7.3 | 6.4 | 4.7 | 4.8 | 4.5 |
| **Hispanic origin and race and poverty status[3,4]** | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 10.4 | 8.8 | 9.6 | 13.9 | 14.2 | 13.6 | 8.0 | *5.4 | 7.2 |
| Near poor | 8.2 | 9.2 | 7.5 | 12.0 | 12.9 | 11.7 | 5.7 | *7.3 | *4.9 |
| Nonpoor | 7.6 | 6.2 | 5.2 | 8.4 | 8.5 | 6.9 | 7.1 | *5.0 | 4.5 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 10.7 | 12.0 | 10.5 | 12.2 | 15.8 | *10.1 | 9.8 | *9.9 | *10.7 |
| Near poor | 8.0 | 8.1 | 8.5 | 11.2 | 8.8 | 7.7 | 6.4 | 7.7 | 9.0 |
| Nonpoor | 5.0 | 5.1 | 4.8 | 5.8 | 6.2 | 5.7 | 4.6 | 4.6 | 4.4 |
| Black or African American only: | | | | | | | | | |
| Poor | 12.7 | 15.4 | 14.6 | 19.1 | 23.0 | 14.7 | 8.8 | 11.6 | 14.5 |
| Near poor | 9.2 | 10.4 | 11.7 | *13.5 | *14.6 | 21.6 | *7.2 | *8.3 | *8.1 |
| Nonpoor | 5.5 | 8.1 | 6.7 | *8.2 | 14.6 | *10.1 | *4.5 | *5.3 | *5.1 |
| **Health insurance status[5]** | | | | | | | | | |
| Insured | 7.0 | 7.5 | 7.1 | 9.6 | 10.2 | 8.7 | 5.7 | 6.2 | 6.3 |
| Private | 5.2 | 5.6 | 5.1 | 6.8 | 7.2 | 5.4 | 4.5 | 4.9 | 4.9 |
| Medicaid | 13.1 | 12.7 | 11.7 | 16.2 | 16.5 | 14.0 | 10.4 | 10.3 | 10.1 |
| Uninsured | 7.7 | 7.0 | 6.6 | 9.8 | 9.1 | *8.8 | 6.8 | 6.2 | 5.9 |
| **Poverty status and health insurance status[4]** | | | | | | | | | |
| Poor: | | | | | | | | | |
| Insured | 12.1 | 13.1 | 12.4 | 15.7 | 18.3 | 13.3 | 9.5 | 10.1 | 11.8 |
| Uninsured | 7.6 | *8.0 | *7.9 | *8.3 | * | * | *7.3 | * | *7.0 |
| Near poor: | | | | | | | | | |
| Insured | 8.4 | 9.1 | 9.0 | 12.3 | 11.4 | 10.8 | 6.3 | 7.9 | 8.0 |
| Uninsured | 7.9 | *7.0 | *6.2 | *11.1 | *10.9 | * | 6.5 | * | *5.1 |
| Nonpoor: | | | | | | | | | |
| Insured | 5.1 | 5.5 | 5.0 | 6.2 | 7.3 | 6.3 | 4.6 | 4.7 | 4.4 |
| Uninsured | 7.7 | *6.3 | *5.9 | *10.1 | * | * | *6.7 | *6.5 | *5.7 |

See footnotes at end of table.



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## Table 81 (page 3 of 3). Emergency department visits within the past 12 months among children under 18 years of age, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population] Revised March 2006 Click here for spreadsheet version

| Characteristic | Under 18 years of age | | | Under 6 years of age | | | 6–17 years of age | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Geographic region | Percent of children with 2 or more emergency department visits[1] | | | | | | | | |
| Northeast | 6.2 | 7.2 | 7.8 | 7.6 | 9.3 | 8.0 | 5.4 | 6.3 | 7.6 |
| Midwest | 6.6 | 6.9 | 6.3 | 10.4 | 8.3 | 8.5 | 4.8 | 6.3 | 5.3 |
| South | 8.0 | 8.7 | 8.0 | 10.1 | 12.3 | 9.5 | 6.9 | 7.0 | 7.3 |
| West | 7.1 | 6.1 | 5.5 | 10.0 | 9.5 | 8.1 | 5.6 | 4.4 | 4.2 |
| Location of residence | | | | | | | | | |
| Within MSA[6] | 7.2 | 7.1 | 6.7 | 9.6 | 9.9 | 8.3 | 5.9 | 5.8 | 6.0 |
| Outside MSA[6] | 6.8 | 8.8 | 8.2 | 9.7 | 11.4 | 10.3 | 5.6 | 7.6 | 7.2 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.
- - - Data not available.
[1]See Appendix II, Emergency department visit.
[2]Includes all other races not shown separately and unknown health insurance status.
[3]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race- specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[4]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 21–25 percent of children in 1997–98 and 28–31 percent in 1999–2003. See Appendix II, Family income; Poverty level.
[5]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes state-sponsored health plans and State Children's Health Insurance Program (SCHIP). The category "insured" also includes military, other government, and Medicare coverage. See Appendix II, Health insurance coverage.
[6]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample child questionnaires.



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## Table 82 (page 1 of 2). No usual source of health care among adults 18–64 years of age, according to selected characteristics: United States, average annual 1993–94 through 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1993–94[1] | 1995–96[1] | 1997–98 | 2000–01 | 2002–03 |
|---|---|---|---|---|---|
| | Percent of adults without a usual source of health care[2] | | | | |
| All adults 18–64 years of age[3,4] | 18.5 | 16.6 | 17.5 | 16.5 | 16.6 |
| Age | | | | | |
| 18–44 years | 21.7 | 19.6 | 21.1 | 20.3 | 20.7 |
| 18–24 years | 26.6 | 22.6 | 27.0 | 26.1 | 27.0 |
| 25–44 years | 20.3 | 18.8 | 19.3 | 18.4 | 18.6 |
| 45–64 years | 12.8 | 11.3 | 11.2 | 9.9 | 9.5 |
| 45–54 years | 14.1 | 12.2 | 12.6 | 10.9 | 10.8 |
| 55–64 years | 11.1 | 9.8 | 9.0 | 8.3 | 7.6 |
| Sex[4] | | | | | |
| Male | 23.3 | 21.0 | 23.2 | 21.8 | 21.8 |
| Female | 13.9 | 12.5 | 11.9 | 11.4 | 11.6 |
| Race[4,5] | | | | | |
| White only | 18.2 | 16.3 | 16.9 | 15.8 | 16.1 |
| Black or African American only | 19.2 | 17.6 | 18.7 | 16.8 | 17.6 |
| American Indian and Alaska Native only | 19.1 | 15.9 | 20.7 | 15.9 | 19.1 |
| Asian only | 24.0 | 20.7 | 21.1 | 18.5 | 20.9 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | * | * |
| 2 or more races | --- | --- | --- | 21.1 | 17.3 |
| American Indian and Alaska Native; White | --- | --- | --- | 24.0 | 17.1 |
| Hispanic origin and race[4,5] | | | | | |
| Hispanic or Latino | 28.8 | 26.2 | 28.6 | 30.8 | 29.4 |
| Mexican | 30.5 | 28.1 | 33.4 | 34.6 | 31.6 |
| Not Hispanic or Latino | 17.5 | 15.5 | 16.1 | 14.6 | 14.5 |
| White only | 17.0 | 15.0 | 15.4 | 13.9 | 13.6 |
| Black or African American only | 18.9 | 17.4 | 18.6 | 16.7 | 17.4 |
| Poverty status[4,6] | | | | | |
| Poor | 28.2 | 24.9 | 28.2 | 27.8 | 22.7 |
| Near poor | 24.6 | 22.3 | 24.7 | 25.1 | 21.7 |
| Nonpoor | 14.8 | 13.5 | 13.9 | 12.7 | 14.0 |
| Hispanic origin and race and poverty status[4,5,6] | | | | | |
| Hispanic or Latino: | | | | | |
| Poor | 38.0 | 32.6 | 40.8 | 43.9 | 35.2 |
| Near poor | 35.7 | 31.6 | 33.3 | 37.3 | 32.6 |
| Nonpoor | 18.3 | 18.2 | 19.0 | 20.8 | 24.5 |
| Not Hispanic or Latino: | | | | | |
| White only: | | | | | |
| Poor | 27.1 | 22.8 | 24.5 | 22.3 | 17.1 |
| Near poor | 22.7 | 20.3 | 21.8 | 21.8 | 17.9 |
| Nonpoor | 14.4 | 13.0 | 13.3 | 11.7 | 12.1 |
| Black or African American only: | | | | | |
| Poor | 23.8 | 21.1 | 23.1 | 21.9 | 21.7 |
| Near poor | 21.6 | 21.2 | 24.7 | 20.9 | 21.1 |
| Nonpoor | 14.6 | 13.6 | 14.4 | 13.2 | 14.6 |
| Health insurance status[4,7] | | | | | |
| Insured | 13.3 | 11.4 | 11.4 | 9.7 | 9.3 |
| Private | 13.1 | 11.3 | 11.5 | 9.7 | 9.4 |
| Medicaid | 15.2 | 12.5 | 10.0 | 9.6 | 8.9 |
| Uninsured | 41.5 | 40.9 | 45.3 | 46.3 | 46.7 |
| Poverty status and health insurance status[4,6] | | | | | |
| Poor: | | | | | |
| Insured | 16.8 | 13.6 | 13.8 | 12.0 | 9.8 |
| Uninsured | 45.7 | 42.1 | 50.4 | 51.7 | 49.9 |
| Near poor: | | | | | |
| Insured | 15.3 | 13.1 | 13.9 | 12.3 | 10.4 |
| Uninsured | 42.9 | 41.5 | 46.2 | 48.4 | 46.3 |
| Nonpoor: | | | | | |
| Insured | 12.3 | 10.8 | 10.7 | 9.1 | 8.8 |
| Uninsured | 37.0 | 39.4 | 41.2 | 41.7 | 44.0 |

See footnotes at end of table.



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## Table 82 (page 2 of 2). No usual source of health care among adults 18–64 years of age, according to selected characteristics: United States, average annual 1993–94 through 2002–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1993–94[1] | 1995–96[1] | 1997–98 | 2000–01 | 2002–03 |
|---|---|---|---|---|---|
| Geographic region[4] | Percent of adults without a usual source of health care[2] | | | | |
| Northeast | 14.5 | 13.3 | 13.2 | 12.1 | 12.2 |
| Midwest | 15.8 | 14.5 | 14.9 | 15.2 | 14.3 |
| South | 21.6 | 18.4 | 20.5 | 17.8 | 18.9 |
| West | 20.5 | 19.5 | 19.8 | 20.0 | 19.5 |
| Location of residence[4] | | | | | |
| Within MSA[8] | 18.8 | 16.9 | 17.6 | 16.7 | 16.8 |
| Outside MSA[8] | 17.4 | 15.4 | 17.1 | 15.8 | 16.1 |

* Estimates are considered unreliable. Data not shown have a relative standard error of greater than 30 percent.
- - - Data not available.
[1]Data prior to 1997 are not strictly comparable with data for later years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey.
[2]Persons who report the emergency department as the place of their usual source of care are defined as having no usual source of care. See Appendix II, Usual source of care.
[3]Includes all other races not shown separately, and unknown health insurance status.
[4]Estimates are for persons 18–64 years of age and are age adjusted to the year 2000 standard population using three age groups: 18–44 years, 45–54 years, and 55–64 years of age. See Appendix II, Age adjustment.
[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[6]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 15–17 percent of persons 18–64 years of age in 1993–96, 25–29 percent in 1997–98, and 31–34 percent in 1999–2003. See Appendix II, Family income; Poverty level.
[7]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Medicaid includes other public assistance through 1996. Starting in 1997 Medicaid includes state-sponsored health plans and State Children's Health Insurance Program (SCHIP). The category "insured" also includes military, other government, and Medicare coverage. In 1993–96 health insurance status was unknown for 8–9 percent of adults in the sample. In 1997–2003 health insurance status was unknown for 1 percent of adults in the sample. See Appendix II, Health insurance coverage.
[8]MSA is metropolitan statistical area.

NOTES: For more data on usual source of care see the National Health Interview Survey home page: www.cdc.gov/nchs/nhis.htm. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, access to care and health insurance supplements (1993–96). Starting in 1997 data are from the family core and sample adult questionnaires.



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## Table 83 (page 1 of 2). Emergency department visits within the past 12 months among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1 or more emergency department visits | | | | 2 or more emergency department visits | | | |
|---|---|---|---|---|---|---|---|---|
| | 1997 | 2000 | 2002 | 2003 | 1997 | 2000 | 2002 | 2003 |
| | Percent of adults with emergency department visit[1] | | | | | | | |
| All adults 18 years of age and over[2,3] | 19.6 | 20.2 | 20.5 | 20.0 | 6.7 | 6.9 | 7.1 | 7.0 |
| **Age** | | | | | | | | |
| 18–44 years | 20.7 | 20.5 | 20.7 | 20.0 | 6.8 | 7.0 | 7.1 | 6.8 |
| 18–24 years | 26.3 | 25.7 | 24.7 | 23.9 | 9.1 | 8.8 | 8.5 | 8.2 |
| 25–44 years | 19.0 | 18.8 | 19.4 | 18.6 | 6.2 | 6.4 | 6.6 | 6.4 |
| 45–64 years | 16.2 | 17.6 | 18.2 | 18.5 | 5.6 | 5.6 | 6.3 | 6.4 |
| 45–54 years | 15.7 | 17.9 | 18.1 | 17.8 | 5.5 | 5.8 | 6.7 | 5.9 |
| 55–64 years | 16.9 | 17.0 | 18.4 | 19.3 | 5.7 | 5.3 | 5.7 | 7.0 |
| 65 years and over | 22.0 | 23.7 | 24.0 | 22.9 | 8.1 | 8.6 | 8.3 | 8.7 |
| 65–74 years | 20.3 | 21.6 | 21.2 | 19.7 | 7.1 | 7.4 | 7.7 | 7.1 |
| 75 years and over | 24.3 | 26.2 | 27.1 | 26.6 | 9.3 | 10.0 | 9.0 | 10.4 |
| **Sex[3]** | | | | | | | | |
| Male | 19.1 | 18.7 | 19.6 | 18.2 | 5.9 | 5.7 | 6.2 | 5.6 |
| Female | 20.2 | 21.6 | 21.5 | 21.8 | 7.5 | 7.9 | 7.9 | 8.4 |
| **Race[3,4]** | | | | | | | | |
| White only | 19.0 | 19.4 | 19.6 | 19.2 | 6.2 | 6.4 | 6.5 | 6.4 |
| Black or African American only | 25.9 | 26.5 | 27.8 | 27.8 | 11.1 | 10.8 | 11.7 | 12.4 |
| American Indian and Alaska Native only | 24.8 | 30.3 | 25.3 | 22.5 | 13.1 | *12.6 | *10.0 | *9.1 |
| Asian only | 11.6 | 13.6 | 13.6 | 12.9 | *2.9 | *3.8 | *2.6 | *3.5 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | * | --- | * | * | * |
| 2 or more races | --- | 32.5 | 30.8 | 25.2 | --- | 11.3 | 13.3 | 11.1 |
| American Indian and Alaska Native; White | --- | 33.9 | 37.7 | 29.7 | --- | *9.4 | 15.9 | *15.1 |
| **Hispanic origin and race[3,4]** | | | | | | | | |
| Hispanic or Latino | 19.2 | 18.3 | 18.4 | 18.5 | 7.4 | 7.0 | 6.8 | 7.3 |
| Mexican | 17.8 | 17.4 | 18.1 | 17.0 | 6.4 | 7.1 | 6.3 | 6.4 |
| Not Hispanic or Latino | 19.7 | 20.6 | 20.9 | 20.3 | 6.7 | 6.9 | 7.2 | 7.0 |
| White only | 19.1 | 19.8 | 20.0 | 19.5 | 6.2 | 6.4 | 6.6 | 6.3 |
| Black or African American only | 25.9 | 26.5 | 27.9 | 27.7 | 11.0 | 10.8 | 11.6 | 12.3 |
| **Poverty status[3,5]** | | | | | | | | |
| Poor | 28.1 | 29.0 | 28.6 | 26.3 | 12.8 | 13.3 | 12.6 | 12.6 |
| Near poor | 23.8 | 23.9 | 24.7 | 23.2 | 9.3 | 9.6 | 9.7 | 9.9 |
| Nonpoor | 17.0 | 18.0 | 18.2 | 18.2 | 4.9 | 5.2 | 5.6 | 5.4 |
| **Hispanic origin and race and poverty status[3,4,5]** | | | | | | | | |
| Hispanic or Latino: | | | | | | | | |
| Poor | 22.1 | 22.4 | 22.3 | 21.2 | 9.8 | 9.7 | 9.0 | 9.6 |
| Near poor | 19.2 | 18.1 | 19.5 | 17.6 | 8.1 | 6.7 | 8.6 | 7.3 |
| Nonpoor | 17.6 | 16.8 | 16.7 | 17.9 | 5.4 | 6.1 | 5.0 | 6.4 |
| Not Hispanic or Latino: | | | | | | | | |
| White only: | | | | | | | | |
| Poor | 29.5 | 30.1 | 30.2 | 27.0 | 13.0 | 13.9 | 13.4 | 12.7 |
| Near poor | 24.3 | 25.5 | 25.9 | 24.0 | 9.1 | 10.4 | 9.6 | 10.0 |
| Nonpoor | 16.8 | 17.7 | 17.7 | 17.8 | 4.8 | 5.0 | 5.3 | 5.0 |
| Black or African American only: | | | | | | | | |
| Poor | 34.6 | 35.4 | 35.3 | 33.4 | 17.5 | 17.4 | 16.7 | 18.1 |
| Near poor | 29.2 | 28.5 | 29.7 | 31.2 | 12.8 | 12.2 | 13.8 | 15.7 |
| Nonpoor | 19.7 | 22.6 | 24.3 | 24.0 | 7.2 | 8.0 | 9.1 | 8.7 |
| **Health insurance status[6,7]** | | | | | | | | |
| 18–64 years of age: | | | | | | | | |
| Insured | 18.8 | 19.5 | 19.6 | 19.7 | 6.1 | 6.4 | 6.7 | 6.7 |
| Private | 16.9 | 17.6 | 17.4 | 17.4 | 4.7 | 5.1 | 5.0 | 5.0 |
| Medicaid | 37.6 | 42.2 | 40.4 | 39.7 | 19.7 | 21.0 | 21.9 | 21.6 |
| Uninsured | 20.0 | 19.3 | 20.4 | 18.1 | 7.5 | 6.9 | 7.4 | 6.7 |
| 65 years of age and over: | | | | | | | | |
| Medicare HMO | 20.2 | 24.4 | 20.3 | 25.6 | 6.7 | 8.5 | 7.4 | 10.8 |
| Private | 21.3 | 23.3 | 24.0 | 21.2 | 6.9 | 7.8 | 7.9 | 7.1 |
| Medicaid | 35.2 | 36.0 | 33.1 | 34.9 | 20.2 | 18.3 | 12.8 | 17.8 |
| Medicare fee-for-service only | 22.0 | 20.1 | 22.4 | 22.2 | 9.4 | 7.2 | 8.6 | 9.4 |

See footnotes at end of table.



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## Table 83 (page 2 of 2). Emergency department visits within the past 12 months among adults 18 years of age and over, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1 or more emergency department visits | | | | 2 or more emergency department visits | | | |
|---|---|---|---|---|---|---|---|---|
| | 1997 | 2000 | 2002 | 2003 | 1997 | 2000 | 2002 | 2003 |
| Poverty status and health insurance status[5,6,7] | Percent of adults with emergency department visit[1] | | | | | | | |
| 18–64 years of age: | | | | | | | | |
| Poor: | | | | | | | | |
| Insured | 31.0 | 33.0 | 32.7 | 30.1 | 15.2 | 16.2 | 15.0 | 15.2 |
| Uninsured | 22.8 | 24.2 | 23.4 | 19.9 | 9.1 | 9.9 | 10.3 | 8.7 |
| Near poor: | | | | | | | | |
| Insured | 25.3 | 25.9 | 26.1 | 25.5 | 9.6 | 10.6 | 10.5 | 11.2 |
| Uninsured | 20.2 | 18.7 | 21.1 | 18.8 | 8.6 | 6.9 | 8.1 | 7.5 |
| Nonpoor: | | | | | | | | |
| Insured | 16.2 | 17.2 | 17.0 | 17.5 | 4.4 | 4.8 | 5.1 | 4.9 |
| Uninsured | 18.0 | 17.4 | 18.5 | 16.7 | 5.5 | 5.5 | 5.7 | 5.0 |
| Geographic region[3] | | | | | | | | |
| Northeast | 19.5 | 20.0 | 20.5 | 20.3 | 6.9 | 6.2 | 6.2 | 6.9 |
| Midwest | 19.3 | 20.1 | 20.9 | 20.0 | 6.2 | 6.9 | 6.7 | 6.4 |
| South | 20.9 | 21.2 | 21.4 | 20.9 | 7.3 | 7.6 | 8.2 | 8.1 |
| West | 17.7 | 18.6 | 18.4 | 18.2 | 6.0 | 6.3 | 6.2 | 5.9 |
| Location of residence[3] | | | | | | | | |
| Within MSA[8] | 19.1 | 19.6 | 19.8 | 19.5 | 6.4 | 6.6 | 6.6 | 6.6 |
| Outside MSA[8] | 21.5 | 22.5 | 23.4 | 22.3 | 7.8 | 7.8 | 8.9 | 8.6 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]See Appendix II, Emergency department visit.

[2]Includes all other races not shown separately and unknown health insurance status.

[3]Estimates are for persons 18 years of age and over and are age adjusted to the year 2000 standard using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 27–31 percent of persons 18 years of age and over in 1997–98 and 33–36 percent in 1999–2003. See Appendix II, Family income; Poverty level.

[6]Estimates for persons 18–64 years of age are age adjusted to the year 2000 Standard using three age groups: 18–44 years, 45–54 years, and 55–64 years of age. Estimates for persons 65 years of age and over are age adjusted to the year 2000 Standard using two age groups: 65–74 years and 75 years and over. See Appendix II, Age adjustment.

[7]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes State-sponsored health plans and State Children's Health Insurance Program (SCHIP). In addition to private and Medicaid, the category "insured" also includes military plans, other government-sponsored health plans, and Medicare, not shown separately. Persons 65 years of age and over who reported Medicare HMO (health maintenance organization) and some other type of health insurance coverage are classified as having Medicare HMO. For persons 65 years of age and over the category "private" includes private and Medicare coverage. See Appendix II, Health insurance coverage.

[8]MSA is metropolitan statistical area.

NOTES: Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core and sample adult questionnaires.



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## Table 84 (page 1 of 2). Dental visits in the past year according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 2 years of age and over[1] | | | 2–17 years of age | | | 18–64 years of age | | | 65 years of age and over[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Percent of persons with a dental visit in the past year[3] | | | | | | | | | | | |
| Total[4] | 64.9 | 64.4 | 66.3 | 72.7 | 74.2 | 75.0 | 64.1 | 62.6 | 64.8 | 54.8 | 55.5 | 58.0 |
| **Sex** | | | | | | | | | | | | |
| Male | 62.6 | 61.5 | 63.6 | 72.3 | 73.7 | 74.1 | 60.4 | 58.4 | 60.9 | 55.4 | 55.4 | 58.4 |
| Female | 67.2 | 67.1 | 68.9 | 73.0 | 74.8 | 75.9 | 67.7 | 66.7 | 68.6 | 54.4 | 55.5 | 57.7 |
| **Race[5]** | | | | | | | | | | | | |
| White only | 66.5 | 66.3 | 67.5 | 74.0 | 76.3 | 76.0 | 65.7 | 64.5 | 65.9 | 56.8 | 58.0 | 59.8 |
| Black or African American only | 56.5 | 54.5 | 58.4 | 68.8 | 68.8 | 70.5 | 57.0 | 53.5 | 58.1 | 35.4 | 33.9 | 38.7 |
| American Indian and Alaska Native only | 51.5 | 51.2 | 59.9 | 66.8 | 66.6 | 69.9 | 49.9 | 50.3 | 58.0 | * | * | *49.2 |
| Asian only | 61.8 | 61.3 | 65.1 | 69.9 | 66.8 | 72.9 | 60.3 | 62.7 | 63.6 | 53.9 | 45.4 | 57.4 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | 59.5 | 61.6 | --- | 71.4 | 74.5 | --- | 57.9 | 59.6 | --- | 44.7 | 51.0 |
| Black or African American; White | --- | 70.1 | 63.6 | --- | 67.2 | 71.3 | --- | 65.4 | 60.3 | --- | * | *80.7 |
| American Indian and Alaska Native; White | --- | 51.9 | 50.0 | --- | 64.3 | 52.8 | --- | 50.2 | 53.7 | --- | *42.7 | * |
| **Hispanic origin and race[5]** | | | | | | | | | | | | |
| Hispanic or Latino | 52.9 | 52.7 | 52.4 | 61.0 | 62.5 | 64.5 | 50.8 | 49.2 | 48.3 | 47.8 | 47.9 | 46.0 |
| Not Hispanic or Latino | 66.4 | 66.3 | 68.6 | 74.7 | 76.7 | 77.3 | 65.7 | 64.6 | 67.4 | 55.2 | 55.9 | 58.7 |
| White only | 68.2 | 68.6 | 70.5 | 76.4 | 79.4 | 79.4 | 67.5 | 66.7 | 69.3 | 57.2 | 58.4 | 60.9 |
| Black or African American only | 56.5 | 54.3 | 58.5 | 68.8 | 68.6 | 70.6 | 56.9 | 53.4 | 58.3 | 35.3 | 33.7 | 38.3 |
| **Poverty status[6]** | | | | | | | | | | | | |
| Poor | 47.7 | 47.5 | 48.2 | 62.0 | 64.4 | 65.8 | 46.9 | 44.3 | 44.5 | 31.5 | 35.0 | 37.1 |
| Near poor | 50.6 | 51.4 | 52.3 | 62.5 | 66.9 | 66.6 | 48.3 | 47.5 | 49.1 | 40.8 | 43.0 | 43.6 |
| Nonpoor | 72.5 | 70.7 | 73.4 | 80.1 | 79.6 | 80.8 | 71.2 | 68.9 | 72.0 | 65.9 | 64.7 | 67.8 |
| **Hispanic origin and race and poverty status[5,6]** | | | | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | | | | |
| Poor | 42.1 | 43.8 | 42.0 | 55.9 | 60.0 | 62.1 | 39.2 | 38.6 | 35.5 | 33.6 | 38.1 | 33.2 |
| Near poor | 46.4 | 45.1 | 45.5 | 53.8 | 57.8 | 59.1 | 43.5 | 40.1 | 40.8 | 47.9 | 40.6 | 39.4 |
| Nonpoor | 64.9 | 61.1 | 62.7 | 73.7 | 68.4 | 71.6 | 62.3 | 58.0 | 59.4 | 58.8 | 61.3 | 60.7 |
| Not Hispanic or Latino: | | | | | | | | | | | | |
| White only: | | | | | | | | | | | | |
| Poor | 50.6 | 51.9 | 52.8 | 64.4 | 69.5 | 69.1 | 50.6 | 48.6 | 50.4 | 32.0 | 38.2 | 39.9 |
| Near poor | 52.9 | 55.3 | 55.8 | 66.1 | 71.3 | 69.6 | 50.4 | 51.4 | 52.8 | 42.2 | 45.2 | 45.9 |
| Nonpoor | 73.9 | 73.1 | 75.6 | 81.3 | 82.7 | 83.2 | 72.7 | 71.1 | 74.2 | 67.0 | 66.5 | 69.1 |
| Black or African American only: | | | | | | | | | | | | |
| Poor | 47.7 | 42.9 | 45.1 | 66.1 | 63.5 | 66.7 | 46.2 | 39.8 | 40.8 | 27.7 | 23.8 | 27.6 |
| Near poor | 46.9 | 47.7 | 52.0 | 61.2 | 68.9 | 69.1 | 46.3 | 45.0 | 50.6 | 26.9 | 26.0 | 29.3 |
| Nonpoor | 66.0 | 61.8 | 66.7 | 77.1 | 72.5 | 74.5 | 66.1 | 61.4 | 67.2 | 49.8 | 45.6 | 51.9 |

See footnotes at end of table.



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## Table 84 (page 2 of 2). Dental visits in the past year according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 2 years of age and over[1] | | | 2–17 years of age | | | 18–64 years of age | | | 65 years of age and over[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Geographic region | Percent of persons with a dental visit in the past year[3] | | | | | | | | | | | |
| Northeast | 69.6 | 70.1 | 72.4 | 77.5 | 80.5 | 81.5 | 69.6 | 69.2 | 71.4 | 55.5 | 55.8 | 61.1 |
| Midwest | 68.3 | 68.0 | 68.8 | 76.4 | 77.9 | 77.6 | 67.4 | 66.6 | 67.6 | 57.6 | 56.9 | 58.8 |
| South | 60.0 | 58.8 | 61.4 | 68.0 | 69.1 | 70.7 | 59.4 | 56.7 | 59.6 | 49.0 | 50.7 | 53.3 |
| West | 64.9 | 65.0 | 66.7 | 71.5 | 73.5 | 74.1 | 62.9 | 62.3 | 64.7 | 61.9 | 63.2 | 62.8 |
| Location of residence | | | | | | | | | | | | |
| Within MSA[7] | 66.5 | 66.0 | 67.9 | 73.6 | 74.8 | 75.5 | 65.7 | 64.4 | 66.5 | 57.6 | 58.5 | 61.3 |
| Outside MSA[7] | 59.1 | 58.1 | 60.0 | 69.3 | 71.9 | 72.9 | 58.0 | 55.4 | 57.9 | 46.1 | 45.9 | 46.7 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE greater than 30 percent.

- - - Data not available.

[1]Estimates are age adjusted to the year 2000 standard using six age groups: 2–17 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[2]Based on 1997–2003 National Health Interview Surveys, it was estimated that 25–30 percent of persons 65 years of age and over were edentulous (having lost all their natural teeth). In 1997–2003 about 70 percent of older dentate persons compared with 16–20 percent of older edentate persons had a dental visit in the past year.

[3]Respondents were asked "About how long has it been since you last saw or talked to a dentist?" See Appendix II, Dental visit.

[4]Includes all other races not shown separately.

[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[6]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 25–29 percent of persons in 1997–98 and 32–35 percent in 1999–2003. See Appendix II, Family income; Poverty level.

[7]MSA is metropolitan statistical area.

NOTES: In 1997 the National Health Interview Survey questionnaire was redesigned. See Appendix I, National Health Interview Survey. Data for additional years are available. See Appendix III. Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, sample child and sample adult questionnaires.



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## Table 85 (page 1 of 2). Untreated dental caries, according to age, sex, race and Hispanic origin, and poverty status: United States, 1971–74, 1988–94, and 1999–2002

[Data are based on dental examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, race and Hispanic origin, and poverty status | 2–5 years | | | 6–17 years | | |
|---|---|---|---|---|---|---|
| | 1971–74 | 1988–94 | 1999–2002 | 1971–74 | 1988–94 | 1999–2002 |
| | Percent of persons with untreated dental caries | | | | | |
| Total[1] | 25.1 | 19.6 | 19.4 | 55.3 | 23.9 | 21.9 |
| Sex | | | | | | |
| Male | 26.6 | 20.0 | 20.4 | 55.2 | 23.0 | 23.0 |
| Female | 23.6 | 19.3 | 18.4 | 55.4 | 24.8 | 20.8 |
| Race and Hispanic origin[2] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White | 23.7 | 14.4 | 16.9 | 52.3 | 19.2 | 18.0 |
| Black or African American | 29.0 | 25.1 | 24.3 | 70.5 | 33.1 | 28.3 |
| Mexican | 34.1 | 35.0 | 31.4 | 60.2 | 37.1 | 32.5 |
| Poverty status[3] | | | | | | |
| Poor | 32.0 | 30.6 | 31.9 | 68.9 | 38.4 | 32.6 |
| Near poor | 29.9 | 25.1 | 20.1 | 60.9 | 28.9 | 29.2 |
| Nonpoor | 17.9 | 9.7 | 11.0 | 46.2 | 15.1 | 13.2 |
| Race, Hispanic origin, and poverty status[2,3] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White: | | | | | | |
| Poor | 32.1 | 26.5 | 34.2 | 68.5 | 34.8 | 29.7 |
| Near poor and nonpoor | 22.1 | 12.2 | 12.8 | 50.4 | 17.0 | 15.8 |
| Black or African American: | | | | | | |
| Poor | 29.1 | 27.7 | 29.3 | 72.7 | 35.7 | 35.8 |
| Near poor and nonpoor | 27.9 | 22.7 | 20.1 | 67.5 | 31.3 | 24.4 |
| Mexican: | | | | | | |
| Poor | * | 38.9 | 39.1 | 57.1 | 46.4 | 39.2 |
| Near poor and nonpoor | 27.4 | 30.5 | 25.7 | 61.2 | 26.9 | 25.1 |

| Sex, race and Hispanic origin, and poverty status | 18–64 years | | | 65–74 years | | |
|---|---|---|---|---|---|---|
| | 1971–74 | 1988–94 | 1999–2002 | 1971–74 | 1988–94 | 1999–2002 |
| | Percent of persons with untreated dental caries | | | | | |
| Total[1] | 48.4 | 28.2 | 23.8 | 29.7 | 25.4 | 17.0 |
| Sex | | | | | | |
| Male | 50.9 | 31.2 | 25.9 | 32.6 | 29.8 | 20.1 |
| Female | 46.0 | 25.3 | 21.7 | 27.4 | 21.5 | 14.4 |
| Race and Hispanic origin[2] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White | 45.6 | 23.6 | 18.7 | 28.3 | 22.7 | 14.3 |
| Black or African American | 68.2 | 48.0 | 41.7 | 41.5 | 46.7 | 35.0 |
| Mexican | 62.0 | 40.0 | 35.5 | * | 43.8 | 33.9 |
| Poverty status[3] | | | | | | |
| Poor | 63.6 | 47.4 | 40.1 | 34.3 | 46.6 | 27.9 |
| Near poor | 56.3 | 42.6 | 36.1 | 35.6 | 40.1 | 28.1 |
| Nonpoor | 43.1 | 19.5 | 16.1 | 26.2 | 19.2 | 12.2 |
| Race, Hispanic origin, and poverty status[2,3] | | | | | | |
| Not Hispanic or Latino: | | | | | | |
| White: | | | | | | |
| Poor | 59.5 | 42.4 | 33.9 | 33.3 | *39.0 | * |
| Near poor and nonpoor | 44.5 | 21.6 | 16.8 | 28.3 | 22.7 | 14.0 |
| Black or African American: | | | | | | |
| Poor | 73.1 | 59.3 | 53.5 | 39.8 | 49.7 | *31.0 |
| Near poor and nonpoor | 65.8 | 43.4 | 37.2 | 41.1 | 43.8 | 39.0 |
| Mexican: | | | | | | |
| Poor | 65.4 | 52.4 | 43.1 | * | 55.5 | *45.0 |
| Near poor and nonpoor | 59.1 | 31.6 | 32.2 | * | 35.6 | 31.1 |

See footnotes at end of table.



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## Table 85 (page 2 of 2). Untreated dental caries, according to age, sex, race and Hispanic origin, and poverty status: United States, 1971–74, 1988–94, and 1999–2002

[Data are based on dental examinations of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Sex, race and Hispanic origin, and poverty status | 75 years and over | | |
|---|---|---|---|
| | 1971–74 | 1988–94 | 1999–2002 |
| | Percent of persons with untreated dental caries | | |
| Total[1] | --- | 30.3 | 20.3 |
| **Sex** | | | |
| Male | --- | 34.4 | 24.4 |
| Female | --- | 28.1 | 17.4 |
| **Race and Hispanic origin[2]** | | | |
| Not Hispanic or Latino: | | | |
| White | --- | 27.8 | 18.3 |
| Black or African American | --- | 62.6 | 46.8 |
| Mexican | --- | 55.6 | 48.2 |
| **Poverty status[3]** | | | |
| Poor | --- | 47.1 | 33.0 |
| Near poor | --- | 34.5 | 23.0 |
| Nonpoor | --- | 23.2 | 15.8 |
| **Race, Hispanic origin, and poverty status[2,3]** | | | |
| Not Hispanic or Latino: | | | |
| White: | | | |
| Poor | --- | 38.0 | *32.2 |
| Near poor and nonpoor | --- | 26.1 | 17.2 |
| Black or African American: | | | |
| Poor | --- | 68.6 | * |
| Near poor and nonpoor | --- | 60.2 | 43.8 |
| Mexican: | | | |
| Poor | --- | 79.4 | * |
| Near poor and nonpoor | --- | * | 49.7 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent or fewer than 30 cases.

--- Data not available.

[1]Includes persons of all races and Hispanic origins, not just those shown separately and unknown poverty status.

[2]Persons of Mexican origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[3]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Persons with unknown poverty status are excluded (4 percent in 1971–74, 6 percent in 1988–94, and 8 percent in 1999–2002). See Appendix II, Family income; Poverty level.

NOTES: Excludes edentulous persons (persons without teeth) of all ages. The majority of edentulous persons are 65 years of age and over. Estimates of edentulism among persons 65 years of age and over are 46 percent in 1971–74, 33 percent in 1988–94, and 27 percent in 1999–2002. See Appendix II, Dental caries. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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## Table 86 (page 1 of 2). Use of mammography for women 40 years of age and over, according to selected characteristics: United States, selected years 1987–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1987 | 1990 | 1991 | 1994 | 1998 | 1999 | 2000 | 2003 |
|---|---|---|---|---|---|---|---|---|
| | Percent of women having a mammogram within the past 2 years[1] | | | | | | | |
| 40 years and over, age adjusted[2,3] | 29.0 | 51.7 | 54.7 | 61.0 | 67.0 | 70.3 | 70.4 | 69.5 |
| 40 years and over, crude[2] | 28.7 | 51.4 | 54.6 | 60.9 | 66.9 | 70.3 | 70.4 | 69.7 |
| **Age** | | | | | | | | |
| 40–49 years | 31.9 | 55.1 | 55.6 | 61.3 | 63.4 | 67.2 | 64.3 | 64.4 |
| 50–64 years | 31.7 | 56.0 | 60.3 | 66.5 | 73.7 | 76.5 | 78.7 | 76.2 |
| 65 years and over | 22.8 | 43.4 | 48.1 | 55.0 | 63.8 | 66.8 | 67.9 | 67.7 |
| 65–74 years | 26.6 | 48.7 | 55.7 | 63.0 | 69.4 | 73.9 | 74.0 | 74.6 |
| 75 years and over | 17.3 | 35.8 | 37.8 | 44.6 | 57.2 | 58.9 | 61.3 | 60.6 |
| **Race[4]** | | | | | | | | |
| 40 years and over, crude: | | | | | | | | |
| White only | 29.6 | 52.2 | 55.6 | 60.6 | 67.4 | 70.6 | 71.4 | 70.1 |
| Black or African American only | 24.0 | 46.4 | 48.0 | 64.3 | 66.0 | 71.0 | 67.8 | 70.4 |
| American Indian and Alaska Native only | * | 43.2 | 54.5 | 65.8 | 45.2 | 63.0 | 47.4 | 63.1 |
| Asian only | * | 46.0 | 45.9 | 55.8 | 60.2 | 58.3 | 53.5 | 57.6 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | --- | * | * | * |
| 2 or more races | --- | --- | --- | --- | --- | 70.2 | 69.2 | 65.3 |
| **Hispanic origin and race[4]** | | | | | | | | |
| 40 years and over, crude: | | | | | | | | |
| Hispanic or Latino | 18.3 | 45.2 | 49.2 | 51.9 | 60.2 | 65.7 | 61.2 | 65.0 |
| Not Hispanic or Latino | 29.4 | 51.8 | 54.9 | 61.5 | 67.5 | 70.7 | 71.1 | 70.1 |
| White only | 30.3 | 52.7 | 56.0 | 61.3 | 68.0 | 71.1 | 72.2 | 70.5 |
| Black or African American only | 23.8 | 46.0 | 47.7 | 64.4 | 66.0 | 71.0 | 67.9 | 70.5 |
| **Age, Hispanic origin, and race[4]** | | | | | | | | |
| 40–49 years: | | | | | | | | |
| Hispanic or Latino | *15.3 | 45.1 | 44.0 | 47.5 | 55.2 | 61.6 | 54.1 | 59.4 |
| Not Hispanic or Latino: | | | | | | | | |
| White only | 34.3 | 57.0 | 58.1 | 62.0 | 64.4 | 68.3 | 67.2 | 65.2 |
| Black or African American only | 27.8 | 48.4 | 48.0 | 67.2 | 65.0 | 69.2 | 60.9 | 68.2 |
| 50–64 years: | | | | | | | | |
| Hispanic or Latino | 23.0 | 47.5 | 61.7 | 60.1 | 67.2 | 69.7 | 66.5 | 69.4 |
| Not Hispanic or Latino: | | | | | | | | |
| White only | 33.6 | 58.1 | 61.5 | 67.5 | 75.3 | 77.9 | 80.6 | 77.2 |
| Black or African American only | 26.4 | 48.4 | 52.4 | 63.6 | 71.2 | 75.0 | 77.7 | 76.2 |
| 65 years and over: | | | | | | | | |
| Hispanic or Latino | * | 41.1 | 40.9 | 48.0 | 59.0 | 67.2 | 68.3 | 69.5 |
| Not Hispanic or Latino: | | | | | | | | |
| White only | 24.0 | 43.8 | 49.1 | 54.9 | 64.3 | 66.8 | 68.3 | 68.1 |
| Black or African American only | 14.1 | 39.7 | 41.6 | 61.0 | 60.6 | 68.1 | 65.5 | 65.4 |
| **Age and poverty status[5]** | | | | | | | | |
| 40 years and over, crude: | | | | | | | | |
| Poor | 14.6 | 30.8 | 35.2 | 44.2 | 50.1 | 57.4 | 54.8 | 55.4 |
| Near poor | 20.9 | 39.1 | 44.4 | 48.6 | 56.1 | 59.5 | 58.1 | 60.8 |
| Nonpoor | 35.2 | 59.2 | 62.2 | 68.5 | 72.6 | 75.0 | 75.9 | 74.3 |
| 40–49 years: | | | | | | | | |
| Poor | 18.6 | 32.2 | 33.0 | 43.0 | 44.8 | 51.3 | 47.4 | 50.6 |
| Near poor | 18.4 | 39.0 | 43.8 | 47.6 | 46.9 | 52.8 | 43.6 | 54.0 |
| Nonpoor | 36.8 | 60.1 | 61.2 | 66.5 | 68.4 | 71.6 | 69.9 | 68.3 |
| 50–64 years: | | | | | | | | |
| Poor | 14.6 | 29.9 | 37.3 | 46.2 | 52.7 | 63.3 | 61.7 | 58.3 |
| Near poor | 24.2 | 39.8 | 50.2 | 49.0 | 61.8 | 64.9 | 68.3 | 64.0 |
| Nonpoor | 37.0 | 63.3 | 66.0 | 73.7 | 78.7 | 80.2 | 82.6 | 80.9 |
| 65 years and over: | | | | | | | | |
| Poor | 13.1 | 30.8 | 35.2 | 43.9 | 51.9 | 57.6 | 54.8 | 57.0 |
| Near poor | 19.9 | 38.6 | 41.8 | 48.8 | 57.8 | 60.2 | 60.3 | 62.8 |
| Nonpoor | 29.7 | 51.5 | 57.8 | 64.0 | 70.1 | 72.5 | 75.0 | 72.6 |

See footnotes at end of table.



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## Table 86 (page 2 of 2). Use of mammography for women 40 years of age and over, according to selected characteristics: United States, selected years 1987–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1987 | 1990 | 1991 | 1994 | 1998 | 1999 | 2000 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Health insurance status[6] | Percent of women having a mammogram within the past 2 years[1] | | | | | | | |
| 40–64 years of age: | | | | | | | | |
| Insured | --- | --- | --- | 68.3 | 72.3 | 75.5 | 76.0 | 75.1 |
| Private | --- | --- | --- | 69.4 | 73.4 | 76.3 | 77.1 | 76.3 |
| Medicaid | --- | --- | --- | 54.5 | 59.7 | 62.5 | 61.7 | 63.5 |
| Uninsured | --- | --- | --- | 34.0 | 40.1 | 44.8 | 40.7 | 41.5 |
| 65 years of age and over: | | | | | | | | |
| Medicare HMO | --- | --- | --- | --- | 70.4 | 76.3 | 73.2 | 70.2 |
| Private | --- | --- | --- | 59.0 | 67.3 | 70.2 | 71.2 | 72.4 |
| Medicaid | --- | --- | --- | 46.2 | 51.1 | 53.8 | 57.6 | 61.2 |
| Medicare fee-for-service only | --- | --- | --- | 36.8 | 48.1 | 51.3 | 55.8 | 53.4 |
| Age and education[7] | | | | | | | | |
| 40 years and over, crude: | | | | | | | | |
| No high school diploma or GED | 17.8 | 36.4 | 40.0 | 48.2 | 54.5 | 56.7 | 57.7 | 58.1 |
| High school diploma or GED | 31.3 | 52.7 | 55.8 | 61.0 | 66.7 | 69.2 | 69.7 | 67.8 |
| Some college or more | 37.7 | 62.8 | 65.2 | 69.7 | 72.8 | 77.3 | 76.2 | 75.1 |
| 40–49 years of age: | | | | | | | | |
| No high school diploma or GED | 15.1 | 38.5 | 40.8 | 50.4 | 47.3 | 48.8 | 46.8 | 53.3 |
| High school diploma or GED | 32.6 | 53.1 | 52.0 | 55.8 | 59.1 | 60.8 | 59.0 | 60.8 |
| Some college or more | 39.2 | 62.3 | 63.7 | 68.7 | 68.3 | 74.4 | 70.6 | 68.1 |
| 50–64 years of age: | | | | | | | | |
| No high school diploma or GED | 21.2 | 41.0 | 43.6 | 51.6 | 58.8 | 62.3 | 66.5 | 63.4 |
| High school diploma or GED | 33.8 | 56.5 | 60.8 | 67.8 | 73.3 | 77.2 | 76.6 | 71.8 |
| Some college or more | 40.5 | 68.0 | 72.7 | 74.7 | 79.8 | 81.2 | 84.2 | 82.7 |
| 65 years of age and over: | | | | | | | | |
| No high school diploma or GED | 16.5 | 33.0 | 37.7 | 45.6 | 54.7 | 56.6 | 57.4 | 56.9 |
| High school diploma or GED | 25.9 | 47.5 | 54.0 | 59.1 | 66.8 | 68.4 | 71.8 | 69.7 |
| Some college or more | 32.3 | 56.7 | 57.9 | 64.3 | 71.3 | 77.1 | 74.1 | 75.1 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE greater than 30 percent.

--- Data not available.

[1]Questions concerning use of mammography differed slightly on the National Health Interview Survey across the years for which data are shown. See Appendix II, Mammography.

[2]Includes all other races not shown separately, unknown poverty status in 1987, unknown health insurance status, and unknown education.

[3]Estimates are age adjusted to the year 2000 standard population using four age groups: 40–49 years, 50–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Poverty status was unknown for 11 percent of women 40 years of age and over in 1987. Missing family income data were imputed for 19–23 percent of women 40 years of age and over in 1990–94 and 35–39 percent in 1998–2003. See Appendix II, Family income; Poverty level.

[6]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes State-sponsored health plans and State Children's Health Insurance Program (SCHIP). In addition to private and Medicaid, the category "insured" also includes military plans, other government-sponsored health plans, and Medicare, not shown separately. Persons 65 years of age and over who reported Medicare HMO (health maintenance organization) and some other type of health insurance coverage are classified as having Medicare HMO. For persons 65 years of age and over the category "private" includes private and Medicare coverage. See Appendix II, Health insurance coverage.

[7]Education categories shown are for 1998 and subsequent years. GED stands for General Educational Development high school equivalency diploma. In years prior to 1996 the following categories based on number of years of school completed were used: less than 12 years, 12 years, 13 years or more. See Appendix II, Education.

NOTES: Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data starting in 1997 are not strictly comparable with data for earlier years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the following supplements: cancer control (1987), health promotion and disease prevention (1990–91), and year 2000 objectives (1993–94). Starting in 1998, data are from the family core and sample adult questionnaires.



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## Table 87 (page 1 of 2). Use of Pap smears for women 18 years of age and over, according to selected characteristics: United States, selected years 1987–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1987 | 1993 | 1994 | 1998 | 1999 | 2000 | 2003 |
|---|---|---|---|---|---|---|---|
| | Percent of women having a Pap smear within the past 3 years[1] | | | | | | |
| 18 years and over, age adjusted[2,3] | 74.1 | 77.7 | 76.8 | 79.3 | 80.8 | 81.3 | 79.2 |
| 18 years and over, crude[2] | 74.4 | 77.7 | 76.8 | 79.1 | 80.8 | 81.2 | 79.0 |
| **Age** | | | | | | | |
| 18–44 years | 83.3 | 84.6 | 82.8 | 84.4 | 86.8 | 84.9 | 83.9 |
| 18–24 years | 74.8 | 78.8 | 76.6 | 73.6 | 76.8 | 73.5 | 75.1 |
| 25–44 years | 86.3 | 86.3 | 84.6 | 87.6 | 89.9 | 88.5 | 86.8 |
| 45–64 years | 70.5 | 77.2 | 77.4 | 81.4 | 81.7 | 84.6 | 81.3 |
| 45–54 years | 75.7 | 82.1 | 81.9 | 83.7 | 83.8 | 86.3 | 83.6 |
| 55–64 years | 65.2 | 70.6 | 71.0 | 78.0 | 78.4 | 82.0 | 77.8 |
| 65 years and over | 50.8 | 57.6 | 57.3 | 59.8 | 61.0 | 64.5 | 60.8 |
| 65–74 years | 57.9 | 64.7 | 64.9 | 67.0 | 70.0 | 71.6 | 70.1 |
| 75 years and over | 40.4 | 48.0 | 47.3 | 51.2 | 50.8 | 56.7 | 51.1 |
| **Race[4]** | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| White only | 74.1 | 77.3 | 76.2 | 78.9 | 80.6 | 81.3 | 78.7 |
| Black or African American only | 80.7 | 82.7 | 83.5 | 84.2 | 85.7 | 85.1 | 84.0 |
| American Indian and Alaska Native only | 85.4 | 78.1 | 73.5 | 74.6 | 92.2 | 76.8 | 84.8 |
| Asian only | 51.9 | 68.8 | 66.4 | 68.5 | 64.4 | 66.4 | 68.3 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | * | * | * |
| 2 or more races | --- | --- | --- | --- | 86.9 | 80.0 | 81.6 |
| **Hispanic origin and race[4]** | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Hispanic or Latino | 67.6 | 77.2 | 74.4 | 75.2 | 76.3 | 77.0 | 75.4 |
| Not Hispanic or Latino | 74.9 | 77.8 | 77.0 | 79.6 | 81.3 | 81.7 | 79.5 |
| White only | 74.7 | 77.3 | 76.5 | 79.3 | 81.0 | 81.8 | 79.3 |
| Black or African American only | 80.9 | 82.7 | 83.8 | 84.2 | 86.0 | 85.1 | 83.8 |
| **Age, Hispanic origin, and race[4]** | | | | | | | |
| 18–44 years: | | | | | | | |
| Hispanic or Latino | 73.9 | 80.9 | 80.6 | 76.4 | 77.0 | 78.1 | 75.9 |
| Not Hispanic or Latino: | | | | | | | |
| White only | 84.5 | 85.3 | 82.9 | 85.7 | 88.7 | 86.6 | 85.8 |
| Black or African American only | 89.1 | 88.0 | 89.1 | 88.9 | 90.8 | 88.5 | 88.6 |
| 45–64 years: | | | | | | | |
| Hispanic or Latino | 57.7 | 75.8 | 70.1 | 78.3 | 79.5 | 77.8 | 77.9 |
| Not Hispanic or Latino: | | | | | | | |
| White only | 71.2 | 77.2 | 77.5 | 81.7 | 81.9 | 85.9 | 81.4 |
| Black or African American only | 76.2 | 80.3 | 82.2 | 84.1 | 84.6 | 85.7 | 84.7 |
| 65 years and over: | | | | | | | |
| Hispanic or Latino | 41.7 | 57.1 | 43.8 | 59.8 | 63.7 | 66.8 | 64.6 |
| Not Hispanic or Latino: | | | | | | | |
| White only | 51.8 | 57.1 | 58.2 | 59.7 | 60.5 | 64.2 | 60.7 |
| Black or African American only | 44.8 | 61.2 | 59.5 | 61.7 | 64.5 | 67.2 | 59.6 |
| **Age and poverty status[5]** | | | | | | | |
| 18 years and over, crude: | | | | | | | |
| Below poverty | 64.3 | 70.3 | 68.8 | 69.8 | 73.6 | 72.0 | 70.5 |
| Near poor | 68.2 | 71.2 | 68.8 | 70.6 | 72.5 | 73.4 | 71.4 |
| Nonpoor | 80.0 | 82.1 | 81.9 | 83.5 | 84.3 | 85.0 | 83.0 |
| 18–44 years: | | | | | | | |
| Below poverty | 77.1 | 77.0 | 78.9 | 77.1 | 79.7 | 77.1 | 77.1 |
| Near poor | 80.4 | 81.9 | 78.2 | 79.2 | 84.0 | 79.4 | 79.5 |
| Nonpoor | 86.4 | 87.9 | 85.7 | 87.6 | 89.0 | 88.0 | 86.9 |
| 45–64 years: | | | | | | | |
| Below poverty | 53.6 | 66.5 | 62.0 | 67.6 | 73.1 | 73.6 | 66.0 |
| Near poor | 60.4 | 64.8 | 66.2 | 69.9 | 70.4 | 76.1 | 71.4 |
| Nonpoor | 74.9 | 81.4 | 82.0 | 85.1 | 84.6 | 87.4 | 85.1 |
| 65 years and over: | | | | | | | |
| Below poverty | 33.2 | 47.4 | 44.0 | 48.2 | 51.9 | 53.7 | 52.6 |
| Near poor | 50.4 | 55.7 | 51.5 | 55.1 | 54.7 | 61.0 | 55.4 |
| Nonpoor | 60.0 | 62.0 | 66.8 | 65.3 | 66.4 | 68.8 | 65.4 |

See footnotes at end of table.



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## Table 87 (page 2 of 2). Use of Pap smears for women 18 years of age and over, according to selected characteristics: United States, selected years 1987–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1987 | 1993 | 1994 | 1998 | 1999 | 2000 | 2003 |
|---|---|---|---|---|---|---|---|
| Health insurance status[6] | Percent of women having a Pap smear within the past 3 years[1] | | | | | | |
| 18–64 years of age: | | | | | | | |
| Insured | --- | 84.7 | 83.8 | 86.0 | 87.2 | 87.8 | 86.4 |
| Private | --- | 84.8 | 83.6 | 86.5 | 87.5 | 88.0 | 87.0 |
| Medicaid | --- | 82.7 | 86.2 | 83.0 | 84.2 | 85.8 | 82.8 |
| Uninsured | --- | 69.4 | 68.6 | 69.6 | 73.3 | 70.4 | 66.6 |
| 65 years of age and over: | | | | | | | |
| Medicare HMO | --- | --- | --- | 66.1 | 69.6 | 67.6 | 61.4 |
| Private | --- | 60.6 | 61.2 | 61.3 | 62.9 | 67.2 | 63.0 |
| Medicaid | --- | 47.8 | 44.9 | 49.9 | 54.8 | 57.8 | 53.9 |
| Medicare fee-for-service only | --- | 43.6 | 42.4 | 49.8 | 48.4 | 55.1 | 53.8 |
| Age and education[7] | | | | | | | |
| 25 years and over, crude: | | | | | | | |
| No high school diploma or GED | 57.1 | 61.9 | 60.9 | 65.0 | 66.1 | 69.9 | 64.9 |
| High school diploma or GED | 76.4 | 78.2 | 76.0 | 77.4 | 79.3 | 79.8 | 75.9 |
| Some college or more | 84.0 | 84.4 | 85.2 | 86.9 | 87.8 | 88.0 | 86.2 |
| 25–44 years of age: | | | | | | | |
| No high school diploma or GED | 75.1 | 73.6 | 73.6 | 76.8 | 79.0 | 79.6 | 71.7 |
| High school diploma or GED | 85.6 | 85.4 | 82.4 | 83.9 | 87.6 | 86.2 | 84.3 |
| Some college or more | 90.1 | 89.8 | 89.1 | 91.5 | 93.0 | 91.4 | 90.8 |
| 45–64 years of age: | | | | | | | |
| No high school diploma or GED | 58.0 | 65.6 | 66.1 | 69.2 | 71.6 | 75.7 | 71.4 |
| High school diploma or GED | 72.3 | 77.6 | 75.9 | 81.0 | 79.8 | 81.8 | 77.6 |
| Some college or more | 80.1 | 83.0 | 84.7 | 85.5 | 85.7 | 89.1 | 86.2 |
| 65 years of age and over: | | | | | | | |
| No high school diploma or GED | 44.0 | 50.7 | 47.7 | 52.4 | 51.8 | 56.6 | 52.5 |
| High school diploma or GED | 55.4 | 61.6 | 61.2 | 60.7 | 63.7 | 66.9 | 61.2 |
| Some college or more | 59.4 | 62.3 | 66.5 | 67.9 | 68.8 | 69.8 | 67.8 |

* Estimates are considered unreliable. Data not shown have a relative standard error greater than 30 percent.

--- Data not available.

[1]Questions concerning use of Pap smears differed slightly on the National Health Interview Survey across the years for which data are shown. See Appendix II, Pap smear.

[2]Includes all other races not shown separately, unknown poverty status in 1987, unknown health insurance status, and unknown education.

[3]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. Age-adjusted estimates in this table may differ from other age-adjusted estimates based on the same data and presented elsewhere if different age groups are used in the adjustment procedure. See Appendix II, Age adjustment.

[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[5]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Poverty status was unknown for 9 percent of women 18 years of age and over in 1987. Missing family income data were imputed for 17–20 percent of women 18 years of age and over in 1990–94 and 35–39 percent in 1998–2003. See Appendix II, Family income; Poverty level.

[6]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes State-sponsored health plans and State Children's Health Insurance Program (SCHIP). In addition to private and Medicaid, the category "insured" also includes military plans, other government-sponsored health plans, and Medicare, not shown separately. Persons 65 years of age and over who reported Medicare HMO (health maintenance organization) and some other type of health insurance coverage are classified as having Medicare HMO. For persons 65 years of age and over the category "private" includes private and Medicare coverage. See Appendix II, Health insurance coverage.

[7]Education categories shown are for 1998 and subsequent years. GED stands for General Educational Development high school equivalency diploma. In years prior to 1996 the following categories based on number of years of school completed were used: less than 12 years, 12 years, 13 years or more. See Appendix II, Education.

NOTES: Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Data starting in 1997 are not strictly comparable with data for earlier years due to the 1997 questionnaire redesign. See Appendix I, National Health Interview Survey. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Some data for 1993 and 1994 have been revised and differ from previous editions of *Health, United States*.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the following supplements: cancer control (1987), year 2000 objectives (1993–94). Starting in 1998, data are from the family core and sample adult questionnaires.



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## Table 88 (page 1 of 3). Visits to physician offices and hospital outpatient and emergency departments by selected characteristics: United States, selected years 1995–2003

[Data are based on reporting by a sample of office-based physicians and hospital outpatient and emergency departments]

Click here for spreadsheet version

| Age, sex, and race | All places[1] | | | | Physician offices | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 2001 | 2002 | 2003 | 1995 | 2001 | 2002 | 2003 |
| | Number of visits in thousands | | | | | | | |
| Total | 860,859 | 1,142,420 | 1,157,798 | 1,114,504 | 697,082 | 951,214 | 964,304 | 906,023 |
| Under 18 years | 194,644 | 220,921 | 238,571 | 223,964 | 150,351 | 173,383 | 188,933 | 169,392 |
| 18–44 years | 285,184 | 341,383 | 337,681 | 330,687 | 219,065 | 267,844 | 263,672 | 251,853 |
| 45–64 years | 188,320 | 300,567 | 308,627 | 301,477 | 159,531 | 259,718 | 267,249 | 257,258 |
| 45–54 years | 104,891 | 165,321 | 169,871 | 164,383 | 88,266 | 141,598 | 145,767 | 138,634 |
| 55–64 years | 83,429 | 135,247 | 138,756 | 137,094 | 71,264 | 118,120 | 121,482 | 118,624 |
| 65 years and over | 192,712 | 279,548 | 272,919 | 258,375 | 168,135 | 250,269 | 244,451 | 227,520 |
| 65–74 years | 102,605 | 136,819 | 132,116 | 120,817 | 90,544 | 122,970 | 118,971 | 106,424 |
| 75 years and over | 90,106 | 142,729 | 140,802 | 137,558 | 77,591 | 127,299 | 125,479 | 121,096 |
| | Number of visits per 100 persons | | | | | | | |
| Total, age adjusted[2] | 334 | 410 | 410 | 391 | 271 | 342 | 342 | 317 |
| Total, crude | 329 | 408 | 409 | 390 | 266 | 340 | 341 | 317 |
| Under 18 years | 275 | 305 | 328 | 307 | 213 | 239 | 260 | 232 |
| 18–44 years | 264 | 311 | 306 | 300 | 203 | 244 | 239 | 229 |
| 45–64 years | 364 | 469 | 466 | 442 | 309 | 406 | 404 | 377 |
| 45–54 years | 339 | 425 | 427 | 406 | 286 | 364 | 367 | 343 |
| 55–64 years | 401 | 538 | 525 | 494 | 343 | 470 | 459 | 428 |
| 65 years and over | 612 | 829 | 804 | 754 | 534 | 742 | 720 | 664 |
| 65–74 years | 560 | 757 | 733 | 668 | 494 | 680 | 660 | 588 |
| 75 years and over | 683 | 913 | 884 | 850 | 588 | 814 | 788 | 748 |
| Sex and age | | | | | | | | |
| Male, age adjusted[2] | 290 | 356 | 353 | 338 | 232 | 294 | 293 | 273 |
| Male, crude | 277 | 343 | 343 | 329 | 220 | 281 | 283 | 264 |
| Under 18 years | 273 | 306 | 329 | 317 | 209 | 238 | 262 | 241 |
| 18–44 years | 190 | 217 | 214 | 202 | 139 | 163 | 161 | 147 |
| 45–54 years | 275 | 349 | 351 | 335 | 229 | 294 | 298 | 280 |
| 55–64 years | 351 | 457 | 448 | 422 | 300 | 399 | 393 | 365 |
| 65–74 years | 508 | 726 | 703 | 633 | 445 | 654 | 631 | 558 |
| 75 years and over | 711 | 934 | 850 | 881 | 616 | 840 | 762 | 777 |
| Female, age adjusted[2] | 377 | 463 | 465 | 442 | 309 | 388 | 388 | 360 |
| Female, crude | 378 | 470 | 472 | 449 | 310 | 395 | 396 | 368 |
| Under 18 years | 277 | 304 | 327 | 297 | 217 | 240 | 258 | 223 |
| 18–44 years | 336 | 402 | 397 | 396 | 265 | 323 | 316 | 309 |
| 45–54 years | 400 | 498 | 500 | 474 | 339 | 431 | 433 | 403 |
| 55–64 years | 446 | 612 | 596 | 561 | 382 | 535 | 521 | 486 |
| 65–74 years | 603 | 782 | 757 | 697 | 534 | 702 | 684 | 613 |
| 75 years and over | 666 | 900 | 905 | 830 | 571 | 798 | 804 | 730 |
| Race and age[3] | | | | | | | | |
| White, age adjusted[2] | 339 | 428 | 421 | 399 | 282 | 364 | 359 | 332 |
| White, crude | 338 | 433 | 426 | 405 | 281 | 369 | 364 | 337 |
| Under 18 years | 295 | 330 | 346 | 330 | 237 | 268 | 282 | 260 |
| 18–44 years | 267 | 327 | 317 | 308 | 211 | 264 | 256 | 242 |
| 45–54 years | 334 | 434 | 439 | 409 | 286 | 378 | 385 | 352 |
| 55–64 years | 397 | 552 | 534 | 500 | 345 | 490 | 476 | 439 |
| 65–74 years | 557 | 778 | 734 | 654 | 496 | 708 | 669 | 582 |
| 75 years and over | 689 | 938 | 880 | 844 | 598 | 845 | 790 | 747 |
| Black or African American, age adjusted | 309 | 357 | 427 | 391 | 204 | 242 | 301 | 261 |
| Black or African American, crude | 281 | 329 | 392 | 363 | 178 | 217 | 269 | 236 |
| Under 18 years | 193 | 210 | 307 | 247 | 100 | 110 | 198 | 131 |
| 18–44 years | 260 | 291 | 316 | 326 | 158 | 178 | 191 | 199 |
| 45–54 years | 387 | 454 | 422 | 442 | 281 | 342 | 306 | 315 |
| 55–64 years | 414 | 519 | 563 | 486 | 294 | 383 | 421 | 349 |
| 65–74 years | 553 | 633 | 842 | 761 | 429 | 492 | *687 | 602 |
| 75 years and over | 534 | 676 | *1,019 | 774 | 395 | 517 | *842 | 608 |

See footnotes at end of table.



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## Table 88 (page 2 of 3). Visits to physician offices and hospital outpatient and emergency departments by selected characteristics: United States, selected years 1995–2003

[Data are based on reporting by a sample of office-based physicians and hospital outpatient and emergency departments]

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| Age, sex, and race | Hospital outpatient departments | | | | Hospital emergency departments | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 2001 | 2002 | 2003 | 1995 | 2001 | 2002 | 2003 |
| | Number of visits in thousands | | | | | | | |
| Total | 67,232 | 83,715 | 83,339 | 94,578 | 96,545 | 107,490 | 110,155 | 113,903 |
| Under 18 years | 17,636 | 21,299 | 21,707 | 25,652 | 26,657 | 26,239 | 27,932 | 28,920 |
| 18–44 years | 24,299 | 27,430 | 28,216 | 32,386 | 41,820 | 46,109 | 45,792 | 46,449 |
| 45–64 years | 14,811 | 21,590 | 21,436 | 23,227 | 13,978 | 19,260 | 19,943 | 20,992 |
| 45–54 years | 8,029 | 12,016 | 12,054 | 12,889 | 8,595 | 11,707 | 12,050 | 12,861 |
| 55–64 years | 6,782 | 9,574 | 9,382 | 10,338 | 5,383 | 7,552 | 7,892 | 8,132 |
| 65 years and over | 10,486 | 13,396 | 11,980 | 13,313 | 14,090 | 15,883 | 16,488 | 17,542 |
| 65–74 years | 6,004 | 7,299 | 6,386 | 7,240 | 6,057 | 6,551 | 6,759 | 7,153 |
| 75 years and over | 4,482 | 6,097 | 5,595 | 6,073 | 8,033 | 9,332 | 9,728 | 10,389 |
| | Number of visits per 100 persons | | | | | | | |
| Total, age adjusted[2] | 26 | 30 | 29 | 33 | 37 | 39 | 39 | 40 |
| Total, crude | 26 | 30 | 29 | 33 | 37 | 38 | 39 | 40 |
| Under 18 years | 25 | 29 | 30 | 35 | 38 | 36 | 38 | 40 |
| 18–44 years | 22 | 25 | 26 | 29 | 39 | 42 | 42 | 42 |
| 45–64 years | 29 | 34 | 32 | 34 | 27 | 30 | 30 | 31 |
| 45–54 years | 26 | 31 | 30 | 32 | 28 | 30 | 30 | 32 |
| 55–64 years | 33 | 38 | 36 | 37 | 26 | 30 | 30 | 29 |
| 65 years and over | 33 | 40 | 35 | 39 | 45 | 47 | 49 | 51 |
| 65–74 years | 33 | 40 | 35 | 40 | 33 | 36 | 38 | 40 |
| 75 years and over | 34 | 39 | 35 | 38 | 61 | 60 | 61 | 64 |
| Sex and age | | | | | | | | |
| Male, age adjusted[2] | 21 | 25 | 24 | 27 | 37 | 37 | 37 | 39 |
| Male, crude | 21 | 24 | 23 | 26 | 36 | 37 | 37 | 38 |
| Under 18 years | 25 | 29 | 28 | 35 | 40 | 38 | 39 | 41 |
| 18–44 years | 14 | 16 | 16 | 18 | 37 | 39 | 37 | 37 |
| 45–54 years | 20 | 26 | 25 | 25 | 26 | 29 | 29 | 30 |
| 55–64 years | 26 | 30 | 28 | 29 | 25 | 28 | 28 | 29 |
| 65–74 years | 29 | 35 | 34 | 35 | 34 | 38 | 38 | 41 |
| 75 years and over | 34 | 37 | 31 | 38 | 61 | 57 | 58 | 67 |
| Female, age adjusted[2] | 31 | 35 | 35 | 40 | 37 | 40 | 41 | 42 |
| Female, crude | 31 | 35 | 35 | 40 | 37 | 40 | 41 | 42 |
| Under 18 years | 25 | 29 | 31 | 36 | 35 | 34 | 38 | 38 |
| 18–44 years | 31 | 34 | 35 | 41 | 40 | 45 | 46 | 47 |
| 45–54 years | 32 | 36 | 36 | 38 | 29 | 31 | 32 | 33 |
| 55–64 years | 38 | 45 | 43 | 45 | 26 | 32 | 32 | 30 |
| 65–74 years | 36 | 45 | 36 | 45 | 32 | 35 | 37 | 39 |
| 75 years and over | 34 | 40 | 38 | 37 | 61 | 61 | 63 | 63 |

See footnotes at end of table.



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## Table 88 (page 3 of 3). Visits to physician offices and hospital outpatient and emergency departments by selected characteristics: United States, selected years 1995–2003

[Data are based on reporting by a sample of office-based physicians and hospital outpatient and emergency departments]

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| Age, sex, and race | Hospital outpatient departments | | | | Hospital emergency departments | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 2001 | 2002 | 2003 | 1995 | 2001 | 2002 | 2003 |
| Race and age[3] | Number of visits per 100 persons | | | | | | | |
| White, age adjusted[2] | 23 | 28 | 27 | 30 | 34 | 36 | 36 | 38 |
| White, crude | 23 | 28 | 27 | 30 | 34 | 36 | 36 | 37 |
| Under 18 years | 23 | 28 | 28 | 33 | 35 | 34 | 36 | 38 |
| 18–44 years | 20 | 23 | 23 | 27 | 36 | 40 | 38 | 39 |
| 45–54 years | 23 | 28 | 27 | 28 | 25 | 28 | 27 | 29 |
| 55–64 years | 28 | 34 | 31 | 33 | 24 | 28 | 27 | 28 |
| 65–74 years | 29 | 37 | 30 | 36 | 32 | 33 | 35 | 36 |
| 75 years and over | 31 | 36 | 31 | 35 | 60 | 58 | 59 | 62 |
| Black or African American, age adjusted | 48 | 51 | 55 | 59 | 58 | 65 | 71 | 71 |
| Black or African American, crude | 45 | 49 | 53 | 58 | 58 | 64 | 70 | 69 |
| Under 18 years | 39 | 44 | 46 | 55 | 53 | 55 | 63 | 61 |
| 18–44 years | 38 | 41 | 46 | 51 | 64 | 71 | 79 | 77 |
| 45–54 years | 55 | 56 | 57 | 62 | 51 | 56 | 59 | 65 |
| 55–64 years | 73 | 79 | 78 | 84 | 47 | 56 | 65 | 53 |
| 65–74 years | *77 | 70 | 87 | 82 | 47 | 71 | 68 | 77 |
| 75 years and over | 66 | 67 | 85 | 64 | 73 | 91 | 92 | 103 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent.
[1]All places includes visits to physician offices and hospital outpatient and emergency departments.
[2]Estimates are age adjusted to the year 2000 standard population using six age groups: under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.
[3]In 1999 the instruction for the race item on the Patient Record Form was changed so that more than one race could be recorded. In previous years only one race could be checked. Estimates for race in this table are for visits where only one race was recorded. Estimates for visits where multiple races were checked are unreliable and are not presented.

NOTES: Rates for 1995–2000 were computed using 1990-based postcensal estimates of the civilian noninstitutionalized population as of July 1 adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the Bureau of the Census. Rates for 2001 and later years were computed using 2000-based postcensal estimates of the civilian noninstitutionalized population as of July 1. The difference between rates for 2000 computed using 1990-based postcensal estimates and 2000 census counts is minimal. See www.cdc.gov/nchs/about/major/ahcd/census2000.htm. Starting with *Health, United States, 2005*, data for 2001 and later years for physicians offices use a revised weighting scheme. Therefore, 2001–02 data for all places and physician offices differ from the previous edition of *Health, United States*. See Appendix I, National Ambulatory Medical Care Survey. Rates will be overestimated to the extent that visits by institutionalized persons are counted in the numerator (for example, hospital emergency department visits by nursing home residents) and institutionalized persons are omitted from the denominator. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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## Table 89 (page 1 of 2). Injury-related visits to hospital emergency departments by sex, age, and intent and mechanism of injury: United States, average annual 1995–96, 1998–99, and 2002–2003

[Data are based on reporting by a sample of hospital emergency departments] Revised March 2006 Click here for spreadsheet version

| *Sex, age, and intent and mechanism of injury*[1] | *1995–96* | *1998–99* | *2002–03* | *1995–96* | *1998–99* | *2002–03* |
|---|---|---|---|---|---|---|
| Both sexes | Injury-related visits in thousands | | | Injury-related visits per 10,000 persons | | |
| All ages[2,3] | 36,081 | 37,361 | 39,676 | 1,360.9 | 1,378.3 | 1,401.4 |
| Male | | | | | | |
| All ages[2,3] | 20,030 | 20,445 | 21,467 | 1,530.7 | 1,535.2 | 1,548.1 |
| Under 18 years[2] | 6,238 | 6,054 | 5,974 | 1,720.2 | 1,644.3 | 1,604.5 |
| Unintentional injuries[4] | 5,478 | 5,190 | 4,781 | 1,510.5 | 1,409.7 | 1,284.2 |
| Falls | 1,402 | 1,247 | 1,228 | 386.5 | 338.7 | 329.9 |
| Struck by or against objects or persons | 1,011 | 1,398 | 1,315 | 278.9 | 379.7 | 353.2 |
| Motor vehicle traffic | 453 | 388 | 369 | 125.0 | 105.5 | 99.2 |
| Cut or pierce | 493 | 505 | 348 | 136.0 | 137.1 | 93.5 |
| Intentional injuries | 290 | 222 | 202 | 80.0 | 60.3 | 54.4 |
| 18–24 years[2] | 2,980 | 2,948 | 2,956 | 2,396.9 | 2,295.1 | 2,134.3 |
| Unintentional injuries[4] | 2,423 | 2,319 | 2,020 | 1,948.7 | 1,805.3 | 1,458.4 |
| Falls | 299 | 333 | 289 | 240.8 | 259.5 | 208.3 |
| Struck by or against objects or persons | 387 | 389 | 433 | 311.0 | 303.1 | 312.8 |
| Motor vehicle traffic | 347 | 412 | 376 | 279.4 | 320.9 | 271.9 |
| Cut or pierce | 304 | 344 | 286 | 244.8 | 268.2 | 206.4 |
| Intentional injuries | 335 | 291 | 289 | 269.2 | 226.5 | 208.8 |
| 25–44 years[2] | 7,245 | 7,112 | 7,157 | 1,767.4 | 1,751.7 | 1,758.7 |
| Unintentional injuries[4] | 5,757 | 5,391 | 4,705 | 1,404.3 | 1,327.8 | 1,156.2 |
| Falls | 817 | 847 | 841 | 199.4 | 208.6 | 206.7 |
| Struck by or against objects or persons | 619 | 819 | 698 | 151.0 | 201.6 | 171.5 |
| Motor vehicle traffic | 912 | 839 | 766 | 222.6 | 206.6 | 188.3 |
| Cut or pierce | 860 | 786 | 615 | 209.8 | 193.7 | 151.2 |
| Intentional injuries | 701 | 473 | 485 | 171.0 | 116.5 | 119.2 |
| 45–64 years[2] | 2,240 | 2,822 | 3,528 | 883.4 | 1,011.9 | 1,082.8 |
| Unintentional injuries[4] | 1,845 | 2,213 | 2,216 | 727.6 | 793.4 | 680.1 |
| Falls | 445 | 569 | 526 | 175.6 | 204.0 | 161.5 |
| Struck by or against objects or persons | 186 | 197 | 247 | 73.3 | 70.6 | 75.8 |
| Motor vehicle traffic | 244 | 322 | 343 | 96.3 | 115.5 | 105.4 |
| Cut or pierce | 203 | 290 | 276 | 79.9 | 104.1 | 84.6 |
| Intentional injuries | 86 | 73 | 123 | 33.8 | 26.2 | 37.9 |
| 65 years and over[2] | 1,327 | 1,509 | 1,854 | 1,000.7 | 1,100.3 | 1,285.9 |
| Unintentional injuries[4] | 1,009 | 1,151 | 1,238 | 760.6 | 839.3 | 858.4 |
| Falls | 505 | 584 | 655 | 380.9 | 426.0 | 454.4 |
| Struck by or against objects or persons | *39 | 101 | 77 | *29.4 | 73.3 | 53.4 |
| Motor vehicle traffic | 99 | 113 | 128 | 74.7 | 82.7 | 88.5 |
| Cut or pierce | *81 | 85 | 91 | *61.1 | *61.7 | 62.8 |
| Intentional injuries | * | 16 | 22 | * | * | * |

See footnotes at end of table.



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## Table 89 (page 2 of 2). Injury-related visits to hospital emergency departments by sex, age, and intent and mechanism of injury: United States, average annual 1995–96, 1998–99, and 2002–2003

[Data are based on reporting by a sample of hospital emergency departments] Revised March 2006 Click here for spreadsheet version

| Sex, age, and intent and mechanism of injury[1] | 1995–96 | 1998–99 | 2002–03 | 1995–96 | 1998–99 | 2002–03 |
|---|---|---|---|---|---|---|
| Female | Injury-related visits in thousands | | | Injury-related visits per 10,000 persons | | |
| All ages[2,3] | 16,051 | 16,917 | 18,208 | 1,186.4 | 1,217.6 | 1,253.1 |
| Under 18 years[2] | 4,372 | 4,290 | 4,321 | 1,263.9 | 1,220.4 | 1,214.5 |
| Unintentional injuries[4] | 3,760 | 3,598 | 3,204 | 1,087.0 | 1,023.4 | 900.4 |
| Falls | 1,040 | 964 | 908 | 300.7 | 274.2 | 255.3 |
| Struck by or against objects or persons | 477 | 689 | 627 | 137.9 | 196.1 | 176.1 |
| Motor vehicle traffic | 447 | 394 | 368 | 129.3 | 112.1 | 103.5 |
| Cut or pierce | 253 | 258 | 198 | 73.0 | 73.4 | 55.7 |
| Intentional injuries | 220 | 147 | 216 | 63.6 | 41.7 | 60.7 |
| 18–24 years[2] | 1,900 | 2,049 | 2,307 | 1,523.4 | 1,589.6 | 1,672.9 |
| Unintentional injuries[4] | 1,430 | 1,464 | 1,493 | 1,146.7 | 1,135.8 | 1,082.9 |
| Falls | 268 | 208 | 261 | 214.5 | 161.7 | 189.3 |
| Struck by or against objects or persons | 134 | 169 | 201 | 107.4 | 130.8 | 145.9 |
| Motor vehicle traffic | 373 | 442 | 457 | 298.8 | 342.7 | 331.2 |
| Cut or pierce | 131 | 122 | 129 | 105.3 | 94.8 | 93.2 |
| Intentional injuries | 239 | 230 | 206 | 191.7 | 178.6 | 149.4 |
| 25–44 years[2] | 5,098 | 5,257 | 5,527 | 1,205.8 | 1,246.7 | 1,320.9 |
| Unintentional injuries[4] | 3,877 | 3,820 | 3,477 | 916.8 | 906.1 | 830.9 |
| Falls | 817 | 908 | 808 | 193.3 | 215.5 | 193.0 |
| Struck by or against objects or persons | 380 | 405 | 382 | 89.8 | 95.9 | 91.3 |
| Motor vehicle traffic | 872 | 794 | 819 | 206.2 | 188.4 | 195.8 |
| Cut or pierce | 338 | 472 | 337 | 79.8 | 111.9 | 80.4 |
| Intentional injuries | 422 | 422 | 402 | 99.8 | 100.2 | 96.2 |
| 45–64 years[2] | 2,369 | 2,802 | 3,335 | 873.7 | 940.4 | 963.4 |
| Unintentional injuries[4] | 1,857 | 2,109 | 2,275 | 685.2 | 707.9 | 657.2 |
| Falls | 600 | 706 | 794 | 221.5 | 237.0 | 229.3 |
| Struck by or against objects or persons | 160 | 193 | 213 | 58.8 | 64.8 | 61.5 |
| Motor vehicle traffic | 343 | 317 | 388 | 126.5 | 106.4 | 111.9 |
| Cut or pierce | 127 | 214 | 205 | 46.9 | 71.8 | 59.1 |
| Intentional injuries | *64 | 111 | 119 | *23.5 | 37.4 | 34.4 |
| 65 years and over[2] | 2,313 | 2,518 | 2,718 | 1,256.1 | 1,346.8 | 1,379.3 |
| Unintentional injuries[4] | 1,931 | 2,016 | 1,960 | 1,049.0 | 1,078.1 | 994.7 |
| Falls | 1,230 | 1,258 | 1,228 | 667.9 | 672.7 | 623.4 |
| Struck by or against objects or persons | 82 | 119 | 170 | 44.8 | 63.6 | 86.1 |
| Motor vehicle traffic | 169 | 148 | 175 | 91.6 | 79.3 | 88.6 |
| Cut or pierce | *42 | 73 | 48 | *22.7 | *39.0 | 24.4 |
| Intentional injuries | * | 34 | 12 | * | * | * |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

[1]Intent and mechanism of injury are based on the first-listed external cause of injury code (E code). Intentional injuries include suicide attempts and assaults. See Appendix II, External cause of injury and Appendix II, table VII for listing of E codes.

[2]Includes all injury-related visits not shown separately in table including those with undetermined intent (0.5 percent in 2002–03), insufficient or no information to code cause of injury (21.3 percent in 2002–03), and resulting from adverse effects of medical treatment (3.9 percent in 2002–03).

[3]Rates are age adjusted to the year 2000 standard population using six age groups: under 18 years, 18–24 years, 25–44 years, 45–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[4]Includes unintentional injury-related visits with mechanism of injury not shown in table.

NOTES: An emergency department visit was considered injury related if the checkbox for injury was indicated, the physician's diagnosis was injury related (ICD–9-CM 800–999), an external cause of injury code was present (ICD–9-CM E800-E999), or the patient's reason for the visit was injury related. Rates for 1995–2000 were computed using 1990-based postcensal estimates of the civilian noninstitutionalized population as of July 1 adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the Bureau of the Census. Starting with 2001, rates were computed using 2000-based postcensal estimates of the civilian noninstitutionalized population as of July 1. The difference between rates for 2000 computed using 1990-based postcensal estimates and rates computed using estimates based on 2000 census counts is minimal. See www.cdc.gov/nchs/about/major/ahcd/census2000.htm. Rates will be overestimated to the extent that visits by institutionalized persons are counted in the numerator (for example, hospital emergency department visits by nursing home residents) and institutionalized persons are omitted from the denominator. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey.



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## Table 90 (page 1 of 2). Visits to primary care generalist and specialist physicians, according to selected characteristics and type of physician: United States, 1980, 1990, 2000, and 2003

[Data are based on reporting by a sample of office-based physicians]

Click here for spreadsheet version

| Age, sex, and race | Type of primary care generalist physician[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All primary care generalists | | | | General and family practice | | | | Internal medicine | | | |
| | 1980 | 1990 | 2000 | 2003 | 1980 | 1990 | 2000 | 2003 | 1980 | 1990 | 2000 | 2003 |
| | Percent of all physician office visits | | | | | | | | | | | |
| Total | 66.2 | 63.6 | 58.9 | 58.5 | 33.5 | 29.9 | 24.1 | 24.5 | 12.1 | 13.8 | 15.3 | 15.6 |
| Under 18 years | 77.8 | 79.5 | 79.7 | 78.3 | 26.1 | 26.5 | 19.9 | 19.3 | 2.0 | 2.9 | * | * |
| 18–44 years | 65.3 | 65.2 | 62.1 | 63.7 | 34.3 | 31.9 | 28.2 | 28.5 | 8.6 | 11.8 | 12.7 | 13.0 |
| 45–64 years | 60.2 | 55.5 | 51.2 | 52.2 | 36.3 | 32.1 | 26.4 | 27.3 | 19.5 | 18.6 | 20.1 | 19.0 |
| 45–54 years | 60.2 | 55.6 | 52.3 | 55.1 | 37.4 | 32.0 | 27.8 | 29.7 | 17.1 | 17.1 | 18.7 | 18.3 |
| 55–64 years | 60.2 | 55.5 | 49.9 | 48.9 | 35.4 | 32.1 | 24.7 | 24.5 | 21.8 | 20.0 | 21.7 | 19.9 |
| 65 years and over | 61.6 | 52.6 | 46.5 | 45.2 | 37.5 | 28.1 | 20.2 | 20.6 | 22.7 | 23.3 | 24.5 | 22.4 |
| 65–74 years | 61.2 | 52.7 | 46.6 | 46.6 | 37.4 | 28.1 | 19.7 | 20.8 | 22.1 | 23.0 | 24.5 | 22.9 |
| 75 years and over | 62.3 | 52.4 | 46.4 | 44.0 | 37.6 | 28.0 | 20.8 | 20.5 | 23.5 | 23.7 | 24.5 | 22.0 |
| Sex and age | | | | | | | | | | | | |
| Male: | | | | | | | | | | | | |
| Under 18 years | 77.3 | 78.1 | 77.7 | 76.5 | 25.6 | 24.1 | 18.3 | 17.3 | 2.0 | 3.0 | * | * |
| 18–44 years | 50.8 | 51.8 | 51.5 | 54.2 | 38.0 | 35.9 | 34.2 | 35.6 | 11.5 | 15.0 | 14.4 | 17.3 |
| 45–64 years | 55.6 | 50.6 | 49.4 | 50.1 | 34.4 | 31.0 | 28.7 | 30.3 | 20.5 | 19.2 | 19.8 | 19.2 |
| 65 years and over | 58.2 | 51.2 | 43.1 | 40.4 | 35.6 | 27.7 | 19.3 | 20.0 | 22.3 | 23.3 | 23.8 | 20.1 |
| Female: | | | | | | | | | | | | |
| Under 18 years | 78.5 | 81.1 | 82.0 | 80.4 | 26.6 | 29.1 | 21.7 | 21.5 | 2.0 | 2.8 | * | * |
| 18–44 years | 72.1 | 71.3 | 67.2 | 68.2 | 32.5 | 30.0 | 25.3 | 25.2 | 7.3 | 10.3 | 11.9 | 10.9 |
| 45–64 years | 63.4 | 58.8 | 52.5 | 53.7 | 37.7 | 32.8 | 24.9 | 25.3 | 18.9 | 18.2 | 20.2 | 18.9 |
| 65 years and over | 63.9 | 53.5 | 48.9 | 48.6 | 38.7 | 28.3 | 20.9 | 21.0 | 22.9 | 23.3 | 25.0 | 24.1 |
| Race and age[2] | | | | | | | | | | | | |
| White: | | | | | | | | | | | | |
| Under 18 years | 77.6 | 79.2 | 78.5 | 78.1 | 26.4 | 27.1 | 21.2 | 19.8 | 2.0 | 2.3 | * | * |
| 18–44 years | 64.8 | 64.4 | 61.4 | 63.3 | 34.5 | 31.9 | 29.2 | 29.1 | 8.6 | 10.6 | 11.0 | 12.1 |
| 45–64 years | 59.6 | 54.2 | 49.3 | 51.9 | 36.0 | 31.5 | 27.3 | 27.5 | 19.2 | 17.6 | 17.1 | 18.4 |
| 65 years and over | 61.4 | 51.9 | 45.1 | 43.1 | 36.6 | 27.5 | 20.3 | 20.3 | 23.3 | 23.1 | 23.0 | 20.8 |
| Black or African American: | | | | | | | | | | | | |
| Under 18 years | 79.9 | 85.5 | 87.3 | 77.3 | 23.7 | 20.2 | * | *18.8 | *2.2 | 9.8 | * | * |
| 18–44 years | 68.5 | 68.3 | 65.0 | 66.5 | 31.7 | 31.9 | 22.0 | 25.0 | 9.0 | 18.1 | 20.9 | * |
| 45–64 years | 66.1 | 61.6 | 61.7 | 56.7 | 38.6 | 31.2 | 23.3 | 26.2 | 22.6 | 26.9 | 35.9 | 23.8 |
| 65 years and over | 64.6 | 58.6 | 52.8 | 56.0 | 49.0 | 28.9 | *18.5 | *20.9 | 14.2 | 28.7 | 33.4 | 31.4 |

See footnotes at end of table.



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## Table 90 (page 2 of 2). Visits to primary care generalist and specialist physicians, according to selected characteristics and type of physician: United States, 1980, 1990, 2000, and 2003

[Data are based on reporting by a sample of office-based physicians] Revised March 2006 Click here for spreadsheet version

| Age, sex, and race | Type of primary care generalist physician[1]: Obstetrics and gynecology 1980 | 1990 | 2000 | 2003 | Pediatrics 1980 | 1990 | 2000 | 2003 | Specialty care physicians 1980 | 1990 | 2000 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Percent of all physician office visits | | | | | | | | | | | |
| Total | 9.6 | 8.7 | 7.8 | 8.4 | 10.9 | 11.2 | 11.7 | 10.1 | 33.8 | 36.4 | 41.1 | 41.5 |
| Under 18 years | 1.3 | 1.2 | *1.1 | *1.5 | 48.5 | 48.9 | 57.3 | 52.4 | 22.2 | 20.5 | 20.3 | 21.7 |
| 18–44 years | 21.7 | 20.8 | 20.4 | 21.5 | 0.7 | 0.7 | *0.9 | *0.7 | 34.7 | 34.8 | 37.9 | 36.3 |
| 45–64 years | 4.2 | 4.6 | 4.5 | 5.6 | * | * | * | * | 39.8 | 44.5 | 48.8 | 47.8 |
| 45–54 years | 5.6 | 6.3 | 5.6 | 6.7 | * | * | * | * | 39.8 | 44.4 | 47.7 | 44.9 |
| 55–64 years | 2.9 | 3.1 | 3.3 | *4.4 | * | * | * | * | 39.8 | 44.5 | 50.1 | 51.1 |
| 65 years and over | 1.4 | 1.1 | 1.5 | *2.0 | * | * | * | * | 38.4 | 47.4 | 53.5 | 54.8 |
| 65–74 years | 1.7 | 1.6 | 2.0 | *2.7 | * | * | * | * | 38.8 | 47.3 | 53.4 | 53.4 |
| 75 years and over | 1.0 | *0.6 | *1.0 | *1.4 | * | * | * | * | 37.7 | 47.6 | 53.6 | 56.0 |
| Sex and age | | | | | | | | | | | | |
| Male: | | | | | | | | | | | | |
| Under 18 years | ... | ... | ... | ... | 49.4 | 50.7 | 58.0 | 53.2 | 22.7 | 21.9 | 22.3 | 23.5 |
| 18–44 years | ... | ... | ... | ... | 1.0 | 0.7 | *1.7 | *1.2 | 49.2 | 48.2 | 48.5 | 45.8 |
| 45–64 years | ... | ... | ... | ... | * | * | * | * | 44.4 | 49.4 | 50.6 | 49.9 |
| 65 years and over | ... | ... | ... | ... | * | * | * | * | 41.8 | 48.8 | 56.9 | 59.6 |
| Female: | | | | | | | | | | | | |
| Under 18 years | 2.5 | 2.3 | 2.1 | *3.2 | 47.4 | 46.9 | 56.5 | 51.4 | 21.5 | 18.9 | 18.0 | 19.6 |
| 18–44 years | 31.7 | 30.4 | 29.6 | 31.6 | 0.6 | 0.7 | * | * | 27.9 | 28.7 | 32.8 | 31.8 |
| 45–64 years | 6.7 | 7.7 | 7.3 | 9.2 | * | * | * | * | 36.6 | 41.2 | 47.5 | 46.3 |
| 65 years and over | 2.1 | 1.8 | 2.6 | *3.4 | * | * | * | * | 36.1 | 46.5 | 51.1 | 51.4 |
| Race and age[2] | | | | | | | | | | | | |
| White: | | | | | | | | | | | | |
| Under 18 years | 1.1 | 1.0 | *1.2 | *1.5 | 48.2 | 48.8 | 54.7 | 52.4 | 22.4 | 20.8 | 21.5 | 21.9 |
| 18–44 years | 21.0 | 21.1 | 20.4 | 21.3 | 0.7 | 0.7 | *0.8 | *0.8 | 35.2 | 35.6 | 38.6 | 36.7 |
| 45–64 years | 4.1 | 4.8 | 4.7 | 5.7 | * | * | * | * | 40.4 | 45.8 | 50.7 | 48.1 |
| 65 years and over | 1.4 | 1.2 | 1.5 | *1.9 | * | * | * | * | 38.6 | 48.1 | 54.9 | 56.9 |
| Black or African American: | | | | | | | | | | | | |
| Under 18 years | 2.8 | *3.4 | * | * | 51.2 | 52.1 | 75.0 | 51.3 | 20.1 | 14.5 | *12.7 | 22.7 |
| 18–44 years | 27.1 | 17.9 | 20.7 | *25.8 | * | * | * | * | 31.5 | 31.7 | 35.0 | 33.5 |
| 45–64 years | 4.8 | 3.5 | *2.4 | * | * | * | * | * | 33.9 | 38.4 | 38.3 | 43.3 |
| 65 years and over | * | * | * | * | * | * | * | * | 35.4 | 41.4 | 47.2 | 44.0 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have a RSE of greater than 30 percent.

. . . Category not applicable.

[1]Type of physician is based on physician's self-designated primary area of practice. Primary care generalist physicians are defined as practitioners in the fields of general and family practice, general internal medicine, general obstetrics and gynecology, and general pediatrics and exclude primary care specialists. Primary care generalists in general and family practice exclude primary care specialities, such as sports medicine and geriatrics. Primary care internal medicine physicians exclude internal medicine specialists, such as allergists, cardiologists, endocrinologists, etc. Primary care obstetrics and gynecology physicians exclude obstetrics and gynecology specialities, such as gynecological oncology, maternal and fetal medicine, general obstetrics and gynecology critical care medicine, and reproductive endocrinology. Primary care pediatricians exclude pediatric specialists, such as adolescent medicine specialists, neonatologists, pediatric allergists, pediatric cardiologists, etc. See Appendix II, Physician specialty.

[2]Beginning in 1999, the instruction for the race item on the Patient Record Form was changed so that more than one race could be recorded. In previous years only one racial category could be checked. Estimates for racial groups presented in this table are for visits where only one race was recorded. Estimates for visits where multiple races were checked are unreliable and are not presented.

NOTES: This table presents data on visits to physician offices and excludes visits to other sites, such as hospital outpatient and emergency departments. In 1980 the survey excluded Alaska and Hawaii. Data for all other years include all 50 States. Visits with type of physician unknown are excluded. Starting with *Health, United States, 2005*, data from 2001 and onward use a revised weighting scheme. Therefore, data for survey years 2001–02 differ from the previous editions of *Health, United States*. See Appendix I, National Ambulatory Medical Care Survey. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey.



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## Table 91 (page 1 of 2). Prescription drug use in the past month by sex, age, race, and Hispanic origin: United States, 1988–94 and 1999–2002

[Data are based on a sample of the civilian noninstitutionalized population]

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| Sex and age | All persons[1] | | Not Hispanic or Latino | | | | Mexican[3] | |
|---|---|---|---|---|---|---|---|---|
| | | | White[2] | | Black or African American[2] | | | |
| | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 | 1988–94 | 1999–2002 |
| | Percent of population with at least one prescription drug in past month | | | | | | | |
| Both sexes, age adjusted[4] | 39.1 | 45.3 | 41.1 | 48.9 | 36.9 | 40.1 | 31.7 | 31.7 |
| Male | 32.7 | 39.9 | 34.2 | 43.1 | 31.1 | 35.4 | 27.5 | 25.8 |
| Female | 45.0 | 50.4 | 47.6 | 54.5 | 41.4 | 43.8 | 36.0 | 37.8 |
| Both sexes, crude | 37.8 | 45.1 | 41.4 | 50.9 | 31.2 | 36.0 | 24.0 | 23.7 |
| Male | 30.6 | 38.7 | 33.5 | 43.9 | 25.5 | 30.8 | 20.1 | 18.8 |
| Female | 44.6 | 51.2 | 48.9 | 57.6 | 36.2 | 40.6 | 28.1 | 28.9 |
| Under 18 years | 20.5 | 24.2 | 22.9 | 27.6 | 14.8 | 18.6 | 16.1 | 15.9 |
| 18–44 years | 31.3 | 35.9 | 34.3 | 41.3 | 27.8 | 28.5 | 21.1 | 19.2 |
| 45–64 years | 54.8 | 64.1 | 55.5 | 66.1 | 57.5 | 62.3 | 48.1 | 49.3 |
| 65 years and over | 73.6 | 84.7 | 74.0 | 85.4 | 74.5 | 81.1 | 67.7 | 72.0 |
| Male: | | | | | | | | |
| Under 18 years | 20.4 | 26.2 | 22.3 | 30.6 | 15.5 | 19.8 | 16.3 | 16.2 |
| 18–44 years | 21.5 | 27.1 | 23.5 | 31.2 | 21.1 | 21.5 | 14.9 | 13.0 |
| 45–64 years | 47.2 | 55.6 | 48.1 | 57.4 | 48.2 | 54.0 | 43.8 | 36.4 |
| 65 years and over | 67.2 | 80.1 | 67.4 | 81.0 | 64.4 | 78.1 | 61.3 | 66.8 |
| Female: | | | | | | | | |
| Under 18 years | 20.6 | 22.0 | 23.6 | 24.4 | 14.2 | 17.3 | 16.0 | 15.6 |
| 18–44 years | 40.7 | 44.6 | 44.7 | 51.7 | 33.4 | 34.2 | 28.1 | 26.2 |
| 45–64 years | 62.0 | 72.0 | 62.6 | 74.7 | 64.4 | 69.0 | 52.2 | 62.4 |
| 65 years and over | 78.3 | 88.1 | 78.8 | 88.8 | 81.3 | 83.1 | 73.0 | 76.3 |
| | Percent of population with three or more prescription drugs in past month | | | | | | | |
| Both sexes, age adjusted[4] | 11.8 | 17.7 | 12.4 | 18.9 | 12.6 | 16.5 | 9.0 | 11.2 |
| Male | 9.4 | 14.8 | 9.9 | 15.9 | 10.2 | 14.4 | 7.0 | 9.5 |
| Female | 13.9 | 20.4 | 14.6 | 21.7 | 14.3 | 18.0 | 11.0 | 12.9 |
| Both sexes, crude | 11.0 | 17.6 | 12.5 | 20.5 | 9.2 | 13.4 | 4.8 | 6.1 |
| Male | 8.3 | 13.9 | 9.5 | 16.4 | 7.0 | 10.9 | 3.4 | 4.8 |
| Female | 13.6 | 21.1 | 15.4 | 24.5 | 11.1 | 15.6 | 6.4 | 7.5 |
| Under 18 years | 2.4 | 4.1 | 3.2 | 4.9 | 1.5 | 2.5 | *1.2 | 2.1 |
| 18–44 years | 5.7 | 8.4 | 6.3 | 10.1 | 5.4 | 6.5 | 3.0 | 2.7 |
| 45–64 years | 20.0 | 30.8 | 20.9 | 31.6 | 21.9 | 31.1 | 16.0 | 20.7 |
| 65 years and over | 35.3 | 51.6 | 35.0 | 52.5 | 41.2 | 50.1 | 31.3 | 39.5 |
| Male: | | | | | | | | |
| Under 18 years | 2.6 | 4.3 | 3.3 | 5.2 | 1.7 | 3.0 | * | 1.9 |
| 18–44 years | 3.6 | 6.7 | 4.1 | 8.4 | 4.2 | 4.4 | *1.8 | *1.7 |
| 45–64 years | 15.1 | 23.5 | 15.8 | 24.0 | 18.7 | 26.3 | 11.6 | 18.2 |
| 65 years and over | 31.3 | 46.0 | 30.9 | 47.0 | 31.7 | 48.2 | 27.6 | 34.2 |
| Female: | | | | | | | | |
| Under 18 years | 2.3 | 3.9 | 3.0 | 4.7 | *1.2 | *2.0 | *1.5 | 2.2 |
| 18–44 years | 7.6 | 10.2 | 8.5 | 11.9 | 6.4 | 8.3 | 4.3 | 4.0 |
| 45–64 years | 24.7 | 37.4 | 25.8 | 39.1 | 24.3 | 35.0 | 20.3 | 23.3 |
| 65 years and over | 38.2 | 55.7 | 38.0 | 56.6 | 47.7 | 51.3 | 34.5 | 44.0 |

See footnotes at end of table.



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## Table 91 (page 2 of 2). Prescription drug use in the past month by sex, age, race, and Hispanic origin: United States, 1988–94 and 1999–2002

[Data are based on a sample of the civilian noninstitutionalized population]

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* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.
[1]Includes persons of all races and Hispanic origins, not just those shown separately.
[2]Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The two non-Hispanic race categories shown in the table conform to 1997 Standards. The 1999–2002 race-specific estimates are for persons who reported only one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[3]Persons of Mexican origin may be of any race.
[4]Age adjusted to the 2000 standard population using four age groups: Under 18 years, 18–44 years , 45–64 years, and 65 years and over. See Appendix II, Age adjustment.

NOTES: Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.



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## Table 92 (page 1 of 3). Selected prescription and nonprescription drugs recorded during physician office visits and hospital outpatient department visits, by age and sex: United States, 1995–96 and 2002–03

[Data are based on a sample of visit records from physician offices and hospital outpatient departments]

Click here for spreadsheet version

| Age group and National Drug Code (NDC) therapeutic class[1] (common reasons for use) | Total | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1995–96 | 2002–03 | 1995–96 | 2002–03 | 1995–96 | 2002–03 |
| **All ages** | | | Visits with at least one drug per 100 population[2] | | | |
| Drug visits[3] | 189.8 | 234.9 | 156.5 | 193.7 | 221.5 | 274.1 |
| | | | Number of drugs per 100 population[4] | | | |
| Total number of drugs[5] | 400.3 | 585.7 | 321.1 | 477.6 | 475.6 | 688.8 |
| NSAID[6] (pain relief) | 19.9 | 30.0 | 16.0 | 24.1 | 23.7 | 35.6 |
| Antidepressants (depression and related disorders) | 13.8 | 27.8 | 9.1 | 19.2 | 18.2 | 36.0 |
| Antihistamines (allergies) | 13.7 | 23.8 | 10.8 | 18.7 | 16.4 | 28.6 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 13.0 | 22.9 | 11.7 | 19.9 | 14.3 | 25.7 |
| Nonnarcotic analgesics (pain relief) | 14.4 | 21.8 | 13.0 | 20.4 | 15.7 | 23.2 |
| Hyperlipidemia (high cholesterol) | 5.4 | 20.8 | 5.4 | 21.5 | 5.4 | 20.2 |
| Hypertension control drugs, not otherwise specified (high blood pressure) | 6.0 | 20.7 | 4.1 | 17.6 | 7.8 | 23.6 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 12.0 | 19.2 | 9.8 | 15.6 | 14.1 | 22.6 |
| Blood glucose/sugar regulators (diabetes) | 9.5 | 18.5 | 8.6 | 17.5 | 10.4 | 19.4 |
| ACE inhibitors (high blood pressure, heart disease) | 9.6 | 16.6 | 9.0 | 16.3 | 10.2 | 16.9 |
| Diuretics (high blood pressure, heart disease) | 10.2 | 15.9 | 7.8 | 12.8 | 12.6 | 18.8 |
| Penicillins (bacterial infections) | 16.6 | 15.2 | 15.5 | 14.3 | 17.7 | 15.9 |
| Narcotic analgesics (pain relief) | 11.2 | 15.3 | 10.3 | 12.3 | 12.2 | 18.2 |
| Vitamins/minerals (dietary supplements) | 9.2 | 14.5 | 3.4 | 8.3 | 14.8 | 20.5 |
| Estrogens/progestins (menopause, hot flashes) | ... | ... | ... | ... | 19.8 | 19.2 |
| **Under 18 years** | | | Visits with at least one drug per 100 population[2] | | | |
| Drug visits[3] | 153.9 | 177.9 | 152.3 | 181.6 | 155.6 | 174.1 |
| | | | Number of drugs per 100 population[4] | | | |
| Total number of drugs[5] | 261.3 | 334.8 | 255.6 | 340.1 | 267.3 | 329.3 |
| Penicillins (bacterial infections) | 37.2 | 34.3 | 36.4 | 34.0 | 38.0 | 34.6 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 13.4 | 26.0 | 14.8 | 27.7 | 11.9 | 24.3 |
| Antihistamines (allergies) | 17.5 | 25.9 | 16.7 | 26.0 | 18.4 | 25.8 |
| Erythromycins/lincosamides (infections) | 10.2 | 13.6 | 11.0 | 13.3 | 9.4 | 13.9 |
| NSAID[6] (pain relief) | 7.4 | 13.1 | 6.9 | 12.4 | 7.9 | 13.8 |
| Cephalosporins (bacterial infections) | 18.1 | 12.7 | 18.8 | 13.7 | 17.3 | 11.6 |
| Nonnarcotic analgesics (pain relief) | 12.1 | 12.0 | 10.4 | 12.5 | 13.9 | 11.4 |
| Antitussives/expectorants (cough and cold, congestion) | 11.8 | 10.3 | 11.0 | 10.3 | 12.7 | 10.3 |
| Nasal corticosteroid inhalants (asthma, breathing, allergies) | 3.5 | 9.3 | 3.5 | 9.3 | 3.5 | 9.3 |
| Anorexiants/CNS stimulants (attention deficit disorder, hyperactivity) | 3.9 | 8.8 | 5.6 | 12.5 | 2.1 | 4.9 |
| Nasal decongestants (congestion) | 14.0 | 8.3 | 12.4 | 8.0 | 15.7 | 8.5 |
| Antidepressants (depression and related disorders) | 1.9 | 6.8 | 1.9 | 7.7 | 1.9 | 5.9 |
| **18–44 years** | | | Visits with at least one drug per 100 population[2] | | | |
| Drug visits[3] | 136.2 | 161.4 | 90.9 | 108.4 | 180.4 | 213.3 |
| | | | Number of drugs per 100 population[4] | | | |
| Total number of drugs[5] | 251.0 | 330.5 | 168.8 | 227.5 | 331.2 | 431.5 |
| Antidepressants (depression and related disorders) | 14.0 | 26.6 | 9.3 | 17.9 | 18.5 | 35.0 |
| NSAID[6] (pain relief) | 16.7 | 22.2 | 14.5 | 16.7 | 18.8 | 27.6 |
| Antihistamines (allergies) | 10.8 | 19.0 | 7.5 | 12.8 | 14.1 | 25.0 |
| Narcotic analgesics (pain relief) | 11.7 | 14.0 | 10.8 | 10.6 | 12.7 | 17.4 |
| Antiasthmatics/bronchodilator (asthma, breathing) | 6.8 | 11.5 | 3.3 | 7.4 | 10.2 | 15.6 |
| Vitamins/minerals (dietary supplements) | 11.8 | 11.3 | 1.1 | 2.1 | 22.2 | 20.2 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 6.6 | 9.4 | 5.3 | 8.5 | 7.9 | 10.2 |
| Penicillins (bacterial infections) | 9.5 | 8.8 | 7.0 | 6.2 | 11.9 | 11.3 |
| Nasal corticosteroid inhalants (asthma, breathing, allergies) | 4.7 | 8.7 | 3.3 | 6.7 | 6.1 | 10.6 |
| Erythromycins/lincosamides (infections) | 7.5 | 8.4 | 5.4 | 5.9 | 9.5 | 10.9 |
| Antitussives/expectorants (cough and cold, congestion) | 7.7 | 8.1 | 5.8 | 5.4 | 9.5 | 10.7 |
| Nonnarcotic analgesics (pain relief) | 6.0 | 7.7 | 4.5 | 5.4 | 7.4 | 9.9 |
| Contraceptive agents (prevent pregnancy) | ... | ... | ... | ... | 13.4 | 22.8 |

See footnotes at end of table.



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## Table 92 (page 2 of 3). Selected prescription and nonprescription drugs recorded during physician office visits and hospital outpatient department visits, by age and sex: United States, 1995–96 and 2002–03

[Data are based on a sample of visit records from physician offices and hospital outpatient departments]

Click here for spreadsheet version

| Age group and National Drug Code (NDC) therapeutic class[1] (common reasons for use) | Total | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1995–96 | 2002–03 | 1995–96 | 2002–03 | 1995–96 | 2002–03 |
| 45–64 years | Visits with at least one drug per 100 population[2] | | | | | |
| Drug visits[3] | 222.4 | 284.1 | 185.0 | 231.7 | 257.4 | 333.3 |
| | Number of drugs per 100 population[4] | | | | | |
| Total number of drugs[5] | 505.1 | 757.7 | 403.2 | 612.5 | 600.4 | 894.3 |
| Antidepressants (depression and related disorders) | 23.5 | 44.5 | 14.9 | 29.6 | 31.5 | 58.4 |
| NSAID[6] (pain relief) | 30.3 | 42.6 | 23.9 | 37.0 | 36.4 | 47.8 |
| Hyperlipidemia (high cholesterol) | 10.4 | 36.9 | 12.0 | 40.2 | 8.8 | 33.7 |
| Hypertension control drugs, not otherwise specified (high blood pressure) | 9.4 | 33.7 | 6.9 | 31.6 | 11.7 | 35.7 |
| Blood glucose/sugar regulators (diabetes) | 17.7 | 33.0 | 16.7 | 32.3 | 18.7 | 33.6 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 19.8 | 29.8 | 18.3 | 24.8 | 21.3 | 34.5 |
| ACE inhibitors (high blood pressure, heart disease) | 16.8 | 26.2 | 17.7 | 28.1 | 16.0 | 24.3 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 14.4 | 26.2 | 11.4 | 20.1 | 17.1 | 32.0 |
| Antihistamines (allergies) | 13.5 | 25.5 | 9.1 | 17.3 | 17.7 | 33.2 |
| Narcotic analgesics (pain relief) | 17.5 | 25.5 | 17.0 | 22.8 | 18.0 | 28.1 |
| Nonnarcotic analgesics (pain relief) | 16.3 | 25.2 | 15.6 | 26.4 | 17.0 | 24.1 |
| Diuretics (high blood pressure, heart disease) | 13.5 | 22.6 | 11.2 | 18.7 | 15.7 | 26.3 |
| Beta blockers (high blood pressure, heart disease) | 10.6 | 20.8 | 10.0 | 18.6 | 11.2 | 22.8 |
| Calcium channel blockers (high blood pressure, heart disease) | 19.3 | 19.4 | 19.9 | 19.5 | 18.8 | 19.3 |
| Estrogens/progestins (menopause, hot flashes) | ... | ... | ... | ... | 55.7 | 43.8 |
| 65 years and over | | | | | | |
| | Visits with at least one drug per 100 population[2] | | | | | |
| Drug visits[3] | 399.4 | 496.7 | 378.1 | 462.0 | 414.7 | 522.2 |
| | Number of drugs per 100 population[4] | | | | | |
| Total number of drugs[5] | 1,047.4 | 1,606.2 | 956.9 | 1,473.8 | 1,112.5 | 1,703.1 |
| Hypertension control drugs, not otherwise specified (high blood pressure) | 29.1 | 91.8 | 22.7 | 81.3 | 33.8 | 99.5 |
| Hyperlipidemia (high cholesterol) | 24.7 | 90.4 | 25.1 | 101.5 | 24.5 | 82.3 |
| Nonnarcotic analgesics (pain relief) | 44.9 | 81.8 | 49.0 | 83.6 | 42.0 | 80.4 |
| Diuretics (high blood pressure, heart disease) | 55.2 | 77.7 | 48.5 | 74.5 | 60.0 | 80.1 |
| ACE inhibitors (high blood pressure, heart disease) | 42.6 | 74.1 | 41.2 | 79.8 | 43.6 | 70.0 |
| Blood glucose/sugar regulators (diabetes) | 37.5 | 69.0 | 38.0 | 76.9 | 37.1 | 63.1 |
| Beta blockers (high blood pressure, heart disease) | 25.5 | 66.9 | 23.6 | 65.7 | 26.8 | 67.7 |
| NSAID[6] (pain relief) | 41.8 | 66.2 | 31.9 | 52.7 | 49.0 | 76.0 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 42.2 | 64.5 | 36.0 | 54.8 | 46.6 | 71.7 |
| Calcium channel blockers (high blood pressure, heart disease) | 57.3 | 60.4 | 52.2 | 51.6 | 60.9 | 66.9 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 31.3 | 46.2 | 37.1 | 46.7 | 27.0 | 45.8 |
| Vitamins/minerals (dietary supplements) | 17.1 | 44.1 | 13.1 | 35.8 | 20.0 | 50.2 |
| Antidepressants (depression and related disorders) | 23.5 | 43.7 | 16.7 | 30.4 | 28.5 | 53.5 |
| Anticoagulants/thrombolytics (blood thinning, reduce or prevent blood clots) | 20.7 | 42.0 | 24.0 | 48.0 | 18.3 | 37.6 |
| Estrogens/progestins (menopause, hot flashes) | ... | ... | ... | ... | 37.1 | 38.5 |
| 65–74 years | Visits with at least one drug per 100 population[2] | | | | | |
| Drug visits[3] | 362.8 | 444.3 | 323.0 | 408.4 | 394.9 | 474.3 |
| | Number of drugs per 100 population[4] | | | | | |
| Total number of drugs[5] | 930.5 | 1,394.7 | 804.7 | 1,278.8 | 1,032.1 | 1,491.4 |
| Hyperlipidemia (high cholesterol) | 27.3 | 93.3 | 27.1 | 102.2 | 27.4 | 85.9 |
| Hypertension control drugs, not otherwise specified (high blood pressure) | 24.8 | 83.1 | 19.2 | 68.4 | 29.3 | 95.4 |
| Blood glucose/sugar regulators (diabetes) | 35.7 | 72.6 | 32.4 | 82.4 | 38.4 | 64.5 |
| Nonnarcotic analgesics (pain relief) | 38.0 | 70.0 | 40.5 | 73.6 | 35.9 | 67.0 |
| ACE inhibitors (high blood pressure, heart disease) | 37.1 | 67.5 | 35.6 | 73.0 | 38.3 | 62.8 |
| NSAID[6] (pain relief) | 42.0 | 61.2 | 31.2 | 54.0 | 50.8 | 67.1 |
| Beta blockers (high blood pressure, heart disease) | 23.7 | 59.1 | 20.7 | 58.2 | 26.1 | 59.8 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 38.7 | 57.1 | 30.6 | 50.8 | 45.2 | 62.3 |
| Diuretics (high blood pressure, heart disease) | 40.0 | 55.8 | 32.3 | 52.2 | 46.3 | 58.8 |
| Calcium channel blockers (high blood pressure, heart disease) | 48.9 | 52.6 | 46.2 | 44.5 | 51.2 | 59.3 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 31.1 | 44.2 | 33.0 | 38.5 | 29.5 | 48.9 |
| Antidepressants (depression and related disorders) | 22.7 | 39.0 | 14.2 | 29.4 | 29.6 | 47.1 |
| Vitamins/minerals (dietary supplements) | 14.1 | 35.9 | 10.1 | 31.1 | 17.4 | 39.8 |
| Antihistamines (allergies) | 14.7 | 34.1 | 12.3 | 27.8 | 16.6 | 39.3 |
| Estrogens/progestins (menopause, hot flashes) | ... | ... | ... | ... | 47.5 | 45.2 |

See footnotes at end of table.



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## Table 92 (page 3 of 3). Selected prescription and nonprescription drugs recorded during physician office visits and hospital outpatient department visits, by age and sex: United States, 1995–96 and 2002–03

[Data are based on a sample of visit records from physician offices and hospital outpatient departments]

Click here for spreadsheet version

| Age group and National Drug Code (NDC) therapeutic class[1] (common reasons for use) | Total | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1995–96 | 2002–03 | 1995–96 | 2002–03 | 1995–96 | 2002–03 |
| 75 years and over | Visits with at least one drug per 100 population[2] | | | | | |
| Drug visits[3] | 449.2 | 555.6 | 466.3 | 532.8 | 438.7 | 570.0 |
| | Number of drugs per 100 population[4] | | | | | |
| Total number of drugs[5] | 1,206.8 | 1,844.1 | 1,200.9 | 1,732.0 | 1,210.4 | 1,914.7 |
| Diuretics (high blood pressure, heart disease) | 75.8 | 102.4 | 74.5 | 104.1 | 76.6 | 101.3 |
| Hypertension control drugs, not otherwise specified (high blood pressure) | 35.1 | 101.6 | 28.4 | 98.5 | 39.2 | 103.5 |
| Nonnarcotic analgesics (pain relief) | 54.4 | 95.0 | 62.6 | 96.8 | 49.4 | 93.9 |
| Hyperlipidemia (high cholesterol) | 21.3 | 87.2 | 21.8 | 100.7 | 21.0 | 78.7 |
| ACE inhibitors (high blood pressure, heart disease) | 50.2 | 81.6 | 50.2 | 88.7 | 50.1 | 77.1 |
| Beta blockers (high blood pressure, heart disease) | 27.9 | 75.7 | 28.3 | 75.7 | 27.6 | 75.7 |
| Acid/peptic disorders (gastrointestinal reflux, ulcers) | 47.0 | 72.9 | 44.7 | 60.1 | 48.3 | 81.0 |
| NSAID[6] (pain relief) | 41.5 | 71.8 | 33.1 | 51.0 | 46.7 | 84.9 |
| Calcium channel blockers (high blood pressure, heart disease) | 68.6 | 69.3 | 61.8 | 61.0 | 72.7 | 74.5 |
| Blood glucose/sugar regulators (diabetes) | 39.8 | 64.8 | 46.9 | 69.7 | 35.5 | 61.8 |
| Anticoagulants/thrombolytics (blood thinning, reduce or prevent blood clots) | 28.6 | 57.5 | 34.9 | 68.8 | 24.7 | 50.3 |
| Vitamins/minerals (dietary supplements) | 21.2 | 53.4 | 18.0 | 42.0 | 23.2 | 60.6 |
| Antidepressants (depression and related disorders) | 24.6 | 49.0 | 20.7 | 31.7 | 27.0 | 59.9 |
| Antiasthmatics/bronchodilators (asthma, breathing) | 31.5 | 48.4 | 43.7 | 57.5 | 24.0 | 42.7 |
| Thyroid/antithyroid (hyper- and hypothyroidism) | 27.1 | 45.1 | 15.1 | 25.0 | 34.4 | 57.8 |

. . . Category not applicable.

[1]The National Drug Code (NDC) therapeutic class is a general therapeutic or pharmacological classification scheme for drug products reported to the Food and Drug Administration (FDA) under the provisions of the Drug Listing Act. See Appendix II, National Drug Code (NDC) Directory therapeutic class and table XI.

[2]Estimated number of drug visits during the 2-year period divided by the sum of population estimates for both years times 100.

[3]Drug visits are physician office and hospital outpatient department visits in which at least one prescription or nonprescription drug was recorded on the patient record form.

[4]Estimated number of drugs recorded during visits during the 2-year period divided by the sum of population estimates for both years times 100.

[5]Until 2002, up to six prescription and nonprescription medications were recorded on the patient record form. Beginning in 2003, up to eight prescription and nonprescription medications are recorded on the patient record form. If 2003 data were restricted to six instead of eight drugs, the 2002–03 total drug rate for all ages would be 2.7 percent lower. See Appendix II, Drugs.

[6]NSAID is nonsteroidal anti-inflammatory drug. Aspirin was not included as an NSAID in this analysis. See Appendix II, National Drug Classification (NDC) system.

NOTE: Drugs recorded on the patient record form are those prescribed, continued, administered, or provided during a physician office visit or hospital outpatient department visit.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey.



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## Table 93. Additions to mental health organizations according to type of service and organization: United States, selected years 1986–2002

[Data are based on inventories of mental health organizations]

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| Service and organization | 1986 | 1990 | 1994[1] | 2000 | 2002[2] | 1986 | 1990 | 1994[1] | 2000 | 2002[2] |
|---|---|---|---|---|---|---|---|---|---|---|
| 24-hour hospital and residential treatment[3] | Additions[4] in thousands | | | | | Additions per 100,000 civilian population[5] | | | | |
| All organizations | 1,819 | 2,035 | 2,267 | 2,029 | 2,193 | 759.9 | 833.7 | 874.6 | 719.3 | 760.4 |
| State and county mental hospitals | 333 | 276 | 238 | 236 | 239 | 139.1 | 113.2 | 92.0 | 83.6 | 82.7 |
| Private psychiatric hospitals | 235 | 407 | 485 | 451 | 477 | 98.0 | 166.5 | 187.1 | 159.8 | 165.6 |
| Non-Federal general hospital psychiatric services | 849 | 960 | 1,067 | 994 | 1,095 | 354.8 | 393.2 | 411.5 | 352.3 | 379.6 |
| Department of Veterans Affairs medical centers[6] | 180 | 198 | 173 | 171 | 182 | 75.1 | 81.2 | 66.9 | 60.5 | 63.1 |
| Residential treatment centers for emotionally disturbed children | 25 | 42 | 47 | 46 | 60 | 10.2 | 17.0 | 18.0 | 16.2 | 20.7 |
| All other organizations[7] | 198 | 153 | 257 | 132 | 141 | 82.7 | 62.6 | 99.0 | 46.8 | 48.7 |
| Less than 24-hour care[8] | | | | | | | | | | |
| All organizations | 2,955 | 3,298 | 3,516 | 4,057 | 3,575 | 1,233.4 | 1,352.4 | 1,356.8 | 1,438.1 | 1,239.7 |
| State and county mental hospitals | 68 | 48 | 42 | 49 | 53 | 28.4 | 19.8 | 16.1 | 17.2 | 18.3 |
| Private psychiatric hospitals | 132 | 163 | 214 | 265 | 426 | 55.2 | 66.9 | 82.4 | 94.1 | 147.6 |
| Non-Federal general hospital psychiatric services | 533 | 659 | 498 | 1,103 | 546 | 222.4 | 270.0 | 192.0 | 391.0 | 189.4 |
| Department of Veterans Affairs medical centers[6] | 133 | 184 | 132 | 139 | 80 | 55.3 | 75.3 | 51.1 | 49.1 | 27.7 |
| Residential treatment centers for emotionally disturbed children | 67 | 100 | 167 | 199 | 208 | 28.1 | 40.8 | 64.6 | 70.6 | 72.0 |
| All other organizations[7] | 2,022 | 2,145 | 2,464 | 2,302 | 2,263 | 844.0 | 879.6 | 950.7 | 816.0 | 784.7 |

[1]Beginning in 1994 data for supportive residential clients (moderately staffed housing arrangements such as supervised apartments, group homes, and halfway houses) are included in the totals and "All other organizations." This change affects the comparability of trend data prior to 1994 with data for 1994 and later years.
[2]Preliminary data.
[3]These data exclude mental health care provided in nonpsychiatric units of hospitals such as general medical units.
[4]See Appendix II, Addition.
[5]Civilian population estimates for 2000 and beyond are based on 2000 Census as of July 1; population estimates for 1992–98 are 1990 postcensal estimates.
[6]Includes Department of Veterans Affairs (VA) neuropsychiatric hospitals, VA general hospital psychiatric services, and VA psychiatric outpatient clinics.
[7]Includes freestanding psychiatric outpatient clinics, partial care organizations, and multiservice mental health organizations. See Appendix I, Survey of Mental Health Organizations.
[8]Formerly reported as partial care and outpatient treatment, the survey format was changed in 1994 and the reporting of these services was combined due to similarities in the care provided. These data exclude office-based mental health care (psychiatrists, psychologists, licensed clinical social workers, and psychiatric nurses).

NOTES: Data for 2000 are revised and differ from the previous edition of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Substance Abuse and Mental Health Services Administration, Center for Mental Health Services (CMHS). Manderscheid RW and Henderson MJ. *Mental Health, United States, 2002*. Washington, DC. U.S. Government Printing Office, 2004; and Survey of Mental Health Organizations, unpublished data.



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## Table 94. Home health care patients, according to age, sex, and diagnosis: United States, selected years 1992–2000

[Data are based on a survey of current home health care patients]

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| Age, sex, and diagnosis | 1992 | 1994 | 1996 | 1998 | 2000 |
|---|---|---|---|---|---|
| | Number of current patients | | | | |
| Total home health care patients | 1,232,200 | 1,889,327 | 2,427,483 | 1,881,768 | 1,355,290 |
| | Current patients per 10,000 population | | | | |
| Total | 47.8 | 71.8 | 90.6 | 69.6 | 48.7 |
| Age at time of survey: | | | | | |
| Under 65 years, crude | 12.6 | 21.0 | 27.8 | 25.0 | 16.4 |
| 65 years and over, crude | 295.4 | 424.9 | 526.3 | 375.7 | 277.0 |
| 65 years and over, age adjusted[1] | 315.8 | 449.6 | 546.6 | 381.0 | 276.5 |
| 65–74 years | 151.7 | 209.1 | 240.1 | 202.0 | 130.2 |
| 75–84 years | 398.3 | 542.2 | 753.6 | 470.3 | 347.6 |
| 85 years and over | 775.9 | 1,206.1 | 1,253.4 | 885.4 | 694.1 |
| Sex: | | | | | |
| Male, total | 32.6 | 47.8 | 60.9 | 47.9 | 35.1 |
| Under 65 years, crude | 10.9 | 17.8 | 22.1 | 22.9 | 15.6 |
| 65 years and over, crude | 219.2 | 303.1 | 386.4 | 255.2 | 199.6 |
| 65 years and over, age adjusted[1] | 255.8 | 350.0 | 438.3 | 277.6 | 216.4 |
| 65–74 years | 121.8 | 169.9 | 187.0 | 159.7 | 100.7 |
| 75–84 years | 322.0 | 427.5 | 598.7 | 321.4 | 270.0 |
| 85 years and over | 635.2 | 893.1 | 1,044.3 | 653.0 | 553.9 |
| Female, total | 62.4 | 94.7 | 118.9 | 90.4 | 61.8 |
| Under 65 years, crude | 14.3 | 24.2 | 33.6 | 27.0 | 17.2 |
| 65 years and over, crude | 347.4 | 508.9 | 623.9 | 460.4 | 332.6 |
| 65 years and over, age adjusted[1] | 351.5 | 506.6 | 615.0 | 445.8 | 315.5 |
| 65–74 years | 175.3 | 240.6 | 283.2 | 236.3 | 154.6 |
| 75–84 years | 445.3 | 614.5 | 854.0 | 568.8 | 400.4 |
| 85 years and over | 830.7 | 1,327.6 | 1,337.0 | 981.7 | 754.9 |
| | Percent distribution | | | | |
| Age at time of survey:[2] | | | | | |
| Under 65 years | 23.1 | 25.7 | 27.0 | 31.3 | 29.5 |
| 65 years and over | 76.9 | 74.3 | 73.0 | 68.7 | 70.5 |
| 65–74 years | 22.6 | 20.6 | 18.4 | 19.7 | 17.3 |
| 75–84 years | 33.9 | 31.2 | 35.3 | 29.9 | 31.3 |
| 85 years and over | 20.4 | 22.4 | 19.4 | 19.1 | 21.9 |
| Sex: | | | | | |
| Male | 33.2 | 32.5 | 32.9 | 33.6 | 35.2 |
| Female | 66.8 | 67.5 | 67.1 | 66.4 | 64.8 |
| Primary admission diagnosis:[3] | | | | | |
| Malignant neoplasms | 5.7 | 5.7 | 4.8 | 3.8 | 4.9 |
| Diabetes | 7.7 | 8.1 | 8.5 | 6.1 | 7.8 |
| Diseases of the nervous system and sense organs | 6.3 | 8.0 | 5.8 | 7.6 | 6.1 |
| Diseases of the circulatory system | 25.9 | 27.2 | 25.6 | 23.6 | 23.6 |
| Diseases of heart | 12.6 | 14.3 | 10.9 | 12.3 | 10.9 |
| Cerebrovascular diseases | 5.8 | 6.1 | 7.8 | 5.1 | 7.3 |
| Diseases of the respiratory system | 6.6 | 6.1 | 7.7 | 7.9 | 6.8 |
| Decubitus ulcers | 1.9 | 1.1 | 1.0 | 1.2 | 1.9 |
| Diseases of the musculoskeletal system and connective tissue | 9.4 | 8.3 | 8.8 | 8.3 | 9.8 |
| Osteoarthritis | 2.5 | 2.8 | 3.2 | 2.7 | 3.5 |
| Fractures, all sites | 3.8 | 3.7 | 3.3 | 4.0 | 4.1 |
| Fracture of neck of femur (hip) | 1.4 | 1.7 | 1.3 | 1.1 | 1.5 |
| Other | 32.7 | 31.8 | 34.6 | 37.5 | 34.9 |

[1]Age adjusted by the direct method to the year 2000 standard population using the following three age groups: 65–74 years, 75–84 years, and 85 years and over. See Appendix II, Age adjustment.
[2]Denominator excludes persons with unknown age.
[3]Denominator excludes persons with unknown diagnosis.

NOTES: Current home health care patients are those who were on the rolls of the agency as of midnight on the day immediately before the date of the survey. Rates are based on the civilian population as of July 1. Population figures are adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Diagnostic categories are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. For a listing of the code numbers, see Appendix II, table IX.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Home and Hospice Care Survey.



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## Table 95. Hospice patients, according to age, sex, and diagnosis: United States, selected years 1992–2000

[Data are based on a survey of current hospice patients]

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| Age, sex, and diagnosis | 1992 | 1994 | 1996 | 1998 | 2000 |
|---|---|---|---|---|---|
| | | | Number of current patients | | |
| Total hospice patients | 52,100 | 60,783 | 59,363 | 79,837 | 105,496 |
| | | | Current patients per 10,000 population | | |
| Total | 2.0 | 2.3 | 2.2 | 3.0 | 3.8 |
| Age at time of survey: | | | | | |
| Under 65 years, crude | 0.5 | 0.8 | 0.5 | 0.7 | 0.8 |
| 65 years and over, crude | 13.1 | 12.9 | 13.9 | 18.2 | 24.9 |
| 65 years and over, age adjusted[1] | 13.7 | 13.6 | 14.4 | 18.4 | 24.9 |
| 65–74 years | 7.8 | 7.3 | 7.8 | 9.9 | 10.1 |
| 75–84 years | 19.2 | 16.9 | 16.9 | 22.0 | 31.9 |
| 85 years and over | 23.4 | 30.6 | 34.7 | 44.7 | 67.3 |
| Sex: | | | | | |
| Male, total | 1.9 | 2.1 | 2.0 | 2.6 | 3.3 |
| Under 65 years, crude | 0.5 | 0.9 | 0.5 | 0.7 | 0.8 |
| 65 years and over, crude | 13.9 | 12.5 | 14.8 | 18.5 | 24.8 |
| 65 years and over, age adjusted[1] | 16.0 | 14.4 | 16.1 | 20.3 | 26.9 |
| 65–74 years | 6.3 | 7.0 | 10.4 | 10.2 | 13.0 |
| 75–84 years | 25.8 | 18.2 | 18.5 | 25.2 | 32.6 |
| 85 years and over | 28.8 | 34.8 | 33.9 | 49.2 | 69.9 |
| Female, total | 2.1 | 2.5 | 2.4 | 3.3 | 4.3 |
| Under 65 years, crude | 0.4 | 0.7 | 0.6 | 0.8 | 0.9 |
| 65 years and over, crude | 12.6 | 13.2 | 13.2 | 18.0 | 25.0 |
| 65 years and over, age adjusted[1] | 12.6 | 13.2 | 12.9 | 17.3 | 23.3 |
| 65–74 years | 8.9 | 7.5 | 5.8 | 9.6 | 7.6 |
| 75–84 years | 15.1 | 16.1 | 15.9 | 19.9 | 31.5 |
| 85 years and over | 21.4 | 29.0 | 35.0 | 42.9 | 66.2 |
| | | | Percent distribution | | |
| Age at time of survey:[2] | | | | | |
| Under 65 years | 19.5 | 30.1 | 21.3 | 21.6 | 18.6 |
| 65 years and over | 80.5 | 69.9 | 78.7 | 78.4 | 81.4 |
| 65–74 years | 27.3 | 22.2 | 24.5 | 22.7 | 17.2 |
| 75–84 years | 38.6 | 30.1 | 32.4 | 32.9 | 37.0 |
| 85 years and over | 14.6 | 17.6 | 21.9 | 22.7 | 27.3 |
| Sex: | | | | | |
| Male | 46.1 | 44.7 | 44.9 | 42.7 | 42.6 |
| Female | 53.9 | 55.3 | 55.1 | 57.3 | 57.4 |
| Primary admission diagnosis:[3] | | | | | |
| Malignant neoplasms | 65.7 | 57.2 | 58.3 | 55.5 | 51.9 |
| Large intestine and rectum | 9.0 | 8.0 | 4.0 | 6.4 | 4.9 |
| Trachea, bronchus, and lung | 21.1 | 12.5 | 15.8 | 13.0 | 12.3 |
| Breast | 3.9 | 4.8 | 6.2 | 4.9 | 4.8 |
| Prostate | 6.0 | 5.9 | 6.6 | 6.1 | 7.7 |
| Diseases of heart | 10.2 | 9.3 | 8.3 | 9.7 | 12.8 |
| Diseases of the respiratory system | 4.3 | 6.6 | 7.3 | 10.6 | 6.5 |
| Other | 19.8 | 27.0 | 26.1 | 24.3 | 28.8 |

[1]Age adjusted by the direct method to the year 2000 standard population using the following three age groups: 65–74 years, 75–84 years, and 85 years and over. See Appendix II, Age adjustment.
[2]Denominator excludes persons with unknown age.
[3]Denominator excludes persons with unknown diagnosis.

NOTES: Current hospice patients are those who were on the rolls of the agency as of midnight on the day immediately before the date of the survey. Rates are based on the civilian population as of July 1. Population figures are adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Diagnostic categories are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. For a listing of the code numbers, see Appendix II, table IX.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Home and Hospice Care Survey.



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## Table 96 (page 1 of 3). Discharges, days of care, and average length of stay in short-stay hospitals, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Discharges[1] | | | Days of care[1] | | | Average length of stay[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| | Number per 1,000 population | | | | | | Number of days | | |
| Total[2,3] | 124.3 | 122.9 | 119.9 | 601.2 | 541.3 | 558.9 | 4.8 | 4.4 | 4.7 |
| **Age** | | | | | | | | | |
| Under 18 years | 90.8 | 81.0 | 72.0 | 319.0 | 269.3 | 258.7 | 3.5 | 3.3 | 3.6 |
| Under 6 years | 203.5 | 188.9 | 169.8 | 632.6 | 601.0 | 610.9 | 3.1 | 3.2 | 3.6 |
| 6–17 years | 34.0 | 29.2 | 24.3 | 163.1 | 110.3 | 86.9 | 4.8 | 3.8 | 3.6 |
| 18–44 years | 96.8 | 94.7 | 93.2 | 358.8 | 311.2 | 352.7 | 3.7 | 3.3 | 3.8 |
| 45–64 years | 124.9 | 124.3 | 129.5 | 631.1 | 574.5 | 676.5 | 5.1 | 4.6 | 5.2 |
| 45–54 years | 99.2 | 106.8 | 107.5 | 527.5 | 495.8 | 543.4 | 5.3 | 4.6 | 5.1 |
| 55–64 years | 164.8 | 150.7 | 161.6 | 792.4 | 693.0 | 871.1 | 4.8 | 4.6 | 5.4 |
| 65 years and over | 274.4 | 293.2 | 283.9 | 1,852.5 | 1,745.3 | 1,607.8 | 6.8 | 6.0 | 5.7 |
| 65–74 years | 249.1 | 250.5 | 242.9 | 1,595.2 | 1,269.6 | 1,261.7 | 6.4 | 5.1 | 5.2 |
| 75 years and over | 307.3 | 342.0 | 330.3 | 2,188.4 | 2,290.1 | 2,000.4 | 7.1 | 6.7 | 6.1 |
| **Under 65 years of age** | | | | | | | | | |
| All persons under 65 years of age[2,4] | 102.2 | 98.1 | 96.0 | 416.4 | 365.5 | 406.2 | 4.1 | 3.7 | 4.2 |
| **Sex[4]** | | | | | | | | | |
| Male | 79.1 | 72.8 | 74.1 | 374.9 | 312.9 | 363.1 | 4.7 | 4.3 | 4.9 |
| Female | 124.7 | 122.9 | 117.5 | 456.6 | 416.7 | 448.7 | 3.7 | 3.4 | 3.8 |
| **Race[4,5]** | | | | | | | | | |
| White only | 100.8 | 96.4 | 93.2 | 385.8 | 342.5 | 378.3 | 3.8 | 3.6 | 4.1 |
| Black or African American only | 126.3 | 121.3 | 124.8 | 688.6 | 536.4 | 623.7 | 5.5 | 4.4 | 5.0 |
| American Indian and Alaska Native only | * | * | * | * | * | * | * | * | * |
| Asian only | 61.7 | 45.0 | 53.2 | * | * | * | * | * | * |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | --- | * | * | --- | * | * |
| 2 or more races | --- | * | *135.9 | --- | * | * | --- | * | * |
| **Hispanic origin and race[4,5]** | | | | | | | | | |
| Hispanic or Latino | 109.9 | 94.9 | 95.6 | 416.7 | 377.4 | 393.5 | 3.8 | 4.0 | 4.1 |
| Not Hispanic or Latino | 101.2 | 98.8 | 96.3 | 415.4 | 365.2 | 407.1 | 4.1 | 3.7 | 4.2 |
| White only | 99.6 | 97.2 | 93.7 | 382.7 | 345.0 | 376.7 | 3.8 | 3.5 | 4.0 |
| Black or African American only | 125.7 | 121.2 | 124.2 | 692.6 | 517.9 | 629.3 | 5.5 | 4.3 | 5.1 |
| **Poverty status[4,6]** | | | | | | | | | |
| Poor | 186.0 | 157.9 | 150.3 | 922.0 | 747.1 | 694.9 | 5.0 | 4.7 | 4.6 |
| Near poor | 119.3 | 124.0 | 117.2 | 530.5 | 491.7 | 571.1 | 4.4 | 4.0 | 4.9 |
| Nonpoor | 82.7 | 83.1 | 82.4 | 308.9 | 283.3 | 323.5 | 3.7 | 3.4 | 3.9 |
| **Hispanic origin and race and poverty status[4,5,6]** | | | | | | | | | |
| Hispanic or Latino: | | | | | | | | | |
| Poor | 152.3 | 132.8 | 132.3 | 592.3 | * | *557.3 | 3.9 | * | *4.2 |
| Near poor | 92.7 | 103.6 | 99.3 | *415.0 | *377.7 | *378.9 | *4.5 | *3.6 | *3.8 |
| Nonpoor | 92.1 | 72.8 | 78.6 | 294.5 | *289.1 | *335.0 | 3.2 | *4.0 | *4.3 |
| Not Hispanic or Latino: | | | | | | | | | |
| White only: | | | | | | | | | |
| Poor | 205.2 | 159.6 | 144.2 | 955.5 | 695.9 | *721.7 | 4.7 | 4.4 | *5.0 |
| Near poor | 124.3 | 129.1 | 125.9 | 503.4 | 488.1 | *557.4 | 4.0 | 3.8 | *4.4 |
| Nonpoor | 83.1 | 85.3 | 82.9 | 303.0 | 287.1 | 311.9 | 3.6 | 3.4 | 3.8 |
| Black or African American only: | | | | | | | | | |
| Poor | 199.0 | 199.4 | *207.2 | * | * | * | * | * | * |
| Near poor | 139.1 | *129.8 | *121.4 | *819.0 | * | * | *5.9 | * | * |
| Nonpoor | 85.2 | 93.3 | 93.1 | *402.1 | 292.6 | *418.8 | *4.7 | 3.1 | *4.5 |
| **Health insurance status[4,7]** | | | | | | | | | |
| Insured | 108.1 | 104.2 | 101.5 | 442.5 | 390.4 | 441.5 | 4.1 | 3.7 | 4.3 |
| Private | 85.6 | 84.3 | 80.1 | 310.2 | 275.1 | 323.0 | 3.6 | 3.3 | 4.0 |
| Medicaid | 311.6 | 277.4 | 268.8 | 1,575.3 | 1,301.2 | 1,397.1 | 5.1 | 4.7 | 5.2 |
| Uninsured | 75.3 | 68.7 | 69.3 | 296.3 | 247.2 | 251.2 | 3.9 | 3.6 | 3.6 |

See footnotes at end of table.



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## Table 96 (page 2 of 3). Discharges, days of care, and average length of stay in short-stay hospitals, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Discharges[1] | | | Days of care[1] | | | Average length of stay[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Poverty status and health insurance status[4,6] | Number per 1,000 population | | | | | | Number of days | | |
| Poor: | | | | | | | | | |
| Insured | 234.6 | 193.0 | 184.5 | 1,243.1 | 958.1 | 912.3 | 5.3 | 5.0 | 4.9 |
| Uninsured | 102.8 | 90.2 | *86.7 | *407.7 | *355.3 | *306.8 | *4.0 | *3.9 | *3.5 |
| Near poor: | | | | | | | | | |
| Insured | 141.2 | 146.1 | 139.5 | 640.0 | 603.7 | *714.7 | 4.5 | 4.1 | *5.1 |
| Uninsured | 72.0 | 75.2 | 69.4 | *285.3 | *252.9 | * | *4.0 | *3.4 | * |
| Nonpoor: | | | | | | | | | |
| Insured | 85.5 | 86.8 | 85.6 | 315.6 | 294.4 | 340.4 | 3.7 | 3.4 | 4.0 |
| Uninsured | *58.5 | 54.5 | 59.3 | * | *193.4 | *201.6 | * | *3.6 | *3.4 |
| Geographic region[4] | | | | | | | | | |
| Northeast | 96.0 | 92.8 | 82.3 | 455.4 | 348.0 | 384.4 | 4.7 | 3.8 | 4.7 |
| Midwest | 108.7 | 104.9 | 95.7 | 384.4 | 382.6 | 368.1 | 3.5 | 3.6 | 3.8 |
| South | 111.8 | 106.6 | 112.5 | 466.1 | 400.6 | 467.4 | 4.2 | 3.8 | 4.2 |
| West | 82.9 | 80.9 | 79.0 | 327.2 | 300.8 | 359.8 | 3.9 | 3.7 | 4.6 |
| Location of residence[4] | | | | | | | | | |
| Within MSA[8] | 99.3 | 94.6 | 91.7 | 411.8 | 355.4 | 406.6 | 4.1 | 3.8 | 4.4 |
| Outside MSA[8] | 113.2 | 112.4 | 113.8 | 435.9 | 407.5 | 405.8 | 3.8 | 3.6 | 3.6 |
| 65 years of age and over | | | | | | | | | |
| All persons 65 years of age and over[2,9] | 276.9 | 294.2 | 284.6 | 1,878.4 | 1,756.9 | 1,614.4 | 6.8 | 6.0 | 5.7 |
| Sex[9] | | | | | | | | | |
| Male | 291.6 | 312.5 | 273.0 | 2,077.4 | 1,804.6 | 1,614.1 | 7.1 | 5.8 | 5.9 |
| Female | 265.2 | 280.6 | 293.7 | 1,727.4 | 1,708.5 | 1,609.3 | 6.5 | 6.1 | 5.5 |
| Hispanic origin and race[5,9] | | | | | | | | | |
| Hispanic or Latino | 312.7 | 290.8 | 311.2 | *2,512.1 | 1,489.4 | *1,725.2 | *8.0 | 5.1 | *5.5 |
| Not Hispanic or Latino | 274.6 | 294.6 | 283.0 | 1,846.3 | 1,771.4 | 1,603.4 | 6.7 | 6.0 | 5.7 |
| White only | 274.8 | 293.0 | 280.6 | 1,808.2 | 1,683.5 | 1,547.2 | 6.6 | 5.7 | 5.5 |
| Black or African American only | 290.8 | *373.3 | 349.4 | 2,423.5 | * | *2,327.8 | 8.3 | * | *6.7 |
| Poverty status[6,9] | | | | | | | | | |
| Poor | 342.3 | 361.2 | 359.5 | 2,566.3 | * | 2,110.0 | 7.5 | * | 5.9 |
| Near poor | 311.5 | 314.8 | 329.1 | 2,269.4 | 1,836.0 | 1,724.6 | 7.3 | 5.8 | 5.2 |
| Nonpoor | 251.5 | 273.8 | 256.5 | 1,606.7 | 1,575.4 | 1,501.8 | 6.4 | 5.8 | 5.9 |
| Health insurance status[7,9] | | | | | | | | | |
| Medicare HMO | 217.8 | 239.7 | 290.5 | 1,355.3 | 1,072.2 | 1,508.4 | 6.2 | 4.5 | 5.2 |
| Private | 271.9 | 295.7 | 265.6 | 1,756.1 | 1,782.6 | 1,537.6 | 6.5 | 6.0 | 5.8 |
| Medicaid | 539.7 | 487.1 | 463.2 | 3,810.6 | 2,505.1 | 3,008.3 | 7.1 | 5.1 | 6.5 |
| Medicare fee-for-service only | 252.9 | 258.2 | *294.1 | 1,906.6 | * | 1,442.7 | 7.5 | * | *4.9 |
| Geographic region[9] | | | | | | | | | |
| Northeast | 265.0 | 281.8 | *300.4 | 1,828.5 | 1,659.3 | 1,604.1 | 6.9 | 5.9 | *5.3 |
| Midwest | 285.2 | 306.3 | 275.2 | 1,971.1 | 1,765.3 | 1,588.6 | 6.9 | 5.8 | 5.8 |
| South | 298.1 | 319.7 | 298.5 | 2,140.2 | 2,075.3 | 1,834.8 | 7.2 | 6.5 | 6.1 |
| West | 237.2 | 243.6 | 249.4 | 1,299.2 | 1,234.8 | 1,200.3 | 5.5 | 5.1 | 4.8 |

See footnotes at end of table.



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## Table 96 (page 3 of 3). Discharges, days of care, and average length of stay in short-stay hospitals, according to selected characteristics: United States, selected years 1997–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Discharges[1] | | | Days of care[1] | | | Average length of stay[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 | 1997 | 2002 | 2003 |
| Location of residence[9] | Number per 1,000 population | | | | | | Number of days | | |
| Within MSA[6] | 271.3 | 283.5 | 286.9 | 1,875.9 | 1,661.8 | 1,593.8 | 6.9 | 5.9 | 5.6 |
| Outside MSA[6] | 295.1 | 329.5 | 276.7 | 1,893.6 | *2,070.2 | 1,683.6 | 6.4 | *6.3 | 6.1 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error of 20–30 percent. Data not shown have a relative standard error of greater than 30 percent.
- - - Data not available.
[1]See Appendix II, Discharge; Days of care; Average length of stay.
[2]Includes all other races not shown separately and unknown health insurance status.
[3]Estimates for all persons are age adjusted to the year 2000 standard population using six age groups: Under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years of age and over. See Appendix II, Age adjustment.
[4]Estimates are for persons under 65 years of age and are age adjusted to the year 2000 standard population using four age groups: Under 18 years, 18–44 years, 45–54 years, and 55–64 years of age. See Appendix II, Age adjustment.
[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999 race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[6]Poor persons are defined as below the poverty threshold. Near poor persons have incomes of 100 percent to less than 200 percent of the poverty threshold. Nonpoor persons have incomes of 200 percent or greater than the poverty threshold. Missing family income data were imputed for 24–28 percent of persons under 65 years of age in 1997–98 and 30–33 percent in 1999–2003; and 36–41 percent of persons 65 years of age and over in 1997–98 and 44–47 percent in 1999–2003. See Appendix II, Poverty level; Family income.
[7]Health insurance categories are mutually exclusive. Persons who reported both Medicaid and private coverage are classified as having private coverage. Starting in 1997 Medicaid includes state-sponsored health plans and State Children's Health Insurance Program (SCHIP). In addition to private and Medicaid, the category "insured" also includes military plans, other government-sponsored health plans, and Medicare, not shown separately. Persons 65 years of age and over who reported Medicare HMO (health maintenance organization) and some other type of health insurance coverage are classified as having Medicare HMO. For persons 65 years of age and over the category "private" includes private and Medicare coverage. See Appendix II, Health insurance coverage.
[8]MSA is metropolitan statistical area.
[9]Estimates are for persons 65 years of age and over and are age adjusted to the year 2000 standard population using two age groups: 65–74 years and 75 years and over. See Appendix II, Age adjustment.

NOTES: Estimates of hospital utilization presented in *Health, United States* utilize two data sources: the National Health Interview Survey (NHIS) and the National Hospital Discharge Survey (NHDS). Differences in estimates from the two surveys are particularly evident for children and persons 65 years of age and over. See Appendix II, Hospital utilization. Data for additional years are available. See Appendix III. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, family core questionnaire.



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## Table 97 (page 1 of 2). Discharges, days of care, and average length of stay in non-Federal short-stay hospitals, according to selected characteristics: United States, selected years 1980–2003

[Data are based on a sample of hospital records]

Click here for spreadsheet version

| Characteristic | 1980[1] | 1985[1] | 1990 | 1995 | 1998 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Discharges per 1,000 population | | | | | |
| Total[2] | 173.4 | 151.4 | 125.2 | 118.0 | 117.9 | 113.3 | 115.1 | 117.3 | 119.5 |
| Age | | | | | | | | | |
| Under 18 years | 75.6 | 61.4 | 46.4 | 42.4 | 40.4 | 40.3 | 43.4 | 43.4 | 43.6 |
| 18–44 years | 155.3 | 128.0 | 102.7 | 91.4 | 88.8 | 84.9 | 87.3 | 90.3 | 91.3 |
| 45–54 years | 174.8 | 146.8 | 112.4 | 98.5 | 92.7 | 92.1 | 94.4 | 95.6 | 99.5 |
| 55–64 years | 215.4 | 194.8 | 163.3 | 148.3 | 155.1 | 141.5 | 139.3 | 146.5 | 145.7 |
| 65 years and over | 383.7 | 369.8 | 334.1 | 347.7 | 365.3 | 353.4 | 354.3 | 357.5 | 367.9 |
| 65–74 years | 315.8 | 297.2 | 261.6 | 260.0 | 267.6 | 254.6 | 256.1 | 254.0 | 265.1 |
| 75 years and over | 489.3 | 475.6 | 434.0 | 459.1 | 477.4 | 462.0 | 460.0 | 466.6 | 475.2 |
| Sex[2] | | | | | | | | | |
| Male | 153.2 | 137.3 | 113.0 | 104.8 | 102.8 | 99.1 | 100.0 | 102.4 | 104.4 |
| Female | 195.0 | 167.3 | 139.0 | 131.7 | 133.3 | 127.7 | 130.6 | 132.9 | 135.1 |
| Geographic region[2] | | | | | | | | | |
| Northeast | 162.0 | 142.6 | 133.2 | 133.5 | 127.3 | 127.5 | 125.2 | 123.5 | 127.6 |
| Midwest | 192.1 | 158.1 | 128.8 | 113.3 | 116.4 | 110.9 | 113.5 | 113.6 | 117.1 |
| South | 179.7 | 155.5 | 132.5 | 125.2 | 126.4 | 120.9 | 126.3 | 126.7 | 125.8 |
| West | 150.5 | 145.7 | 100.7 | 96.7 | 97.1 | 89.4 | 88.8 | 99.7 | 103.9 |
| | | | | Days of care per 1,000 population | | | | | |
| Total[3] | 1,297.0 | 997.5 | 818.9 | 638.6 | 598.6 | 557.7 | 562.2 | 570.9 | 574.6 |
| Age | | | | | | | | | |
| Under 18 years | 341.4 | 281.2 | 226.3 | 184.7 | 182.4 | 179.0 | 192.5 | 195.2 | 195.5 |
| 18–44 years | 818.6 | 619.2 | 467.7 | 351.7 | 328.3 | 309.4 | 322.7 | 333.9 | 339.7 |
| 45–54 years | 1,314.9 | 967.8 | 699.7 | 516.2 | 452.9 | 437.4 | 455.4 | 456.7 | 477.2 |
| 55–64 years | 1,889.4 | 1,436.9 | 1,172.3 | 867.2 | 836.1 | 729.1 | 732.2 | 752.2 | 735.9 |
| 65 years and over | 4,098.3 | 3,228.0 | 2,895.6 | 2,373.7 | 2,264.2 | 2,111.9 | 2,064.2 | 2,085.1 | 2,088.3 |
| 65–74 years | 3,147.0 | 2,437.3 | 2,087.8 | 1,684.7 | 1,596.1 | 1,439.0 | 1,449.5 | 1,411.9 | 1,428.9 |
| 75 years and over | 5,578.8 | 4,381.3 | 4,009.1 | 3,247.8 | 3,030.8 | 2,851.9 | 2,725.5 | 2,795.0 | 2,776.1 |
| Sex[2] | | | | | | | | | |
| Male | 1,239.7 | 973.3 | 805.8 | 623.9 | 576.7 | 535.9 | 534.5 | 549.5 | 546.7 |
| Female | 1,365.2 | 1,033.1 | 840.5 | 654.9 | 622.9 | 581.0 | 591.9 | 596.0 | 605.2 |
| Geographic region[2] | | | | | | | | | |
| Northeast | 1,400.6 | 1,113.0 | 1,026.7 | 839.0 | 731.0 | 718.6 | 697.7 | 690.0 | 694.4 |
| Midwest | 1,484.8 | 1,078.6 | 830.6 | 590.9 | 552.5 | 500.5 | 491.6 | 502.1 | 507.9 |
| South | 1,262.3 | 957.7 | 820.4 | 666.0 | 643.9 | 592.5 | 623.6 | 618.6 | 609.8 |
| West | 956.9 | 824.7 | 575.5 | 451.1 | 450.4 | 408.2 | 408.3 | 454.7 | 476.4 |
| | | | | Average length of stay in days | | | | | |
| Total[2] | 7.5 | 6.6 | 6.5 | 5.4 | 5.1 | 4.9 | 4.9 | 4.9 | 4.8 |
| Age | | | | | | | | | |
| Under 18 years | 4.5 | 4.6 | 4.9 | 4.4 | 4.5 | 4.4 | 4.4 | 4.5 | 4.5 |
| 18–44 years | 5.3 | 4.8 | 4.6 | 3.8 | 3.7 | 3.6 | 3.7 | 3.7 | 3.7 |
| 45–54 years | 7.5 | 6.6 | 6.2 | 5.2 | 4.9 | 4.8 | 4.8 | 4.8 | 4.8 |
| 55–64 years | 8.8 | 7.4 | 7.2 | 5.8 | 5.4 | 5.2 | 5.3 | 5.1 | 5.1 |
| 65 years and over | 10.7 | 8.7 | 8.7 | 6.8 | 6.2 | 6.0 | 5.8 | 5.8 | 5.7 |
| 65–74 years | 10.0 | 8.2 | 8.0 | 6.5 | 6.0 | 5.7 | 5.7 | 5.6 | 5.4 |
| 75 years and over | 11.4 | 9.2 | 9.2 | 7.1 | 6.3 | 6.2 | 5.9 | 6.0 | 5.8 |
| Sex[2] | | | | | | | | | |
| Male | 8.1 | 7.1 | 7.1 | 6.0 | 5.6 | 5.4 | 5.3 | 5.4 | 5.2 |
| Female | 7.0 | 6.2 | 6.0 | 5.0 | 4.7 | 4.6 | 4.5 | 4.5 | 4.5 |

See footnotes at end of table.



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## Table 97 (page 2 of 2). Discharges, days of care, and average length of stay in non-Federal short-stay hospitals, according to selected characteristics: United States, selected years 1980–2003

[Data are based on a sample of hospital records]

Click here for spreadsheet version

| Characteristic | 1980[1] | 1985[1] | 1990 | 1995 | 1998 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Geographic region[2] | Average length of stay in days | | | | | | | | |
| Northeast | 8.6 | 7.8 | 7.7 | 6.3 | 5.7 | 5.6 | 5.6 | 5.6 | 5.4 |
| Midwest | 7.7 | 6.8 | 6.5 | 5.2 | 4.7 | 4.5 | 4.3 | 4.4 | 4.3 |
| South | 7.0 | 6.2 | 6.2 | 5.3 | 5.1 | 4.9 | 4.9 | 4.9 | 4.8 |
| West | 6.4 | 5.7 | 5.7 | 4.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |

[1]Comparisons of data from 1980–85 with data from later years should be made with caution as estimates of change may reflect improvements in the design rather than true changes in hospital use. See Appendix I, National Hospital Discharge Survey.

[2]Estimates are age adjusted to the year 2000 standard population using six age groups: under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

NOTES: Rates are based on the civilian population as of July 1. Starting with *Health, United States, 2003*, rates for 2000 and beyond are based on the 2000 census. Rates for 1990–99 use population estimates based on the 1990 census adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Rates for 1990–99 are not strictly comparable with rates for 2000 and beyond because population estimates for 1990–99 have not been revised to reflect Census 2000. See Appendix I, National Hospital Discharge Survey, Population Census and Population Estimates. Estimates of hospital utilization from the National Health Interview Survey (NHIS) and the National Hospital Discharge Survey (NHDS) may differ because NHIS data are based on household interviews of the civilian noninstitutionalized population, whereas NHDS data are based on hospital discharge records of all persons. See Appendix II, Hospital utilization. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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## Table 98 (page 1 of 3). Rates of discharges and days of care in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records]

Revised March 2006

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| Sex, age, and first-listed diagnosis | Discharges | | | Days of care | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Both sexes | Number per 1,000 population | | | | | |
| Total[1,2] | 125.2 | 113.3 | 119.5 | 818.9 | 557.7 | 574.6 |
| Male | | | | | | |
| All ages[1,2] | 113.0 | 99.1 | 104.4 | 805.8 | 535.9 | 546.7 |
| Under 18 years[2] | 46.3 | 40.9 | 44.9 | 233.6 | 195.6 | 200.0 |
| Pneumonia | 5.3 | 5.4 | 5.9 | 22.6 | 17.3 | 19.1 |
| Asthma | 3.3 | 3.5 | 3.9 | 9.3 | 7.4 | 8.9 |
| Injuries and poisoning | 6.8 | 5.0 | 5.5 | 30.1 | 21.4 | 21.6 |
| Fracture, all sites | 2.2 | 1.8 | 2.0 | 9.3 | 7.2 | 6.1 |
| 18–44 years[2] | 57.9 | 45.0 | 47.7 | 351.7 | 217.5 | 236.0 |
| HIV infection | *0.3 | 0.6 | 0.5 | *3.0 | *5.4 | 4.3 |
| Alcohol and drug[3] | 3.7 | 4.0 | 3.6 | 33.1 | 19.1 | 14.9 |
| Serious mental illness[4] | 3.4 | *5.3 | 5.8 | 47.1 | *43.6 | 46.2 |
| Diseases of heart | 3.0 | 2.7 | 3.0 | 16.3 | 9.4 | *13.5 |
| Intervertebral disc disorders | 2.6 | 1.5 | 1.2 | 10.7 | 3.2 | 2.9 |
| Injuries and poisoning | 13.1 | 7.3 | 8.4 | 65.7 | 33.2 | 40.8 |
| Fracture, all sites | 4.0 | 2.5 | 3.0 | 22.7 | 12.8 | 15.5 |
| 45–64 years[2] | 140.3 | 112.7 | 120.1 | 943.4 | 570.4 | 605.0 |
| HIV infection | *0.1 | *0.5 | *0.7 | * | * | * |
| Malignant neoplasms | 10.6 | 6.2 | 6.6 | 99.1 | 42.1 | 44.7 |
| Trachea, bronchus, lung | 2.7 | 0.9 | 0.9 | 19.1 | 5.2 | 6.1 |
| Diabetes | 2.9 | 3.7 | 3.1 | 21.2 | 22.5 | 14.8 |
| Alcohol and drug[3] | 3.5 | 3.5 | 4.2 | 29.7 | 15.8 | 18.7 |
| Serious mental illness[4] | 2.5 | *4.0 | 4.4 | 34.8 | *34.6 | 39.9 |
| Diseases of heart | 31.7 | 26.4 | 24.7 | 185.0 | 101.5 | 99.0 |
| Ischemic heart disease | 22.6 | 17.7 | 14.8 | 128.2 | 63.8 | 56.1 |
| Acute myocardial infarction | 7.4 | 5.9 | 4.8 | 55.8 | 27.8 | 25.0 |
| Congestive heart failure | 3.0 | 3.3 | 3.9 | 19.7 | 17.2 | 18.5 |
| Cerebrovascular diseases | 4.1 | 3.8 | 3.8 | 40.7 | 19.8 | 16.6 |
| Pneumonia | 3.5 | 3.4 | 4.1 | 27.4 | 20.5 | 24.9 |
| Injuries and poisoning | 11.6 | 8.8 | 11.0 | 82.6 | 49.8 | 60.9 |
| Fracture, all sites | 3.3 | 2.5 | 3.1 | 24.2 | 16.2 | 18.0 |
| 65–74 years[2] | 287.8 | 264.9 | 276.5 | 2,251.5 | 1,489.7 | 1,465.3 |
| Malignant neoplasms | 27.9 | 17.6 | 19.3 | 277.6 | 121.2 | 124.7 |
| Large intestine and rectum | 3.0 | 3.0 | 2.1 | 34.2 | 27.3 | 17.0 |
| Trachea, bronchus, lung | 6.4 | 2.8 | 3.6 | 55.7 | 19.2 | 21.0 |
| Prostate | 5.1 | 3.7 | 3.9 | 33.1 | 14.0 | 12.7 |
| Diabetes | 4.4 | 4.7 | 5.1 | 39.8 | 29.0 | 27.9 |
| Serious mental illness[4] | 2.5 | *3.4 | 2.8 | 43.8 | 39.9 | 28.6 |
| Diseases of heart | 69.4 | 70.6 | 66.3 | 487.2 | 331.9 | 290.0 |
| Ischemic heart disease | 42.0 | 39.7 | 35.2 | 285.2 | 171.2 | 147.4 |
| Acute myocardial infarction | 14.0 | 12.5 | 12.5 | 122.4 | 66.5 | 66.9 |
| Congestive heart failure | 11.4 | 13.4 | 13.5 | 90.2 | 76.8 | 65.6 |
| Cerebrovascular diseases | 13.8 | 13.2 | 13.4 | 114.8 | 59.0 | 57.8 |
| Pneumonia | 11.4 | 12.8 | 12.9 | 107.8 | 82.0 | 77.2 |
| Hyperplasia of prostate | 14.4 | 5.4 | 3.8 | 65.0 | 15.0 | 10.5 |
| Osteoarthritis | 5.0 | 9.6 | 8.7 | 44.9 | 46.7 | 34.7 |
| Injuries and poisoning | 17.6 | 17.9 | 19.2 | 139.0 | 105.7 | 105.6 |
| Fracture, all sites | 4.5 | 4.7 | 4.6 | 45.9 | 29.9 | 27.5 |
| Fracture of neck of femur (hip) | 1.5 | *2.0 | *1.5 | *18.1 | *15.9 | *10.4 |

See footnotes at end of table.



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## Table 98 (page 2 of 3). Rates of discharges and days of care in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records] Revised March 2006 Click here for spreadsheet version

| Sex, age, and first-listed diagnosis | Discharges | | | Days of care | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Male—Con. | Number per 1,000 population | | | | | |
| 75 years and over[2] | 478.5 | 467.4 | 483.1 | 4,231.6 | 2,888.0 | 2,844.9 |
| Malignant neoplasms | 41.0 | 21.9 | 24.1 | 408.3 | 165.2 | 166.8 |
| Large intestine and rectum | 5.4 | 4.2 | 4.0 | 80.7 | 44.1 | 36.9 |
| Trachea, bronchus, lung | 5.4 | 3.0 | 4.1 | 53.4 | 18.3 | 29.3 |
| Prostate | 9.7 | 3.2 | 2.3 | 65.6 | *19.4 | *10.4 |
| Diabetes | 4.6 | 6.5 | 6.6 | 51.2 | 43.2 | *36.5 |
| Serious mental illness[4] | *2.6 | 2.9 | 2.5 | *40.5 | *32.6 | *25.2 |
| Diseases of heart | 106.2 | 113.3 | 110.3 | 855.7 | 600.9 | 560.2 |
| Ischemic heart disease | 49.1 | 53.0 | 47.2 | 398.1 | 276.1 | 238.8 |
| Acute myocardial infarction | 23.1 | 23.0 | 21.6 | 227.5 | 136.5 | 142.6 |
| Congestive heart failure | 31.0 | 30.5 | 31.1 | 242.3 | 175.4 | 170.6 |
| Cerebrovascular diseases | 30.2 | 30.2 | 29.1 | 298.3 | 171.2 | 142.2 |
| Pneumonia | 38.6 | 37.2 | 39.7 | 393.6 | 233.3 | 245.2 |
| Hyperplasia of prostate | 17.9 | 6.8 | 5.4 | 109.2 | 21.6 | 17.0 |
| Osteoarthritis | 5.8 | 6.2 | 9.7 | 60.7 | 28.7 | 42.3 |
| Injuries and poisoning | 31.2 | 33.6 | 34.6 | 341.3 | 257.7 | 226.1 |
| Fracture, all sites | 13.7 | 14.4 | 15.3 | 145.1 | *119.2 | 108.0 |
| Fracture of neck of femur (hip) | 8.5 | 8.4 | 9.7 | 97.8 | 63.3 | 67.2 |
| Female | | | | | | |
| All ages[1,2] | 139.0 | 127.7 | 135.1 | 840.5 | 581.0 | 605.2 |
| Under 18 years[2] | 46.4 | 39.6 | 42.2 | 218.7 | 161.5 | 190.9 |
| Pneumonia | 4.0 | 4.8 | 4.5 | 17.4 | 17.2 | 13.9 |
| Asthma | 2.2 | 2.4 | 2.3 | 6.8 | 5.5 | 5.3 |
| Injuries and poisoning | 4.3 | 3.1 | 3.6 | 16.7 | *12.0 | *15.4 |
| Fracture, all sites | 1.3 | 0.9 | 1.1 | 6.4 | 2.3 | 3.6 |
| 18–44 years[2] | 146.8 | 124.8 | 135.2 | 582.0 | 401.1 | 444.2 |
| HIV infection | * | 0.3 | 0.3 | * | *2.1 | 2.5 |
| Delivery | 69.9 | 64.5 | 69.5 | 195.0 | 160.2 | 179.6 |
| Alcohol and drug[3] | 1.6 | *2.1 | 1.9 | 14.1 | *10.8 | *9.5 |
| Serious mental illness[4] | 3.7 | *5.4 | 6.0 | 54.3 | *41.1 | 48.2 |
| Diseases of heart | 1.3 | 1.7 | 1.8 | 7.2 | 6.3 | 7.5 |
| Intervertebral disc disorders | 1.5 | 1.0 | 1.1 | 7.3 | 2.4 | 2.6 |
| Injuries and poisoning | 6.7 | 4.3 | 4.8 | 36.6 | 18.1 | 18.9 |
| Fracture, all sites | 1.6 | 1.0 | 1.0 | 10.7 | 4.5 | 4.8 |
| 45–64 years[2] | 131.0 | 110.2 | 116.5 | 886.5 | 533.6 | 560.9 |
| HIV infection | * | * | * | * | * | * |
| Malignant neoplasms | 12.7 | 6.1 | 6.4 | 107.4 | 34.7 | 37.9 |
| Trachea, bronchus, lung | 1.7 | 0.5 | 0.8 | 14.8 | 3.4 | 5.3 |
| Breast | 2.8 | 1.3 | 1.0 | 12.1 | 2.6 | 2.5 |
| Diabetes | 2.9 | 2.9 | 2.8 | 25.8 | 15.0 | 15.3 |
| Alcohol and drug[3] | 1.0 | 1.5 | 1.6 | 8.0 | *7.1 | *8.2 |
| Serious mental illness[4] | 4.0 | 4.6 | 5.4 | 60.5 | 42.7 | 48.1 |
| Diseases of heart | 16.6 | 14.6 | 14.1 | 101.1 | 59.5 | 59.7 |
| Ischemic heart disease | 9.9 | 7.8 | 6.9 | 57.4 | 29.5 | 25.0 |
| Acute myocardial infarction | 2.8 | 2.0 | 1.9 | 21.6 | 10.0 | 8.2 |
| Congestive heart failure | 2.1 | 2.9 | 3.1 | 15.8 | 13.6 | 14.5 |
| Cerebrovascular diseases | 3.0 | 3.5 | 3.0 | 32.1 | 19.5 | 15.3 |
| Pneumonia | 3.4 | 3.6 | 3.9 | 26.5 | 20.8 | 21.3 |
| Injuries and poisoning | 9.4 | 7.7 | 8.8 | 63.3 | 41.2 | 48.8 |
| Fracture, all sites | 3.1 | 2.7 | 2.0 | 25.0 | 13.3 | 9.5 |

See footnotes at end of table.



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## Table 98 (page 3 of 3). Rates of discharges and days of care in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records] Revised March 2006 Click here for spreadsheet version

| Sex, age, and first-listed diagnosis | Discharges | | | Days of care | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Female—Con. | Number per 1,000 population | | | | | |
| 65–74 years[2] | 241.1 | 246.1 | 255.5 | 1,959.3 | 1,397.1 | 1,398.4 |
| Malignant neoplasms | 20.9 | 14.1 | 14.5 | 189.8 | 101.0 | 98.5 |
| Large intestine and rectum | 2.4 | 1.7 | 2.0 | 34.9 | 15.2 | 17.1 |
| Trachea, bronchus, lung | 2.6 | 2.4 | 2.5 | 26.9 | *17.5 | 16.8 |
| Breast | 3.9 | 2.8 | 2.2 | 17.6 | * | *4.3 |
| Diabetes | 5.8 | 4.6 | 5.1 | 46.8 | 26.1 | 26.8 |
| Serious mental illness[4] | 3.9 | 4.0 | 4.4 | 62.8 | 46.3 | 44.1 |
| Diseases of heart | 45.1 | 52.1 | 48.0 | 316.9 | 256.0 | 229.6 |
| Ischemic heart disease | 24.4 | 23.3 | 20.5 | 153.8 | 113.9 | 86.8 |
| Acute myocardial infarction | 7.5 | 8.0 | 7.6 | 58.1 | 52.8 | 40.6 |
| Congestive heart failure | 9.2 | 12.7 | 11.6 | 81.8 | 68.4 | 61.8 |
| Cerebrovascular diseases | 11.3 | 12.3 | 11.1 | 96.0 | 59.4 | 58.4 |
| Pneumonia | 8.7 | 11.7 | 11.8 | 81.8 | 73.5 | 65.6 |
| Osteoarthritis | 6.9 | 9.3 | 13.2 | 68.9 | 43.6 | 54.7 |
| Injuries and poisoning | 17.8 | 18.3 | 18.5 | 166.2 | 109.9 | 103.2 |
| Fracture, all sites | 8.4 | 7.7 | 7.3 | 97.3 | 43.8 | 39.8 |
| Fracture of neck of femur (hip) | 3.6 | 3.2 | 2.8 | *59.6 | 21.1 | 16.8 |
| 75 years and over[2] | 409.6 | 458.8 | 470.5 | 3,887.1 | 2,830.8 | 2,734.8 |
| Malignant neoplasms | 22.1 | 17.6 | 15.9 | 257.3 | 125.7 | 124.5 |
| Large intestine and rectum | 4.6 | 3.4 | 2.8 | 69.8 | 28.4 | 26.8 |
| Trachea, bronchus, lung | 2.1 | 1.9 | 2.0 | 20.6 | 14.0 | *16.2 |
| Breast | 3.9 | 2.5 | 1.4 | 22.0 | *8.9 | *4.4 |
| Diabetes | 4.6 | 6.3 | 6.2 | 55.3 | 34.0 | 28.6 |
| Serious mental illness[4] | 4.2 | 4.7 | 3.3 | 78.4 | 49.2 | 37.2 |
| Diseases of heart | 84.6 | 99.1 | 97.2 | 672.8 | 523.4 | 480.1 |
| Ischemic heart disease | 33.7 | 35.5 | 32.1 | 253.2 | 185.5 | 150.8 |
| Acute myocardial infarction | 13.1 | 16.5 | 15.8 | 125.9 | 110.7 | 95.1 |
| Congestive heart failure | 28.0 | 32.2 | 29.6 | 236.6 | 181.7 | 159.4 |
| Cerebrovascular diseases | 29.6 | 27.6 | 24.5 | 302.0 | 156.8 | 138.3 |
| Pneumonia | 23.9 | 30.5 | 29.7 | 260.1 | 209.7 | 189.9 |
| Osteoarthritis | 5.3 | 8.7 | 10.6 | 54.1 | 40.4 | 45.8 |
| Injuries and poisoning | 46.3 | 44.7 | 46.2 | 489.2 | 275.4 | 271.0 |
| Fracture, all sites | 31.5 | 30.0 | 29.4 | 352.7 | 190.0 | 173.5 |
| Fracture of neck of femur (hip) | 18.8 | 17.9 | 15.5 | 236.3 | 125.3 | 98.6 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

[1]Estimates are age adjusted to the year 2000 standard population using six age groups: under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[2]Includes discharges with first-listed diagnoses not shown in table.

[3]Includes abuse, dependence, and withdrawal. These estimates are for non-Federal short-stay hospitals and do not include alcohol and drug discharges from other types of facilities or programs such as the Department of Veterans Affairs or day treatment programs.

[4]These estimates are for non-Federal short-stay hospitals and do not include serious mental illness discharges from other types of facilities or programs such as the Department of Veterans Affairs or long-term hospitals.

NOTES: Excludes newborn infants. Diagnostic categories are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9-CM). See Appendix II, Diagnosis; Human immunodeficiency virus (HIV) infection; Table IX for ICD–9-CM codes. Rates are based on the civilian population as of July 1. Starting with *Health, United States, 2003,* rates for 2000 and beyond are based on the 2000 census. Rates for 1990–99 use population estimates based on the 1990 census adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Rates for 1990–99 are not strictly comparable with rates for 2000 and beyond because population estimates for 1990–99 have not been revised to reflect Census 2000. See Appendix I, National Hospital Discharge Survey; Population Census and Population Estimates. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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## Table 99 (page 1 of 3). Discharges and average length of stay in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records] Revised March 2006 Click here for spreadsheet version

| Sex, age, and first-listed diagnosis | Discharges | | | Average length of stay | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Both sexes | Number in thousands | | | Number of days | | |
| Total[1,2] | 30,788 | 31,706 | 34,738 | 6.5 | 4.9 | 4.8 |
| Male | | | | | | |
| All ages[1,2] | 12,280 | 12,514 | 13,874 | 7.1 | 5.4 | 5.2 |
| Under 18 years[2] | 1,572 | 1,515 | 1,679 | 5.0 | 4.8 | 4.5 |
| Pneumonia | 178 | 199 | 221 | 4.3 | 3.2 | 3.2 |
| Asthma | 111 | 129 | 146 | 2.8 | 2.1 | 2.3 |
| Injuries and poisoning | 232 | 185 | 207 | 4.4 | 4.3 | 3.9 |
| Fracture, all sites | 76 | 68 | 77 | 4.2 | 3.9 | 3.0 |
| 18–44 years[2] | 3,120 | 2,498 | 2,683 | 6.1 | 4.8 | 4.9 |
| HIV infection | *15 | 32 | 28 | *10.6 | *9.4 | 8.6 |
| Alcohol and drug[3] | 201 | 224 | 203 | 8.9 | 4.7 | 4.1 |
| Serious mental illness[4] | 184 | *296 | 323 | 13.8 | *8.2 | 8.0 |
| Diseases of heart | 163 | 148 | 169 | 5.4 | 3.5 | *4.5 |
| Intervertebral disc disorders | 138 | 81 | 69 | 4.2 | 2.2 | 2.3 |
| Injuries and poisoning | 704 | 408 | 470 | 5.0 | 4.5 | 4.9 |
| Fracture, all sites | 217 | 141 | 171 | 5.6 | 5.0 | 5.1 |
| 45–64 years[2] | 3,115 | 3,424 | 4,016 | 6.7 | 5.1 | 5.0 |
| HIV infection | *3 | *15 | *22 | *7.1 | * | * |
| Malignant neoplasms | 235 | 188 | 221 | 9.4 | 6.8 | 6.7 |
| Trachea, bronchus, lung | 60 | 26 | 30 | 7.1 | 6.0 | 6.9 |
| Diabetes | 65 | 114 | 105 | 7.3 | 6.0 | 4.7 |
| Alcohol and drug[3] | 77 | 106 | 140 | 8.5 | 4.5 | 4.5 |
| Serious mental illness[4] | 56 | *120 | 147 | 13.7 | *8.8 | 9.1 |
| Diseases of heart | 704 | 802 | 827 | 5.8 | 3.8 | 4.0 |
| Ischemic heart disease | 502 | 539 | 494 | 5.7 | 3.6 | 3.8 |
| Acute myocardial infarction | 165 | 178 | 161 | 7.5 | 4.7 | 5.2 |
| Congestive heart failure | 66 | 101 | 129 | 6.7 | 5.2 | 4.8 |
| Cerebrovascular diseases | 91 | 116 | 126 | 10.0 | 5.2 | 4.4 |
| Pneumonia | 77 | 104 | 137 | 7.9 | 6.0 | 6.1 |
| Injuries and poisoning | 257 | 266 | 369 | 7.2 | 5.7 | 5.5 |
| Fracture, all sites | 74 | 77 | 102 | 7.2 | 6.4 | 5.9 |
| 65–74 years[2] | 2,268 | 2,199 | 2,309 | 7.8 | 5.6 | 5.3 |
| Malignant neoplasms | 220 | 146 | 161 | 9.9 | 6.9 | 6.5 |
| Large intestine and rectum | 24 | 24 | 18 | 11.4 | 9.2 | 8.0 |
| Trachea, bronchus, lung | 50 | 23 | 30 | 8.7 | 6.8 | 5.8 |
| Prostate | 40 | 31 | 33 | 6.5 | 3.8 | 3.2 |
| Diabetes | 34 | 39 | 42 | 9.1 | 6.2 | 5.5 |
| Serious mental illness[4] | 20 | *28 | 24 | 17.4 | *11.7 | 10.1 |
| Diseases of heart | 547 | 586 | 553 | 7.0 | 4.7 | 4.4 |
| Ischemic heart disease | 331 | 329 | 294 | 6.8 | 4.3 | 4.2 |
| Acute myocardial infarction | 110 | 104 | 105 | 8.8 | 5.3 | 5.3 |
| Congestive heart failure | 90 | 112 | 113 | 7.9 | 5.7 | 4.9 |
| Cerebrovascular diseases | 108 | 109 | 112 | 8.3 | 4.5 | 4.3 |
| Pneumonia | 90 | 106 | 108 | 9.5 | 6.4 | 6.0 |
| Hyperplasia of prostate | 113 | 45 | 32 | 4.5 | 2.8 | 2.8 |
| Osteoarthritis | 39 | 80 | 72 | 9.0 | 4.9 | 4.0 |
| Injuries and poisoning | 139 | 149 | 160 | 7.9 | 5.9 | 5.5 |
| Fracture, all sites | 36 | 39 | 38 | 10.2 | 6.4 | 6.0 |
| Fracture of neck of femur (hip) | 12 | *17 | *12 | *11.8 | *7.9 | *7.1 |

See footnotes at end of table.



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## Table 99 (page 2 of 3). Discharges and average length of stay in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records] Revised March 2006 Click here for spreadsheet version

| Sex, age, and first-listed diagnosis | Discharges | | | Average length of stay | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Male—Con. | Number in thousands | | | Number of days | | |
| 75 years and over[2] | 2,203 | 2,878 | 3,188 | 8.8 | 6.2 | 5.9 |
| Malignant neoplasms | 189 | 135 | 159 | 10.0 | 7.6 | 6.9 |
| Large intestine and rectum | 25 | 26 | 26 | 15.0 | 10.6 | 9.2 |
| Trachea, bronchus, lung | 25 | 18 | 27 | 10.0 | 6.1 | 7.2 |
| Prostate | 45 | 20 | 16 | 6.8 | *6.1 | *4.4 |
| Diabetes | 21 | 40 | 44 | 11.0 | 6.6 | *5.5 |
| Serious mental illness[4] | *12 | 18 | 17 | *15.5 | *11.2 | *10.0 |
| Diseases of heart | 489 | 697 | 728 | 8.1 | 5.3 | 5.1 |
| Ischemic heart disease | 226 | 326 | 311 | 8.1 | 5.2 | 5.1 |
| Acute myocardial infarction | 106 | 141 | 142 | 9.9 | 5.9 | 6.6 |
| Congestive heart failure | 143 | 188 | 205 | 7.8 | 5.7 | 5.5 |
| Cerebrovascular diseases | 139 | 186 | 192 | 9.9 | 5.7 | 4.9 |
| Pneumonia | 178 | 229 | 262 | 10.2 | 6.3 | 6.2 |
| Hyperplasia of prostate | 82 | 42 | 36 | 6.1 | 3.2 | 3.1 |
| Osteoarthritis | 27 | 38 | 64 | 10.5 | 4.6 | 4.4 |
| Injuries and poisoning | 144 | 207 | 228 | 10.9 | 7.7 | 6.5 |
| Fracture, all sites | 63 | 89 | 101 | 10.6 | *8.3 | 7.1 |
| Fracture of neck of femur (hip) | 39 | 52 | 64 | 11.5 | 7.5 | 6.9 |
| Female | | | | | | |
| All ages[1,2] | 18,508 | 19,192 | 20,864 | 6.0 | 4.5 | 4.5 |
| Under 18 years[2] | 1,500 | 1,397 | 1,504 | 4.7 | 4.1 | 4.5 |
| Pneumonia | 129 | 168 | 159 | 4.4 | 3.6 | 3.1 |
| Asthma | 71 | 85 | 81 | 3.1 | 2.3 | 2.3 |
| Injuries and poisoning | 138 | 111 | 128 | 3.9 | *3.8 | *4.3 |
| Fracture, all sites | 42 | 32 | 38 | 5.0 | 2.5 | 3.4 |
| 18–44 years[2] | 8,018 | 6,941 | 7,537 | 4.0 | 3.2 | 3.3 |
| HIV infection | * | 15 | 19 | * | *7.5 | 7.4 |
| Delivery | 3,815 | 3,588 | 3,874 | 2.8 | 2.5 | 2.6 |
| Alcohol and drug[3] | 85 | *116 | 106 | 9.1 | *5.2 | *5.0 |
| Serious mental illness[4] | 200 | *300 | 333 | 14.8 | *7.6 | 8.1 |
| Diseases of heart | 73 | 95 | 102 | 5.4 | 3.7 | 4.1 |
| Intervertebral disc disorders | 84 | 58 | 60 | 4.7 | 2.3 | 2.4 |
| Injuries and poisoning | 366 | 237 | 268 | 5.5 | 4.2 | 3.9 |
| Fracture, all sites | 85 | 57 | 57 | 6.9 | 4.4 | 4.7 |
| 45–64 years[2] | 3,129 | 3,534 | 4,104 | 6.8 | 4.8 | 4.8 |
| HIV infection | * | * | * | * | * | * |
| Malignant neoplasms | 303 | 195 | 226 | 8.5 | 5.7 | 5.9 |
| Trachea, bronchus, lung | 41 | 17 | 27 | 8.6 | 6.4 | 6.8 |
| Breast | 67 | 40 | 37 | 4.3 | 2.1 | 2.4 |
| Diabetes | 70 | 93 | 99 | 8.9 | 5.2 | 5.4 |
| Alcohol and drug[3] | 23 | 47 | 55 | 8.2 | *4.8 | *5.2 |
| Serious mental illness[4] | 95 | 146 | 191 | 15.2 | 9.4 | 8.8 |
| Diseases of heart | 397 | 470 | 498 | 6.1 | 4.1 | 4.2 |
| Ischemic heart disease | 237 | 251 | 242 | 5.8 | 3.8 | 3.6 |
| Acute myocardial infarction | 68 | 64 | 66 | 7.6 | 5.0 | 4.4 |
| Congestive heart failure | 51 | 94 | 110 | 7.4 | 4.6 | 4.6 |
| Cerebrovascular diseases | 72 | 113 | 104 | 10.7 | 5.5 | 5.2 |
| Pneumonia | 80 | 117 | 136 | 7.9 | 5.7 | 5.5 |
| Injuries and poisoning | 225 | 248 | 310 | 6.7 | 5.3 | 5.5 |
| Fracture, all sites | 75 | 87 | 71 | 7.9 | 4.9 | 4.7 |

See footnotes at end of table.

## Table 99 (page 3 of 3). Discharges and average length of stay in non-Federal short-stay hospitals, according to sex, age, and selected first-listed diagnoses: United States, selected years 1990–2003

[Data are based on a sample of hospital records] Revised March 2006 Click here for spreadsheet version

| Sex, age, and first-listed diagnosis | Discharges | | | Average length of stay | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2003 | 1990 | 2000 | 2003 |
| Female—Con. | Number in thousands | | | Number of days | | |
| 65–74 years[2] | 2,421 | 2,479 | 2,552 | 8.1 | 5.7 | 5.5 |
| Malignant neoplasms | 210 | 142 | 144 | 9.1 | 7.2 | 6.8 |
| Large intestine and rectum | 24 | 17 | 20 | 14.5 | 9.0 | 8.4 |
| Trachea, bronchus, lung | 26 | 25 | 25 | 10.2 | *7.1 | 6.8 |
| Breast | 40 | 29 | 22 | 4.5 | * | *2.0 |
| Diabetes | 59 | 47 | 51 | 8.0 | 5.6 | 5.2 |
| Serious mental illness[4] | 39 | 40 | 43 | 16.3 | 11.7 | 10.1 |
| Diseases of heart | 453 | 525 | 480 | 7.0 | 4.9 | 4.8 |
| Ischemic heart disease | 245 | 235 | 205 | 6.3 | 4.9 | 4.2 |
| Acute myocardial infarction | 75 | 81 | 76 | 7.8 | 6.6 | 5.4 |
| Congestive heart failure | 92 | 128 | 116 | 8.9 | 5.4 | 5.3 |
| Cerebrovascular diseases | 114 | 124 | 111 | 8.5 | 4.8 | 5.3 |
| Pneumonia | 87 | 117 | 117 | 9.4 | 6.3 | 5.6 |
| Osteoarthritis | 69 | 94 | 132 | 10.0 | 4.7 | 4.1 |
| Injuries and poisoning | 179 | 185 | 184 | 9.3 | 6.0 | 5.6 |
| Fracture, all sites | 85 | 77 | 73 | 11.5 | 5.7 | 5.4 |
| Fracture of neck of femur (hip) | 36 | 32 | 28 | *16.7 | 6.7 | 5.9 |
| 75 years and over[2] | 3,440 | 4,840 | 5,168 | 9.5 | 6.2 | 5.8 |
| Malignant neoplasms | 185 | 186 | 175 | 11.7 | 7.1 | 7.8 |
| Large intestine and rectum | 39 | 36 | 31 | 15.1 | 8.4 | 9.6 |
| Trachea, bronchus, lung | 18 | 20 | 22 | 9.9 | 7.3 | *8.1 |
| Breast | 33 | 27 | 15 | 5.7 | *3.5 | *3.2 |
| Diabetes | 39 | 67 | 68 | 11.9 | 5.4 | 4.6 |
| Serious mental illness[4] | 35 | 49 | 37 | 18.7 | 10.5 | 11.2 |
| Diseases of heart | 711 | 1,045 | 1,067 | 8.0 | 5.3 | 4.9 |
| Ischemic heart disease | 283 | 375 | 352 | 7.5 | 5.2 | 4.7 |
| Acute myocardial infarction | 110 | 174 | 174 | 9.6 | 6.7 | 6.0 |
| Congestive heart failure | 235 | 339 | 325 | 8.5 | 5.6 | 5.4 |
| Cerebrovascular diseases | 249 | 292 | 269 | 10.2 | 5.7 | 5.6 |
| Pneumonia | 201 | 322 | 327 | 10.9 | 6.9 | 6.4 |
| Osteoarthritis | 45 | 91 | 117 | 10.2 | 4.7 | 4.3 |
| Injuries and poisoning | 389 | 472 | 507 | 10.6 | 6.2 | 5.9 |
| Fracture, all sites | 265 | 316 | 323 | 11.2 | 6.3 | 5.9 |
| Fracture of neck of femur (hip) | 158 | 189 | 171 | 12.5 | 7.0 | 6.3 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

[1]Average length of stay estimates are age adjusted to the year 2000 standard population using six age groups: under 18 years, 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.

[2]Includes discharges with first-listed diagnoses not shown in table.

[3]Includes abuse, dependence, and withdrawal. These estimates are for non-Federal short-stay hospitals and do not include alcohol and drug discharges from other types of facilities or programs such as the Department of Veterans Affairs or day treatment programs.

[4]These estimates are for non-Federal short-stay hospitals and do not include serious mental illness discharges from other types of facilities or programs such as the Department of Veterans Affairs or long-term hospitals.

NOTES: Excludes newborn infants. Diagnostic categories are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM). See Appendix II, Diagnosis; Human immunodeficiency virus (HIV) infection; Table IX for ICD-9-CM codes. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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## Table 100 (page 1 of 3). Hospital stays with at least one procedure, according to sex, age, and selected procedures: United States, average annual 1992–93 and 2002–03

[Data are based on a sample of hospital records]

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| Age and procedure category | Both sexes | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1992–93 | 2002–03 | 1992–93 | 2002–03 | 1992–93 | 2002–03 |
| 18 years of age and over | Number in thousands[1] | | | | | |
| Hospital stays with at least one procedure[2] | 18,700 | 19,283 | 6,953 | 7,084 | 11,748 | 12,199 |
| 18 years of age and over, age adjusted[3] | Number per 10,000 population[4] | | | | | |
| Hospital stays with at least one procedure[2] | 992.3 | 897.3 | 845.8 | 729.0 | 1,152.6 | 1,076.2 |
| Cardiac catheterization | 54.6 | 58.8 | 74.4 | 78.8 | 37.9 | 42.2 |
| Insertion, replacement, removal, and revision of pacemaker leads or device | 8.8 | 10.4 | 10.9 | 12.2 | 7.4 | 9.1 |
| Incision, excision, and occlusion of vessels | 40.3 | 64.1 | 46.9 | 68.2 | 35.5 | 61.1 |
| Angiocardiography using contrast material | 45.6 | 47.5 | 61.3 | 61.5 | 32.3 | 35.8 |
| Operations on vessels of heart | 37.0 | 43.1 | 56.4 | 64.4 | 20.8 | 25.4 |
| Removal of coronary artery obstruction and insertion of stent(s) | 21.0 | 30.2 | 30.7 | 43.5 | 12.7 | 18.9 |
| Insertion of coronary artery stent(s)[5] | . . . | 25.0 | . . . | 36.8 | . . . | 15.1 |
| Coronary artery bypass graft | 16.9 | 13.2 | 27.1 | 21.3 | 8.6 | 6.6 |
| Diagnostic procedures on small intestine | 44.8 | 47.1 | 47.1 | 46.7 | 43.1 | 47.8 |
| Diagnostic procedures on large intestine | 28.7 | 26.7 | 27.7 | 24.8 | 29.6 | 28.3 |
| Diagnostic radiology | 78.0 | 35.1 | 80.4 | 34.9 | 76.6 | 35.6 |
| Computerized axial tomography | 54.9 | 28.4 | 59.2 | 28.5 | 51.2 | 28.1 |
| Diagnostic ultrasound | 66.1 | 32.7 | 61.5 | 33.8 | 71.1 | 32.2 |
| Joint replacement of lower extremity | 22.6 | 35.6 | 18.2 | 30.9 | 25.7 | 39.3 |
| Total hip replacement | 6.8 | 9.5 | 6.2 | 9.2 | 7.1 | 9.6 |
| Partial hip replacement | 4.9 | 5.0 | 2.9 | 3.5 | 6.1 | 6.0 |
| Total knee replacement | 8.9 | 17.7 | 6.9 | 15.1 | 10.5 | 20.0 |
| Reduction of fracture and dislocation | 27.5 | 24.2 | 24.7 | 23.3 | 28.3 | 23.6 |
| Excision or destruction of intervertebral disc | 17.3 | 14.4 | 19.6 | 16.2 | 15.2 | 12.9 |
| Cholecystectomy | 27.2 | 19.7 | 18.9 | 14.9 | 35.4 | 24.4 |
| Laparoscopic cholecystectomy | 18.1 | 14.5 | 10.9 | 9.6 | 25.0 | 19.3 |
| Lysis of peritoneal adhesions | 18.0 | 15.2 | 7.3 | 5.9 | 28.1 | 24.1 |
| 18–44 years of age | Number in thousands[1] | | | | | |
| Hospital stays with at least one procedure[2] | 7,855 | 7,238 | 1,874 | 1,481 | 5,981 | 5,757 |
| | Number per 10,000 population[4] | | | | | |
| Hospital stays with at least one procedure[2] | 719.2 | 646.5 | 344.9 | 263.8 | 1,089.5 | 1,031.3 |
| Repair of hernia | 4.7 | 4.2 | 5.0 | 2.6 | 4.3 | 5.9 |
| Cesarean section and removal of fetus[6] | . . . | . . . | . . . | . . . | 163.1 | 191.0 |
| Forceps, vacuum, and breech delivery[6] | . . . | . . . | . . . | . . . | 77.1 | 55.6 |
| Other procedures inducing or assisting delivery[6,7] | . . . | . . . | . . . | . . . | 399.6 | 399.5 |
| Dilation and curettage of uterus[6] | . . . | . . . | . . . | . . . | 20.9 | 7.1 |
| Total abdominal hysterectomy[6] | . . . | . . . | . . . | . . . | 38.5 | 36.5 |
| Vaginal hysterectomy[6] | . . . | . . . | . . . | . . . | 20.3 | 18.8 |
| Cardiac catheterization | 8.3 | 9.1 | 12.3 | 12.3 | 4.4 | 5.9 |
| Incision, excision, and occlusion of vessels | 11.9 | 20.2 | 12.3 | 20.2 | 11.4 | 20.3 |
| Angiocardiography using contrast material | 7.4 | 8.2 | 11.0 | 10.6 | 3.8 | 5.7 |
| Operations on vessels of heart | 3.6 | 4.5 | 6.2 | 7.0 | 1.0 | 2.0 |
| Removal of coronary artery obstruction and insertion of stent(s) | 2.6 | 3.6 | 4.5 | 5.5 | *0.7 | 1.7 |
| Insertion of coronary artery stent(s)[5] | . . . | 3.0 | . . . | 4.7 | . . . | 1.2 |
| Coronary artery bypass graft | 1.0 | 0.9 | 1.8 | 1.5 | * | * |
| Diagnostic procedures on small intestine | 12.9 | 13.4 | 13.8 | 11.4 | 12.1 | 15.5 |
| Diagnostic procedures on large intestine | 6.7 | 6.3 | 6.6 | 5.7 | 6.9 | 6.9 |
| Diagnostic radiology | 33.2 | 14.7 | 32.4 | 12.7 | 33.9 | 16.6 |
| Computerized axial tomography | 21.2 | 11.4 | 24.7 | 11.4 | 17.6 | 11.3 |
| Diagnostic ultrasound | 29.0 | 10.6 | 15.8 | 7.7 | 42.0 | 13.6 |
| Reduction of fracture and dislocation | 15.9 | 13.4 | 21.3 | 18.9 | 10.5 | 7.9 |
| Excision or destruction of intervertebral disc | 15.0 | 10.6 | 18.7 | 11.6 | 11.5 | 9.7 |
| Cholecystectomy | 16.1 | 12.0 | 6.3 | 5.0 | 25.8 | 19.0 |
| Laparoscopic cholecystectomy | 11.9 | 10.2 | 4.1 | 3.7 | 19.5 | 16.8 |
| Lysis of peritoneal adhesions | 15.2 | 12.4 | 2.1 | 1.6 | 28.2 | 23.2 |

See footnotes at end of table.



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## Table 100 (page 2 of 3). Hospital stays with at least one procedure, according to sex, age, and selected procedures: United States, average annual 1992–93 and 2002–03

[Data are based on a sample of hospital records]

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| Age and procedure category | Both sexes | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1992–93 | 2002–03 | 1992–93 | 2002–03 | 1992–93 | 2002–03 |
| 45–64 years of age | Number in thousands[1] | | | | | |
| Hospital stays with at least one procedure[2] | 4,227 | 4,924 | 2,105 | 2,457 | 2,122 | 2,467 |
| | Number per 10,000 population[4] | | | | | |
| Hospital stays with at least one procedure[2] | 866.5 | 727.8 | 892.3 | 746.2 | 842.2 | 710.4 |
| Transurethral prostatectomy[8] | ... | ... | 21.2 | 6.5 | ... | ... |
| Repair of hernia | 15.7 | 13.5 | 18.6 | 12.2 | 12.9 | 14.6 |
| Total abdominal hysterectomy[6] | ... | ... | ... | ... | 49.6 | 47.2 |
| Vaginal hysterectomy[6] | ... | ... | ... | ... | 19.4 | 21.1 |
| Cardiac catheterization | 86.5 | 79.8 | 120.3 | 106.7 | 54.9 | 54.3 |
| Insertion, replacement, removal, and revision of pacemaker leads or device | 6.1 | 4.3 | 7.6 | 5.5 | 4.8 | 3.1 |
| Incision, excision, and occlusion of vessels | 43.2 | 65.0 | 48.1 | 68.5 | 38.6 | 61.6 |
| Angiocardiography using contrast material | 72.9 | 64.4 | 99.1 | 83.2 | 48.3 | 46.5 |
| Operations on vessels of heart | 59.5 | 58.6 | 91.8 | 88.4 | 29.3 | 30.3 |
| Removal of coronary artery obstruction and insertion of stent(s) | 35.3 | 41.4 | 52.2 | 61.2 | 19.5 | 22.6 |
| Insertion of coronary artery stent(s)[5] | ... | 34.4 | ... | 52.0 | ... | 17.6 |
| Coronary artery bypass graft | 25.8 | 17.6 | 42.1 | 27.7 | 10.7 | 8.0 |
| Diagnostic procedures on small intestine | 42.2 | 41.5 | 44.2 | 41.7 | 40.3 | 41.3 |
| Diagnostic procedures on large intestine | 27.2 | 20.9 | 26.3 | 18.0 | 28.1 | 23.7 |
| Diagnostic radiology | 76.8 | 31.5 | 77.7 | 31.4 | 75.9 | 31.5 |
| Computerized axial tomography | 48.8 | 24.0 | 51.1 | 25.5 | 46.6 | 22.7 |
| Diagnostic ultrasound | 60.6 | 30.4 | 63.3 | 34.2 | 58.2 | 26.9 |
| Joint replacement of lower extremity | 18.0 | 34.8 | 15.2 | 31.0 | 20.7 | 38.4 |
| Total hip replacement | 6.5 | 10.4 | 7.1 | 11.6 | 5.9 | 9.4 |
| Partial hip replacement | 1.6 | 1.2 | * | *1.0 | 2.2 | 1.3 |
| Total knee replacement | 7.8 | 20.2 | 5.2 | 16.1 | 10.2 | 24.1 |
| Reduction of fracture and dislocation | 21.1 | 16.4 | 18.4 | 17.8 | 23.6 | 15.0 |
| Excision or destruction of intervertebral disc | 23.7 | 21.0 | 25.1 | 23.2 | 22.4 | 18.9 |
| Cholecystectomy | 31.9 | 20.5 | 21.1 | 17.3 | 41.9 | 23.4 |
| Laparoscopic cholecystectomy | 23.0 | 14.6 | 14.2 | 11.1 | 31.4 | 17.8 |
| Lysis of peritoneal adhesions | 16.6 | 14.9 | 7.6 | 5.7 | 25.0 | 23.6 |
| 65–74 years of age | Number in thousands[1] | | | | | |
| Hospital stays with at least one procedure[2] | 3,216 | 2,889 | 1,605 | 1,421 | 1,611 | 1,468 |
| | Number per 10,000 population[4] | | | | | |
| Hospital stays with at least one procedure[2] | 1,749.6 | 1,578.4 | 1,974.0 | 1,707.4 | 1,571.7 | 1,470.7 |
| Transurethral prostatectomy[8] | ... | ... | 128.6 | 50.5 | ... | ... |
| Repair of hernia | 36.2 | 27.1 | 51.1 | 29.5 | 24.4 | 25.0 |
| Total abdominal hysterectomy[6] | ... | ... | ... | ... | 23.8 | 18.0 |
| Vaginal hysterectomy[6] | ... | ... | ... | ... | 14.2 | 13.9 |
| Cardiac catheterization | 175.7 | 178.1 | 227.5 | 230.0 | 134.7 | 134.8 |
| Insertion, replacement, removal, and revision of pacemaker leads or device | 24.3 | 27.8 | 28.9 | 28.6 | 20.6 | 27.0 |
| Incision, excision, and occlusion of vessels | 109.5 | 154.9 | 131.5 | 167.1 | 92.0 | 144.7 |
| Angiocardiography using contrast material | 144.0 | 139.4 | 185.2 | 174.3 | 111.3 | 110.2 |
| Operations on vessels of heart | 127.5 | 144.8 | 184.6 | 208.5 | 82.1 | 91.7 |
| Removal of coronary artery obstruction and insertion of stent(s) | 67.0 | 97.3 | 91.8 | 134.5 | 47.4 | 66.3 |
| Insertion of coronary artery stent(s)[5] | ... | 81.8 | ... | 113.9 | ... | 55.0 |
| Coronary artery bypass graft | 64.0 | 48.6 | 97.8 | 75.9 | 37.1 | 25.9 |
| Diagnostic procedures on small intestine | 104.6 | 110.7 | 104.2 | 114.9 | 105.0 | 107.2 |
| Diagnostic procedures on large intestine | 64.4 | 67.9 | 57.9 | 64.4 | 69.6 | 70.8 |
| Diagnostic radiology | 159.7 | 75.8 | 169.5 | 77.9 | 151.9 | 74.1 |
| Computerized axial tomography | 120.6 | 59.1 | 129.4 | 56.5 | 113.7 | 61.3 |
| Diagnostic ultrasound | 142.7 | 75.5 | 152.2 | 78.5 | 135.2 | 73.0 |
| Joint replacement of lower extremity | 79.0 | 120.3 | 61.2 | 95.2 | 93.1 | 141.2 |
| Total hip replacement | 24.4 | 30.5 | 20.5 | 26.5 | 27.6 | 33.8 |
| Partial hip replacement | 8.0 | 8.3 | *3.7 | 5.9 | 11.5 | 10.3 |
| Total knee replacement | 40.4 | 70.1 | 30.7 | 52.9 | 48.1 | 84.4 |
| Reduction of fracture and dislocation | 38.4 | 36.8 | 28.4 | 26.7 | 46.4 | 45.2 |
| Excision or destruction of intervertebral disc | 17.6 | 16.8 | 15.6 | 19.1 | 19.3 | 15.0 |
| Cholecystectomy | 54.5 | 40.1 | 48.7 | 38.8 | 59.1 | 41.1 |
| Laparoscopic cholecystectomy | 31.6 | 27.5 | 24.2 | 24.9 | 37.5 | 29.6 |
| Lysis of peritoneal adhesions | 24.5 | 20.9 | 21.3 | 16.8 | 27.0 | 24.3 |

See footnotes at end of table.



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## Table 100 (page 3 of 3). Hospital stays with at least one procedure, according to sex, age, and selected procedures: United States, average annual 1992–93 and 2002–03

[Data are based on a sample of hospital records]

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| Age and procedure category | Both sexes | | Male | | Female | |
|---|---|---|---|---|---|---|
| | 1992–93 | 2002–03 | 1992–93 | 2002–03 | 1992–93 | 2002–03 |
| 75 years of age and over | Number in thousands[1] | | | | | |
| Hospital stays with at least one procedure[2] | 3,402 | 4,232 | 1,369 | 1,725 | 2,033 | 2,507 |
| | Number per 10,000 population[4] | | | | | |
| Hospital stays with at least one procedure[2] | 2,455.5 | 2,424.5 | 2,756.6 | 2,638.9 | 2,287.3 | 2,296.1 |
| Transurethral prostatectomy[8] | ... | ... | 225.9 | 81.2 | ... | ... |
| Repair of hernia | 41.5 | 27.2 | 58.4 | 32.1 | 32.0 | 24.3 |
| Total abdominal hysterectomy[6] | ... | ... | ... | ... | 13.8 | 13.0 |
| Vaginal hysterectomy[6] | ... | ... | ... | ... | 9.1 | 6.8 |
| Cardiac catheterization | 114.2 | 176.7 | 150.0 | 246.0 | 94.2 | 135.2 |
| Insertion, replacement, removal, and revision of pacemaker leads or device | 57.6 | 78.7 | 72.6 | 94.5 | 49.3 | 69.2 |
| Incision, excision, and occlusion of vessels | 143.6 | 249.1 | 180.2 | 272.4 | 123.1 | 235.1 |
| Angiocardiography using contrast material | 93.2 | 142.8 | 120.2 | 191.7 | 78.1 | 113.4 |
| Operations on vessels of heart | 78.9 | 128.3 | 120.6 | 194.3 | 55.6 | 88.8 |
| Removal of coronary artery obstruction and insertion of stent(s) | 41.0 | 90.0 | 59.2 | 127.5 | 30.8 | 67.5 |
| Insertion of coronary artery stent(s)[5] | ... | 73.3 | ... | 106.7 | ... | 53.3 |
| Coronary artery bypass graft | 39.0 | 39.1 | 63.5 | 67.7 | 25.4 | 22.0 |
| Diagnostic procedures on small intestine | 200.0 | 219.1 | 214.9 | 220.8 | 191.6 | 218.2 |
| Diagnostic procedures on large intestine | 141.0 | 136.2 | 138.8 | 131.2 | 142.1 | 139.2 |
| Diagnostic radiology | 289.9 | 137.9 | 309.1 | 146.2 | 279.2 | 132.8 |
| Computerized axial tomography | 228.9 | 121.8 | 240.8 | 121.2 | 222.2 | 122.2 |
| Diagnostic ultrasound | 248.8 | 139.2 | 258.0 | 155.0 | 243.6 | 129.8 |
| Joint replacement of lower extremity | 118.1 | 162.9 | 91.7 | 145.6 | 132.8 | 173.3 |
| Total hip replacement | 27.7 | 37.1 | 22.4 | 33.2 | 30.7 | 39.4 |
| Partial hip replacement | 44.7 | 48.0 | 27.7 | 32.0 | 54.2 | 57.6 |
| Total knee replacement | 36.1 | 63.3 | 30.8 | 64.7 | 39.1 | 62.5 |
| Reduction of fracture and dislocation | 115.7 | 109.9 | 65.9 | 68.9 | 143.6 | 134.4 |
| Excision or destruction of intervertebral disc | 8.1 | 12.1 | 9.4 | 16.7 | 7.4 | 9.3 |
| Cholecystectomy | 54.4 | 44.9 | 61.8 | 44.0 | 50.2 | 45.4 |
| Laparoscopic cholecystectomy | 26.6 | 28.1 | 28.7 | 25.9 | 25.4 | 29.4 |
| Lysis of peritoneal adhesions | 34.0 | 28.1 | 25.8 | 23.3 | 38.7 | 31.0 |

* Estimates are considered unreliable. Rates for inpatient procedures preceded by an asterisk are based on 5,000–8,999 estimated procedures; those based on fewer than 5,000 are not shown. Estimates that are not shown generally have a relative standard error of greater than 30 percent.
... Category not applicable.
[1]Average number of procedures per year.
[2]Includes stays for procedures not shown separately.
[3]Estimates are age adjusted to the year 2000 standard population using five age groups: 18–44 years, 45–54 years, 55–64 years, 65–74 years, and 75 years and over. See Appendix II, Age adjustment.
[4]Average annual rate.
[5]The procedure code for insertion of coronary artery stents (36.06) first appears in the 1996 data. A second procedure code for the insertion of drug-eluting stents (36.07) first appears in the 2003 data.
[6]Rate for female population only.
[7]Includes artificial rupture of membranes, surgical and medical induction of labor, and episiotomy.
[8]Rate for male population only.

NOTES: Up to four procedures were coded for each hospital stay. If more than one procedure with the same code (e.g., a coronary artery bypass graft) was performed during the hospital stay, it is counted only once. Procedure categories are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)*. See Appendix II, Procedure; and table X for ICD-9-CM codes. Rates are based on the civilian population as of July 1. Rates for 1990–99 use population estimates based on the 1990 census adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Rates prior to 2000 are not strictly comparable with rates after 2000 because population estimates for data years before 2000 have not been revised to reflect Census 2000. See Appendix I, National Hospital Discharge Survey.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.



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## Table 101. Hospital admissions, average length of stay, and outpatient visits, according to type of ownership and size of hospital, and percent outpatient surgery: United States, selected years 1975–2003

[Data are based on reporting by a census of hospitals]

| Type of ownership and size of hospital | 1975 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Admissions | | | | Number in thousands | | | | |
| All hospitals | 36,157 | 38,892 | 33,774 | 33,282 | 34,891 | 35,644 | 36,326 | 36,611 |
| Federal | 1,913 | 2,044 | 1,759 | 1,559 | 1,034 | 1,001 | 1,027 | 973 |
| Non-Federal[1] | 34,243 | 36,848 | 32,015 | 31,723 | 33,946 | 34,644 | 35,299 | 35,637 |
| Community[2] | 33,435 | 36,143 | 31,181 | 30,945 | 33,089 | 33,814 | 34,478 | 34,783 |
| Nonprofit | 23,722 | 25,566 | 22,878 | 22,557 | 24,453 | 27,983 | 25,425 | 25,668 |
| For profit | 2,646 | 3,165 | 3,066 | 3,428 | 4,141 | 4,197 | 4,365 | 4,481 |
| State-local government | 7,067 | 7,413 | 5,236 | 4,961 | 4,496 | 4,634 | 4,688 | 4,634 |
| 6–24 beds | 174 | 159 | 95 | 124 | 141 | 140 | 162 | 162 |
| 25–49 beds | 1,431 | 1,254 | 870 | 944 | 995 | 1,030 | 1,062 | 1,098 |
| 50–99 beds | 3,675 | 3,700 | 2,474 | 2,299 | 2,355 | 2,422 | 2,471 | 2,464 |
| 100–199 beds | 7,017 | 7,162 | 5,833 | 6,288 | 6,735 | 6,778 | 6,826 | 6,817 |
| 200–299 beds | 6,174 | 6,596 | 6,333 | 6,495 | 6,702 | 6,630 | 6,800 | 6,887 |
| 300–399 beds | 4,739 | 5,358 | 5,091 | 4,693 | 5,135 | 5,328 | 5,607 | 5,590 |
| 400–499 beds | 3,689 | 4,401 | 3,644 | 3,413 | 3,617 | 3,779 | 3,593 | 3,591 |
| 500 beds or more | 6,537 | 7,513 | 6,840 | 6,690 | 7,410 | 7,706 | 7,958 | 8,174 |
| Average length of stay | | | | Number of days | | | | |
| All hospitals | 11.4 | 9.9 | 9.1 | 7.8 | 6.8 | 6.7 | 6.6 | 6.6 |
| Federal | 20.3 | 16.8 | 14.9 | 13.1 | 12.8 | 13.2 | 11.7 | 11.5 |
| Non-Federal[1] | 10.9 | 9.6 | 8.8 | 7.5 | 6.6 | 6.6 | 6.5 | 6.4 |
| Community[2] | 7.7 | 7.6 | 7.2 | 6.5 | 5.8 | 5.7 | 5.7 | 5.7 |
| Nonprofit | 7.8 | 7.7 | 7.3 | 6.4 | 5.7 | 5.6 | 5.6 | 5.5 |
| For profit | 6.6 | 6.5 | 6.4 | 5.8 | 5.4 | 5.4 | 5.3 | 5.3 |
| State-local government | 7.6 | 7.3 | 7.7 | 7.4 | 6.7 | 6.7 | 6.6 | 6.6 |
| 6–24 beds | 5.6 | 5.3 | 5.4 | 5.5 | 4.2 | 4.0 | 4.1 | 4.0 |
| 25–49 beds | 6.0 | 5.8 | 6.1 | 5.7 | 5.1 | 5.0 | 5.0 | 5.0 |
| 50–99 beds | 6.8 | 6.7 | 7.2 | 7.0 | 6.4 | 6.4 | 6.4 | 6.3 |
| 100–199 beds | 7.1 | 7.0 | 7.1 | 6.4 | 5.7 | 5.7 | 5.7 | 5.6 |
| 200–299 beds | 7.5 | 7.4 | 6.9 | 6.2 | 5.7 | 5.6 | 5.5 | 5.4 |
| 300–399 beds | 7.8 | 7.6 | 7.0 | 6.1 | 5.5 | 5.4 | 5.5 | 5.4 |
| 400–499 beds | 8.1 | 7.9 | 7.3 | 6.3 | 5.6 | 5.6 | 5.5 | 5.5 |
| 500 beds or more | 9.1 | 8.7 | 8.1 | 7.1 | 6.2 | 6.1 | 6.1 | 6.1 |
| Outpatient visits[3] | | | | Number in thousands | | | | |
| All hospitals | 254,844 | 262,951 | 368,184 | 483,195 | 592,673 | 612,276 | 640,515 | 648,560 |
| Federal | 51,957 | 50,566 | 58,527 | 59,934 | 63,402 | 64,035 | 75,781 | 74,240 |
| Non-Federal[1] | 202,887 | 212,385 | 309,657 | 423,261 | 531,972 | 548,242 | 564,734 | 574,320 |
| Community[2] | 190,672 | 202,310 | 301,329 | 414,345 | 521,405 | 538,480 | 556,404 | 563,186 |
| Nonprofit | 131,435 | 142,156 | 221,073 | 303,851 | 393,168 | 404,901 | 416,910 | 424,215 |
| For profit | 7,713 | 9,696 | 20,110 | 31,940 | 43,378 | 44,706 | 45,215 | 44,246 |
| State-local government | 51,525 | 50,459 | 60,146 | 78,554 | 84,858 | 88,873 | 94,280 | 94,725 |
| 6–24 beds | 915 | 1,155 | 1,471 | 3,644 | 4,555 | 4,556 | 5,930 | 6,512 |
| 25–49 beds | 5,855 | 6,227 | 10,812 | 19,465 | 27,007 | 27,941 | 29,726 | 31,261 |
| 50–99 beds | 16,303 | 17,976 | 27,582 | 38,597 | 49,385 | 51,331 | 53,342 | 52,959 |
| 100–199 beds | 35,156 | 36,453 | 58,940 | 91,312 | 114,183 | 114,921 | 117,573 | 119,856 |
| 200–299 beds | 32,772 | 36,073 | 60,561 | 84,080 | 99,248 | 99,596 | 102,424 | 100,095 |
| 300–399 beds | 29,169 | 30,495 | 43,699 | 54,277 | 73,444 | 75,242 | 79,092 | 80,938 |
| 400–499 beds | 22,127 | 25,501 | 33,394 | 44,284 | 52,205 | 59,580 | 57,841 | 57,203 |
| 500 beds or more | 48,375 | 48,430 | 64,870 | 78,685 | 101,378 | 105,314 | 110,475 | 114,362 |
| Outpatient surgery | | | | Percent of total surgeries[4] | | | | |
| Community hospitals[2] | --- | 16.3 | 50.5 | 58.1 | 62.7 | 63.0 | 63.4 | 63.3 |

--- Data not available.

[1]The category of non-Federal hospitals comprises psychiatric, tuberculosis and other respiratory diseases hospitals, and long-term and short-term general and other special hospitals. See Appendix II, Hospital.

[2]Community hospitals are non-Federal short-term general and special hospitals whose facilities and services are available to the public. See Appendix II, Hospital.

[3]Outpatient visits include visits to the emergency department, outpatient department, referred visits (pharmacy, EKG, radiology), and outpatient surgery. See Appendix II, Outpatient visit.

[4]Total surgeries is a measure of patients with at least one surgical procedure. Persons with multiple surgical procedures are counted only once.

NOTE: Data for additional years are available. See Appendix III.

SOURCES: American Hospital Association Annual Survey of Hospitals. Hospital Statistics, 1976, 1981, 1991–2005 Editions. Chicago. (Copyrights 1976, 1981, 1991–2005: Used with the permission of Health Forum LLC, an affiliate of the American Hospital Association.)



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## Table 102. Nursing home residents 65 years of age and over, according to age, sex, and race: United States, 1973–74, 1985, 1995, and 1999

[Data are based on a sample of nursing home residents]

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| Age, sex, and race | Residents | | | | Residents per 1,000 population | | | |
|---|---|---|---|---|---|---|---|---|
| | 1973–74 | 1985 | 1995 | 1999 | 1973–74 | 1985 | 1995 | 1999 |
| **Age** | | | | | | | | |
| 65 years and over, age adjusted[1] | ... | ... | ... | ... | 58.5 | 54.0 | 45.9 | 43.3 |
| 65 years and over, crude | 961,500 | 1,318,300 | 1,422,600 | 1,469,500 | 44.7 | 46.2 | 42.4 | 42.9 |
| 65–74 years | 163,100 | 212,100 | 190,200 | 194,800 | 12.3 | 12.5 | 10.1 | 10.8 |
| 75–84 years | 384,900 | 509,000 | 511,900 | 517,600 | 57.7 | 57.7 | 45.9 | 43.0 |
| 85 years and over | 413,600 | 597,300 | 720,400 | 757,100 | 257.3 | 220.3 | 198.6 | 182.5 |
| **Male** | | | | | | | | |
| 65 years and over, age adjusted[1] | ... | ... | ... | ... | 42.5 | 38.8 | 32.8 | 30.6 |
| 65 years and over, crude | 265,700 | 334,400 | 356,800 | 377,800 | 30.0 | 29.0 | 26.1 | 26.5 |
| 65–74 years | 65,100 | 80,600 | 79,300 | 84,100 | 11.3 | 10.8 | 9.5 | 10.3 |
| 75–84 years | 102,300 | 141,300 | 144,300 | 149,500 | 39.9 | 43.0 | 33.3 | 30.8 |
| 85 years and over | 98,300 | 112,600 | 133,100 | 144,200 | 182.7 | 145.7 | 130.8 | 116.5 |
| **Female** | | | | | | | | |
| 65 years and over, age adjusted[1] | ... | ... | ... | ... | 67.5 | 61.5 | 52.3 | 49.8 |
| 65 years and over, crude | 695,800 | 983,900 | 1,065,800 | 1,091,700 | 54.9 | 57.9 | 53.7 | 54.6 |
| 65–74 years | 98,000 | 131,500 | 110,900 | 110,700 | 13.1 | 13.8 | 10.6 | 11.2 |
| 75–84 years | 282,600 | 367,700 | 367,600 | 368,100 | 68.9 | 66.4 | 53.9 | 51.2 |
| 85 years and over | 315,300 | 484,700 | 587,300 | 612,900 | 294.9 | 250.1 | 224.9 | 210.5 |
| **White[2]** | | | | | | | | |
| 65 years and over, age adjusted[1] | ... | ... | ... | ... | 61.2 | 55.5 | 45.4 | 41.9 |
| 65 years and over, crude | 920,600 | 1,227,400 | 1,271,200 | 1,279,600 | 46.9 | 47.7 | 42.3 | 42.1 |
| 65–74 years | 150,100 | 187,800 | 154,400 | 157,200 | 12.5 | 12.3 | 9.3 | 10.0 |
| 75–84 years | 369,700 | 473,600 | 453,800 | 440,600 | 60.3 | 59.1 | 44.9 | 40.5 |
| 85 years and over | 400,800 | 566,000 | 663,000 | 681,700 | 270.8 | 228.7 | 200.7 | 181.8 |
| **Black or African American[2]** | | | | | | | | |
| 65 years and over, age adjusted[1] | ... | ... | ... | ... | 28.2 | 41.5 | 50.4 | 55.6 |
| 65 years and over, crude | 37,700 | 82,000 | 122,900 | 145,900 | 22.0 | 35.0 | 45.2 | 51.1 |
| 65–74 years | 12,200 | 22,500 | 29,700 | 30,300 | 11.1 | 15.4 | 18.4 | 18.2 |
| 75–84 years | 13,400 | 30,600 | 47,300 | 58,700 | 26.7 | 45.3 | 57.2 | 66.5 |
| 85 years and over | 12,100 | 29,000 | 45,800 | 56,900 | 105.7 | 141.5 | 167.1 | 183.1 |

... Category not applicable.

[1]Age adjusted by the direct method to the year 2000 population standard using the following three age groups: 65–74 years, 75–84 years, and 85 years and over.

[2]Beginning in 1999 the instruction for the race item on the Current Resident Questionnaire was changed so that more than one race could be recorded. In previous years only one racial category could be checked. Estimates for racial groups presented in this table are for residents for whom only one race was recorded. Estimates for residents where multiple races were checked are unreliable due to small sample sizes and are not shown.

NOTES: Excludes residents in personal care or domiciliary care homes. Age refers to age at time of interview. Civilian population estimates used to compute rates for the 1990s are 1990-based postcensal estimates, as of July 1. Starting in 1997, population figures are adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Bureau of the Census. Data for additional years are available. See Appendix III.

SOURCES: Hing E, Sekscenski E, Strahan G. The National Nursing Home Survey: 1985 summary for the United States. National Center for Health Statistics. Vital Health Stat 13(97). 1989; and Centers for Disease Control and Prevention, National Center for Health Statistics, National Nursing Home Survey for other data years.



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## Table 103. Nursing home residents 65 years of age and over, according to selected functional status and age, sex, and race: United States, 1985, 1995, and 1999

[Data are based on a sample of nursing home residents]

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| Age, sex, and race | Functional status[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent mobility | | | Incontinent | | | Dependent eating | | | Dependent mobility, eating, and incontinent | | |
| | 1985 | 1995 | 1999 | 1985 | 1995 | 1999 | 1985 | 1995 | 1999 | 1985 | 1995 | 1999 |
| | Percent | | | | | | | | | | | |
| All persons | | | | | | | | | | | | |
| 65 years and over, age adjusted[2] | 75.7 | 79.0 | 80.3 | 55.0 | 63.8 | 65.7 | 40.9 | 44.9 | 47.3 | 32.5 | 36.5 | 36.9 |
| 65 years and over, crude | 74.8 | 79.0 | 80.4 | 54.5 | 63.8 | 65.7 | 40.5 | 44.9 | 47.4 | 32.1 | 36.5 | 37.0 |
| 65–74 years | 61.2 | 73.0 | 73.9 | 42.9 | 61.9 | 58.5 | 33.5 | 43.8 | 43.1 | 25.7 | 35.8 | 31.7 |
| 75–84 years | 70.5 | 76.5 | 77.8 | 55.1 | 62.5 | 64.2 | 39.4 | 45.2 | 46.6 | 30.6 | 35.3 | 35.4 |
| 85 years and over | 83.3 | 82.4 | 83.8 | 58.1 | 65.3 | 68.6 | 43.9 | 45.0 | 49.0 | 35.6 | 37.5 | 39.4 |
| Male | | | | | | | | | | | | |
| 65 years and over, age adjusted[2] | 71.2 | 76.6 | 76.6 | 54.2 | 63.8 | 66.6 | 36.0 | 42.1 | 45.2 | 28.0 | 34.3 | 35.0 |
| 65 years and over, crude | 67.8 | 75.8 | 75.9 | 51.9 | 63.9 | 66.0 | 34.9 | 42.7 | 45.1 | 26.9 | 34.8 | 35.0 |
| 65–74 years | 55.8 | 70.6 | 70.5 | 38.8 | 63.4 | 59.6 | 32.8 | 44.2 | 45.0 | 24.1 | 36.9 | 34.8 |
| 75–84 years | 65.7 | 76.6 | 76.9 | 54.4 | 64.6 | 68.9 | 32.6 | 44.1 | 44.7 | 25.5 | 35.5 | 35.2 |
| 85 years and over | 79.2 | 78.2 | 78.1 | 58.1 | 63.4 | 66.8 | 39.2 | 40.2 | 45.7 | 30.9 | 32.7 | 34.9 |
| Female | | | | | | | | | | | | |
| 65 years and over, age adjusted[2] | 77.3 | 79.7 | 81.5 | 55.4 | 63.6 | 65.0 | 42.4 | 45.6 | 47.8 | 33.9 | 36.9 | 37.2 |
| 65 years and over, crude | 77.1 | 80.1 | 81.9 | 55.4 | 63.8 | 65.6 | 42.4 | 45.6 | 48.1 | 33.8 | 37.0 | 37.7 |
| 65–74 years | 64.5 | 74.8 | 76.4 | 45.4 | 60.9 | 57.7 | 34.0 | 43.6 | 41.6 | 26.7 | 35.0 | 29.3 |
| 75–84 years | 72.3 | 76.5 | 78.2 | 55.3 | 61.7 | 62.2 | 42.0 | 45.7 | 47.4 | 32.6 | 35.2 | 35.6 |
| 85 years and over | 84.3 | 83.3 | 85.2 | 58.1 | 65.7 | 69.0 | 45.0 | 46.0 | 49.7 | 36.7 | 38.6 | 40.4 |
| White[3] | | | | | | | | | | | | |
| 65 years and over, age adjusted[2] | 75.2 | 78.5 | 79.9 | 54.6 | 63.2 | 64.9 | 40.4 | 44.2 | 46.1 | 32.1 | 35.7 | 35.7 |
| 65 years and over, crude | 74.3 | 78.7 | 80.2 | 54.2 | 63.3 | 65.1 | 40.1 | 44.2 | 46.2 | 31.7 | 35.7 | 35.8 |
| 65–74 years | 60.2 | 71.4 | 72.6 | 42.2 | 60.2 | 57.1 | 32.6 | 41.9 | 40.7 | 24.9 | 33.8 | 28.8 |
| 75–84 years | 69.6 | 76.4 | 77.5 | 54.2 | 61.8 | 63.8 | 38.9 | 44.9 | 45.8 | 30.1 | 34.7 | 34.8 |
| 85 years and over | 83.1 | 81.9 | 83.6 | 58.2 | 65.0 | 67.8 | 43.5 | 44.3 | 47.7 | 35.5 | 36.9 | 38.1 |
| Black or African American[3] | | | | | | | | | | | | |
| 65 years and over, age adjusted[2] | 83.4 | 83.2 | 82.1 | 61.0 | 69.3 | 71.9 | 49.2 | 52.2 | 55.9 | 38.2 | 44.0 | 46.8 |
| 65 years and over, crude | 81.1 | 82.1 | 81.5 | 59.9 | 69.1 | 70.6 | 47.9 | 51.7 | 54.9 | 37.7 | 43.7 | 45.7 |
| 65–74 years | 70.9 | 79.6 | 78.7 | 48.6 | 68.3 | 64.6 | 43.1 | 51.2 | 53.3 | 33.8 | 43.1 | 42.6 |
| 75–84 years | 82.5 | 77.8 | 80.1 | 70.1 | 68.9 | 67.5 | 47.9 | 49.5 | 49.7 | 40.6 | 42.3 | 41.0 |
| 85 years and over | 87.4 | 88.0 | 84.5 | 57.9 | 69.8 | 77.0 | 51.7 | 54.3 | 61.0 | 37.6 | 45.5 | 52.1 |

[1]Nursing home residents who are dependent in mobility and eating require the assistance of a person or special equipment. Nursing home residents who are incontinent have difficulty in controlling bowels and/or bladder or have an ostomy or indwelling catheter.
[2]Age adjusted by the direct method to the 1995 National Nursing Home Survey population using the following three age groups: 65–74 years, 75–84 years, and 85 years and over.
[3]Beginning in 1999 the instruction for the race item on the Current Resident Questionnaire was changed so that more than one race could be recorded. In previous years only one racial category could be checked. Estimates for racial groups presented in this table are for residents for whom only one race was recorded. Estimates for residents where multiple races were checked are unreliable due to small sample sizes and are not shown.

NOTES: Age refers to age at time of interview. Excludes residents in personal care or domiciliary care homes. Data for additional years are available. See Appendix III.

SOURCES: Hing E, Sekscenski E, Strahan G. The National Nursing Home Survey: 1985 summary for the United States. National Center for Health Statistics. Vital Health Stat 13(97). 1989; and Centers for Disease Control and Prevention, National Center for Health Statistics, National Nursing Home Survey for other data years.



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## Table 104. Persons employed in health service sites, according to sex: United States, selected years 2000–04

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Site | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| **Both sexes** | | | Number of persons in thousands | | |
| All employed civilians[1] | 136,891 | 136,933 | 136,485 | 137,736 | 139,252 |
| All health service sites[2] | 12,211 | 12,558 | 13,069 | 13,615 | 13,817 |
| Offices and clinics of physicians | 1,387 | 1,499 | 1,533 | 1,673 | 1,727 |
| Offices and clinics of dentists | 672 | 701 | 734 | 771 | 780 |
| Offices and clinics of chiropractors | 120 | 111 | 132 | 142 | 156 |
| Offices and clinics of optometrists | 95 | 102 | 113 | 92 | 93 |
| Offices and clinics of other health practitioners[3] | 143 | 140 | 149 | 250 | 274 |
| Outpatient care centers | 772 | 830 | 850 | 873 | 885 |
| Home health care services | 548 | 582 | 636 | 741 | 750 |
| Other health care services[4] | 1,027 | 1,101 | 1,188 | 943 | 976 |
| Hospitals | 5,202 | 5,256 | 5,330 | 5,652 | 5,700 |
| Nursing care facilities | 1,593 | 1,568 | 1,715 | 1,877 | 1,858 |
| Residential care facilities, without nursing | 652 | 668 | 689 | 601 | 618 |
| **Men** | | | | | |
| All health service sites[2] | 2,756 | 2,778 | 2,838 | 2,986 | 3,067 |
| Offices and clinics of physicians | 354 | 379 | 370 | 414 | 424 |
| Offices and clinics of dentists | 158 | 150 | 151 | 163 | 158 |
| Offices and clinics of chiropractors | 32 | 39 | 47 | 53 | 63 |
| Offices and clinics of optometrists | 26 | 27 | 29 | 29 | 24 |
| Offices and clinics of other health practitioners[3] | 38 | 41 | 42 | 63 | 69 |
| Outpatient care centers | 186 | 185 | 172 | 200 | 203 |
| Home health care services | 45 | 51 | 54 | 56 | 65 |
| Other health care services[4] | 304 | 345 | 362 | 297 | 314 |
| Hospitals | 1,241 | 1,187 | 1,195 | 1,263 | 1,333 |
| Nursing care facilities | 195 | 189 | 223 | 267 | 251 |
| Residential care facilities, without nursing | 177 | 185 | 193 | 181 | 164 |
| **Women** | | | | | |
| All health service sites[2] | 9,457 | 9,782 | 10,232 | 10,631 | 10,750 |
| Offices and clinics of physicians | 1,034 | 1,120 | 1,164 | 1,259 | 1,302 |
| Offices and clinics of dentists | 514 | 551 | 584 | 607 | 623 |
| Offices and clinics of chiropractors | 88 | 72 | 85 | 90 | 93 |
| Offices and clinics of optometrists | 69 | 75 | 84 | 64 | 69 |
| Offices and clinics of other health practitioners[3] | 106 | 99 | 106 | 186 | 204 |
| Outpatient care centers | 586 | 646 | 678 | 673 | 683 |
| Home health care services | 503 | 531 | 582 | 685 | 685 |
| Other health care services[4] | 723 | 756 | 826 | 646 | 662 |
| Hospitals | 3,961 | 4,069 | 4,135 | 4,390 | 4,366 |
| Nursing care facilities | 1,398 | 1,380 | 1,492 | 1,611 | 1,607 |
| Residential care facilities, without nursing | 475 | 483 | 496 | 420 | 454 |
| **Both sexes** | | | Percent of employed civilians | | |
| All health service sites | 8.9 | 9.2 | 9.6 | 9.9 | 9.9 |
| | | | Percent distribution | | |
| All health service sites | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Offices and clinics of physicians | 11.4 | 11.9 | 11.7 | 12.3 | 12.5 |
| Offices and clinics of dentists | 5.5 | 5.6 | 5.6 | 5.7 | 5.6 |
| Offices and clinics of chiropractors | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 |
| Offices and clinics of optometrists | 0.8 | 0.8 | 0.9 | 0.7 | 0.7 |
| Offices and clinics of other health practitioners[3] | 1.2 | 1.1 | 1.1 | 1.8 | 2.0 |
| Outpatient care centers | 6.3 | 6.6 | 6.5 | 6.4 | 6.4 |
| Home health care services | 4.5 | 4.6 | 4.9 | 5.4 | 5.4 |
| Other health care services[4] | 8.4 | 8.8 | 9.1 | 6.9 | 7.1 |
| Hospitals | 42.6 | 41.9 | 40.8 | 41.5 | 41.3 |
| Nursing care facilities | 13.0 | 12.5 | 13.1 | 13.8 | 13.4 |
| Residential care facilities, without nursing | 5.3 | 5.3 | 5.3 | 4.4 | 4.5 |

[1]Excludes workers under the age of 16 years.
[2]Data for health service sites for men and women may not sum to total for all health service sites for both sexes due to rounding.
[3]Includes health service sites such as acupuncture, nutritionists' offices, speech defect clinics, and other offices and clinics. For a complete list of clinics under this category, see www.census.gov/hhes/www/ioindex/coms_797_847.html, Census Industry Code 808.
[4]Includes health service sites such as ambulance services, blood banks, CT-SCAN (computer tomography) centers, and other offices and clinics. For a complete list of clinics under this category, see www.census.gov/hhes/www/ioindex/coms_797_847.html, Census Industry Code 818.

NOTES: Annual data are based on data collected each month and averaged over the year. Health service sites are based on the 2002 North American Industry Classification System. See Appendix II, Industry of employment.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey: Employment and Earnings, January 2005 at www.bls.gov/cps/home.htm#annual (table 18) and unpublished data.



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## Table 105 (page 1 of 2). Active physicians and doctors of medicine in patient care, according to geographic division and State: United States, 1975, 1985, 1995, and 2003

[Data are based on reporting by physicians]

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| Geographic division and State | Total physicians[1] | | | | Doctors of medicine in patient care[2] | | | |
|---|---|---|---|---|---|---|---|---|
| | 1975 | 1985 | 1995[3] | 2003[4,5] | 1975 | 1985 | 1995 | 2003[5] |
| | Number per 10,000 civilian population | | | | | | | |
| United States | 15.3 | 20.7 | 24.2 | 26.6 | 13.5 | 18.0 | 21.3 | 23.5 |
| New England | 19.1 | 26.7 | 32.5 | 36.3 | 16.9 | 22.9 | 28.8 | 32.3 |
| Connecticut | 19.8 | 27.6 | 32.8 | 34.9 | 17.7 | 24.3 | 29.5 | 31.2 |
| Maine | 12.8 | 18.7 | 22.3 | 29.9 | 10.7 | 15.6 | 18.2 | 24.1 |
| Massachusetts | 20.8 | 30.2 | 37.5 | 40.8 | 18.3 | 25.4 | 33.2 | 36.5 |
| New Hampshire | 14.3 | 18.1 | 21.5 | 26.3 | 13.1 | 16.7 | 19.8 | 24.0 |
| Rhode Island | 17.8 | 23.3 | 30.4 | 34.3 | 16.1 | 20.2 | 26.7 | 30.7 |
| Vermont | 18.2 | 23.8 | 26.9 | 35.0 | 15.5 | 20.3 | 24.2 | 32.1 |
| Middle Atlantic | 19.5 | 26.1 | 32.4 | 34.3 | 17.0 | 22.2 | 28.0 | 29.6 |
| New Jersey | 16.2 | 23.4 | 29.3 | 32.1 | 14.0 | 19.8 | 24.9 | 27.3 |
| New York | 22.7 | 29.0 | 35.3 | 37.1 | 20.2 | 25.2 | 31.6 | 33.1 |
| Pennsylvania | 16.6 | 23.6 | 30.1 | 31.5 | 13.9 | 19.2 | 24.6 | 25.7 |
| East North Central | 13.9 | 19.3 | 23.3 | 25.9 | 12.0 | 16.4 | 19.8 | 22.2 |
| Illinois | 14.5 | 20.5 | 24.8 | 27.1 | 13.1 | 18.2 | 22.1 | 23.9 |
| Indiana | 10.6 | 14.7 | 18.4 | 21.8 | 9.6 | 13.2 | 16.6 | 19.7 |
| Michigan | 15.4 | 20.8 | 24.8 | 26.7 | 12.0 | 16.0 | 19.0 | 20.9 |
| Ohio | 14.1 | 19.9 | 23.8 | 26.5 | 12.2 | 16.8 | 20.0 | 22.6 |
| Wisconsin | 12.5 | 17.7 | 21.5 | 24.8 | 11.4 | 15.9 | 19.6 | 22.8 |
| West North Central | 13.3 | 18.3 | 21.8 | 24.6 | 11.4 | 15.6 | 18.9 | 21.3 |
| Iowa | 11.4 | 15.6 | 19.2 | 21.6 | 9.4 | 12.4 | 15.1 | 16.6 |
| Kansas | 12.8 | 17.3 | 20.8 | 23.0 | 11.2 | 15.1 | 18.0 | 19.8 |
| Minnesota | 14.9 | 20.5 | 23.4 | 27.0 | 13.7 | 18.5 | 21.5 | 24.8 |
| Missouri | 15.0 | 20.5 | 23.9 | 25.7 | 11.6 | 16.3 | 19.7 | 21.3 |
| Nebraska | 12.1 | 15.7 | 19.8 | 23.6 | 10.9 | 14.4 | 18.3 | 21.9 |
| North Dakota | 9.7 | 15.8 | 20.5 | 23.5 | 9.2 | 14.9 | 18.9 | 21.8 |
| South Dakota | 8.2 | 13.4 | 16.7 | 21.3 | 7.7 | 12.3 | 15.7 | 19.9 |
| South Atlantic | 14.0 | 19.7 | 23.4 | 26.4 | 12.6 | 17.6 | 21.0 | 23.6 |
| Delaware | 14.3 | 19.7 | 23.4 | 26.6 | 12.7 | 17.1 | 19.7 | 22.6 |
| District of Columbia | 39.6 | 55.3 | 63.6 | 70.7 | 34.6 | 45.6 | 53.6 | 60.2 |
| Florida | 15.2 | 20.2 | 22.9 | 25.4 | 13.4 | 17.8 | 20.3 | 22.4 |
| Georgia | 11.5 | 16.2 | 19.7 | 21.8 | 10.6 | 14.7 | 18.0 | 19.8 |
| Maryland | 18.6 | 30.4 | 34.1 | 39.1 | 16.5 | 24.9 | 29.9 | 33.6 |
| North Carolina | 11.7 | 16.9 | 21.1 | 24.5 | 10.6 | 15.0 | 19.4 | 22.6 |
| South Carolina | 10.0 | 14.7 | 18.9 | 22.5 | 9.3 | 13.6 | 17.6 | 20.9 |
| Virginia | 12.9 | 19.5 | 22.5 | 26.4 | 11.9 | 17.8 | 20.8 | 24.4 |
| West Virginia | 11.0 | 16.3 | 21.0 | 24.2 | 10.0 | 14.6 | 17.9 | 20.5 |
| East South Central | 10.5 | 15.0 | 19.2 | 22.3 | 9.7 | 14.0 | 17.8 | 20.5 |
| Alabama | 9.2 | 14.2 | 18.4 | 21.1 | 8.6 | 13.1 | 17.0 | 19.3 |
| Kentucky | 10.9 | 15.1 | 19.2 | 22.4 | 10.1 | 13.9 | 18.0 | 20.6 |
| Mississippi | 8.4 | 11.8 | 13.9 | 18.3 | 8.0 | 11.1 | 13.0 | 16.7 |
| Tennessee | 12.4 | 17.7 | 22.5 | 25.1 | 11.3 | 16.2 | 20.8 | 23.3 |
| West South Central | 11.9 | 16.4 | 19.5 | 21.4 | 10.5 | 14.5 | 17.3 | 19.1 |
| Arkansas | 9.1 | 13.8 | 17.3 | 20.2 | 8.5 | 12.8 | 16.0 | 18.6 |
| Louisiana | 11.4 | 17.3 | 21.7 | 25.1 | 10.5 | 16.1 | 20.3 | 23.7 |
| Oklahoma | 11.6 | 16.1 | 18.8 | 19.9 | 9.4 | 12.9 | 14.7 | 15.5 |
| Texas | 12.5 | 16.8 | 19.4 | 21.0 | 11.0 | 14.7 | 17.3 | 18.9 |
| Mountain | 14.3 | 17.8 | 20.2 | 22.5 | 12.6 | 15.7 | 17.8 | 19.8 |
| Arizona | 16.7 | 20.2 | 21.4 | 22.7 | 14.1 | 17.1 | 18.2 | 18.9 |
| Colorado | 17.3 | 20.7 | 23.7 | 26.2 | 15.0 | 17.7 | 20.6 | 22.8 |
| Idaho | 9.5 | 12.1 | 13.9 | 17.7 | 8.9 | 11.4 | 13.1 | 16.1 |
| Montana | 10.6 | 14.0 | 18.4 | 23.0 | 10.1 | 13.2 | 17.1 | 21.4 |
| Nevada | 11.9 | 16.0 | 16.7 | 19.0 | 10.9 | 14.5 | 14.6 | 17.2 |
| New Mexico | 12.2 | 17.0 | 20.2 | 23.5 | 10.1 | 14.7 | 18.0 | 21.1 |
| Utah | 14.1 | 17.2 | 19.2 | 20.8 | 13.0 | 15.5 | 17.6 | 19.1 |
| Wyoming | 9.5 | 12.9 | 15.3 | 19.4 | 8.9 | 12.0 | 13.9 | 18.1 |

See footnotes at end of table.



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## Table 105 (page 2 of 2). Active physicians and doctors of medicine in patient care, according to geographic division and State: United States, 1975, 1985, 1995, and 2003

[Data are based on reporting by physicians]

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| Geographic division and State | Total physicians[1] | | | | Doctors of medicine in patient care[2] | | | |
|---|---|---|---|---|---|---|---|---|
| | 1975 | 1985 | 1995[3] | 2003[4,5] | 1975 | 1985 | 1995 | 2003[5] |
| | Number per 10,000 civilian population | | | | | | | |
| Pacific | 17.9 | 22.5 | 23.3 | 25.5 | 16.3 | 20.5 | 21.2 | 23.1 |
| Alaska | 8.4 | 13.0 | 15.7 | 23.2 | 7.8 | 12.1 | 14.2 | 20.4 |
| California | 18.8 | 23.7 | 23.7 | 25.2 | 17.3 | 21.5 | 21.7 | 22.8 |
| Hawaii | 16.2 | 21.5 | 24.8 | 30.9 | 14.7 | 19.8 | 22.8 | 28.1 |
| Oregon | 15.6 | 19.7 | 21.6 | 25.9 | 13.8 | 17.6 | 19.5 | 23.5 |
| Washington | 15.3 | 20.2 | 22.5 | 26.1 | 13.6 | 17.9 | 20.2 | 23.7 |

[1]Includes active doctors of medicine and active doctors of osteopathy. See Appendix II, Physician.
[2]Excludes doctors of osteopathy (DOs); States with more than 2,500 active DOs are Pennsylvania, Michigan, Florida, Ohio, California, New York, and New Jersey. States with fewer than 100 active DOs are Wyoming, Vermont, North Dakota, District of Columbia, South Dakota, Montana, and Nebraska. Excludes doctors of medicine in medical teaching, administration, research, and other nonpatient care activities.
[3]Data for doctors of osteopathy are as of July 1996.
[4]Data for doctors of osteopathy are as of June 2003.
[5]Data for the year 2003 include Federal and non-Federal physicians. Prior to the year 2003, the data include non-Federal physicians only.

NOTES: Data for doctors of medicine are as of December 31. Data for additional years are available. See Appendix III.

SOURCES: American Medical Association (AMA). Physician distribution and medical licensure in the U.S., 1975; Physician characteristics and distribution in the U.S., 1986 edition; 1996–97 edition; 2005 edition; Department of Physician Practice and Communication Information, Division of Survey and Data Resources, AMA. (Copyrights 1976, 1986, 1997, 2005: Used with the permission of the AMA); American Osteopathic Association: 1975–76 Yearbook and Directory of Osteopathic Physicians, 1985–86 Yearbook and Directory of Osteopathic Physicians; American Association of Colleges of Osteopathic Medicine: 2003 Annual Report on Osteopathic Medical Education, 2004.



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## Table 106. Doctors of medicine, according to activity and place of medical education: United States and outlying U.S. areas, selected years 1975–2003

[Data are based on reporting by physicians]

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| Activity and place of medical education | 1975 | 1985 | 1995 | 1999 | 2000 | 2001 | 2002 | 2003[1] |
|---|---|---|---|---|---|---|---|---|
| | Number of doctors of medicine | | | | | | | |
| Doctors of medicine | 393,742 | 552,716 | 720,325 | 797,634 | 813,770 | 836,156 | 853,187 | 871,535 |
| Professionally active[2] | 340,280 | 497,140 | 625,443 | 669,949 | 692,368 | 713,375 | 719,431 | 736,211 |
| Place of medical education: | | | | | | | | |
| U.S. medical graduates | --- | 392,007 | 481,137 | 510,738 | 525,691 | 537,529 | 544,779 | 558,167 |
| International medical graduates[3] | --- | 105,133 | 144,306 | 158,211 | 164,437 | 171,639 | 172,770 | 178,044 |
| Activity: | | | | | | | | |
| Non-Federal | 312,089 | 475,573 | 604,364 | 650,899 | 672,987 | 693,358 | 699,249 | --- |
| Patient care[4] | 287,837 | 431,527 | 564,074 | 610,656 | 631,431 | 652,328 | 658,123 | 691,873 |
| Office-based practice | 213,334 | 329,041 | 427,275 | 473,241 | 490,398 | 514,016 | 516,246 | 529,836 |
| General and family practice | 46,347 | 53,862 | 59,932 | 66,246 | 67,534 | 70,030 | 71,696 | 73,508 |
| Cardiovascular diseases | 5,046 | 9,054 | 13,739 | 15,586 | 16,300 | 16,991 | 16,989 | 17,301 |
| Dermatology | 3,442 | 5,325 | 6,959 | 7,788 | 7,969 | 8,199 | 8,282 | 8,477 |
| Gastroenterology | 1,696 | 4,135 | 7,300 | 8,185 | 8,515 | 8,905 | 9,044 | 9,326 |
| Internal medicine | 28,188 | 52,712 | 72,612 | 84,633 | 88,699 | 94,674 | 96,496 | 99,670 |
| Pediatrics | 12,687 | 22,392 | 33,890 | 40,502 | 42,215 | 44,824 | 46,097 | 47,996 |
| Pulmonary diseases | 1,166 | 3,035 | 4,964 | 5,745 | 6,095 | 6,596 | 6,672 | 6,919 |
| General surgery | 19,710 | 24,708 | 24,086 | 26,822 | 24,475 | 25,632 | 24,902 | 25,284 |
| Obstetrics and gynecology | 15,613 | 23,525 | 29,111 | 31,103 | 31,726 | 32,582 | 32,738 | 33,636 |
| Ophthalmology | 8,795 | 12,212 | 14,596 | 15,238 | 15,598 | 15,994 | 16,052 | 16,240 |
| Orthopedic surgery | 8,148 | 13,033 | 17,136 | 16,974 | 17,367 | 17,829 | 18,118 | 18,423 |
| Otolaryngology | 4,297 | 5,751 | 7,139 | 7,282 | 7,581 | 7,866 | 8,001 | 8,103 |
| Plastic surgery | 1,706 | 3,299 | 4,612 | 5,127 | 5,308 | 5,545 | 5,593 | 5,725 |
| Urological surgery | 5,025 | 7,081 | 7,991 | 8,229 | 8,460 | 8,636 | 8,615 | 8,804 |
| Anesthesiology | 8,970 | 15,285 | 23,770 | 26,635 | 27,624 | 28,868 | 28,661 | 29,254 |
| Diagnostic radiology | 1,978 | 7,735 | 12,751 | 14,259 | 14,622 | 15,596 | 15,896 | 16,403 |
| Emergency medicine | --- | --- | 11,700 | 13,932 | 14,541 | 15,823 | 16,907 | 17,727 |
| Neurology | 1,862 | 4,691 | 7,623 | 8,065 | 8,559 | 9,156 | 9,034 | 9,304 |
| Pathology, anatomical/clinical | 4,195 | 6,877 | 9,031 | 10,074 | 10,267 | 10,554 | 10,103 | 10,209 |
| Psychiatry | 12,173 | 18,521 | 23,334 | 24,393 | 24,955 | 25,653 | 25,350 | 25,656 |
| Radiology | 6,970 | 7,355 | 5,994 | 6,523 | 6,674 | 6,830 | 6,916 | 7,010 |
| Other specialty | 15,320 | 28,453 | 29,005 | 29,900 | 35,314 | 37,233 | 34,084 | 34,861 |
| Hospital-based practice | 74,503 | 102,486 | 136,799 | 137,225 | 141,033 | 138,312 | 141,877 | 162,037 |
| Residents and interns[5] | 53,527 | 72,159 | 93,650 | 92,461 | 95,125 | 92,935 | 96,547 | 100,033 |
| Full-time hospital staff | 20,976 | 30,327 | 43,149 | 44,764 | 45,908 | 45,377 | 45,330 | 62,004 |
| Other professional activity[6] | 24,252 | 44,046 | 40,290 | 41,243 | 41,556 | 41,118 | 41,126 | 44,338 |
| Federal[7] | 28,191 | 21,567 | 21,079 | 18,050 | 19,381 | 20,017 | 20,182 | --- |
| Patient care | 24,100 | 17,293 | 18,057 | 14,678 | 15,999 | 16,611 | 16,701 | --- |
| Office-based practice | 2,095 | 1,156 | ... | ... | ... | ... | ... | --- |
| Hospital-based practice | 22,005 | 16,137 | 18,057 | 14,678 | 15,999 | 16,611 | 16,701 | --- |
| Residents and interns | 4,275 | 3,252 | 2,702 | 375 | 600 | 739 | 390 | --- |
| Full-time hospital staff | 17,730 | 12,885 | 15,355 | 14,303 | 15,399 | 15,872 | 16,311 | --- |
| Other professional activity[6] | 4,091 | 4,274 | 3,022 | 3,372 | 3,382 | 3,406 | 3,481 | --- |
| Inactive | 21,449 | 38,646 | 72,326 | 75,893 | 75,168 | 81,520 | 84,166 | 84,360 |
| Not classified | 26,145 | 13,950 | 20,579 | 50,906 | 45,136 | 38,314 | 49,067 | 50,447 |
| Unknown address | 5,868 | 2,980 | 1,977 | 886 | 1,098 | 2,947 | 523 | 517 |

--- Data not available.
... Category not applicable.
[1]Activity data for the year 2003 include Federal and non-Federal physicians.
[2]Excludes inactive, not classified, and address unknown. See Appendix II, Physician.
[3]International medical graduates received their medical education in schools outside the United States and Canada.
[4]Specialty information based on the physician's self-designated primary area of practice. Categories include generalists and specialists. See Appendix II, Physician specialty.
[5]Beginning in 1990 clinical fellows are included in this category. In prior years clinical fellows were included in Other professional activity.
[6]Includes medical teaching, administration, research, and other. Prior to 1990 this category also included clinical fellows.
[7]Beginning in 1993 data collection for Federal physicians was revised.

NOTES: Data for doctors of medicine are as of December 31, except for 1990–94 data, which are as of January 1. Outlying areas include Puerto Rico, Virgin Islands, and the Pacific islands of Canton, Caroline, Guam, Mariana, Marshall, American Samoa, and Wake. Data for additional years are available. See Appendix III.

SOURCES: American Medical Association (AMA). Distribution of physicians in the United States, 1970; Physician distribution and medical licensure in the U.S., 1975; Physician characteristics and distribution in the U.S., 1981, 1986, 1989, 1990, 1992, 1993, 1994, 1995–96, 1996–97, 1997–98, 1999, 2000–2001, 2001–2002, 2002–2003, 2003–2004, 2004, 2005 editions, Department of Physician Practice and Communications Information, Division of Survey and Data Resources, AMA. (Copyrights 1971, 1976, 1982, 1986, 1989, 1990, 1992, 1993, 1994, 1996, 1997, 1997, 1999, 2000, 2001, 2002, 2003, 2005: Used with the permission of the AMA.)



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## Table 107. Doctors of medicine in primary care, according to specialty: United States and outlying U.S. areas, selected years 1949–2003

[Data are based on reporting by physicians]

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| Specialty | 1949[1] | 1960[1] | 1970 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Number | | | | | |
| Total doctors of medicine[2] | 201,277 | 260,484 | 334,028 | 467,679 | 615,421 | 720,325 | 813,770 | 836,156 | 853,187 | 871,535 |
| Active doctors of medicine[3] | 191,577 | 247,257 | 310,929 | 435,545 | 559,988 | 646,022 | 737,504 | 751,689 | 768,498 | 786,658 |
| General primary care specialists | 113,222 | 125,359 | 134,354 | 170,705 | 213,514 | 241,329 | 274,653 | 283,583 | 286,294 | 293,701 |
| General practice/family medicine | 95,980 | 88,023 | 57,948 | 60,049 | 70,480 | 75,976 | 86,312 | 88,597 | 89,357 | 91,545 |
| Internal medicine | 12,453 | 26,209 | 39,924 | 58,462 | 76,295 | 88,240 | 101,353 | 105,229 | 106,499 | 109,317 |
| Obstetrics/Gynecology | --- | --- | 18,532 | 24,612 | 30,220 | 33,519 | 35,922 | 36,869 | 36,810 | 37,725 |
| Pediatrics | 4,789 | 11,127 | 17,950 | 27,582 | 36,519 | 43,594 | 51,066 | 52,888 | 53,628 | 55,114 |
| Primary care subspecialists | --- | --- | 3,161 | 16,642 | 30,911 | 39,659 | 52,294 | 55,871 | 57,929 | 60,589 |
| Family medicine | --- | --- | --- | --- | --- | 236 | 483 | 564 | 627 | 691 |
| Internal medicine | --- | --- | 1,948 | 13,069 | 22,054 | 26,928 | 34,831 | 37,558 | 38,821 | 40,598 |
| Obstetrics/Gynecology | --- | --- | 344 | 1,693 | 3,477 | 4,133 | 4,319 | 4,173 | 4,228 | 4,191 |
| Pediatrics | --- | --- | 869 | 1,880 | 5,380 | 8,362 | 12,661 | 13,576 | 14,253 | 15,109 |
| | | | | | Percent of active doctors of medicine | | | | | |
| General primary care specialists | 59.1 | 50.7 | 43.2 | 39.2 | 38.1 | 37.4 | 37.2 | 37.7 | 37.3 | 37.3 |
| General practice/family medicine | 50.1 | 35.6 | 18.6 | 13.8 | 12.6 | 11.8 | 11.7 | 11.8 | 11.6 | 11.6 |
| Internal medicine | 6.5 | 10.6 | 12.8 | 13.4 | 13.6 | 13.7 | 13.7 | 14.0 | 13.9 | 13.9 |
| Obstetrics/Gynecology | --- | --- | 6.0 | 5.7 | 5.4 | 5.2 | 4.9 | 4.9 | 4.8 | 4.8 |
| Pediatrics | 2.5 | 4.5 | 5.8 | 6.3 | 6.5 | 6.7 | 6.9 | 7.0 | 7.0 | 7.0 |
| Primary care subspecialists | --- | --- | 1.0 | 3.8 | 5.5 | 6.1 | 7.1 | 7.4 | 7.5 | 7.7 |
| Family medicine | --- | --- | --- | --- | --- | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| Internal medicine | --- | --- | 0.6 | 3.0 | 3.9 | 4.2 | 4.7 | 5.0 | 5.1 | 5.2 |
| Obstetrics/Gynecology | --- | --- | 0.1 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 |
| Pediatrics | --- | --- | 0.3 | 0.4 | 1.0 | 1.3 | 1.7 | 1.8 | 1.9 | 1.9 |

0.0 Percent greater than zero but less than 0.05.
--- Data not available.
[1]Estimated by the Bureau of Health Professions, Health Resources Administration. Active doctors of medicine (M.D.'s) include those with address unknown and primary specialty not classified.
[2]Includes M.D.'s engaged in Federal and non-Federal patient care (office-based or hospital-based) and other professional activities.
[3]Beginning in 1970, M.D.'s who are inactive, have unknown address, or primary specialty not classified are excluded. See Appendix II, Physician.

NOTES: See Appendix II, Physician specialty. Data are as of December 31 except for 1990–94 data, which are as of January 1, and 1949 data, which are as of midyear. Outlying areas include Puerto Rico, Virgin Islands, and the Pacific islands of Canton, Caroline, Guam, Mariana, Marshall, American Samoa, and Wake. Data for additional years are available. See Appendix III.

SOURCES: Health Manpower Source Book: Medical Specialists, USDHEW, 1962; American Medical Association (AMA). Distribution of physicians in the United States, 1970; Physician characteristics and distribution in the U.S., 1981, 1992, 1996–97, 1997–98, 1999, 2000–2001, 2001–2002, 2002–2003, 2003–2004, 2004, 2005 editions, Department of Data Survey and Planning, Division of Survey and Data Resources, AMA. (Copyrights 1971, 1982, 1992, 1996, 1997, 1997, 1999, 2000, 2001, 2002, 2003, 2004, 2005: Used with the permission of the AMA.)



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## Table 108. Active health personnel according to occupation: United States, selected years 1980–2001

[Data are compiled by the Bureau of Health Professions]

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| Occupation | 1980 | 1985[1] | 1990 | 1995 | 1999 | 2000[2] | 2001 |
|---|---|---|---|---|---|---|---|
| | | | Number of active health personnel | | | | |
| Chiropractors | 25,600 | 35,000 | 42,400 | 52,100 | 61,500 | 64,100 | 66,800 |
| Dentists[3] | 121,900 | 133,500 | 147,500 | 158,600 | 164,700 | 168,000 | --- |
| Nurses, registered[4] | 1,272,900 | 1,538,100 | 1,789,600 | 2,115,800 | 2,201,800 | --- | --- |
| Associate and diploma | 908,300 | 1,024,500 | 1,107,300 | 1,235,100 | 1,237,400 | --- | --- |
| Baccalaureate | 297,300 | 419,900 | 549,000 | 673,200 | 731,200 | --- | --- |
| Masters and doctorate | 67,300 | 93,700 | 133,300 | 207,500 | 229,200 | --- | --- |
| Nutritionists/Dieticians | 32,000 | --- | 57,000 | --- | --- | 90,000 | --- |
| Occupational therapists | 25,000 | --- | 42,000 | --- | --- | 72,000 | --- |
| Optometrists | 21,900 | 24,000 | 26,000 | 28,900 | 31,500 | 32,200 | --- |
| Pharmacists | 142,400 | 153,500 | 168,000 | 181,000 | 193,400 | 196,000 | --- |
| Physical therapists | 50,000 | --- | 92,000 | --- | --- | 130,000 | --- |
| Physicians | 427,122 | 542,653 | 567,610 | 672,859 | 753,176 | 772,296 | 793,263 |
| Federal | 17,642 | 23,305 | 20,784 | 21,153 | 17,338 | 19,228 | 20,017 |
| Doctors of medicine[5] | 16,585 | 21,938 | 19,166 | 19,830 | 17,224 | 19,110 | 20,017 |
| Doctors of osteopathy[6] | 1,057 | 1,367 | 1,618 | 1,323 | 114 | 118 | --- |
| Non-Federal | 409,480 | 519,348 | 546,826 | 651,706 | 735,838 | 753,068 | 773,246 |
| Doctors of medicine[5] | 393,407 | 497,473 | 520,450 | 617,362 | 693,345 | 708,463 | 731,672 |
| Doctors of osteopathy[6] | 16,073 | 21,875 | 26,376 | 34,344 | 42,493 | 44,605 | 41,574 |
| Podiatrists[7] | 7,780 | 9,620 | 10,353 | 10,304 | 11,853 | 12,242 | --- |
| Speech therapists | 50,000 | --- | 65,000 | --- | --- | 121,000 | --- |
| | | | Number per 100,000 population | | | | |
| Chiropractors | 11.3 | 14.6 | 17.0 | 19.6 | 22.0 | 22.8 | 23.5 |
| Dentists[3] | 54.0 | 56.5 | 59.1 | 59.6 | 59.0 | 59.5 | --- |
| Nurses, registered[4] | 560.0 | 641.4 | 716.9 | 794.6 | 789.1 | --- | --- |
| Associate and diploma | 399.9 | 425.8 | 443.6 | 463.8 | 443.4 | --- | --- |
| Baccalaureate | 130.9 | 175.6 | 219.9 | 252.8 | 262.0 | --- | --- |
| Masters and doctorate | 29.6 | 39.9 | 53.4 | 77.9 | 82.1 | --- | --- |
| Nutritionists/Dieticians | 14.0 | --- | 22.8 | --- | --- | 31.9 | --- |
| Occupational therapists | 10.9 | --- | 16.8 | --- | --- | 25.5 | --- |
| Optometrists | 9.6 | 10.1 | 10.4 | 10.9 | 11.3 | 11.4 | --- |
| Pharmacists | 62.5 | 66.3 | 67.3 | 68.0 | 69.3 | 69.5 | --- |
| Physical therapists | 21.8 | --- | 36.9 | --- | --- | 46.1 | --- |
| Physicians | 189.8 | 221.3 | 223.9 | 248.9 | 265.9 | 269.7 | 274.3 |
| Federal | 7.8 | 9.5 | 8.2 | 7.8 | 6.1 | 6.7 | 6.9 |
| Doctors of medicine[5] | 7.4 | 8.9 | 7.6 | 7.3 | 6.1 | 6.7 | 6.9 |
| Doctors of osteopathy[6] | 0.5 | 0.6 | 0.6 | 0.5 | 0.0 | 0.0 | --- |
| Non-Federal | 182.0 | 211.8 | 215.7 | 241.1 | 259.8 | 263.0 | 267.3 |
| Doctors of medicine[5] | 174.9 | 202.9 | 205.3 | 228.4 | 244.8 | 247.4 | 253.0 |
| Doctors of osteopathy[6] | 7.1 | 8.9 | 10.4 | 12.7 | 15.0 | 15.6 | 14.4 |
| Podiatrists[7] | 3.4 | 4.0 | 4.1 | 3.9 | 4.3 | 4.4 | --- |
| Speech therapists | 21.8 | --- | 26.0 | --- | --- | 42.9 | --- |

--- Data not available.

[1]Osteopath, podiatric, and chiropractic data are for 1986.

[2]Data for speech therapists are for 1996.

[3]Excludes dentists in military service, U.S. Public Health Service, and Department of Veterans Affairs.

[4]See Appendix II, Nurse Supply Estimates. In 1999 the total number of registered nurses includes an estimated 4,000 nurses whose highest nursing-related educational preparation was not known.

[5]Excludes physicians with unknown addresses and those who do not practice or practice fewer than 20 hours per week. 1990 data for doctors of medicine are as of January 1; in other years these data are as of December 31. See Appendix II, Physician.

[6]Beginning in 2001, doctors of osteopathy include Federal and non-Federal doctors of osteopathy.

[7]Podiatrists in patient care.

NOTE: Ratios for all health occupations are based on resident population.

SOURCES: National Center for Health Workforce Analysis, Bureau of Health Professions: United States Health Personnel FACTBOOK. Health Resources and Services Administration. Rockville, Md., June 2003 and unpublished data; American Medical Association. Physician characteristics and distribution in the U.S., 1981, 1986, 1992, 1996–97, 2001–2002, 2002–2003, and 2003–2004 editions. Chicago, 1982, 1986, 1992, 1997, 2001, 2002, and 2003; American Osteopathic Association. 1980–81 Yearbook and Directory of Osteopathic Physicians. Chicago, 1980. American Association of Colleges of Osteopathic Medicine. Annual statistical report, 1990, 1997, 1999, 2000, and 2001 editions. Rockville, MD, 1990, 1997, 2000, 2001, and 2002; Bureau of Labor Statistics: unpublished data.



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## Table 109. First-year enrollment and graduates of health professions schools and number of schools, according to profession: United States, selected years 1980–2003

[Data are based on reporting by health professions schools]

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| Profession | 1980 | 1985 | 1990 | 1995 | 2000 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| First-year enrollment | | | | Number | | | |
| Dentistry | 6,132 | 5,047 | 3,979 | 4,121 | 4,314 | 4,407 | 4,448 |
| Medicine (Allopathic) | 16,930 | 16,997 | 16,756 | 17,085 | 16,856 | 16,875 | 16,953 |
| Medicine (Osteopathic) | 1,426 | 1,750 | 1,844 | 2,217 | 2,848 | 3,043 | 3,079 |
| Nursing: | | | | | | | |
| Licensed practical | 56,316 | 47,034 | 52,969 | 57,906 | --- | --- | --- |
| Registered, total | 105,952 | 118,224 | 108,580 | 127,184 | --- | --- | --- |
| Baccalaureate | 35,414 | 39,573 | 29,858 | 43,451 | --- | --- | --- |
| Associate degree | 53,633 | 63,776 | 68,634 | 76,016 | --- | --- | --- |
| Diploma | 16,905 | 14,875 | 10,088 | 7,717 | --- | --- | --- |
| Optometry | 1,202 | 1,187 | 1,258 | 1,390 | 1,410 | --- | 1,416 |
| Pharmacy | 8,035 | 6,986 | 8,267 | 8,740 | 8,382 | 9,128 | 9,909 |
| Podiatry | 695 | 811 | 561 | 630 | 475 | 419 | 441 |
| Public Health[1] | --- | --- | 4,392 | 5,332 | 5,840 | 6,329 | 6,786 |
| Graduates | | | | | | | |
| Dentistry | 5,256 | 5,353 | 4,233 | 3,908 | 4,171 | 4,349 | 4,443 |
| Medicine (Allopathic) | 15,113 | 16,318 | 15,398 | 15,883 | 15,718 | 15,648 | 15,499 |
| Medicine (Osteopathic) | 1,059 | 1,474 | 1,529 | 1,843 | 2,279 | 2,536 | 2,607 |
| Nursing:[2] | | | | | | | |
| Licensed practical | 41,892 | 36,955 | 35,417 | 44,234 | --- | --- | --- |
| Registered, total | 75,523 | 82,075 | 66,088 | 97,052 | --- | 72,882 | --- |
| Baccalaureate | 24,994 | 24,975 | 18,571 | 31,254 | --- | 30,522 | --- |
| Associate degree | 36,034 | 45,208 | 42,318 | 58,749 | --- | 40,073 | --- |
| Diploma | 14,495 | 11,892 | 5,199 | 7,049 | --- | 2,287 | --- |
| Occupational therapy | --- | --- | 2,424 | 3,473 | --- | --- | --- |
| Optometry | 1,073 | 1,114 | 1,115 | 1,219 | 1,315 | 1,309 | 1,305 |
| Pharmacy | 7,432 | 5,735 | 6,956 | 7,837 | 7,260 | 7,573 | 7,488 |
| Podiatry | 597 | 582 | 679 | 558 | 583 | 478 | 436 |
| Public Health | 3,326 | 3,047 | 3,549 | 4,636 | 5,879 | 5,664 | 5,906 |
| Schools | | | | | | | |
| Dentistry | 60 | 60 | 58 | 54 | 55 | 56 | 56 |
| Medicine (Allopathic) | 126 | 127 | 127 | 125 | 125 | 125 | 126 |
| Medicine (Osteopathic) | 14 | 15 | 15 | 16 | 19 | 19 | 19 |
| Nursing:[3] | | | | | | | |
| Licensed practical | 1,299 | 1,165 | 1,154 | 1,210 | --- | --- | --- |
| Registered, total | 1,385 | 1,473 | 1,470 | 1,516 | --- | 1,459 | --- |
| Baccalaureate | 377 | 441 | 489 | 521 | --- | 526 | --- |
| Associate degree | 697 | 776 | 829 | 876 | --- | 857 | --- |
| Diploma | 311 | 256 | 152 | 119 | --- | 76 | --- |
| Occupational therapy | 50 | 61 | 69 | 98 | 142 | --- | --- |
| Optometry | 16 | 17 | 17 | 17 | 17 | 17 | 17 |
| Pharmacy | 72 | 72 | 74 | 75 | 81 | 83 | 89 |
| Podiatry | 5 | 7 | 7 | 7 | 7 | 7 | 7 |
| Public Health | 21 | 23 | 25 | 27 | 28 | 32 | 33 |

--- Data not available.

[1]Number of students entering Schools of Public Health for the first time.

[2]Data for 2000–2002 exclude American Samoa, Guam, Puerto Rico, and the Virgin Islands.

[3]Some nursing schools offer more than one type of program. Numbers shown for nursing are number of nursing programs.

NOTES: Some numbers in this table have been revised and differ from previous editions of *Health, United States*. Data on the number of schools are reported as of the beginning of the academic year while data on first-year enrollment and number of graduates are reported as of the end of the academic year.

SOURCES: Association of American Medical Colleges: AAMC Data Book, Statistical Information Related to Medical Schools and Teaching Hospitals, 2004. Washington, DC. 2004 and unpublished data (Copyright 2005: Used with the permission of the AMA); Bureau of Health Professions: United States Health Personnel FACTBOOK. Health Resources and Services Administration. Rockville, MD. 2003; National League for Nursing: unpublished data; American Dental Association: 2002–03 Survey of Predoctoral Dental Education, vol.1, Academic Programs, Enrollments, and Graduates, Chicago. 2004; American Dental Education Association: www.adea.org/ADEA.html; American Association of Colleges of Osteopathic Medicine. 2003 Annual Report on Osteopathic Medical Education, Chevy Chase, MD. 2004; Association of Schools of Public Health: 2003 Annual Data Report. Washington, DC. 2004; Association of Schools and Colleges of Optometry: Annual Student Data Report Academic Year 2003–2004 and unpublished data; American Association of Colleges of Pharmacy: Academic Pharmacy's Vital Statistics, 2004 and unpublished data; American Association of Colleges of Podiatric Medicine: unpublished data; American Medical Association: Health Professions Career and Education Directory, 29th edition. Chicago. 2001.



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## Table 110 (page 1 of 2). Total enrollment of minorities in schools for selected health occupations, according to detailed race and Hispanic origin: United States, academic years 1980–81, 1990–91, 2001–02, and 2002–03

[Data are based on reporting by health professions associations]

Click here for spreadsheet version

| Occupation, detailed race, and Hispanic origin | 1980–81 | 1990–91 | 2001–02 | 2002–03 | 1980–81 | 1990–91 | 2001–02 | 2002–03[1] |
|---|---|---|---|---|---|---|---|---|
| Dentistry | Number of students | | | | Percent distribution of students | | | |
| All races | 22,842 | 15,951 | 17,487 | 17,657 | 100.0 | 100.0 | 100.0 | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White[2] | 19,947 | 11,185 | 11,411 | 11,243 | 87.3 | 70.1 | 65.3 | 63.7 |
| Black or African American | 1,022 | 940 | 854 | 904 | 4.5 | 5.9 | 4.9 | 5.1 |
| Hispanic or Latino[3] | 780 | 1,254 | 1,030 | 1,066 | 3.4 | 7.9 | 5.9 | 6.0 |
| American Indian or Alaska Native | 53 | 53 | 74 | 80 | 0.2 | 0.3 | 0.4 | 0.5 |
| Asian or Pacific Islander | 1,040 | 2,519 | 4,118 | 4,041 | 4.6 | 15.8 | 23.5 | 22.9 |
| Medicine (Allopathic) | | | | | | | | |
| All races[2,4] | 65,189 | 65,163 | 66,989 | 66,334 | 100.0 | 100.0 | 100.0 | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 55,434 | 47,893 | 41,737 | 42,435 | 85.0 | 73.5 | 62.3 | 64.0 |
| Black or African American | 3,708 | 4,241 | 4,746 | 4,905 | 5.7 | 6.5 | 7.1 | 7.4 |
| Hispanic or Latino | 2,761 | 3,538 | 4,167 | 4,264 | 4.2 | 5.4 | 6.2 | 6.4 |
| Mexican | 951 | 1,109 | 1,630 | 1,614 | 1.5 | 1.7 | 2.4 | 2.4 |
| Mainland Puerto Rican | 329 | 457 | 447 | 321 | 0.5 | 0.7 | 0.7 | 0.5 |
| Other Hispanic or Latino[5] | 1,481 | 1,972 | 2,090 | 2,329 | 2.3 | 3.0 | 3.1 | 3.5 |
| American Indian or Alaska Native[6] | 221 | 277 | 527 | 567 | 0.3 | 0.4 | 0.8 | 0.9 |
| Asian or Pacific Islander | 1,924 | 8,436 | 13,139 | 13,589 | 3.0 | 12.9 | 19.6 | 20.5 |
| Medicine (Osteopathic) | | | | | | | | |
| All races[2] | 4,940 | 6,792 | 11,101 | 11,432 | 100.0 | 100.0 | 100.0 | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 4,688 | 5,680 | 8,062 | 8,410 | 94.9 | 83.6 | 72.6 | 73.6 |
| Black or African American | 94 | 217 | 407 | 404 | 1.9 | 3.2 | 3.7 | 3.5 |
| Hispanic or Latino | 52 | 277 | 386 | 420 | 1.1 | 4.1 | 3.5 | 3.7 |
| American Indian or Alaska Native | 19 | 36 | 68 | 82 | 0.4 | 0.5 | 0.6 | 0.7 |
| Asian or Pacific Islander | 87 | 582 | 1,817 | 1,782 | 1.8 | 8.6 | 16.4 | 15.6 |
| Nursing, registered[7] | | | | | | | | |
| All races | 230,966 | 221,170 | 221,334 | --- | --- | 100.0 | 100.0 | --- |
| Not Hispanic or Latino: | | | | | | | | |
| White[2] | --- | 183,102 | 173,585 | --- | --- | 82.8 | 78.4 | --- |
| Black or African American | --- | 23,094 | 26,026 | --- | --- | 10.4 | 11.8 | --- |
| Hispanic or Latino | --- | 6,580 | 10,886 | --- | --- | 3.0 | 4.9 | --- |
| American Indian or Alaska Native | --- | 1,803 | 2,516 | --- | --- | 0.8 | 1.1 | --- |
| Asian or Pacific Islander | --- | 6,591 | 8,321 | --- | --- | 3.0 | 3.8 | --- |
| Optometry | | | | | | | | |
| All races[2] | 4,641 | 4,760 | --- | 5,354 | 100.0 | 100.0 | --- | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 4,221 | 3,706 | --- | 3,230 | 91.0 | 77.9 | --- | 60.3 |
| Black or African American | 57 | 134 | --- | 171 | 1.2 | 2.8 | --- | 3.2 |
| Hispanic or Latino | 108 | 296 | --- | 302 | 2.3 | 6.2 | --- | 5.6 |
| American Indian or Alaska Native | 12 | 21 | --- | 35 | 0.3 | 0.4 | --- | 0.7 |
| Asian or Pacific Islander | 243 | 603 | --- | 1,254 | 5.2 | 12.7 | --- | 23.4 |
| Pharmacy[8] | | | | | | | | |
| All races[2] | 21,628 | 29,797 | 35,885 | 38,902 | 100.0 | 100.0 | 100.0 | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 19,153 | 21,717 | 21,088 | 22,764 | 88.6 | 80.5 | 58.8 | 58.5 |
| Black or African American | 945 | 2,103 | 3,407 | 3,826 | 4.4 | 5.7 | 9.5 | 9.8 |
| Hispanic or Latino | 459 | 1,118 | 1,322 | 1,466 | 2.1 | 4.2 | 3.7 | 3.8 |
| American Indian or Alaska Native | 36 | 85 | 179 | 168 | 0.2 | 0.3 | 0.5 | 0.4 |
| Asian or Pacific Islander | 1,035 | 3,346 | 7,506 | 8,263 | 4.8 | 9.4 | 20.9 | 21.2 |

See footnotes at end of table.



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## Table 110 (page 2 of 2). Total enrollment of minorities in schools for selected health occupations, according to detailed race and Hispanic origin: United States, academic years 1980–81, 1990–91,2001–02, and 2002–03

[Data are based on reporting by health professions associations]

Click here for spreadsheet version

| *Occupation, detailed race, and Hispanic origin* | *1980–81* | *1990–91* | *2001–02* | *2002–03* | *1980–81* | *1990–91* | *2001–02* | *2002–03*[1] |
|---|---|---|---|---|---|---|---|---|
| Podiatry | Number of students | | | | Percent distribution of students | | | |
| All races[2] | 2,577 | 2,221 | 1,783 | 1,637 | 100.0 | 100.0 | 100.0 | 100.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 2,353 | 1,671 | 1,108 | 993 | 91.3 | 75.2 | 62.1 | 60.7 |
| Black or African American | 110 | 235 | 190 | 192 | 4.3 | 10.6 | 10.7 | 11.7 |
| Hispanic or Latino | 39 | 149 | 116 | 119 | 1.5 | 6.7 | 6.5 | 7.3 |
| American Indian or Alaska Native | 6 | 7 | 14 | 11 | 0.2 | 0.3 | 0.8 | 0.7 |
| Asian or Pacific Islander | 69 | 159 | 234 | 208 | 2.7 | 7.2 | 13.1 | 12.7 |

- - - Data not available.

[1]Data for optometry are for 2003–04.

[2]Includes other and unknown races; foreign students were included in total for osteopathic medicine and optometry; starting in 1992–93, foreign students were excluded from total for allopathic medicine.

[3]Includes students from University of Puerto Rico.

[4]Starting in 2002–03, counts by race and ethnicity are in combination or alone and do not sum to the unduplicated total.

[5]Includes The Commonwealth of Puerto Rico students.

[6]Starting in 1997–98, includes American Indian, Alaska Native, and Native Hawaiian; prior to 1997, included only American Indian and Alaska Native.

[7]In 1990 the National League for Nursing developed a new system for analyzing minority data. In evaluating the former system, much underreporting was noted. Therefore, race-specific data before 1990 would not be comparable and are not shown. Additional changes in the minority data question were introduced for academic years 2000–01 and 2001–02, resulting in a discontinuity in the trend.

[8]Prior to 1992–93, pharmacy total enrollment data were for students in the final 3 years of pharmacy education. Beginning in 1992–93, pharmacy data are for all students.

NOTES: Total enrollment data are collected at the beginning of the academic year. Data for chiropractic students, occupational and physical therapy students, and public health students were not available for this table. Some numbers have been revised and differ from the previous edition of *Health, United States*.

SOURCES: Association of American Medical Colleges: AAMC Data Book: Statistical Information Related to Medical Education. Washington, DC. 2004 (Copyright 2005: Used with the permission of the AAMC.). AAMC Data Warehouse, unpublished data; American Association of Colleges of Osteopathic Medicine: 2003 Annual Report on Osteopathic Medical Education. Chevy Chase, Maryland. 2004; Bureau of Health Professions: Minorities and Women in the Health Fields, 1990 Edition; American Dental Association: 2002–03 Survey of Predoctoral Dental Education, vol.1, Academic Programs, Enrollments, and Graduates. Chicago. 2004; American Dental Education Association: www.adea.org/ADEA.html and unpublished data; Association of Schools and Colleges of Optometry: Annual Student Data Report Academic Year 2003–2004 and unpublished data; American Association of Colleges of Pharmacy: Profile of Pharmacy Students, Fall 2002; American Association of Colleges of Podiatric Medicine: unpublished data; National League for Nursing: unpublished data.



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## Table 111. First-year and total enrollment of women in schools for selected health occupations, according to detailed race and Hispanic origin: United States, academic years 1980–81, 1990–91, and 2002–03

[Data are based on reporting by health professions associations]

Click here for spreadsheet version

| Enrollment, occupation, detailed race, and Hispanic origin | Both sexes | | | Women | | |
|---|---|---|---|---|---|---|
| | 1980–81 | 1990–91 | 2002–03[1] | 1980–81 | 1990–91[2] | 2002–03[1] |
| First-year enrollment | Number of students | | | Percent of students | | |
| Dentistry | 6,030 | 4,001 | 4,448 | 19.8 | 37.9 | 44.0 |
| Medicine (Allopathic)[3] | 17,186 | 16,876 | 16,953 | 28.9 | 38.8 | 49.0 |
| Not Hispanic or Latino: | | | | | | |
| White | 14,262 | 11,830 | 11,404 | 27.4 | 37.7 | --- |
| Black or African American | 1,128 | 1,263 | 1,394 | 45.5 | 55.3 | --- |
| Hispanic or Latino | 818 | 933 | 1,227 | 31.5 | 42.0 | --- |
| Mexican | 258 | 285 | 428 | 30.6 | 39.3 | --- |
| Mainland Puerto Rican | 95 | 120 | 112 | 43.2 | 43.3 | --- |
| Other Hispanic or Latino[4] | 465 | 528 | 687 | 29.7 | 43.3 | --- |
| American Indian or Alaska Native[5] | 67 | 76 | 194 | 35.8 | 40.8 | --- |
| Asian or Pacific Islander | 572 | 2,527 | 3,657 | 31.5 | 40.3 | --- |
| Medicine (Osteopathic) | 1,496 | 1,950 | 3,079 | 22.0 | 34.2 | 47.5 |
| Nurses, registered[6] | 110,201 | 113,526 | --- | 92.7 | 89.3 | --- |
| Optometry | 1,258 | 1,239 | 1,416 | 25.3 | 50.6 | 62.7 |
| Pharmacy[7] | 7,377 | 8,267 | 9,128 | 48.4 | --- | 67.7 |
| Podiatry | 695 | 561 | 419 | --- | 28.0 | 45.0 |
| Public Health | 3,348 | 4,289 | 6,329 | --- | 62.1 | 68.3 |
| Total enrollment | | | | | | |
| Dentistry | 22,842 | 15,951 | 17,657 | 17.0 | 34.4 | --- |
| Medicine (Allopathic)[3] | 65,189 | 65,163 | 66,334 | 26.5 | 37.3 | 46.8 |
| Not Hispanic or Latino: | | | | | | |
| White | 55,434 | 47,893 | 42,435 | 25.0 | 35.4 | --- |
| Black or African American | 3,708 | 4,241 | 4,905 | 44.3 | 55.8 | --- |
| Hispanic or Latino | 2,761 | 3,538 | 4,264 | 30.1 | 39.0 | --- |
| Mexican | 951 | 1,109 | 1,614 | 26.4 | 38.5 | --- |
| Mainland Puerto Rican | 329 | 457 | 321 | 35.9 | 43.1 | --- |
| Other Hispanic[4] | 1,481 | 1,972 | 2,329 | 31.1 | 38.4 | --- |
| American Indian or Alaska Native[5] | 221 | 277 | 567 | 28.5 | 42.6 | --- |
| Asian or Pacific Islander | 1,924 | 8,436 | 13,589 | 30.4 | 37.7 | --- |
| Medicine (Osteopathic) | 4,940 | 6,792 | 11,432 | 19.7 | 32.7 | 44.6 |
| Nurses, registered[6] | 230,966 | 221,170 | --- | 94.3 | --- | --- |
| Optometry | 4,641 | 4,760 | 5,354 | --- | 47.3 | 60.4 |
| Pharmacy | 26,617 | 29,797 | 38,902 | 47.4 | 62.4 | 67.1 |
| Podiatry | 2,577 | 2,154 | 1,637 | 11.9 | 28.9 | 41.7 |
| Public Health | 8,486 | 11,386 | 17,878 | 55.2 | 62.5 | 66.4 |

--- Data not available.

[1]Data for optometry are for 2003–04.

[2]Percent of women podiatry students is for 1991–92.

[3]Includes race and ethnicity unspecified; for first year enrollment, starting in 2000–2001, also includes foreign students; for total enrollment, starting in 1992–93, excludes foreign students.

[4]Includes Commonwealth Puerto Rican students.

[5]Starting in 1997–98, includes American Indian, Alaska Native, and Native Hawaiian; prior to 1997, included only American Indian and Alaska Native.

[6]Excludes American Samoa, Guam, Puerto Rico, and Virgin Islands.

[7]Pharmacy first-year enrollment is for students in the first year of the final 3 years of pharmacy education.

NOTES: Total enrollment data are collected at the beginning of the academic year while first-year enrollment data are collected during the academic year. Data for chiropractic students and occupational, physical, and speech therapy students were not available for this table. Some numbers in this table have been revised and differ from the previous edition of *Health, United States*.

SOURCES: Association of American Medical Colleges: AAMC Data Book: Statistical Information Related to Medical Education. Washington, DC. 2004 (Copyright 2005. Used with the permission of the AAMC); American Association of Colleges of Osteopathic Medicine: 2003 Annual Report on Osteopathic Medical Education. Chevy Chase, Maryland. 2004; Bureau of Health Professions: Minorities and Women in the Health Fields, 1990 edition; American Dental Association: 2002–03 Survey of Predoctoral Dental Education, vol.1, Academic Programs, Enrollments, and Graduates. Chicago. 2004 and unpublished data; Association of Schools and Colleges of Optometry: Annual Student Data Report Academic Year 2003–04 and unpublished data; American Association of Colleges of Pharmacy: Profile of Pharmacy Students, Fall 2002 and unpublished data; American Association of Colleges of Podiatric Medicine: unpublished data; National League for Nursing: Nursing Data Review. New York. 1997; Nursing data book. New York. 1982 and unpublished data; State-Approved Schools of Nursing-RN. New York. 1973; Association of Schools of Public Health: 2003 Annual Data Report. Washington, DC. 2004.



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## Table 112. Hospitals, beds, and occupancy rates, according to type of ownership and size of hospital: United States, selected years 1975–2003

[Data are based on reporting by a census of hospitals]

| Type of ownership and size of hospital | 1975 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Hospitals | | | | Number | | | | |
| All hospitals | 7,156 | 6,965 | 6,649 | 6,291 | 5,810 | 5,801 | 5,794 | 5,764 |
| Federal | 382 | 359 | 337 | 299 | 245 | 243 | 240 | 239 |
| Non-Federal[1] | 6,774 | 6,606 | 6,312 | 5,992 | 5,565 | 5,558 | 5,554 | 5,525 |
| Community[2] | 5,875 | 5,830 | 5,384 | 5,194 | 4,915 | 4,908 | 4,927 | 4,895 |
| Nonprofit | 3,339 | 3,322 | 3,191 | 3,092 | 3,003 | 2,998 | 3,025 | 2,984 |
| For profit | 775 | 730 | 749 | 752 | 749 | 754 | 766 | 790 |
| State-local government | 1,761 | 1,778 | 1,444 | 1,350 | 1,163 | 1,156 | 1,136 | 1,121 |
| 6–24 beds | 299 | 259 | 226 | 278 | 288 | 281 | 321 | 327 |
| 25–49 beds | 1,155 | 1,029 | 935 | 922 | 910 | 916 | 931 | 965 |
| 50–99 beds | 1,481 | 1,462 | 1,263 | 1,139 | 1,055 | 1,070 | 1,072 | 1,031 |
| 100–199 beds | 1,363 | 1,370 | 1,306 | 1,324 | 1,236 | 1,218 | 1,190 | 1,168 |
| 200–299 beds | 678 | 715 | 739 | 718 | 656 | 635 | 625 | 624 |
| 300–399 beds | 378 | 412 | 408 | 354 | 341 | 348 | 358 | 349 |
| 400–499 beds | 230 | 266 | 222 | 195 | 182 | 191 | 174 | 172 |
| 500 beds or more | 291 | 317 | 285 | 264 | 247 | 249 | 256 | 256 |
| Beds | | | | | | | | |
| All hospitals | 1,465,828 | 1,364,516 | 1,213,327 | 1,080,601 | 983,628 | 987,440 | 975,962 | 965,256 |
| Federal | 131,946 | 117,328 | 98,255 | 77,079 | 53,067 | 51,900 | 49,838 | 47,456 |
| Non-Federal[1] | 1,333,882 | 1,247,188 | 1,115,072 | 1,003,522 | 930,561 | 935,540 | 926,124 | 917,800 |
| Community[2] | 941,844 | 988,387 | 927,360 | 872,736 | 823,560 | 825,966 | 820,653 | 813,307 |
| Nonprofit | 658,195 | 692,459 | 656,755 | 609,729 | 582,988 | 585,070 | 582,179 | 574,587 |
| For profit | 73,495 | 87,033 | 101,377 | 105,737 | 109,883 | 108,718 | 108,422 | 109,671 |
| State-local government | 210,154 | 208,895 | 169,228 | 157,270 | 130,689 | 132,178 | 130,052 | 129,049 |
| 6–24 beds | 5,615 | 4,932 | 4,427 | 5,085 | 5,156 | 4,964 | 5,629 | 5,635 |
| 25–49 beds | 41,783 | 37,478 | 35,420 | 34,352 | 33,333 | 33,263 | 33,200 | 33,613 |
| 50–99 beds | 106,776 | 105,278 | 90,394 | 82,024 | 75,865 | 76,924 | 76,882 | 74,025 |
| 100–199 beds | 192,438 | 192,892 | 183,867 | 187,381 | 175,778 | 174,024 | 171,625 | 167,451 |
| 200–299 beds | 164,405 | 172,390 | 179,670 | 175,240 | 159,807 | 154,420 | 152,682 | 152,487 |
| 300–399 beds | 127,728 | 139,434 | 138,938 | 121,136 | 117,220 | 119,753 | 123,399 | 119,903 |
| 400–499 beds | 101,278 | 117,724 | 98,833 | 86,459 | 80,763 | 84,745 | 77,145 | 76,333 |
| 500 beds or more | 201,821 | 218,259 | 195,811 | 181,059 | 175,638 | 177,873 | 180,091 | 183,860 |
| Occupancy rate[3] | | | | Percent | | | | |
| All hospitals | 76.7 | 77.7 | 69.5 | 65.7 | 66.1 | 66.7 | 67.8 | 68.1 |
| Federal | 80.7 | 80.1 | 72.9 | 72.6 | 68.2 | 69.8 | 66.0 | 64.8 |
| Non-Federal[1] | 76.3 | 77.4 | 69.2 | 65.1 | 65.9 | 66.5 | 67.9 | 68.3 |
| Community[2] | 75.0 | 75.6 | 66.8 | 62.8 | 63.9 | 64.5 | 65.8 | 66.2 |
| Nonprofit | 77.5 | 78.2 | 69.3 | 64.5 | 65.5 | 65.8 | 67.2 | 67.7 |
| For profit | 65.9 | 65.2 | 52.8 | 51.8 | 55.9 | 57.8 | 59.0 | 59.6 |
| State-local government | 70.4 | 71.1 | 65.3 | 63.7 | 63.2 | 64.1 | 64.9 | 65.3 |
| 6–24 beds | 48.0 | 46.8 | 32.3 | 36.9 | 31.7 | 31.3 | 32.4 | 31.9 |
| 25–49 beds | 56.7 | 52.8 | 41.3 | 42.6 | 41.3 | 42.5 | 44.0 | 44.6 |
| 50–99 beds | 64.7 | 64.2 | 53.8 | 54.1 | 54.8 | 55.5 | 56.7 | 57.2 |
| 100–199 beds | 71.2 | 71.4 | 61.5 | 58.8 | 60.0 | 60.7 | 61.7 | 62.6 |
| 200–299 beds | 77.1 | 77.4 | 67.1 | 63.1 | 65.0 | 65.5 | 66.7 | 67.0 |
| 300–399 beds | 79.7 | 79.7 | 70.0 | 64.8 | 65.7 | 66.4 | 68.2 | 68.5 |
| 400–499 beds | 81.1 | 81.2 | 73.5 | 68.1 | 69.1 | 68.9 | 70.5 | 70.7 |
| 500 beds or more | 80.9 | 82.1 | 77.3 | 71.4 | 72.2 | 72.8 | 74.0 | 74.2 |

[1]The category of non-Federal hospitals comprises psychiatric, tuberculosis and other respiratory diseases hospitals, and long-term and short-term general and other special hospitals. See Appendix II, Hospital.
[2]Community hospitals are non-Federal short-term general and special hospitals whose facilities and services are available to the public. See Appendix II, Hospital.
[3]Estimated percent of staffed beds that are occupied. See Appendix II, Occupancy rate.

NOTE: Data for additional years are available. See Appendix III.

SOURCES: American Hospital Association Annual Survey of Hospitals. Hospital Statistics, 1976, 1981, 1991–2005 Editions. Chicago. (Copyrights 1976, 1981, 1991–2005: Used with the permission of Health Forum LLC, an affiliate of the American Hospital Association.)



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## Table 113. Mental health organizations and beds for 24-hour hospital and residential treatment according to type of organization: United States, selected years 1986–2002

[Data are based on inventories of mental health organizations]

Click here for spreadsheet version

| Type of organization | 1986 | 1990 | 1994[1] | 1998 | 2000 | 2002[2] |
|---|---|---|---|---|---|---|
| | | | Number of mental health organizations | | | |
| All organizations | 4,747 | 5,284 | 5,392 | 5,722 | 4,541 | 4,301 |
| State and county mental hospitals | 285 | 273 | 256 | 229 | 223 | 222 |
| Private psychiatric hospitals | 314 | 462 | 430 | 348 | 269 | 253 |
| Non-Federal general hospital psychiatric services | 1,351 | 1,674 | 1,612 | 1,707 | 1,373 | 1,285 |
| Department of Veterans Affairs medical centers[3] | 139 | 141 | 161 | 145 | 142 | 140 |
| Residential treatment centers for emotionally disturbed children | 437 | 501 | 459 | 461 | 475 | 508 |
| All other organizations[4] | 2,221 | 2,233 | 2,474 | 2,832 | 2,059 | 1,893 |
| | | | Number of beds | | | |
| All organizations | 267,613 | 272,253 | 290,604 | 267,796 | 212,621 | 211,199 |
| State and county mental hospitals | 119,033 | 98,789 | 81,911 | 68,872 | 60,675 | 57,263 |
| Private psychiatric hospitals | 30,201 | 44,871 | 42,399 | 33,408 | 26,484 | 25,095 |
| Non-Federal general hospital psychiatric services | 45,808 | 53,479 | 52,984 | 54,434 | 39,690 | 40,202 |
| Department of Veterans Affairs medical centers[3] | 26,874 | 21,712 | 21,146 | 16,973 | 9,363 | 9,672 |
| Residential treatment centers for emotionally disturbed children | 24,547 | 29,756 | 32,110 | 31,965 | 33,375 | 39,049 |
| All other organizations[4] | 21,150 | 23,646 | 60,054 | 62,144 | 43,034 | 39,918 |
| | | | Beds per 100,000 civilian population[5] | | | |
| All organizations | 111.7 | 111.6 | 112.1 | 99.5 | 75.4 | 73.2 |
| State and county mental hospitals | 49.7 | 40.5 | 31.6 | 25.6 | 21.5 | 19.9 |
| Private psychiatric hospitals | 12.6 | 18.4 | 16.4 | 12.4 | 9.4 | 8.7 |
| Non-Federal general hospital psychiatric services | 19.1 | 21.9 | 20.4 | 20.2 | 14.1 | 13.9 |
| Department of Veterans Affairs medical centers[3] | 11.2 | 8.9 | 8.2 | 6.3 | 3.3 | 3.4 |
| Residential treatment centers for emotionally disturbed children | 10.3 | 12.2 | 12.4 | 11.9 | 11.8 | 13.5 |
| All other organizations[4] | 8.8 | 9.7 | 23.2 | 23.1 | 15.3 | 13.8 |

[1]Beginning in 1994 data for supportive residential clients (moderately staffed housing arrangements such as supervised apartments, group homes, and halfway houses) are included in the totals and "All other organizations." This change affects the comparability of trend data prior to 1994 with data for 1994 and later years.
[2]Preliminary data.
[3]Includes Department of Veterans Affairs (VA) neuropsychiatric hospitals, VA general hospital psychiatric services, and VA psychiatric outpatient clinics.
[4]Includes freestanding psychiatric outpatient clinics, partial care organizations, and multiservice mental health organizations. See Appendix I, Survey of Mental Health Organizations.
[5]Civilian population estimates for 2000 and beyond are based on 2000 Census as of July 1; population estimates for 1992–98 are 1990 postcensal estimates.

NOTES: Data for 2000 are revised and differ from the previous edition of *Health, United States*. These data exclude mental health care provided in nonpsychiatric units of hospitals such as general medical units. Data for additional years are available. See Appendix III.

SOURCES: Substance Abuse and Mental Health Services Administration, Center for Mental Health Services (CMHS). Manderscheid RW and Henderson MJ. *Mental Health, United States, 2002*. Washington, DC. U.S. Government Printing Office, 2004; and Survey of Mental Health Organizations, unpublished data.



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## Table 114. Community hospital beds and average annual percent change, according to geographic division and State: United States, selected years 1960–2003

[Data are based on reporting by a census of hospitals]

| Geographic division and State | 1960[1,2] | 1970[1] | 1980[1] | 1990[3] | 2000[3] | 2003[3] | 1960–70[1,2] | 1970–80[1] | 1980–90[4] | 1990–2000[3] | 2000–03[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Beds per 1,000 resident population[5] | | | | | | Average annual percent change | | | | |
| United States | 3.6 | 4.3 | 4.5 | 3.7 | 2.9 | 2.8 | 1.8 | 0.5 | –1.9 | –2.4 | –1.2 |
| New England | 3.9 | 4.1 | 4.1 | 3.4 | 2.5 | 2.4 | 0.5 | 0.0 | –1.9 | –3.0 | –1.4 |
| Connecticut | 3.4 | 3.4 | 3.5 | 2.9 | 2.3 | 2.1 | 0.0 | 0.3 | –1.9 | –2.3 | –3.0 |
| Maine | 3.4 | 4.7 | 4.7 | 3.7 | 2.9 | 2.8 | 3.3 | 0.0 | –2.4 | –2.4 | –1.2 |
| Massachusetts | 4.2 | 4.4 | 4.4 | 3.6 | 2.6 | 2.5 | 0.5 | 0.0 | –2.0 | –3.2 | –1.3 |
| New Hampshire | 4.4 | 4.0 | 3.9 | 3.1 | 2.3 | 2.2 | –0.9 | –0.3 | –2.3 | –2.9 | –1.5 |
| Rhode Island | 3.7 | 4.0 | 3.8 | 3.2 | 2.3 | 2.2 | 0.8 | –0.5 | –1.7 | –3.2 | –1.5 |
| Vermont | 4.5 | 4.5 | 4.4 | 3.0 | 2.7 | 2.4 | 0.0 | –0.2 | –3.8 | –1.0 | –3.9 |
| Middle Atlantic | 4.0 | 4.4 | 4.6 | 4.1 | 3.4 | 3.2 | 1.0 | 0.4 | –1.1 | –1.9 | –2.0 |
| New Jersey | 3.1 | 3.6 | 4.2 | 3.7 | 3.0 | 2.6 | 1.5 | 1.6 | –1.3 | –2.1 | –4.7 |
| New York | 4.3 | 4.6 | 4.5 | 4.1 | 3.5 | 3.4 | 0.7 | –0.2 | –0.9 | –1.6 | –1.0 |
| Pennsylvania | 4.1 | 4.7 | 4.8 | 4.4 | 3.4 | 3.3 | 1.4 | 0.2 | –0.9 | –2.5 | –1.0 |
| East North Central | 3.6 | 4.4 | 4.7 | 3.9 | 2.9 | 2.8 | 2.0 | 0.7 | –1.8 | –2.9 | –1.2 |
| Illinois | 4.0 | 4.7 | 5.1 | 4.0 | 3.0 | 2.8 | 1.6 | 0.8 | –2.4 | –2.8 | –2.3 |
| Indiana | 3.1 | 4.0 | 4.5 | 3.9 | 3.2 | 3.1 | 2.6 | 1.2 | –1.4 | –2.0 | –1.1 |
| Michigan | 3.3 | 4.3 | 4.4 | 3.7 | 2.6 | 2.6 | 2.7 | 0.2 | –1.7 | –3.5 | 0.0 |
| Ohio | 3.4 | 4.2 | 4.7 | 4.0 | 3.0 | 2.9 | 2.1 | 1.1 | –1.6 | –2.8 | –1.1 |
| Wisconsin | 4.3 | 5.2 | 4.9 | 3.8 | 2.9 | 2.7 | 1.9 | –0.6 | –2.5 | –2.7 | –2.4 |
| West North Central | 4.3 | 5.7 | 5.8 | 4.9 | 3.9 | 3.7 | 2.9 | 0.2 | –1.7 | –2.3 | –1.7 |
| Iowa | 3.9 | 5.6 | 5.7 | 5.1 | 4.0 | 3.7 | 3.7 | 0.2 | –1.1 | –2.4 | –2.6 |
| Kansas | 4.2 | 5.4 | 5.8 | 4.8 | 4.0 | 3.9 | 2.5 | 0.7 | –1.9 | –1.8 | –0.8 |
| Minnesota | 4.8 | 6.1 | 5.7 | 4.4 | 3.4 | 3.2 | 2.4 | –0.7 | –2.6 | –2.5 | –2.0 |
| Missouri | 3.9 | 5.1 | 5.7 | 4.8 | 3.6 | 3.4 | 2.7 | 1.1 | –1.7 | –2.8 | –1.9 |
| Nebraska | 4.4 | 6.2 | 6.0 | 5.5 | 4.8 | 4.3 | 3.5 | –0.3 | –0.9 | –1.4 | –3.6 |
| North Dakota | 5.2 | 6.8 | 7.4 | 7.0 | 6.0 | 5.7 | 2.7 | 0.8 | –0.6 | –1.5 | –1.7 |
| South Dakota | 4.5 | 5.6 | 5.5 | 6.1 | 5.7 | 5.8 | 2.2 | –0.2 | 1.0 | –0.7 | 0.6 |
| South Atlantic | 3.3 | 4.0 | 4.5 | 3.7 | 2.9 | 2.8 | 1.9 | 1.2 | –1.9 | –2.4 | –1.2 |
| Delaware | 3.7 | 3.7 | 3.6 | 3.0 | 2.3 | 2.5 | 0.0 | –0.3 | –1.8 | –2.6 | 2.8 |
| District of Columbia | 5.9 | 7.4 | 7.3 | 7.6 | 5.8 | 6.0 | 2.3 | –0.1 | 0.4 | –2.7 | 1.1 |
| Florida | 3.1 | 4.4 | 5.1 | 3.9 | 3.2 | 3.0 | 3.6 | 1.5 | –2.6 | –2.0 | –2.1 |
| Georgia | 2.8 | 3.8 | 4.6 | 4.0 | 2.9 | 2.8 | 3.1 | 1.9 | –1.4 | –3.2 | –1.2 |
| Maryland | 3.3 | 3.1 | 3.6 | 2.8 | 2.1 | 2.1 | –0.6 | 1.5 | –2.5 | –2.8 | 0.0 |
| North Carolina | 3.4 | 3.8 | 4.2 | 3.3 | 2.9 | 2.8 | 1.1 | 1.0 | –2.4 | –1.3 | –1.2 |
| South Carolina | 2.9 | 3.7 | 3.9 | 3.3 | 2.9 | 2.7 | 2.5 | 0.5 | –1.7 | –1.3 | –2.4 |
| Virginia | 3.0 | 3.7 | 4.1 | 3.3 | 2.4 | 2.3 | 2.1 | 1.0 | –2.1 | –3.1 | –1.4 |
| West Virginia | 4.1 | 5.4 | 5.5 | 4.7 | 4.4 | 4.3 | 2.8 | 0.2 | –1.6 | –0.7 | –0.8 |
| East South Central | 3.0 | 4.4 | 5.1 | 4.7 | 3.8 | 3.7 | 3.9 | 1.5 | –0.8 | –2.1 | –0.9 |
| Alabama | 2.8 | 4.3 | 5.1 | 4.6 | 3.7 | 3.5 | 4.4 | 1.7 | –1.0 | –2.2 | –1.8 |
| Kentucky | 3.0 | 4.0 | 4.5 | 4.3 | 3.7 | 3.6 | 2.9 | 1.2 | –0.5 | –1.5 | –0.9 |
| Mississippi | 2.9 | 4.4 | 5.3 | 5.0 | 4.8 | 4.5 | 4.3 | 1.9 | –0.6 | –0.4 | –2.1 |
| Tennessee | 3.4 | 4.7 | 5.5 | 4.8 | 3.6 | 3.5 | 3.3 | 1.6 | –1.4 | –2.8 | –0.9 |
| West South Central | 3.3 | 4.3 | 4.7 | 3.8 | 3.0 | 2.9 | 2.7 | 0.9 | –2.1 | –2.3 | –1.1 |
| Arkansas | 2.9 | 4.2 | 5.0 | 4.6 | 3.7 | 3.6 | 3.8 | 1.8 | –0.8 | –2.2 | –0.9 |
| Louisiana | 3.9 | 4.2 | 4.8 | 4.6 | 3.9 | 4.0 | 0.7 | 1.3 | –0.4 | –1.6 | 0.8 |
| Oklahoma | 3.2 | 4.5 | 4.6 | 4.0 | 3.2 | 3.1 | 3.5 | 0.2 | –1.4 | –2.2 | –1.1 |
| Texas | 3.3 | 4.3 | 4.7 | 3.5 | 2.7 | 2.6 | 2.7 | 0.9 | –2.9 | –2.6 | –1.3 |
| Mountain | 3.5 | 4.3 | 3.8 | 3.1 | 2.3 | 2.2 | 2.1 | –1.2 | –2.0 | –2.9 | –1.5 |
| Arizona | 3.0 | 4.1 | 3.6 | 2.7 | 2.1 | 1.9 | 3.2 | –1.3 | –2.8 | –2.5 | –3.3 |
| Colorado | 3.8 | 4.6 | 4.2 | 3.2 | 2.2 | 2.1 | 1.9 | –0.9 | –2.7 | –3.7 | –1.5 |
| Idaho | 3.2 | 4.0 | 3.7 | 3.2 | 2.7 | 2.5 | 2.3 | –0.8 | –1.4 | –1.7 | –2.5 |
| Montana | 5.1 | 5.8 | 5.9 | 5.8 | 4.7 | 4.7 | 1.3 | 0.2 | –0.2 | –2.1 | 0.0 |
| Nevada | 3.9 | 4.2 | 4.2 | 2.8 | 1.9 | 1.9 | 0.7 | 0.0 | –4.0 | –3.8 | 0.0 |
| New Mexico | 2.9 | 3.5 | 3.1 | 2.8 | 1.9 | 2.0 | 1.9 | –1.2 | –1.0 | –3.8 | 1.7 |
| Utah | 2.8 | 3.6 | 3.1 | 2.6 | 1.9 | 1.9 | 2.5 | –1.5 | –1.7 | –3.1 | 0.0 |
| Wyoming | 4.6 | 5.5 | 3.6 | 4.8 | 3.9 | 3.5 | 1.8 | –4.1 | 2.9 | –2.1 | –3.5 |
| Pacific | 3.1 | 3.7 | 3.5 | 2.7 | 2.1 | 2.1 | 1.8 | –0.6 | –2.6 | –2.5 | 0.0 |
| Alaska | 2.4 | 2.3 | 2.7 | 2.3 | 2.3 | 2.2 | –0.4 | 1.6 | –1.6 | 0.0 | –1.5 |
| California | 3.0 | 3.8 | 3.6 | 2.7 | 2.1 | 2.1 | 2.4 | –0.5 | –2.8 | –2.5 | 0.0 |
| Hawaii | 3.7 | 3.4 | 3.1 | 2.7 | 2.5 | 2.5 | –0.8 | –0.9 | –1.4 | –0.8 | 0.0 |
| Oregon | 3.5 | 4.0 | 3.5 | 2.8 | 1.9 | 1.9 | 1.3 | –1.3 | –2.2 | –3.8 | 0.0 |
| Washington | 3.3 | 3.5 | 3.1 | 2.5 | 1.9 | 1.8 | 0.6 | –1.2 | –2.1 | –2.7 | –1.8 |

[1]Data exclude facilities for the mentally retarded. See Appendix II, Hospital.
[2]1960 data include hospital units of institutions such as prisons and college infirmaries.
[3]Starting with 1990, data exclude hospital units of institutions, facilities for the mentally retarded, and alcoholism and chemical dependency hospitals. See Appendix II, Hospital.
[4]1990 data used in this calculation (not shown in table) exclude only facilities for the mentally retarded, consistent with exclusions from 1980 data.
[5]Civilian population for 1997 and earlier years.

NOTE: Data for additional years are available. See Appendix III.

SOURCES: American Hospital Association (AHA): Hospitals. *JAHA* 35(15):383–430, 1961 (Copyright 1961: Used with permission of AHA); National Center for Health Statistics, Division of Health Care Statistics and AHA Annual Survey of Hospitals for 1970, 1980; Hospital Statistics 1991–92, 2001–2005 Editions. Chicago (Copyrights 1971, 1981, 1991, 2001, 2002, 2003, 2005: Used with permission of Health Forum LLC, an affiliate of the American Hospital Association).

## Table 115. Occupancy rates in community hospitals and average annual percent change, according to geographic division and State: United States, selected years 1960–2003

[Data are based on reporting by a census of hospitals]

| Geographic division and State | 1960[1,2] | 1970[1] | 1980[1] | 1990[3] | 2000[3] | 2003[3] | 1960–70[1,2] | 1970–80[1] | 1980–90[4] | 1990–2000[3] | 2000–03[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Occupancy rate[5] | | | | | | Average annual percent change | | | | |
| United States | 75 | 77 | 75 | 67 | 64 | 66 | 0.3 | –0.3 | –1.1 | –0.5 | 1.0 |
| New England | 75 | 80 | 80 | 74 | 70 | 72 | 0.6 | 0.0 | –0.8 | –0.6 | 0.9 |
| Connecticut | 78 | 83 | 80 | 77 | 75 | 77 | 0.6 | –0.4 | –0.4 | –0.3 | 0.9 |
| Maine | 73 | 73 | 75 | 72 | 64 | 60 | 0.0 | 0.3 | –0.4 | –1.2 | –2.1 |
| Massachusetts | 76 | 80 | 82 | 74 | 71 | 75 | 0.5 | 0.2 | –1.0 | –0.4 | 1.8 |
| New Hampshire | 67 | 73 | 73 | 67 | 59 | 62 | 0.9 | 0.0 | –0.9 | –1.3 | 1.7 |
| Rhode Island | 76 | 83 | 86 | 79 | 72 | 75 | 0.9 | 0.4 | –0.8 | –0.9 | 1.4 |
| Vermont | 69 | 76 | 74 | 67 | 67 | 62 | 1.0 | –0.3 | –1.0 | 0.0 | –2.6 |
| Middle Atlantic | 78 | 82 | 83 | 81 | 74 | 74 | 0.5 | 0.1 | –0.2 | –0.9 | 0.0 |
| New Jersey | 78 | 83 | 83 | 80 | 69 | 74 | 0.6 | 0.0 | –0.4 | –1.5 | 2.4 |
| New York | 79 | 83 | 86 | 86 | 79 | 78 | 0.5 | 0.4 | 0.0 | –0.8 | –0.4 |
| Pennsylvania | 76 | 82 | 80 | 73 | 68 | 69 | 0.8 | –0.2 | –0.9 | –0.7 | 0.5 |
| East North Central | 78 | 80 | 77 | 65 | 61 | 63 | 0.3 | –0.4 | –1.7 | –0.6 | 1.1 |
| Illinois | 76 | 79 | 75 | 66 | 60 | 64 | 0.4 | –0.5 | –1.3 | –0.9 | 2.2 |
| Indiana | 80 | 80 | 78 | 61 | 56 | 58 | 0.0 | –0.3 | –2.4 | –0.9 | 1.2 |
| Michigan | 81 | 81 | 78 | 66 | 65 | 66 | 0.0 | –0.4 | –1.7 | –0.2 | 0.5 |
| Ohio | 81 | 82 | 79 | 65 | 61 | 62 | 0.1 | –0.4 | –1.9 | –0.6 | 0.5 |
| Wisconsin | 74 | 73 | 74 | 65 | 60 | 62 | –0.1 | 0.1 | –1.3 | –0.8 | 1.1 |
| West North Central | 72 | 74 | 71 | 62 | 60 | 61 | 0.3 | –0.4 | –1.3 | –0.3 | 0.6 |
| Iowa | 73 | 72 | 69 | 62 | 58 | 59 | –0.1 | –0.4 | –1.1 | –0.7 | 0.6 |
| Kansas | 69 | 71 | 69 | 56 | 53 | 56 | 0.3 | –0.3 | –2.1 | –0.5 | 1.9 |
| Minnesota | 72 | 74 | 74 | 67 | 67 | 69 | 0.3 | 0.0 | –1.0 | 0.0 | 1.0 |
| Missouri | 76 | 79 | 75 | 62 | 58 | 62 | 0.4 | –0.5 | –1.9 | –0.7 | 2.2 |
| Nebraska | 66 | 70 | 67 | 58 | 59 | 58 | 0.6 | –0.4 | –1.4 | 0.2 | –0.6 |
| North Dakota | 71 | 67 | 69 | 64 | 60 | 59 | –0.6 | 0.3 | –0.7 | –0.6 | –0.6 |
| South Dakota | 66 | 66 | 61 | 62 | 65 | 62 | 0.0 | –0.8 | 0.2 | 0.5 | –1.6 |
| South Atlantic | 75 | 78 | 76 | 67 | 65 | 68 | 0.4 | –0.3 | –1.3 | –0.3 | 1.5 |
| Delaware | 70 | 79 | 82 | 77 | 75 | 81 | 1.2 | 0.4 | –0.6 | –0.3 | 2.6 |
| District of Columbia | 81 | 78 | 83 | 75 | 74 | 73 | –0.4 | 0.6 | –1.0 | –0.1 | –0.5 |
| Florida | 74 | 76 | 72 | 62 | 61 | 65 | 0.3 | –0.5 | –1.5 | –0.2 | 2.1 |
| Georgia | 72 | 77 | 70 | 66 | 63 | 67 | 0.7 | –0.9 | –0.6 | –0.5 | 2.1 |
| Maryland | 74 | 79 | 84 | 79 | 73 | 75 | 0.7 | 0.6 | –0.6 | –0.8 | 0.9 |
| North Carolina | 74 | 79 | 78 | 73 | 70 | 71 | 0.7 | –0.1 | –0.7 | –0.4 | 0.5 |
| South Carolina | 77 | 76 | 77 | 71 | 69 | 73 | –0.1 | 0.1 | –0.8 | –0.3 | 1.9 |
| Virginia | 78 | 81 | 78 | 67 | 68 | 69 | 0.4 | –0.4 | –1.5 | 0.1 | 0.5 |
| West Virginia | 75 | 79 | 76 | 63 | 61 | 62 | 0.5 | –0.4 | –1.9 | –0.3 | 0.5 |
| East South Central | 72 | 78 | 75 | 63 | 59 | 61 | 0.8 | –0.4 | –1.7 | –0.7 | 1.1 |
| Alabama | 71 | 80 | 73 | 63 | 60 | 62 | 1.2 | –0.9 | –1.5 | –0.5 | 1.1 |
| Kentucky | 73 | 80 | 77 | 62 | 62 | 62 | 0.9 | –0.4 | –2.1 | 0.0 | 0.0 |
| Mississippi | 63 | 74 | 71 | 59 | 59 | 57 | 1.6 | –0.4 | –1.8 | 0.0 | –1.1 |
| Tennessee | 76 | 78 | 76 | 64 | 56 | 61 | 0.3 | –0.3 | –1.7 | –1.3 | 2.9 |
| West South Central | 69 | 73 | 70 | 58 | 58 | 62 | 0.6 | –0.4 | –1.9 | 0.0 | 2.2 |
| Arkansas | 70 | 74 | 70 | 62 | 59 | 58 | 0.6 | –0.6 | –1.2 | –0.5 | –0.6 |
| Louisiana | 68 | 74 | 70 | 57 | 56 | 60 | 0.8 | –0.6 | –2.0 | –0.2 | 2.3 |
| Oklahoma | 71 | 73 | 68 | 58 | 56 | 59 | 0.3 | –0.7 | –1.6 | –0.4 | 1.8 |
| Texas | 68 | 73 | 70 | 57 | 59 | 63 | 0.7 | –0.4 | –2.0 | 0.3 | 2.2 |
| Mountain | 70 | 71 | 70 | 61 | 61 | 64 | 0.1 | –0.1 | –1.4 | 0.0 | 1.6 |
| Arizona | 74 | 73 | 74 | 62 | 63 | 68 | –0.1 | 0.1 | –1.8 | 0.2 | 2.6 |
| Colorado | 81 | 74 | 72 | 64 | 58 | 65 | –0.9 | –0.3 | –1.2 | –1.0 | 3.9 |
| Idaho | 56 | 66 | 65 | 56 | 53 | 56 | 1.7 | –0.2 | –1.5 | –0.5 | 1.9 |
| Montana | 60 | 66 | 66 | 61 | 67 | 66 | 1.0 | 0.0 | –0.8 | 0.9 | –0.5 |
| Nevada | 71 | 73 | 69 | 60 | 71 | 71 | 0.3 | –0.6 | –1.4 | 1.7 | 0.0 |
| New Mexico | 65 | 70 | 66 | 58 | 58 | 58 | 0.7 | –0.6 | –1.3 | 0.0 | 0.0 |
| Utah | 70 | 74 | 70 | 59 | 56 | 57 | 0.6 | –0.6 | –1.7 | –0.5 | 0.6 |
| Wyoming | 61 | 63 | 57 | 54 | 56 | 53 | 0.3 | –1.0 | –0.5 | 0.4 | –1.8 |
| Pacific | 71 | 71 | 69 | 64 | 65 | 67 | 0.0 | –0.3 | –0.7 | 0.2 | 1.0 |
| Alaska | 54 | 59 | 58 | 50 | 57 | 54 | 0.9 | –0.2 | –1.5 | 1.3 | –1.8 |
| California | 74 | 71 | 69 | 64 | 66 | 69 | –0.4 | –0.3 | –0.7 | 0.3 | 1.5 |
| Hawaii | 62 | 76 | 75 | 85 | 76 | 72 | 2.1 | –0.1 | 1.3 | –1.1 | –1.8 |
| Oregon | 66 | 69 | 69 | 57 | 59 | 59 | 0.4 | 0.0 | –1.9 | 0.3 | 0.0 |
| Washington | 63 | 70 | 72 | 63 | 60 | 61 | 1.1 | 0.3 | –1.3 | –0.5 | 0.6 |

[1]Data exclude facilities for the mentally retarded. See Appendix II, Hospital.
[2]1960 data include hospital units of institutions such as prisons and college infirmaries.
[3]Starting with 1990, data exclude hospital units of institutions, facilities for the mentally retarded, and alcoholism and chemical dependency hospitals. See Appendix II, Hospital.
[4]1990 data used in this calculation (not shown in table) exclude only facilities for the mentally retarded, consistent with exclusions from 1980 data.
[5]Estimated percent of staffed beds that are occupied. See Appendix II, Occupancy rate.

NOTE: Data for additional years are available. See Appendix III.

SOURCES: American Hospital Association (AHA): Hospitals. *JAHA* 35(15):383–430, 1961. (Copyright 1961: Used with permission of AHA); AHA Annual Survey of Hospitals, 1970 and 1980 unpublished; Hospital Statistics 1991–92, 2001–2005 Editions. Chicago (Copyrights 1971, 1981, 1991, 2001, 2002, 2003, 2004, 2005: Used with permission of Health Forum LLC, an affiliate of the American Hospital Association).



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## Table 116 (page 1 of 2). Nursing homes, beds, occupancy, and residents, according to geographic division and State: United States, 1995–2003

[Data are based on a census of certified nursing facilities]

Click here for spreadsheet version

| Geographic division and State | Nursing homes | | | Beds | | |
|---|---|---|---|---|---|---|
| | 1995 | 2000 | 2003 | 1995 | 2000 | 2003 |
| United States | 16,389 | 16,886 | 16,323 | 1,751,302 | 1,795,388 | 1,756,699 |
| New England | 1,140 | 1,137 | 1,067 | 115,488 | 118,562 | 111,892 |
| Connecticut | 267 | 259 | 252 | 32,827 | 32,433 | 31,248 |
| Maine | 132 | 126 | 119 | 9,243 | 8,248 | 7,552 |
| Massachusetts | 550 | 526 | 478 | 54,532 | 56,030 | 52,323 |
| New Hampshire | 74 | 83 | 81 | 7,412 | 7,837 | 7,811 |
| Rhode Island | 94 | 99 | 94 | 9,612 | 10,271 | 9,376 |
| Vermont | 23 | 44 | 43 | 1,862 | 3,743 | 3,582 |
| Middle Atlantic | 1,650 | 1,796 | 1,767 | 244,342 | 267,772 | 264,041 |
| New Jersey | 300 | 361 | 356 | 43,967 | 52,195 | 50,551 |
| New York | 624 | 665 | 671 | 107,750 | 120,514 | 122,633 |
| Pennsylvania | 726 | 770 | 740 | 92,625 | 95,063 | 90,857 |
| East North Central | 3,171 | 3,301 | 3,182 | 367,879 | 369,657 | 360,504 |
| Illinois | 827 | 869 | 827 | 103,230 | 110,766 | 106,734 |
| Indiana | 556 | 564 | 527 | 59,538 | 56,762 | 55,475 |
| Michigan | 432 | 439 | 431 | 49,473 | 50,696 | 49,225 |
| Ohio | 943 | 1,009 | 989 | 106,884 | 105,038 | 106,426 |
| Wisconsin | 413 | 420 | 408 | 48,754 | 46,395 | 42,644 |
| West North Central | 2,258 | 2,281 | 2,212 | 200,109 | 193,754 | 186,548 |
| Iowa | 419 | 467 | 454 | 39,959 | 37,034 | 35,428 |
| Kansas | 429 | 392 | 374 | 30,016 | 27,067 | 27,045 |
| Minnesota | 432 | 433 | 425 | 43,865 | 42,149 | 39,336 |
| Missouri | 546 | 551 | 534 | 52,679 | 54,829 | 54,415 |
| Nebraska | 231 | 236 | 228 | 18,169 | 17,877 | 16,378 |
| North Dakota | 87 | 88 | 84 | 7,125 | 6,954 | 6,582 |
| South Dakota | 114 | 114 | 113 | 8,296 | 7,844 | 7,364 |
| South Atlantic | 2,215 | 2,418 | 2,374 | 243,069 | 264,147 | 263,651 |
| Delaware | 42 | 43 | 42 | 4,739 | 4,906 | 4,679 |
| District of Columbia | 19 | 20 | 21 | 3,206 | 3,078 | 3,114 |
| Florida | 627 | 732 | 693 | 72,656 | 83,365 | 82,546 |
| Georgia | 352 | 363 | 360 | 38,097 | 39,817 | 39,998 |
| Maryland | 218 | 255 | 243 | 28,394 | 31,495 | 29,362 |
| North Carolina | 391 | 410 | 423 | 38,322 | 41,376 | 43,022 |
| South Carolina | 166 | 178 | 178 | 16,682 | 18,102 | 18,306 |
| Virginia | 271 | 278 | 278 | 30,070 | 30,595 | 31,472 |
| West Virginia | 129 | 139 | 136 | 10,903 | 11,413 | 11,152 |
| East South Central | 1,014 | 1,071 | 1,065 | 99,707 | 106,250 | 108,105 |
| Alabama | 221 | 225 | 228 | 23,353 | 25,248 | 26,369 |
| Kentucky | 288 | 307 | 296 | 23,221 | 25,341 | 25,629 |
| Mississippi | 183 | 190 | 204 | 16,059 | 17,068 | 18,149 |
| Tennessee | 322 | 349 | 337 | 37,074 | 38,593 | 37,958 |
| West South Central | 2,264 | 2,199 | 2,069 | 224,695 | 224,100 | 217,469 |
| Arkansas | 256 | 255 | 242 | 29,952 | 25,715 | 24,791 |
| Louisiana | 337 | 337 | 314 | 37,769 | 39,430 | 38,397 |
| Oklahoma | 405 | 392 | 370 | 33,918 | 33,903 | 32,733 |
| Texas | 1,266 | 1,215 | 1,143 | 123,056 | 125,052 | 121,548 |
| Mountain | 800 | 827 | 785 | 70,134 | 75,152 | 73,464 |
| Arizona | 152 | 150 | 135 | 16,162 | 17,458 | 16,451 |
| Colorado | 219 | 225 | 215 | 19,912 | 20,240 | 20,127 |
| Idaho | 76 | 84 | 80 | 5,747 | 6,181 | 6,258 |
| Montana | 100 | 104 | 101 | 7,210 | 7,667 | 7,489 |
| Nevada | 42 | 51 | 44 | 3,998 | 5,547 | 5,197 |
| New Mexico | 83 | 80 | 81 | 6,969 | 7,289 | 7,443 |
| Utah | 91 | 93 | 90 | 7,101 | 7,651 | 7,438 |
| Wyoming | 37 | 40 | 39 | 3,035 | 3,119 | 3,061 |
| Pacific | 1,877 | 1,856 | 1,802 | 185,879 | 175,994 | 171,025 |
| Alaska | 15 | 15 | 14 | 814 | 821 | 806 |
| California | 1,382 | 1,369 | 1,342 | 140,203 | 131,762 | 129,658 |
| Hawaii | 34 | 45 | 45 | 2,513 | 4,006 | 4,059 |
| Oregon | 161 | 150 | 141 | 13,885 | 13,500 | 12,789 |
| Washington | 285 | 277 | 260 | 28,464 | 25,905 | 23,713 |

See footnotes at end of table.



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## Table 116 (page 2 of 2). Nursing homes, beds, occupancy, and residents, according to geographic division and State: United States, 1995–2003

[Data are based on a census of certified nursing facilities]

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| Geographic division and State | Residents | | | Occupancy rate[1] | | | Resident rate[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1995 | 2000 | 2003 | 1995 | 2000 | 2003 | 1995 | 2000 | 2003 |
| United States | 1,479,550 | 1,480,076 | 1,451,672 | 84.5 | 82.4 | 82.6 | 404.5 | 349.1 | 308.0 |
| New England | 105,792 | 106,308 | 101,561 | 91.6 | 89.7 | 90.8 | 474.2 | 419.5 | 359.2 |
| Connecticut | 29,948 | 29,657 | 28,622 | 91.2 | 91.4 | 91.6 | 541.7 | 461.4 | 386.8 |
| Maine | 8,587 | 7,298 | 6,954 | 92.9 | 88.5 | 92.1 | 417.9 | 313.0 | 274.9 |
| Massachusetts | 49,765 | 49,805 | 46,993 | 91.3 | 88.9 | 89.8 | 477.3 | 426.8 | 366.8 |
| New Hampshire | 6,877 | 7,158 | 7,145 | 92.8 | 91.3 | 91.5 | 434.1 | 392.6 | 346.7 |
| Rhode Island | 8,823 | 9,041 | 8,528 | 91.8 | 88.0 | 91.0 | 476.9 | 432.6 | 363.1 |
| Vermont | 1,792 | 3,349 | 3,319 | 96.2 | 89.5 | 92.7 | 207.0 | 335.0 | 296.7 |
| Middle Atlantic | 228,649 | 242,674 | 239,286 | 93.6 | 90.6 | 90.6 | 384.0 | 354.2 | 313.8 |
| New Jersey | 40,397 | 45,837 | 44,356 | 91.9 | 87.8 | 87.7 | 351.6 | 337.0 | 290.3 |
| New York | 103,409 | 112,957 | 113,456 | 96.0 | 93.7 | 92.5 | 371.8 | 362.6 | 330.5 |
| Pennsylvania | 84,843 | 83,880 | 81,474 | 91.6 | 88.2 | 89.7 | 419.2 | 353.1 | 305.9 |
| East North Central | 294,319 | 289,404 | 278,339 | 80.0 | 78.3 | 77.2 | 476.1 | 414.3 | 358.1 |
| Illinois | 83,696 | 83,604 | 79,833 | 81.1 | 75.5 | 74.8 | 495.3 | 435.4 | 377.4 |
| Indiana | 44,328 | 42,328 | 40,623 | 74.5 | 74.6 | 73.2 | 548.9 | 462.3 | 401.9 |
| Michigan | 43,271 | 42,615 | 41,547 | 87.5 | 84.1 | 84.4 | 345.0 | 299.1 | 256.5 |
| Ohio | 79,026 | 81,946 | 79,839 | 73.9 | 78.0 | 75.0 | 499.5 | 463.5 | 406.5 |
| Wisconsin | 43,998 | 38,911 | 36,497 | 90.2 | 83.9 | 85.6 | 518.9 | 406.9 | 343.2 |
| West North Central | 164,660 | 157,224 | 149,004 | 82.3 | 81.1 | 79.9 | 489.6 | 429.8 | 378.5 |
| Iowa | 27,506 | 29,204 | 27,805 | 68.8 | 78.9 | 78.5 | 458.0 | 448.5 | 394.8 |
| Kansas | 25,140 | 22,230 | 21,085 | 83.8 | 82.1 | 78.0 | 528.9 | 429.4 | 384.5 |
| Minnesota | 41,163 | 38,813 | 36,231 | 93.8 | 92.1 | 92.1 | 537.4 | 453.4 | 380.0 |
| Missouri | 39,891 | 38,586 | 37,345 | 75.7 | 70.4 | 68.6 | 432.8 | 391.5 | 361.1 |
| Nebraska | 16,166 | 14,989 | 13,598 | 89.0 | 83.8 | 83.0 | 501.4 | 441.5 | 376.0 |
| North Dakota | 6,868 | 6,343 | 6,137 | 96.4 | 91.2 | 93.2 | 522.0 | 430.7 | 380.8 |
| South Dakota | 7,926 | 7,059 | 6,803 | 95.5 | 90.0 | 92.4 | 543.3 | 438.8 | 391.4 |
| South Atlantic | 217,303 | 227,818 | 232,185 | 89.4 | 86.2 | 88.1 | 335.4 | 291.9 | 264.6 |
| Delaware | 3,819 | 3,900 | 3,962 | 80.6 | 79.5 | 84.7 | 448.7 | 369.7 | 318.6 |
| District of Columbia | 2,576 | 2,858 | 2,861 | 80.3 | 92.9 | 91.9 | 297.6 | 318.4 | 306.0 |
| Florida | 61,845 | 69,050 | 71,987 | 85.1 | 82.8 | 87.2 | 228.2 | 208.4 | 193.7 |
| Georgia | 35,933 | 36,559 | 36,372 | 94.3 | 91.8 | 90.9 | 496.0 | 416.1 | 375.4 |
| Maryland | 24,716 | 25,629 | 25,270 | 87.0 | 81.4 | 86.1 | 432.7 | 383.1 | 326.1 |
| North Carolina | 35,511 | 36,658 | 37,936 | 92.7 | 88.6 | 88.2 | 401.1 | 347.6 | 320.1 |
| South Carolina | 14,568 | 15,739 | 16,220 | 87.3 | 86.9 | 88.6 | 366.0 | 313.1 | 278.1 |
| Virginia | 28,119 | 27,091 | 27,614 | 93.5 | 88.5 | 87.7 | 385.2 | 310.4 | 277.9 |
| West Virginia | 10,216 | 10,334 | 9,963 | 93.7 | 90.5 | 89.3 | 355.2 | 325.2 | 298.4 |
| East South Central | 91,563 | 96,348 | 95,938 | 91.8 | 90.7 | 88.7 | 416.6 | 385.5 | 363.2 |
| Alabama | 21,691 | 23,089 | 23,564 | 92.9 | 91.4 | 89.4 | 370.1 | 343.1 | 329.6 |
| Kentucky | 20,696 | 22,730 | 22,814 | 89.1 | 89.7 | 89.0 | 391.9 | 390.1 | 370.5 |
| Mississippi | 15,247 | 15,815 | 16,057 | 94.9 | 92.7 | 88.5 | 405.3 | 368.7 | 366.8 |
| Tennessee | 33,929 | 34,714 | 33,503 | 91.5 | 89.9 | 88.3 | 479.6 | 426.1 | 383.6 |
| West South Central | 169,047 | 159,160 | 156,297 | 75.2 | 71.0 | 71.9 | 486.1 | 397.6 | 368.7 |
| Arkansas | 20,823 | 19,317 | 17,997 | 69.5 | 75.1 | 72.6 | 508.3 | 415.5 | 365.9 |
| Louisiana | 32,493 | 30,735 | 29,151 | 86.0 | 77.9 | 75.9 | 639.3 | 523.8 | 470.0 |
| Oklahoma | 26,377 | 23,833 | 21,679 | 77.8 | 70.3 | 66.2 | 499.1 | 416.8 | 372.6 |
| Texas | 89,354 | 85,275 | 87,470 | 72.6 | 68.2 | 72.0 | 439.9 | 358.4 | 343.7 |
| Mountain | 58,738 | 59,379 | 58,451 | 83.8 | 79.0 | 79.6 | 335.9 | 271.2 | 229.4 |
| Arizona | 12,382 | 13,253 | 13,245 | 76.6 | 75.9 | 80.5 | 233.3 | 193.4 | 163.7 |
| Colorado | 17,055 | 17,045 | 16,344 | 85.7 | 84.2 | 81.2 | 420.6 | 353.5 | 300.7 |
| Idaho | 4,697 | 4,640 | 4,754 | 81.7 | 75.1 | 76.0 | 321.7 | 257.0 | 224.2 |
| Montana | 6,415 | 5,973 | 5,739 | 89.0 | 77.9 | 76.6 | 491.4 | 389.5 | 328.1 |
| Nevada | 3,645 | 3,657 | 4,308 | 91.2 | 65.9 | 82.9 | 312.0 | 215.3 | 195.3 |
| New Mexico | 6,051 | 6,503 | 6,280 | 86.8 | 89.2 | 84.4 | 332.0 | 279.0 | 236.9 |
| Utah | 5,832 | 5,703 | 5,306 | 82.1 | 74.5 | 71.3 | 323.5 | 262.2 | 213.3 |
| Wyoming | 2,661 | 2,605 | 2,475 | 87.7 | 83.5 | 80.9 | 468.2 | 386.8 | 334.2 |
| Pacific | 149,479 | 141,761 | 140,611 | 80.4 | 80.5 | 82.2 | 302.4 | 241.3 | 207.7 |
| Alaska | 634 | 595 | 619 | 77.9 | 72.5 | 76.8 | 348.0 | 225.9 | 185.2 |
| California | 109,805 | 106,460 | 107,578 | 78.3 | 80.8 | 83.0 | 302.9 | 250.1 | 220.2 |
| Hawaii | 2,413 | 3,558 | 3,806 | 96.0 | 88.8 | 93.8 | 178.5 | 202.6 | 172.4 |
| Oregon | 11,673 | 9,990 | 8,640 | 84.1 | 74.0 | 67.6 | 244.9 | 173.9 | 131.0 |
| Washington | 24,954 | 21,158 | 19,968 | 87.7 | 81.7 | 84.2 | 362.5 | 251.6 | 205.9 |

[1]Percent of beds occupied (number of nursing home residents per 100 nursing home beds).

[2]Number of nursing home residents (all ages) per 1,000 resident population 85 years of age and over. Resident rates for 1995–99 are based on population estimates projected from the 1990 census. Starting with 2000, resident rates are based on the 2000 census.

NOTES: Annual numbers of nursing homes, beds, and residents are based on a 15-month OSCAR reporting cycle. See Appendix I, Online Survey Certification and Reporting Database (OSCAR). Data for additional years are available. See Appendix III.

SOURCES: Cowles CM, 1995 Nursing Home Statistical Yearbook. Anacortes, WA: Cowles Research Group, 1995; Cowles CM, 2000 Nursing Home Statistical Yearbook. Washington, DC: American Association of Homes and Services for the Aging, 2001; and Cowles Research Group, unpublished data. Based on data from the Centers for Medicare & Medicaid Services' Online Survey Certification and Reporting (OSCAR) database.



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## Table 117. Medicare-certified providers and suppliers: United States, selected years 1980–2003

[Data are compiled from various Centers for Medicare & Medicaid Services data systems]

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| Providers or suppliers | 1980 | 1985 | 1990 | 1996 | 1997 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | Number of providers or suppliers | | | | | | | | |
| Home health agencies | 2,924 | 5,679 | 5,730 | 8,437 | 10,807 | 7,857 | 7,099 | 6,813 | 6,928 |
| Clinical Lab Improvement Act Facilities | --- | --- | --- | 159,907 | 164,054 | 171,018 | 168,333 | 173,807 | 176,947 |
| End stage renal disease facilities | 999 | 1,393 | 1,937 | 2,876 | 3,367 | 3,787 | 3,991 | 4,113 | 4,309 |
| Outpatient physical therapy | 419 | 854 | 1,195 | 2,302 | 2,758 | 2,867 | 2,874 | 2,836 | 2,961 |
| Portable X-ray | 216 | 308 | 443 | 555 | 656 | 666 | 675 | 644 | 641 |
| Rural health clinics | 391 | 428 | 551 | 2,775 | 3,673 | 3,453 | 3,334 | 3,283 | 3,306 |
| Comprehensive outpatient rehabilitation facilities | --- | 72 | 186 | 307 | 531 | 522 | 518 | 524 | 587 |
| Ambulatory surgical centers | --- | 336 | 1,197 | 2,112 | 2,480 | 2,894 | 3,147 | 3,371 | 3,597 |
| Hospices | --- | 164 | 825 | 1,927 | 2,344 | 2,326 | 2,267 | 2,275 | 2,323 |

--- Data not available.

NOTES: Provider and supplier data for 1980–90 are as of July 1. Provider and supplier data for 1996–98 are as of December. Provider and supplier data for 2000, 2001, 2002, and 2003 are as of December 1999, December 2000, December 2001, and December 2002, respectively. Providers and suppliers certified for Medicare are deemed to meet Medicaid standards.

SOURCE: Centers for Medicare & Medicaid Services, Office of Research, Development, and Information.



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## Table 118. Total health expenditures as a percent of gross domestic product and per capita health expenditures in dollars: Selected countries and years 1960–2002

[Data compiled by the Organization for Economic Cooperation and Development]

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| Country | 1960 | 1970 | 1980 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001[1] | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Health expenditures as a percent of gross domestic product | | | | | |
| Australia | 4.1 | --- | 7.0 | 7.8 | 8.2 | 8.6 | 8.8 | 9.0 | 9.1 | --- |
| Austria | 4.3 | 5.3 | 7.6 | 7.1 | 8.2 | 7.7 | 7.8 | 7.7 | 7.6 | 7.7 |
| Belgium | --- | 4.0 | 6.4 | 7.4 | 8.7 | 8.6 | 8.7 | 8.8 | 9.0 | 9.1 |
| Canada | 5.4 | 7.0 | 7.1 | 9.0 | 9.2 | 9.2 | 9.0 | 8.9 | 9.4 | 9.6 |
| Czech Republic | --- | --- | --- | 5.0 | 7.3 | 7.1 | 7.1 | 7.1 | 7.3 | 7.4 |
| Denmark | --- | --- | 9.1 | 8.5 | 8.2 | 8.4 | 8.5 | 8.4 | 8.6 | 8.8 |
| Finland | 3.8 | 5.6 | 6.4 | 7.8 | 7.5 | 6.9 | 6.9 | 6.7 | 7.0 | 7.3 |
| France | 3.8 | 5.4 | 7.1 | 8.6 | 9.5 | 9.3 | 9.3 | 9.3 | 9.4 | 9.7 |
| Germany | --- | 6.2 | 8.7 | 8.5 | 10.6 | 10.6 | 10.6 | 10.6 | 10.8 | 10.9 |
| Greece | --- | 6.1 | 6.6 | 7.4 | 9.6 | 9.4 | 9.6 | 9.7 | 9.4 | 9.5 |
| Hungary | --- | --- | --- | --- | 7.5 | 7.3 | 7.4 | 7.1 | 7.4 | 7.8 |
| Iceland | 3.0 | 4.7 | 6.2 | 8.0 | 8.4 | 8.6 | 9.4 | 9.2 | 9.2 | 9.9 |
| Ireland | 3.7 | 5.1 | 8.4 | 6.1 | 6.8 | 6.2 | 6.3 | 6.4 | 6.9 | 7.3 |
| Italy | --- | --- | --- | 8.0 | 7.4 | 7.7 | 7.8 | 8.1 | 8.3 | 8.5 |
| Japan | 3.0 | 4.5 | 6.5 | 5.9 | 6.8 | 7.2 | 7.4 | 7.6 | 7.8 | --- |
| Korea | --- | --- | --- | 4.2 | 4.1 | 4.4 | 4.7 | 4.6 | 5.3 | 5.1 |
| Luxembourg | --- | 3.6 | 5.9 | 6.1 | 6.4 | 5.8 | 6.2 | 5.5 | 5.9 | 6.2 |
| Mexico | --- | --- | --- | 4.8 | 5.6 | 5.4 | 5.6 | 5.6 | 6.0 | 6.1 |
| Netherlands | --- | --- | 7.5 | 8.0 | 8.4 | 8.1 | 8.2 | 8.2 | 8.5 | 9.1 |
| New Zealand | --- | 5.1 | 5.9 | 6.9 | 7.2 | 7.9 | 7.8 | 7.9 | 8.0 | 8.5 |
| Norway | 2.9 | 4.4 | 7.0 | 7.7 | 7.9 | 8.5 | 8.5 | 7.7 | 8.9 | 9.6 |
| Poland | --- | --- | --- | 4.9 | 5.6 | 6.0 | 5.9 | 5.7 | 6.0 | 6.1 |
| Portugal | --- | 2.6 | 5.6 | 6.2 | 8.2 | 8.4 | 8.7 | 9.2 | 9.3 | 9.3 |
| Slovak Republic | --- | --- | --- | --- | --- | 5.7 | 5.8 | 5.5 | 5.6 | 5.7 |
| Spain | 1.5 | 3.6 | 5.4 | 6.7 | 7.6 | 7.5 | 7.5 | 7.5 | 7.5 | 7.6 |
| Sweden | --- | 6.9 | 9.1 | 8.4 | 8.1 | 8.3 | 8.4 | 8.4 | 8.8 | 9.2 |
| Switzerland | 4.9 | 5.4 | 7.3 | 8.3 | 9.7 | 10.3 | 10.5 | 10.4 | 10.9 | 11.2 |
| Turkey | --- | 2.4 | 3.3 | 3.6 | 3.4 | 4.8 | 6.4 | 6.6 | --- | --- |
| United Kingdom | 3.9 | 4.5 | 5.6 | 6.0 | 7.0 | 6.9 | 7.2 | 7.3 | 7.5 | 7.7 |
| United States | 5.1 | 7.0 | 8.8 | 12.0 | 13.4 | 13.2 | 13.2 | 13.3 | 14.1 | 14.9 |
| | | | | | Per capita health expenditures[1] | | | | | |
| Australia | $ 93 | --- | $ 684 | $1,300 | $1,737 | $2,077 | $2,231 | $2,379 | $2,504 | --- |
| Austria | 77 | 190 | 762 | 1,344 | 1,865 | 1,953 | 2,069 | 2,147 | 2,174 | 2,220 |
| Belgium | --- | 147 | 627 | 1,340 | 1,882 | 2,041 | 2,139 | 2,288 | 2,441 | 2,515 |
| Canada | 121 | 289 | 770 | 1,714 | 2,044 | 2,291 | 2,400 | 2,541 | 2,743 | 2,931 |
| Czech Republic | --- | --- | --- | 553 | 876 | 918 | 932 | 977 | 1,083 | 1,118 |
| Denmark | --- | --- | 943 | 1,554 | 1,843 | 2,141 | 2,297 | 2,353 | 2,520 | 2,583 |
| Finland | 62 | 190 | 584 | 1,414 | 1,428 | 1,607 | 1,641 | 1,698 | 1,841 | 1,943 |
| France | 69 | 206 | 699 | 1,555 | 2,025 | 2,231 | 2,306 | 2,416 | 2,588 | 2,736 |
| Germany | --- | 266 | 955 | 1,729 | 2,263 | 2,470 | 2,563 | 2,640 | 2,735 | 2,817 |
| Greece | --- | 171 | 464 | 838 | 1,269 | 1,428 | 1,517 | 1,617 | 1,670 | 1,814 |
| Hungary | --- | --- | --- | --- | 674 | 775 | 820 | 847 | 961 | 1,079 |
| Iceland | 57 | 163 | 698 | 1,598 | 1,853 | 2,252 | 2,540 | 2,559 | 2,680 | 2,807 |
| Ireland | 42 | 117 | 511 | 791 | 1,208 | 1,487 | 1,623 | 1,774 | 2,059 | 2,367 |
| Italy | --- | --- | --- | 1,397 | 1,524 | 1,800 | 1,853 | 2,001 | 2,107 | 2,166 |
| Japan | 29 | 144 | 559 | 1,105 | 1,530 | 1,742 | 1,829 | 1,958 | 2,077 | --- |
| Korea | --- | --- | --- | 329 | 491 | 589 | 714 | 777 | 943 | 996 |
| Luxembourg | --- | 161 | 637 | 1,533 | 2,053 | 2,291 | 2,734 | 2,682 | 2,900 | 3,065 |
| Mexico | --- | --- | --- | 290 | 380 | 427 | 463 | 494 | 536 | 553 |
| Netherlands | --- | --- | 750 | 1,419 | 1,827 | 2,016 | 2,098 | 2,196 | 2,455 | 2,643 |
| New Zealand | --- | 205 | 488 | 987 | 1,238 | 1,441 | 1,527 | 1,611 | 1,710 | 1,857 |
| Norway | 49 | 140 | 659 | 1,385 | 1,892 | 2,314 | 2,561 | 2,747 | 3,258 | 3,409 |
| Poland | --- | --- | --- | 298 | 423 | 563 | 571 | 578 | 629 | 654 |
| Portugal | --- | 54 | 283 | 661 | 1,080 | 1,290 | 1,424 | 1,570 | 1,662 | 1,702 |
| Slovak Republic | --- | --- | --- | --- | --- | 559 | 578 | 591 | 633 | 698 |
| Spain | 16 | 97 | 363 | 865 | 1,195 | 1,371 | 1,467 | 1,493 | 1,567 | 1,646 |
| Sweden | --- | 305 | 924 | 1,566 | 1,733 | 1,961 | 2,119 | 2,243 | 2,370 | 2,517 |
| Switzerland | 166 | 350 | 1,031 | 2,040 | 2,555 | 2,967 | 2,985 | 3,111 | 3,288 | 3,446 |
| Turkey | --- | 24 | 76 | 165 | 184 | 312 | 392 | 446 | --- | --- |
| United Kingdom | 84 | 160 | 472 | 977 | 1,393 | 1,607 | 1,725 | 1,839 | 2,012 | 2,160 |
| United States | 143 | 348 | 1,067 | 2,738 | 3,698 | 4,098 | 4,302 | 4,560 | 4,914 | 5,317 |

--- Data not available.

[1]Per capita health expenditures for each country have been adjusted to U.S. dollars using gross domestic product purchasing power parities (PPP) for each year.

NOTE: These data include revisions in health expenditures and may differ from previous editions of *Health, United States*.

SOURCES: All countries except United States from the Organization for Economic Cooperation and Development Health Data File 2004, 3rd edition following the annual update, www.oecd.org/els/health; United States data from the Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group. National health expenditures, 2003. Internet address: cms.hhs.gov/statistics/nhe.

## Table 119. Gross domestic product, Federal and State and local government expenditures, national health expenditures, and average annual percent change: United States, selected years 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Gross domestic product, government expenditures, and national health expenditures* | *1960* | *1970* | *1980* | *1990* | *1995* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount in billions | | | | |
| Gross domestic product (GDP) | $ 527 | $1,040 | $2,796 | $ 5,803 | $ 7,401 | $ 9,817 | $ 10,128 | $ 10,487 | $ 11,004 |
| Federal government expenditures | 85.8 | 198.6 | 576.6 | 1,228.7 | 1,575.7 | 1,864.4 | 1,969.5 | 2,101.8 | 2,241.6 |
| State and local government expenditures | 38.1 | 107.5 | 307.8 | 660.8 | 902.5 | 1,269.5 | 1,368.2 | 1,436.9 | 1,498.1 |
| National health expenditures | 26.7 | 73.1 | 245.8 | 696.0 | 990.2 | 1,309.9 | 1,426.4 | 1,559.0 | 1,678.9 |
| Private | 20.1 | 45.4 | 140.9 | 413.5 | 533.6 | 717.5 | 771.8 | 841.0 | 913.2 |
| Public | 6.6 | 27.6 | 104.8 | 282.5 | 456.6 | 592.4 | 654.6 | 718.0 | 765.7 |
| Federal government | 2.8 | 17.6 | 71.3 | 192.7 | 322.4 | 416.0 | 463.8 | 508.6 | 541.7 |
| State and local government | 3.8 | 10.0 | 33.5 | 89.8 | 134.2 | 176.4 | 190.8 | 209.4 | 224.0 |
| | | | | | Amount per capita | | | | |
| National health expenditures | $ 143 | $ 348 | $1,067 | $ 2,738 | $ 3,698 | $ 4,560 | $ 4,914 | $ 5,317 | $ 5,671 |
| Private | 108 | 216 | 612 | 1,627 | 1,993 | 2,498 | 2,659 | 2,869 | 3,084 |
| Public | 35 | 131 | 455 | 1,111 | 1,705 | 2,062 | 2,255 | 2,449 | 2,586 |
| | | | | | Percent | | | | |
| National health expenditures as percent of GDP | 5.1 | 7.0 | 8.8 | 12.0 | 13.4 | 13.3 | 14.1 | 14.9 | 15.3 |
| Health expenditures as a percent of total government expenditures | | | | | | | | | |
| Federal | 3.3 | 8.9 | 12.4 | 15.7 | 20.5 | 22.3 | 23.5 | 24.2 | 24.2 |
| State and local | 9.9 | 9.3 | 10.9 | 13.6 | 14.9 | 13.9 | 13.9 | 14.6 | 15.0 |
| | | | | | Percent distribution | | | | |
| National health expenditures | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Private | 75.2 | 62.2 | 57.3 | 59.4 | 53.9 | 54.8 | 54.1 | 53.9 | 54.4 |
| Public | 24.8 | 37.8 | 42.7 | 40.6 | 46.1 | 45.2 | 45.9 | 46.1 | 45.6 |
| | | | | | Average annual percent change from previous year shown | | | | |
| Gross domestic product | ... | 7.0 | 10.4 | 7.6 | 5.0 | 5.8 | 3.2 | 3.5 | 4.9 |
| Federal government expenditures | ... | 8.8 | 11.2 | 7.9 | 5.1 | 3.1 | 5.6 | 6.7 | 6.7 |
| State and local government expenditures | ... | 10.9 | 11.1 | 7.9 | 6.4 | 5.4 | 7.8 | 5.0 | 4.3 |
| National health expenditures | ... | 10.6 | 12.9 | 11.0 | 7.3 | 5.8 | 8.9 | 9.3 | 7.7 |
| Private | ... | 8.5 | 12.0 | 11.4 | 5.2 | 6.1 | 7.6 | 9.0 | 8.6 |
| Public | ... | 15.4 | 14.3 | 10.4 | 10.1 | 5.3 | 10.5 | 9.7 | 6.6 |
| Federal government | ... | 20.1 | 15.0 | 10.5 | 10.8 | 5.2 | 11.5 | 9.7 | 6.5 |
| State and local government | ... | 10.2 | 12.8 | 10.4 | 8.4 | 5.6 | 8.2 | 9.7 | 7.0 |
| National health expenditures, per capita | ... | 9.3 | 11.9 | 9.9 | 6.2 | 4.5 | 7.8 | 8.2 | 6.6 |
| Private | ... | 7.2 | 11.0 | 10.3 | 4.1 | 4.9 | 6.5 | 7.9 | 7.5 |
| Public | ... | 14.0 | 13.2 | 9.3 | 8.9 | 4.1 | 9.4 | 8.6 | 5.6 |

... Category not applicable.

NOTES: These data include revisions in health expenditures and may differ from previous editions of *Health, United States*. They reflect U.S. Bureau of the Census resident population estimates as of July 2004. Federal and State and local government total expenditures reflect September 2004 revisions from the Bureau of Economic Analysis. Percents are calculated using unrounded data.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National health accounts, National health expenditures, 2003. Internet address: www.cms.hhs.gov/statistics/nhe/.



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## Table 120. Consumer Price Index and average annual percent change for all items, selected items, and medical care components: United States, selected years 1960–2004

[Data are based on reporting by samples of providers and other retail outlets]

Click here for spreadsheet version

| Items and medical care components | 1960 | 1970 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Consumer Price Index (CPI) | | | | | |
| All items | 29.6 | 38.8 | 82.4 | 130.7 | 152.4 | 172.2 | 177.1 | 179.9 | 184.0 | 188.9 |
| All items excluding medical care | 30.2 | 39.2 | 82.8 | 128.8 | 148.6 | 167.3 | 171.9 | 174.3 | 178.1 | 182.7 |
| All services | 24.1 | 35.0 | 77.9 | 139.2 | 168.7 | 195.3 | 203.4 | 209.8 | 216.5 | 222.8 |
| Food | 30.0 | 39.2 | 86.8 | 132.4 | 148.4 | 167.8 | 173.1 | 176.2 | 180.0 | 186.2 |
| Apparel | 45.7 | 59.2 | 90.9 | 124.1 | 132.0 | 129.6 | 127.3 | 124.0 | 120.9 | 120.4 |
| Housing | --- | 36.4 | 81.1 | 128.5 | 148.5 | 169.6 | 176.4 | 180.3 | 184.8 | 189.5 |
| Energy | 22.4 | 25.5 | 86.0 | 102.1 | 105.2 | 124.6 | 129.3 | 121.7 | 136.5 | 151.4 |
| Medical care | 22.3 | 34.0 | 74.9 | 162.8 | 220.5 | 260.8 | 272.8 | 285.6 | 297.1 | 310.1 |
| Components of medical care | | | | | | | | | | |
| Medical care services | 19.5 | 32.3 | 74.8 | 162.7 | 224.2 | 266.0 | 278.8 | 292.9 | 306.0 | 321.3 |
| Professional services | --- | 37.0 | 77.9 | 156.1 | 201.0 | 237.7 | 246.5 | 253.9 | 261.2 | 271.5 |
| Physicians' services | 21.9 | 34.5 | 76.5 | 160.8 | 208.8 | 244.7 | 253.6 | 260.6 | 267.7 | 278.3 |
| Dental services | 27.0 | 39.2 | 78.9 | 155.8 | 206.8 | 258.5 | 269.0 | 281.0 | 292.5 | 306.9 |
| Eye glasses and eye care[1] | --- | --- | --- | 117.3 | 137.0 | 149.7 | 154.5 | 155.5 | 155.9 | 159.3 |
| Services by other medical professionals[1] | --- | --- | --- | 120.2 | 143.9 | 161.9 | 167.3 | 171.8 | 177.1 | 181.9 |
| Hospital and related services | --- | --- | 69.2 | 178.0 | 257.8 | 317.3 | 338.3 | 367.8 | 394.8 | 417.9 |
| Hospital services[2] | --- | --- | --- | --- | --- | 115.9 | 123.6 | 134.7 | 144.7 | 153.4 |
| Inpatient hospital services[2,3] | --- | --- | --- | --- | --- | 113.8 | 121.0 | 131.2 | 140.1 | 148.1 |
| Outpatient hospital services[1,3] | --- | --- | --- | 138.7 | 204.6 | 263.8 | 281.1 | 309.8 | 337.9 | 356.3 |
| Hospital rooms | 9.3 | 23.6 | 68.0 | 175.4 | 251.2 | --- | --- | --- | --- | --- |
| Other inpatient services[1] | --- | --- | --- | 142.7 | 206.8 | --- | --- | --- | --- | --- |
| Nursing homes and adult day care[2] | --- | --- | --- | --- | --- | 117.0 | 121.8 | 127.9 | 135.2 | 140.4 |
| Medical care commodities | 46.9 | 46.5 | 75.4 | 163.4 | 204.5 | 238.1 | 247.6 | 256.4 | 262.8 | 269.3 |
| Prescription drugs and medical supplies | 54.0 | 47.4 | 72.5 | 181.7 | 235.0 | 285.4 | 300.9 | 316.5 | 326.3 | 337.1 |
| Nonprescription drugs and medical supplies[1] | --- | --- | --- | 120.6 | 140.5 | 149.5 | 150.6 | 150.4 | 152.0 | 152.3 |
| Internal and respiratory over-the-counter drugs | --- | 42.3 | 74.9 | 145.9 | 167.0 | 176.9 | 178.9 | 178.8 | 181.2 | 180.9 |
| Nonprescription medical equipment and supplies | --- | --- | 79.2 | 138.0 | 166.3 | 178.1 | 178.2 | 177.5 | 178.1 | 179.7 |
| | | | | | Average annual percent change from previous year shown | | | | | |
| All items | ... | 2.7 | 7.8 | 4.7 | 3.1 | 2.5 | 2.8 | 1.6 | 2.3 | 2.7 |
| All items excluding medical care | ... | 2.6 | 7.8 | 4.5 | 2.9 | 2.4 | 2.7 | 1.4 | 2.2 | 2.6 |
| All services | ... | 3.8 | 8.3 | 6.0 | 3.9 | 3.0 | 4.1 | 3.1 | 3.2 | 2.9 |
| Food | ... | 2.7 | 8.3 | 4.3 | 2.3 | 2.5 | 3.2 | 1.8 | 2.2 | 3.4 |
| Apparel | ... | 2.6 | 4.4 | 3.2 | 1.2 | –0.4 | –1.8 | –2.6 | –2.5 | –0.4 |
| Housing | ... | --- | 8.3 | 4.7 | 2.9 | 2.7 | 4.0 | 2.2 | 2.5 | 2.5 |
| Energy | ... | 1.3 | 12.9 | 1.7 | 0.6 | 3.4 | 3.8 | –5.9 | 12.2 | 10.9 |
| Medical care | ... | 4.3 | 8.2 | 8.1 | 6.3 | 3.4 | 4.6 | 4.7 | 4.0 | 4.4 |
| Components of medical care | | | | | | | | | | |
| Medical care services | ... | 5.2 | 8.8 | 8.1 | 6.6 | 3.5 | 4.8 | 5.1 | 4.5 | 5.0 |
| Professional services | ... | --- | 7.7 | 7.2 | 5.2 | 3.4 | 3.7 | 3.0 | 2.9 | 3.9 |
| Physicians' services | ... | 4.6 | 8.3 | 7.7 | 5.4 | 3.2 | 3.6 | 2.8 | 2.7 | 4.0 |
| Dental services | ... | 3.8 | 7.2 | 7.0 | 5.8 | 4.6 | 4.1 | 4.5 | 4.1 | 4.9 |
| Eye glasses and eye care[1] | ... | --- | --- | --- | 3.2 | 1.8 | 3.2 | 0.6 | 0.3 | 2.2 |
| Services by other medical professionals[1] | ... | --- | --- | --- | 3.7 | 2.4 | 3.3 | 2.7 | 3.1 | 2.7 |
| Hospital and related services | ... | --- | --- | 9.9 | 7.7 | 4.2 | 6.6 | 8.7 | 7.3 | 5.9 |
| Hospital services[2] | ... | --- | --- | --- | --- | --- | 6.6 | 9.0 | 7.4 | 6.0 |
| Inpatient hospital services[2,3] | ... | --- | --- | --- | --- | --- | 6.3 | 8.4 | 6.8 | 5.7 |
| Outpatient hospital services[1,3] | ... | --- | --- | --- | 8.1 | 5.2 | 6.6 | 10.2 | 9.1 | 5.4 |
| Hospital rooms | ... | 9.8 | 11.2 | 9.9 | 7.4 | --- | --- | --- | --- | --- |
| Other inpatient services[1] | ... | --- | --- | --- | 7.7 | --- | --- | --- | --- | --- |
| Nursing homes and adult day care[2] | ... | --- | --- | --- | --- | --- | 4.1 | 5.0 | 5.7 | 3.8 |
| Medical care commodities | ... | –0.1 | 5.0 | 8.0 | 4.6 | 3.1 | 4.0 | 3.6 | 2.5 | 2.5 |
| Prescription drugs and medical supplies | ... | –1.3 | 4.3 | 9.6 | 5.3 | 4.0 | 5.4 | 5.2 | 3.1 | 3.3 |
| Nonprescription drugs and medical supplies[1] | ... | --- | --- | --- | 3.1 | 1.2 | 0.7 | –0.1 | 1.1 | 0.2 |
| Internal and respiratory over-the-counter drugs | ... | --- | 5.9 | 6.9 | 2.7 | 1.2 | 1.1 | –0.1 | 1.3 | –0.2 |
| Nonprescription medical equipment and supplies | ... | --- | --- | 5.7 | 3.8 | 1.4 | 0.1 | –0.4 | 0.3 | 0.9 |

--- Data not available.
... Category not applicable.
[1]December 1986 = 100.
[2]December 1996 = 100.
[3]Special index based on a substantially smaller sample.

NOTES: Consumer Price Index for all urban consumers (CPI-U) U.S. city average, detailed expenditure categories. 1982–84 = 100, except where noted. Data are not seasonally adjusted.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Various releases. 2004 data available from the Bureau of Labor Statistics Web site at www.bls.gov/cpi/cpid04av.pdf.



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## Table 121. Growth in personal health care expenditures and percent distribution of factors affecting growth: United States, 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Period | Average annual percent increase | Factors affecting growth | | | | |
|---|---|---|---|---|---|---|
| | | All factors | Inflation[1] | | Population | Intensity[2] |
| | | | Economy-wide | Medical | | |
| | | Percent distribution[3] | | | | |
| 1960–2003 | 10.1 | 100 | 39 | 17 | 11 | 32 |
| 1960–65 | 8.2 | 100 | 17 | 10 | 18 | 55 |
| 1965–70 | 12.7 | 100 | 33 | 12 | 8 | 46 |
| 1970–75 | 12.3 | 100 | 55 | 1 | 8 | 36 |
| 1975–80 | 13.7 | 100 | 55 | 12 | 7 | 26 |
| 1980–85 | 11.7 | 100 | 46 | 32 | 9 | 13 |
| 1980–81 | 16.1 | 100 | 60 | 17 | 7 | 16 |
| 1981–82 | 12.4 | 100 | 51 | 36 | 9 | 5 |
| 1982–83 | 10.1 | 100 | 40 | 35 | 10 | 14 |
| 1983–84 | 9.7 | 100 | 40 | 39 | 10 | 11 |
| 1984–85 | 10.1 | 100 | 31 | 41 | 10 | 18 |
| 1985–90 | 10.4 | 100 | 32 | 26 | 10 | 31 |
| 1985–86 | 8.7 | 100 | 26 | 31 | 11 | 31 |
| 1986–87 | 9.6 | 100 | 29 | 23 | 10 | 38 |
| 1987–88 | 11.3 | 100 | 31 | 25 | 9 | 35 |
| 1988–89 | 10.6 | 100 | 37 | 29 | 10 | 24 |
| 1989–90 | 11.7 | 100 | 34 | 24 | 11 | 31 |
| 1990–95 | 7.3 | 100 | 35 | 30 | 18 | 17 |
| 1990–91 | 10.3 | 100 | 35 | 21 | 14 | 30 |
| 1991–92 | 8.5 | 100 | 28 | 35 | 17 | 20 |
| 1992–93 | 6.4 | 100 | 37 | 37 | 21 | 5 |
| 1993–94 | 5.2 | 100 | 41 | 31 | 24 | 4 |
| 1994–95 | 6.0 | 100 | 35 | 27 | 21 | 18 |
| 1995–2000 | 5.6 | 100 | 30 | 19 | 21 | 30 |
| 1995–96 | 5.2 | 100 | 37 | 21 | 22 | 21 |
| 1996–97 | 5.3 | 100 | 32 | 9 | 23 | 36 |
| 1997–98 | 5.3 | 100 | 21 | 21 | 23 | 35 |
| 1998–99 | 5.5 | 100 | 27 | 24 | 21 | 28 |
| 1999–2000 | 6.6 | 100 | 34 | 18 | 17 | 31 |
| 2000–2003 | 8.2 | 100 | 25 | 22 | 13 | 40 |
| 2000–2001 | 8.7 | 100 | 28 | 17 | 12 | 43 |
| 2001–2002 | 8.7 | 100 | 20 | 27 | 12 | 42 |
| 2002–2003 | 7.3 | 100 | 26 | 24 | 14 | 36 |

[1]Total inflation is economy-wide and medical inflation is the medical inflation above economy-wide inflation.
[2]The residual percent of growth which cannot be attributed to price increases or population growth represents changes in use or kinds of services and supplies.
[3]Percents may not sum to 100 due to rounding.

NOTES: These data include revisions in health expenditures for 1995 forward and revisions in population for 1990 forward. Additionally, the implicit price deflator for Gross Domestic Product (GDP) is now used to measure economy-wide inflation for all years 1960–2003. Previous estimates of the factors accounting for growth used GDP chain-type price index. All indexes used to calculate the factors affecting growth were rebased in 2003 with base year 2000.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National health accounts, National health expenditures, 2003. Internet address: www.cms.hhs.gov/statistics/nhe/.



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## Table 122 (page 1 of 2). National health expenditures, average annual percent change, and percent distribution, according to type of expenditure: United States, selected years 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Type of national health expenditure | 1960 | 1970 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount in billions | | | | |
| National health expenditures | $26.7 | $73.1 | $245.8 | $696.0 | $990.2 | $1,309.9 | $1,426.4 | $1,559.0 | $1,678.9 |
| Health services and supplies | 25.0 | 67.3 | 233.5 | 669.6 | 957.6 | 1,260.9 | 1,373.8 | 1,499.8 | 1,614.2 |
| Personal health care | 23.4 | 63.2 | 214.6 | 609.4 | 865.7 | 1,136.1 | 1,235.5 | 1,342.9 | 1,440.8 |
| Hospital care | 9.2 | 27.6 | 101.5 | 253.9 | 343.6 | 413.1 | 446.4 | 484.2 | 515.9 |
| Professional services | 8.3 | 20.7 | 67.3 | 216.9 | 316.5 | 426.4 | 464.4 | 503.0 | 542.0 |
| Physician and clinical services | 5.4 | 14.0 | 47.1 | 157.5 | 220.5 | 290.2 | 315.1 | 340.8 | 369.7 |
| Other professional services | 0.4 | 0.7 | 3.6 | 18.2 | 28.6 | 38.8 | 42.6 | 46.1 | 48.5 |
| Dental services | 2.0 | 4.7 | 13.3 | 31.5 | 44.5 | 60.7 | 65.6 | 70.9 | 74.3 |
| Other personal health care | 0.6 | 1.3 | 3.3 | 9.6 | 22.9 | 36.7 | 41.1 | 45.3 | 49.5 |
| Nursing home and home health | 0.9 | 4.4 | 20.1 | 65.3 | 105.1 | 126.9 | 134.9 | 143.1 | 150.8 |
| Home health care[1] | 0.1 | 0.2 | 2.4 | 12.6 | 30.5 | 31.6 | 33.7 | 36.5 | 40.0 |
| Nursing home care[1] | 0.8 | 4.2 | 17.7 | 52.7 | 74.6 | 95.3 | 101.2 | 106.6 | 110.8 |
| Retail outlet sales of medical products | 5.0 | 10.5 | 25.7 | 73.3 | 100.5 | 169.7 | 189.7 | 212.6 | 232.1 |
| Prescription drugs | 2.7 | 5.5 | 12.0 | 40.3 | 60.8 | 121.5 | 140.8 | 161.8 | 179.2 |
| Other medical products | 2.3 | 5.0 | 13.7 | 33.1 | 39.7 | 48.1 | 48.9 | 50.7 | 52.9 |
| Government administration and net cost of private health insurance | 1.2 | 2.8 | 12.1 | 40.0 | 60.5 | 81.0 | 90.9 | 105.7 | 119.7 |
| Government public health activities[2] | 0.4 | 1.4 | 6.7 | 20.2 | 31.4 | 43.9 | 47.4 | 51.2 | 53.8 |
| Investment | 1.7 | 5.7 | 12.3 | 26.4 | 32.6 | 49.0 | 52.6 | 59.2 | 64.6 |
| Research[3] | 0.7 | 2.0 | 5.5 | 12.7 | 17.1 | 29.1 | 32.9 | 36.5 | 40.2 |
| Construction | 1.0 | 3.8 | 6.8 | 13.7 | 15.5 | 19.8 | 19.7 | 22.7 | 24.5 |
| | | | | | Average annual percent change from previous year shown | | | | |
| National health expenditures | ... | 10.6 | 12.9 | 11.0 | 7.3 | 5.8 | 8.9 | 9.3 | 7.7 |
| Health services and supplies | ... | 10.4 | 13.2 | 11.1 | 7.4 | 5.7 | 9.0 | 9.2 | 7.6 |
| Personal health care | ... | 10.5 | 13.0 | 11.0 | 7.3 | 5.6 | 8.7 | 8.7 | 7.3 |
| Hospital care | ... | 11.7 | 13.9 | 9.6 | 6.2 | 3.8 | 8.1 | 8.5 | 6.5 |
| Professional services | ... | 9.5 | 12.5 | 12.4 | 7.9 | 6.1 | 8.9 | 8.3 | 7.8 |
| Physician and clinical services | ... | 10.1 | 12.9 | 12.8 | 7.0 | 5.6 | 8.6 | 8.2 | 8.5 |
| Other professional services | ... | 6.6 | 17.1 | 17.5 | 9.5 | 6.3 | 9.9 | 8.0 | 5.3 |
| Dental services | ... | 9.1 | 11.1 | 9.0 | 7.1 | 6.4 | 8.0 | 8.0 | 4.8 |
| Other personal health care | ... | 7.2 | 10.0 | 11.4 | 18.9 | 9.9 | 12.1 | 10.1 | 9.2 |
| Nursing home and home health | ... | 17.2 | 16.3 | 12.5 | 10.0 | 3.8 | 6.3 | 6.1 | 5.4 |
| Home health care[1] | ... | 14.5 | 26.9 | 18.1 | 19.4 | 0.7 | 6.5 | 8.5 | 9.5 |
| Nursing home care[1] | ... | 17.4 | 15.4 | 11.5 | 7.2 | 5.0 | 6.2 | 5.3 | 4.0 |
| Retail outlet sales of medical products | ... | 7.8 | 9.4 | 11.1 | 6.5 | 11.0 | 11.8 | 12.0 | 9.2 |
| Prescription drugs | ... | 7.5 | 8.2 | 12.8 | 8.6 | 14.9 | 15.9 | 14.9 | 10.7 |
| Other medical products | ... | 8.1 | 10.6 | 9.2 | 3.8 | 3.9 | 1.7 | 3.6 | 4.2 |
| Government administration and net cost of private health insurance | ... | 8.6 | 15.9 | 12.7 | 8.6 | 6.0 | 12.3 | 16.3 | 13.2 |
| Government public health activities | ... | 13.2 | 17.4 | 11.6 | 9.2 | 6.9 | 8.1 | 7.9 | 5.1 |
| Investment | ... | 12.9 | 7.9 | 8.0 | 4.3 | 8.5 | 7.4 | 12.7 | 9.1 |
| Research[3] | ... | 10.9 | 10.8 | 8.8 | 6.2 | 11.3 | 12.9 | 11.0 | 10.0 |
| Construction | ... | 14.1 | 6.1 | 7.3 | 2.4 | 5.1 | –0.7 | 15.5 | 7.7 |

See footnotes at end of table.



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## Table 122 (page 2 of 2). National health expenditures, average annual percent change, and percent distribution, according to type of expenditure: United States, selected years 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Type of national health expenditure* | *1960* | *1970* | *1980* | *1990* | *1995* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Percent distribution | | | | |
| National health expenditures | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Health services and supplies | 93.6 | 92.2 | 95.0 | 96.2 | 96.7 | 96.3 | 96.3 | 96.2 | 96.1 |
| Personal health care | 87.6 | 86.5 | 87.3 | 87.6 | 87.4 | 86.7 | 86.6 | 86.1 | 85.8 |
| Hospital care | 34.4 | 37.8 | 41.3 | 36.5 | 34.7 | 31.5 | 31.3 | 31.1 | 30.7 |
| Professional services | 31.3 | 28.3 | 27.4 | 31.2 | 32.0 | 32.6 | 32.6 | 32.3 | 32.3 |
| Physician and clinical services | 20.1 | 19.1 | 19.2 | 22.6 | 22.3 | 22.2 | 22.1 | 21.9 | 22.0 |
| Other professional services | 1.5 | 1.0 | 1.5 | 2.6 | 2.9 | 3.0 | 3.0 | 3.0 | 2.9 |
| Dental services | 7.4 | 6.4 | 5.4 | 4.5 | 4.5 | 4.6 | 4.6 | 4.5 | 4.4 |
| Other personal health care | 2.4 | 1.7 | 1.3 | 1.4 | 2.3 | 2.8 | 2.9 | 2.9 | 2.9 |
| Nursing home and home health | 3.4 | 6.1 | 8.2 | 9.4 | 10.6 | 9.7 | 9.5 | 9.2 | 9.0 |
| Home health care[1] | 0.2 | 0.3 | 1.0 | 1.8 | 3.1 | 2.4 | 2.4 | 2.3 | 2.4 |
| Nursing home care[1] | 3.2 | 5.8 | 7.2 | 7.6 | 7.5 | 7.3 | 7.1 | 6.8 | 6.6 |
| Retail outlet sales of medical products | 18.6 | 14.3 | 10.5 | 10.5 | 10.2 | 13.0 | 13.3 | 13.6 | 13.8 |
| Prescription drugs | 10.0 | 7.5 | 4.9 | 5.8 | 6.1 | 9.3 | 9.9 | 10.4 | 10.7 |
| Other medical products | 8.5 | 6.8 | 5.6 | 4.7 | 4.0 | 3.7 | 3.4 | 3.3 | 3.1 |
| Government administration and net cost of private health insurance | 4.5 | 3.8 | 4.9 | 5.7 | 6.1 | 6.2 | 6.4 | 6.8 | 7.1 |
| Government public health activities | 1.5 | 1.9 | 2.7 | 2.9 | 3.2 | 3.3 | 3.3 | 3.3 | 3.2 |
| Investment | 6.4 | 7.8 | 5.0 | 3.8 | 3.3 | 3.7 | 3.7 | 3.8 | 3.9 |
| Research[3] | 2.6 | 2.7 | 2.2 | 1.8 | 1.7 | 2.2 | 2.3 | 2.3 | 2.4 |
| Construction | 3.8 | 5.2 | 2.8 | 2.0 | 1.6 | 1.5 | 1.4 | 1.5 | 1.5 |

. . . Category not applicable.

[1]Freestanding facilities only. Additional services of this type are provided in hospital-based facilities and counted as hospital care.

[2]Includes personal care services delivered by government public health agencies.

[3]Research and development expenditures of drug companies and other manufacturers and providers of medical equipment and supplies are excluded from "research expenditures," but are included in the expenditure class in which the product falls in that they are covered by the payment received for that product.

NOTES: These data include revisions in health expenditures and differ from previous editions of *Health, United States*. Percents are calculated using unrounded data.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National health accounts, National health expenditures, 2003. Internet address: www.cms.hhs.gov/statistics/nhe/.



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## Table 123 (page 1 of 2). Personal health care expenditures, according to type of expenditure and source of funds: United States, selected years 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

Click here for spreadsheet version

| *Type of personal health care expenditures and source of funds* | *1960* | *1970* | *1980* | *1990* | *1995* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount | | | | |
| Per capita | $ 126 | $ 301 | $ 931 | $2,398 | $3,233 | $ 3,955 | $ 4,257 | $ 4,580 | $ 4,866 |
| | | | | | Amount in billions | | | | |
| All personal health care expenditures[1] | $ 23.4 | $ 63.2 | $214.6 | $609.4 | $865.7 | $1,136.1 | $1,235.5 | $1,342.9 | $1,440.8 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 55.2 | 39.7 | 27.1 | 22.5 | 16.9 | 17.0 | 16.3 | 16.0 | 16.0 |
| Private health insurance | 21.4 | 22.3 | 28.3 | 33.4 | 33.4 | 35.1 | 35.4 | 35.7 | 36.0 |
| Other private funds | 2.0 | 2.8 | 4.3 | 5.0 | 5.1 | 4.8 | 4.4 | 4.2 | 4.2 |
| Government | 21.4 | 35.2 | 40.3 | 39.0 | 44.6 | 43.1 | 43.8 | 44.2 | 43.8 |
| Federal | 8.7 | 22.9 | 29.3 | 28.6 | 34.1 | 32.7 | 33.5 | 33.7 | 33.3 |
| State and local | 12.6 | 12.3 | 11.1 | 10.5 | 10.5 | 10.4 | 10.3 | 10.5 | 10.5 |
| | | | | | Amount in billions | | | | |
| Hospital care expenditures[2] | $ 9.2 | $ 27.6 | $101.5 | $253.9 | $343.6 | $ 413.1 | $ 446.4 | $ 484.2 | $ 515.9 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 20.8 | 9.1 | 5.2 | 4.4 | 3.1 | 3.1 | 3.0 | 3.1 | 3.2 |
| Private health insurance | 35.8 | 32.6 | 35.6 | 38.3 | 32.5 | 33.4 | 33.6 | 33.8 | 34.4 |
| Other private funds | 1.2 | 3.3 | 4.9 | 4.1 | 4.3 | 4.9 | 4.4 | 4.1 | 4.1 |
| Government[3] | 42.2 | 55.1 | 54.3 | 53.2 | 60.1 | 58.6 | 59.1 | 59.0 | 58.3 |
| Medicaid[4] | ... | 9.6 | 10.4 | 10.9 | 15.9 | 16.9 | 16.6 | 17.1 | 16.9 |
| Medicare | ... | 19.4 | 26.0 | 26.7 | 31.2 | 30.6 | 31.1 | 30.7 | 30.3 |
| | | | | | Amount in billions | | | | |
| Physician services expenditures | $ 5.4 | $ 14.0 | $ 47.1 | $157.5 | $220.5 | $ 290.2 | $ 315.1 | $ 340.8 | $ 369.7 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 61.6 | 46.1 | 30.2 | 19.3 | 11.9 | 11.1 | 10.5 | 10.2 | 10.2 |
| Private health insurance | 29.8 | 30.1 | 35.3 | 43.0 | 48.5 | 48.5 | 48.6 | 49.1 | 49.7 |
| Other private funds | 1.4 | 1.6 | 3.9 | 7.2 | 8.0 | 7.3 | 7.1 | 6.9 | 6.9 |
| Government[3] | 7.2 | 22.2 | 30.5 | 30.6 | 31.6 | 33.1 | 33.8 | 33.8 | 33.3 |
| Medicaid[4] | ... | 4.6 | 5.2 | 4.5 | 6.7 | 6.6 | 6.9 | 7.2 | 7.1 |
| Medicare | ... | 11.8 | 17.4 | 19.1 | 19.0 | 20.4 | 20.7 | 20.2 | 19.9 |
| | | | | | Amount in billions | | | | |
| Nursing home expenditures[5] | $ 0.8 | $ 4.2 | $ 17.7 | $ 52.7 | $ 74.6 | $ 95.3 | $ 101.2 | $ 106.6 | $ 110.8 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 77.9 | 53.6 | 40.0 | 37.5 | 26.9 | 28.7 | 27.9 | 26.6 | 27.9 |
| Private health insurance | 0.0 | 0.2 | 1.2 | 5.8 | 7.5 | 7.9 | 7.8 | 7.6 | 7.6 |
| Other private funds | 6.3 | 4.9 | 4.5 | 7.5 | 6.4 | 4.5 | 3.8 | 3.6 | 3.8 |
| Government[3] | 15.7 | 41.2 | 54.2 | 49.2 | 59.1 | 58.9 | 60.4 | 62.3 | 60.7 |
| Medicaid[4] | ... | 22.3 | 50.2 | 43.9 | 47.5 | 46.7 | 46.1 | 47.4 | 46.1 |
| Medicare | ... | 3.4 | 1.7 | 3.2 | 9.3 | 10.0 | 12.0 | 12.7 | 12.4 |

See footnotes at end of table.



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## Table 123 (page 2 of 2). Personal health care expenditures, according to type of expenditure and source of funds: United States, selected years 1960–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Type of personal health care expenditures and source of funds* | *1960* | *1970* | *1980* | *1990* | *1995* | *2000* | *2001* | *2002* | *2003* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount in billions | | | | |
| Prescription drug expenditures | $ 2.7 | $ 5.5 | $ 12.0 | $ 40.3 | $ 60.8 | $121.5 | $140.8 | $161.8 | $179.2 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 96.0 | 82.4 | 69.4 | 59.1 | 42.7 | 31.5 | 30.2 | 29.5 | 29.7 |
| Private health insurance | 1.3 | 8.8 | 16.7 | 24.4 | 37.1 | 46.5 | 47.5 | 47.7 | 46.3 |
| Other private funds | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Government[3] | 2.7 | 8.8 | 13.9 | 16.6 | 20.1 | 21.9 | 22.3 | 22.9 | 24.1 |
| Medicaid[4] | . . . | 7.6 | 11.7 | 12.6 | 16.0 | 17.1 | 17.4 | 17.7 | 18.8 |
| Medicare | . . . | 0.0 | 0.0 | 0.5 | 1.3 | 1.9 | 1.8 | 1.6 | 1.6 |
| | | | | | Amount in billions | | | | |
| All other personal health care expenditures[6] | $ 5.3 | $ 11.9 | $ 36.3 | $104.9 | $166.2 | $216.0 | $232.0 | $249.5 | $265.1 |
| | | | | | Percent distribution | | | | |
| All sources of funds | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Out-of-pocket payments | 84.2 | 78.6 | 64.3 | 49.6 | 38.3 | 38.3 | 36.5 | 35.5 | 34.9 |
| Private health insurance | 1.6 | 3.3 | 15.5 | 24.7 | 25.2 | 26.2 | 25.8 | 25.3 | 25.0 |
| Other private funds | 4.2 | 3.6 | 4.3 | 4.7 | 4.3 | 4.0 | 3.7 | 3.5 | 3.4 |
| Government[3] | 10.1 | 14.5 | 16.0 | 20.9 | 32.2 | 31.6 | 34.0 | 35.7 | 36.7 |
| Medicaid[4] | . . . | 3.3 | 3.9 | 6.5 | 12.5 | 15.7 | 17.2 | 18.3 | 19.1 |
| Medicare | . . . | 1.1 | 3.8 | 7.1 | 13.1 | 9.0 | 9.8 | 10.4 | 10.6 |

. . . Category not applicable.

[1]Includes all expenditures for specified health services and supplies other than expenses for program administration, net cost of private health insurance, and government public health activities.

[2]Includes expenditures for hospital-based nursing home care and home health agency care.

[3]Includes other government expenditures for these health care services, for example, Medicaid State Children's Health Insurance Program (SCHIP) expansion and SCHIP, care funded by the Department of Veterans Affairs, and State and locally financed subsidies to hospitals.

[4]Excludes Medicaid SCHIP expansion and SCHIP.

[5]Includes expenditures for care in freestanding nursing homes. Expenditures for care in facility-based nursing homes are included with hospital care.

[6]Includes expenditures for dental services, other professional services, home health care, nonprescription drugs and other medical nondurables, vision products and other medical durables, and other personal health care, not shown separately.

NOTES: These data include revisions in health expenditures and differ from previous editions of *Health, United States*. Percents are calculated using unrounded data.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National health accounts, National health expenditures, 2003. Internet address: www.cms.hhs.gov/statistics/nhe/.



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## Table 124 (page 1 of 2). Expenses for health care and prescribed medicine according to selected population characteristics: United States, selected years 1987–2002

[Data are based on household interviews of a sample of the noninstitutionalized population and a sample of medical providers]

Click here for spreadsheet version

| Characteristic | Population in millions[2] | | | Total expenses[1]: Percent of persons with expense | | | | Total expenses[1]: Mean annual expense per person with expense[3] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 2000 | 2002 | 1987 | 1997 | 2000 | 2002 | 1987 | 1997 | 2000 | 2002 |
| All ages | 271.3 | 278.4 | 288.2 | 84.5 | 84.1 | 83.5 | 85.2 | $2,474 | $2,717 | $2,821 | $3,302 |
| Under 65 years: | | | | | | | | | | | |
| Total | 237.1 | 243.6 | 251.9 | 83.2 | 82.5 | 81.8 | 83.6 | $1,926 | $2,060 | $2,222 | $2,557 |
| Under 6 years | 23.8 | 24.1 | 23.3 | 88.9 | 88.0 | 86.7 | 88.8 | 1,636 | 962 | 1,174 | 1,364 |
| 6–17 years | 48.1 | 48.4 | 49.5 | 80.2 | 81.7 | 80.0 | 83.6 | 1,078 | 1,079 | 1,167 | 1,228 |
| 18–44 years | 108.9 | 109.0 | 111.2 | 81.5 | 78.3 | 77.7 | 78.5 | 1,693 | 1,867 | 1,990 | 2,233 |
| 45–64 years | 56.3 | 62.1 | 68.0 | 87.0 | 89.2 | 88.5 | 90.0 | 3,278 | 3,616 | 3,721 | 4,321 |
| Sex | | | | | | | | | | | |
| Male | 118.0 | 120.9 | 125.4 | 78.8 | 77.6 | 76.6 | 78.2 | 1,816 | 1,862 | 2,127 | 2,350 |
| Female | 119.1 | 122.7 | 126.6 | 87.5 | 87.4 | 87.0 | 89.0 | 2,019 | 2,235 | 2,305 | 2,737 |
| Hispanic origin and race[4] | | | | | | | | | | | |
| Hispanic or Latino | 29.4 | 32.0 | 37.5 | 71.0 | 69.5 | 69.0 | 69.6 | 1,536 | 1,715 | 1,514 | 1,793 |
| Not Hispanic or Latino: | | | | | | | | | | | |
| White | 166.2 | 169.2 | 165.8 | 86.9 | 87.2 | 86.6 | 88.7 | 1,932 | 2,210 | 2,324 | 2,761 |
| Black or African American | 31.3 | 32.1 | 31.8 | 72.2 | 72.1 | 71.3 | 76.1 | 2,330 | 1,652 | 2,360 | 2,557 |
| Other | 10.2 | 10.2 | 16.8 | 72.8 | 75.8 | 76.0 | 78.6 | 1,278 | 1,370 | 1,894 | 1,790 |
| Insurance status[5] | | | | | | | | | | | |
| Any private insurance | 174.0 | 181.6 | 181.5 | 86.5 | 86.5 | 85.9 | 88.2 | 1,847 | 2,099 | 2,117 | 2,485 |
| Public insurance only | 29.8 | 29.7 | 36.7 | 82.4 | 83.3 | 83.6 | 84.7 | 3,098 | 2,504 | 3,373 | 3,590 |
| Uninsured all year | 33.3 | 32.3 | 33.7 | 61.8 | 61.1 | 57.3 | 57.4 | 1,204 | 1,231 | 1,567 | 1,491 |
| 65 years and over | 34.2 | 34.8 | 36.3 | 93.7 | 95.2 | 95.5 | 96.3 | $6,110 | $6,666 | $6,415 | $7,797 |
| Sex | | | | | | | | | | | |
| Male | 14.6 | 15.0 | 15.4 | 92.0 | 94.5 | 93.4 | 95.8 | 6,252 | 7,491 | 6,878 | 8,186 |
| Female | 19.6 | 19.8 | 20.8 | 94.9 | 95.7 | 97.1 | 96.7 | 6,010 | 6,058 | 6,077 | 7,511 |
| Hispanic origin and race[4] | | | | | | | | | | | |
| Hispanic or Latino | 1.7 | 1.9 | 2.2 | 82.5 | 94.2 | 92.5 | 90.2 | 5,818 | 6,975 | 5,756 | 7,925 |
| Not Hispanic or Latino: | | | | | | | | | | | |
| White | 28.8 | 28.9 | 29.6 | 94.9 | 95.9 | 95.9 | 97.2 | 6,015 | 6,699 | 6,512 | 7,824 |
| Black or African American | 2.8 | 2.9 | 3.0 | 88.5 | 92.2 | 94.0 | 93.8 | 7,364 | 6,565 | 6,169 | 7,938 |
| Other | * | * | 1.4 | * | * | * | 92.5 | * | * | * | 6,678 |
| Insurance status[6] | | | | | | | | | | | |
| Medicare only | 8.8 | 12.0 | 11.1 | 85.9 | 92.1 | 94.8 | 95.1 | 4,813 | 6,141 | 5,508 | 7,180 |
| Medicare and private insurance | 21.7 | 19.2 | 20.4 | 95.4 | 97.0 | 96.0 | 97.6 | 6,045 | 6,501 | 6,578 | 7,814 |
| Medicare and other public coverage | 3.2 | 3.2 | 4.3 | 94.4 | 93.2 | 96.3 | 95.3 | 9,388 | 9,395 | 8,802 | 9,606 |

See footnotes at end of table.



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## Table 124 (page 2 of 2). Expenses for health care and prescribed medicine according to selected population characteristics: United States, selected years 1987–2002

[Data are based on household interviews of a sample of the noninstitutionalized population and a sample of medical providers]

Click here for spreadsheet version

| Characteristic | Prescribed medicine expenses | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Percent of persons with expense | | | | Mean annual out-of-pocket expense per person with out-of-pocket expense[3,7] | | | |
| | 1987 | 1997 | 2000 | 2002 | 1987 | 1997 | 2000 | 2002 |
| All ages | 57.3 | 62.1 | 62.3 | 64.4 | $146 | $226 | $286 | $344 |
| Under 65 years: | | | | | | | | |
| Total | 54.0 | 58.7 | 58.5 | 60.6 | $108 | $160 | $208 | 242 |
| Under 6 years | 61.8 | 61.3 | 56.9 | 58.4 | 38 | 39 | 39 | 43 |
| 6–17 years | 44.3 | 48.2 | 46.2 | 50.0 | 71 | 61 | 73 | 86 |
| 18–44 years | 51.3 | 55.9 | 56.0 | 56.8 | 84 | 137 | 158 | 191 |
| 45–64 years | 65.3 | 71.8 | 73.3 | 75.3 | 204 | 298 | 392 | 434 |
| Sex | | | | | | | | |
| Male | 46.5 | 51.5 | 51.3 | 53.2 | 100 | 142 | 183 | 212 |
| Female | 61.4 | 65.8 | 65.6 | 67.9 | 114 | 174 | 228 | 265 |
| Hispanic origin and race[4] | | | | | | | | |
| Hispanic or Latino | 41.6 | 47.7 | 45.0 | 45.5 | 78 | 106 | 153 | 177 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 57.7 | 63.1 | 63.8 | 66.7 | 112 | 174 | 224 | 259 |
| Black or African American | 44.1 | 50.0 | 47.6 | 51.2 | 95 | 129 | 171 | 227 |
| Other | 41.1 | 44.8 | 47.8 | 51.6 | 79 | 139 | 146 | 181 |
| Insurance status[5] | | | | | | | | |
| Any private insurance | 56.5 | 61.6 | 61.6 | 64.9 | 111 | 152 | 179 | 217 |
| Public insurance only | 56.5 | 62.0 | 62.4 | 60.1 | 74 | 158 | 298 | 267 |
| Uninsured all year | 35.1 | 40.2 | 37.6 | 38.1 | 119 | 231 | 345 | 426 |
| 65 years and over | 81.6 | 86.0 | 88.3 | 90.5 | $336 | $541 | 651 | 817 |
| Sex | | | | | | | | |
| Male | 78.0 | 82.8 | 83.9 | 89.1 | 312 | 488 | 488 | 674 |
| Female | 84.0 | 88.3 | 91.5 | 91.4 | 350 | 578 | 764 | 920 |
| Hispanic origin and race[4] | | | | | | | | |
| Hispanic or Latino | 74.7 | 87.5 | 83.9 | 83.4 | 443 | 442 | 548 | 678 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 82.3 | 86.7 | 89.0 | 91.6 | 342 | 559 | 675 | 840 |
| Black or African American | 79.5 | 85.3 | 85.3 | 87.8 | 263 | 449 | 556 | 742 |
| Other | * | * | * | 83.2 | * | * | * | 667 |
| Insurance status[6] | | | | | | | | |
| Medicare only | 70.6 | 82.1 | 87.7 | 89.6 | 371 | 625 | 777 | 1,067 |
| Medicare and private insurance | 83.4 | 88.1 | 89.0 | 91.7 | 348 | 549 | 602 | 753 |
| Medicare and other public coverage | 88.2 | 85.0 | 88.5 | 89.4 | 127 | 303 | 515 | 507 |

* Estimates are considered unreliable. Data not shown are based on fewer than 100 sample cases. Data preceded by an asterisk have a relative standard error equal to or greater than 30 percent.

[1]Includes expenses for inpatient hospital and physician services, ambulatory physician and nonphysician services, prescribed medicines, home health services, dental services, and other medical equipment, supplies, and services that were purchased or rented during the year. Excludes expenses for over-the-counter medications, alternative care services, phone contacts with health providers, and premiums for health insurance.

[2]Includes persons in the civilian noninstitutionalized population for all or part of the year. Expenditures for persons only in this population for part of the year are restricted to those incurred during periods of eligibility (e.g., expenses incurred during periods of institutionalization and military service are not included in estimates).

[3]Estimates of expenses have been updated to 2002 dollars using the Consumer Price Index (all items) and differ from the previous edition of *Health, United States*. See Appendix II, Consumer Price Index (CPI).

[4]Persons of Hispanic origin may be of any race. Beginning in 2002, MEPS respondents were allowed to report multiple races and these persons are included in the "Other" category. As a result, there is a slight increase in percent of persons classified in the "Other" category in 2002 compared with prior years.

[5]Any private insurance includes individuals with insurance that provided coverage for hospital and physician care at any time during the year, other than Medicare, Medicaid, or other public coverage for hospital or physician services. Public insurance only includes individuals who were not covered by private insurance at any time during the year but were covered by Medicare, Medicaid, other public coverage for hospital or physician services, and/or CHAMPUS/CHAMPVA (TRICARE) at any point during the year. Uninsured includes persons not covered by either private or public insurance throughout the entire year or period of eligibility for the survey.

[6]Populations do not add to total because uninsured persons and persons with unknown insurance status were excluded.

[7]Includes expenses for all prescribed medications that were purchased or refilled during the survey year.

NOTES: 1987 estimates are based on National Medical Expenditure Survey (NMES) while estimates for other years are based on Medical Expenditure Panel Survey (MEPS). Because expenditures in NMES were based primarily on charges while those for MEPS were based on payments, NMES data were adjusted to be more comparable to MEPS using estimated charge to payment ratios for 1987. Overall, this resulted in about an 11-percent reduction from the unadjusted 1987 NMES expenditure estimates. See Zuvekas S and Cohen S. A guide to comparing health care estimates in the 1996 Medical Expenditure Panel Survey to the 1987 National Medical Expenditure Survey. Inquiry. vol. 39. Spring 2002. Data for additional years are available. See Appendix III.

SOURCE: Agency for Healthcare Research and Quality, Center for Cost and Financing Studies. 1987 National Medical Expenditure Survey and 1996–2002 Medical Expenditure Panel Surveys.



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## Table 125 (page 1 of 2). Sources of payment for health care according to selected population characteristics: United States, selected years 1987–2002

[Data are based on household interviews of a sample of the noninstitutionalized population and a sample of medical providers]

Click here for spreadsheet version

| Characteristic | All sources | Sources of payment for health care: Out of pocket 1987 | Out of pocket 1997 | Out of pocket 2000 | Out of pocket 2002 | Private insurance[1] 1987 | Private insurance[1] 1997 | Private insurance[1] 2000 | Private insurance[1] 2002 |
|---|---|---|---|---|---|---|---|---|---|
| | | Percent distribution | | | | | | | |
| All ages | 100.0 | 24.8 | 19.4 | 19.4 | 19.1 | 36.6 | 40.3 | 40.3 | 38.8 |
| Under 65 years: | | | | | | | | | |
| Total | 100.0 | 26.2 | 21.1 | 20.3 | 20.3 | 46.6 | 53.1 | 52.5 | 51.1 |
| Under 6 years | 100.0 | 18.5 | 14.2 | 10.3 | 9.1 | 39.5 | 49.3 | 51.2 | 36.1 |
| 6–17 years | 100.0 | 35.7 | 29.0 | 27.7 | 25.6 | 47.3 | 53.2 | 48.8 | 43.7 |
| 18–44 years | 100.0 | 27.4 | 21.1 | 19.9 | 20.7 | 46.8 | 52.9 | 51.2 | 51.8 |
| 45–64 years | 100.0 | 24.0 | 20.1 | 20.2 | 20.2 | 47.8 | 53.6 | 54.5 | 53.7 |
| Sex | | | | | | | | | |
| Male | 100.0 | 24.5 | 21.3 | 18.1 | 18.5 | 44.6 | 50.3 | 52.2 | 49.3 |
| Female | 100.0 | 27.5 | 21.0 | 22.1 | 21.6 | 48.1 | 55.1 | 52.7 | 52.5 |
| Hispanic origin and race[2] | | | | | | | | | |
| Hispanic or Latino | 100.0 | 22.0 | 18.8 | 20.5 | 18.2 | 36.1 | 42.3 | 45.8 | 35.2 |
| Not Hispanic or Latino: | | | | | | | | | |
| White | 100.0 | 28.2 | 21.8 | 21.7 | 21.5 | 50.1 | 55.8 | 55.1 | 54.5 |
| Black or African American | 100.0 | 15.5 | 17.1 | 11.8 | 13.3 | 30.0 | 42.3 | 40.5 | 41.6 |
| Other | 100.0 | 27.2 | 21.2 | 17.0 | 21.4 | 46.7 | 45.2 | 51.2 | 49.0 |
| Insurance status | | | | | | | | | |
| Any private insurance[3] | 100.0 | 29.0 | 21.6 | 21.2 | 21.4 | 60.0 | 67.6 | 70.2 | 69.0 |
| Public insurance only[4] | 100.0 | 8.9 | 10.6 | 9.8 | 8.7 | ... | ... | ... | ... |
| Uninsured all year[5] | 100.0 | 40.6 | 41.3 | 40.4 | 49.3 | ... | ... | ... | ... |
| 65 years and over | 100.0 | 22.0 | 16.3 | 17.5 | 16.9 | 15.8 | 16.5 | 14.9 | 14.3 |
| Sex | | | | | | | | | |
| Male | 100.0 | 21.7 | 14.2 | 14.2 | 14.2 | 17.6 | 20.1 | 16.8 | 15.6 |
| Female | 100.0 | 22.2 | 18.1 | 20.2 | 19.0 | 14.4 | 13.2 | 13.3 | 13.3 |
| Hispanic origin and race[2] | | | | | | | | | |
| Hispanic or Latino | 100.0 | *13.5 | 13.6 | 13.9 | 10.6 | *4.7 | 5.9 | 8.4 | 4.2 |
| Not Hispanic or Latino: | | | | | | | | | |
| White | 100.0 | 23.7 | 17.0 | 18.3 | 17.9 | 16.7 | 17.9 | 15.2 | 15.5 |
| Black or African American | 100.0 | 11.2 | 11.4 | 13.6 | 12.3 | *11.9 | 8.8 | 9.3 | 10.5 |
| Other | 100.0 | * | * | * | 14.1 | * | * | * | 10.6 |
| Insurance status | | | | | | | | | |
| Medicare only | 100.0 | 29.8 | 19.8 | 22.2 | 21.4 | ... | ... | ... | ... |
| Medicare and private insurance | 100.0 | 23.4 | 17.3 | 17.0 | 16.9 | 18.9 | 25.7 | 25.3 | 24.3 |
| Medicare and other public coverage | 100.0 | *6.2 | 5.2 | 9.1 | 7.9 | ... | ... | ... | ... |

See footnotes at end of table.



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## Table 125 (page 2 of 2). Sources of payment for health care according to selected population characteristics: United States, selected years 1987–2002

[Data are based on household interviews of a sample of the noninstitutionalized population and a sample of medical providers]

Click here for spreadsheet version

| Characteristic | Sources of payment for health care | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Public coverage[6] | | | | Other[7] | | | |
| | 1987 | 1997 | 2000 | 2002 | 1987 | 1997 | 2000 | 2002 |
| | Percent distribution | | | | | | | |
| All ages | 34.1 | 34.4 | 35.4 | 37.1 | 4.5 | 5.9 | 5.0 | 5.0 |
| Under 65 years: | | | | | | | | |
| Total | 21.3 | 18.1 | 21.3 | 22.5 | 6.0 | 7.7 | 6.0 | 6.1 |
| Under 6 years | 35.8 | 25.4 | 33.6 | 49.3 | 6.2 | 11.2 | 4.9 | *5.4 |
| 6–17 years | 11.8 | 14.1 | 20.1 | 25.4 | 5.2 | 3.7 | 3.4 | 5.2 |
| 18–44 years | 19.4 | 15.7 | 21.1 | 20.9 | 6.4 | 10.3 | 7.8 | 6.7 |
| 45–64 years | 22.4 | 20.3 | 20.2 | 20.3 | 5.8 | 6.0 | 5.2 | 5.9 |
| Sex | | | | | | | | |
| Male | 23.9 | 19.5 | 23.5 | 26.5 | 7.1 | 8.9 | 6.3 | 5.7 |
| Female | 19.2 | 17.0 | 19.5 | 19.5 | 5.2 | 6.8 | 5.7 | 6.4 |
| Hispanic origin and race[2] | | | | | | | | |
| Hispanic or Latino | 35.8 | 28.9 | 27.5 | 35.1 | 6.0 | 10.0 | 6.2 | 11.5 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 15.9 | 15.3 | 18.0 | 18.5 | 5.8 | 7.1 | 5.2 | 5.4 |
| Black or African American | 47.2 | 30.7 | 38.8 | 38.9 | 7.3 | 9.9 | 8.8 | 6.2 |
| Other | 21.0 | 23.7 | 19.0 | 23.4 | 5.1 | 9.9 | *12.8 | 6.2 |
| Insurance status | | | | | | | | |
| Any private insurance[3] | 6.2 | 6.6 | 5.3 | 6.3 | 4.8 | 4.2 | 3.3 | 3.3 |
| Public insurance only[4] | 87.2 | 80.7 | 84.4 | 83.9 | 3.9 | 8.7 | 5.8 | 7.4 |
| Uninsured all year[5] | 28.6 | 7.5 | *21.2 | 9.4 | 30.9 | 51.1 | 38.4 | 41.4 |
| 65 years and over | 60.8 | 64.8 | 64.7 | 66.0 | 1.5 | 2.5 | 2.9 | 2.8 |
| Sex | | | | | | | | |
| Male | 58.8 | 63.4 | 66.9 | 67.4 | *1.9 | 2.3 | 2.2 | 2.8 |
| Female | 62.3 | 65.9 | 63.0 | 64.9 | 1.1 | 2.7 | 3.5 | 2.8 |
| Hispanic origin and race[2] | | | | | | | | |
| Hispanic or Latino | 80.2 | 77.8 | 75.6 | 77.2 | *1.6 | *2.7 | *2.2 | *8.0 |
| Not Hispanic or Latino: | | | | | | | | |
| White | 58.0 | 62.6 | 64.1 | 64.0 | 1.6 | 2.5 | 2.4 | 2.6 |
| Black or African American | 76.3 | 77.6 | 68.3 | 75.5 | 0.6 | 2.2 | *8.9 | 1.8 |
| Other | * | * | * | 73.7 | * | * | * | *1.6 |
| Insurance status | | | | | | | | |
| Medicare only | 68.8 | 72.4 | 72.2 | 71.4 | 1.4 | 7.7 | 5.7 | 7.2 |
| Medicare and private insurance | 56.1 | 56.3 | 57.1 | 57.8 | 1.6 | 0.6 | *0.6 | *1.0 |
| Medicare and other public coverage | 92.9 | 92.7 | 87.3 | 89.8 | 1.0 | *2.1 | *3.6 | 1.4 |

. . . Category not applicable. *Estimates are considered unreliable. Data not shown are based on fewer than 100 sample cases. Data preceded by an asterisk have a relative standard error greater than or equal to 30 percent.

[1]Private insurance—Includes any type of private insurance payments reported for people with private health insurance coverage during the year.

[2]Persons of Hispanic origin may be of any race. Beginning in 2002, MEPS respondents were allowed to report multiple races and these persons are included in the "Other" category. As a result, there is a slight increase in percent of persons classified in the "Other" category in 2002 compared with prior years.

[3]Includes individuals with insurance that provided coverage for hospital and physician care at any time during the year, other than Medicare, Medicaid, or other public coverage for hospital or physician services.

[4]Includes individuals who were not covered by private insurance at any time during the year but were covered by Medicare, Medicaid, other public coverage for hospital or physician services, and/or CHAMPUS/CHAMPVA (TRICARE) at any point during the year.

[5]Includes individuals not covered by either private or public insurance throughout the entire year or period of eligibility for the survey. However, a portion of expenses for the uninsured were paid by sources that were not defined as health insurance coverage, such as the Department of Veterans Affairs, community and neighborhood clinics, the Indian Health Service, State and local health departments, State programs other than Medicaid, Workers' Compensation, and other unclassified sources (e.g., automobile, homeowner's, liability insurance).

[6]Public coverage—Includes payments made by Medicare, Medicaid, the Department of Veterans Affairs, other Federal sources (e.g., Indian Health Service, military treatment facilities, and other care provided by the Federal Government), and various State and local sources (e.g., community and neighborhood clinics, State and local health departments, and State programs other than Medicaid).

[7]Other sources—Includes Workers' Compensation, unclassified sources (automobile, homeowner's, or liability insurance, and other miscellaneous or unknown sources), Medicaid payments reported for people who were not enrolled in the program at any time during the year, and any type of private insurance payments reported for people without private health insurance coverage during the year as defined in the survey.

NOTES: 1987 estimates are based on the National Medical Expenditure Survey (NMES) while estimates for other years are based on the Medical Expenditure Panel Survey (MEPS). Because expenditures in NMES were based primarily on charges while those for MEPS were based on payments, data for NMES were adjusted to be more comparable to MEPS using estimated charge to payment ratios for 1987. Overall, this resulted in an approximate 11-percent reduction from the unadjusted 1987 NMES expenditure estimates. For a detailed explanation of this adjustment, see Zuvekas S and Cohen S. A guide to comparing health care estimates in the 1996 Medical Expenditure Panel Survey to the 1987 National Medical Expenditure Survey. Inquiry. vol. 39. Spring 2002. Data for additional years are available. See Appendix III.

SOURCE: Agency for Healthcare Research and Quality, Center for Cost and Financing Studies. 1987 National Medical Expenditure Survey and 1996–2002 Medical Expenditure Panel Surveys.



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## Table 126. Out-of-pocket health care expenses for persons with medical expenses by age: United States, selected years 1987–2002

[Data are based on household interviews for a sample of the noninstitutionalized population and a sample of medical providers]

Click here for spreadsheet version

| Age and year | Percent of persons with expense | Amount paid out of pocket for persons with expense[1] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Total | $0 | $1–124 | $125–249 | $250–499 | $500–999 | $1,000+ |
| | | Percent distribution | | | | | | |
| **All ages** | | | | | | | | |
| 1987 | 84.5 | 100.0 | 10.4 | 29.2 | 16.6 | 17.4 | 13.3 | 13.1 |
| 1998 | 83.8 | 100.0 | 7.7 | 36.5 | 15.8 | 16.1 | 12.2 | 11.8 |
| 1999 | 84.3 | 100.0 | 7.4 | 35.9 | 15.5 | 15.6 | 12.8 | 12.7 |
| 2000 | 83.5 | 100.0 | 6.9 | 34.8 | 15.0 | 16.2 | 13.0 | 14.1 |
| 2001 | 85.4 | 100.0 | 7.1 | 31.7 | 14.7 | 16.6 | 13.8 | 16.2 |
| 2002 | 85.2 | 100.0 | 7.8 | 29.8 | 14.3 | 15.7 | 14.8 | 17.6 |
| **Under 6 years** | | | | | | | | |
| 1987 | 88.9 | 100.0 | 19.2 | 38.7 | 18.9 | 14.7 | 5.3 | 3.2 |
| 1998 | 87.6 | 100.0 | 17.4 | 60.1 | 12.4 | 6.8 | 2.3 | 0.9 |
| 1999 | 87.9 | 100.0 | 17.7 | 60.5 | 12.2 | 5.9 | 2.6 | 1.1 |
| 2000 | 86.7 | 100.0 | 16.7 | 61.0 | 11.1 | 7.5 | 2.4 | 1.3 |
| 2001 | 88.8 | 100.0 | 18.5 | 57.8 | 12.9 | 7.6 | 2.1 | 1.1 |
| 2002 | 88.8 | 100.0 | 21.5 | 51.7 | 14.0 | 7.7 | 3.9 | 1.3 |
| **6–17 years** | | | | | | | | |
| 1987 | 80.2 | 100.0 | 15.5 | 37.9 | 18.2 | 12.4 | 8.5 | 7.6 |
| 1998 | 80.6 | 100.0 | 16.3 | 47.0 | 15.0 | 11.1 | 5.6 | 5.1 |
| 1999 | 81.5 | 100.0 | 15.0 | 46.6 | 15.4 | 11.2 | 6.0 | 5.8 |
| 2000 | 80.0 | 100.0 | 14.7 | 46.5 | 14.5 | 11.2 | 6.5 | 6.6 |
| 2001 | 83.2 | 100.0 | 15.0 | 45.2 | 15.0 | 11.1 | 6.0 | 7.7 |
| 2002 | 83.6 | 100.0 | 16.6 | 43.2 | 14.7 | 12.0 | 6.8 | 6.7 |
| **18–44 years** | | | | | | | | |
| 1987 | 81.5 | 100.0 | 10.1 | 32.3 | 17.7 | 18.2 | 11.9 | 9.8 |
| 1998 | 78.0 | 100.0 | 6.4 | 40.2 | 17.9 | 17.0 | 10.7 | 7.7 |
| 1999 | 78.9 | 100.0 | 6.4 | 40.2 | 17.6 | 16.6 | 11.1 | 8.1 |
| 2000 | 77.7 | 100.0 | 5.8 | 39.1 | 17.8 | 17.1 | 11.7 | 8.5 |
| 2001 | 79.3 | 100.0 | 6.0 | 34.8 | 17.5 | 18.8 | 13.3 | 9.7 |
| 2002 | 78.5 | 100.0 | 6.7 | 34.2 | 17.4 | 17.1 | 13.9 | 10.8 |
| **45–64 years** | | | | | | | | |
| 1987 | 87.0 | 100.0 | 5.7 | 20.4 | 15.6 | 20.7 | 18.8 | 18.8 |
| 1998 | 89.2 | 100.0 | 2.9 | 25.6 | 16.2 | 20.1 | 17.7 | 17.5 |
| 1999 | 88.9 | 100.0 | 2.7 | 24.0 | 16.4 | 19.7 | 19.0 | 18.2 |
| 2000 | 88.5 | 100.0 | 2.6 | 22.3 | 15.6 | 19.9 | 18.8 | 20.9 |
| 2001 | 89.9 | 100.0 | 2.4 | 19.6 | 13.9 | 20.4 | 19.8 | 23.8 |
| 2002 | 90.0 | 100.0 | 2.3 | 18.8 | 12.8 | 19.1 | 21.3 | 25.8 |
| **65–74 years** | | | | | | | | |
| 1987 | 92.8 | 100.0 | 5.3 | 15.4 | 11.6 | 18.5 | 22.1 | 27.1 |
| 1998 | 94.3 | 100.0 | 2.0 | 17.8 | 13.3 | 20.7 | 20.6 | 25.6 |
| 1999 | 95.3 | 100.0 | 1.4 | 16.1 | 11.3 | 17.9 | 23.7 | 29.6 |
| 2000 | 94.7 | 100.0 | 1.5 | 14.4 | 10.6 | 20.2 | 20.1 | 33.2 |
| 2001 | 95.6 | 100.0 | 1.5 | 14.4 | 9.9 | 18.3 | 21.7 | 34.2 |
| 2002 | 96.1 | 100.0 | 1.8 | 10.1 | 9.9 | 16.4 | 22.5 | 39.3 |
| **75 years or more** | | | | | | | | |
| 1987 | 95.1 | 100.0 | 5.6 | 12.9 | 10.0 | 17.1 | 21.2 | 33.2 |
| 1998 | 96.3 | 100.0 | 3.0 | 14.3 | 11.6 | 17.7 | 22.2 | 31.3 |
| 1999 | 95.3 | 100.0 | 2.6 | 14.5 | 10.2 | 18.6 | 20.2 | 33.8 |
| 2000 | 96.5 | 100.0 | 2.6 | 14.2 | 8.4 | 18.2 | 22.0 | 34.6 |
| 2001 | 97.0 | 100.0 | 1.7 | 10.1 | 9.2 | 14.4 | 21.1 | 43.6 |
| 2002 | 96.5 | 100.0 | 2.2 | 9.0 | 7.7 | 14.4 | 20.4 | 46.2 |

[1] 1987 dollars were converted to 1998 dollars using the national Consumer Price Index (CPI). Starting in 1998, percent distributions are based on actual dollars (non-adjusted).

NOTES: Out-of-pocket expenses include expenditures for inpatient hospital and physician services, ambulatory physician and nonphysician services, prescribed medicines, home health services, dental services, and various other medical equipment, supplies, and services that were purchased or rented during the year. Out-of-pocket expenses for over-the-counter medications, alternative care services, phone contacts with health providers, and premiums for health insurance policies are not included in these estimates. 1987 estimates are based on the National Medical Expenditure Survey (NMES) while estimates for other years are based on the Medical Expenditure Panel Survey (MEPS). Because expenditures in NMES were based primarily on charges while those for MEPS were based on payments, data for the NMES were adjusted to be more comparable to MEPS using estimated charge to payment ratios for 1987. Overall this resulted in an approximate 11-percent reduction from the unadjusted 1987 NMES expenditure estimates. For a detailed explanation of this adjustment, see Zuvekas S and Cohen S. A guide to comparing health care estimates in the 1996 Medical Expenditure Panel Survey to the 1987 National Medical Expenditure Survey. Inquiry. vol 39. Spring 2002.

SOURCES: Agency for Healthcare Research and Quality, Center for Cost and Financing Studies. 1987 National Medical Expenditure Survey and 1998–2002 Medical Expenditure Panel Surveys.



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## Table 127 (page 1 of 2). Expenditures for health services and supplies and percent distribution, by type of payer: United States, selected calendar years 1987–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Type of payer | 1987 | 1993 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount in billions | | | | |
| Total[1] | $477.8 | $856.3 | $1,055.8 | $1,112.6 | $1,180.2 | $1,260.9 | $1,373.8 | $1,499.8 | $1,614.2 |
| Private | 331.2 | 546.8 | 664.7 | 714.0 | 760.2 | 812.2 | 862.9 | 923.4 | 992.2 |
| Private business | 122.4 | 221.2 | 268.0 | 287.7 | 313.4 | 342.6 | 369.3 | 395.2 | 423.0 |
| Employer contribution to private health insurance premiums | 84.4 | 161.5 | 194.9 | 209.9 | 229.6 | 251.3 | 274.5 | 297.4 | 320.6 |
| Private employer contribution to Medicare hospital insurance trust fund[2] | 24.6 | 35.8 | 49.5 | 53.8 | 57.6 | 62.3 | 63.4 | 62.9 | 64.3 |
| Workers compensation and temporary disability insurance | 11.7 | 21.1 | 20.0 | 20.2 | 22.3 | 24.7 | 27.1 | 30.3 | 33.2 |
| Industrial inplant health services | 1.7 | 2.8 | 3.6 | 3.8 | 4.0 | 4.2 | 4.4 | 4.7 | 4.9 |
| Household | 186.4 | 289.4 | 348.2 | 374.8 | 393.5 | 418.3 | 442.4 | 475.3 | 512.6 |
| Employee contribution to private health insurance premiums and individual policy premiums | 41.9 | 86.9 | 107.8 | 114.6 | 117.5 | 126.3 | 139.5 | 157.3 | 174.1 |
| Employee and self-employment contributions and voluntary premiums paid to Medicare hospital insurance trust fund[2] | 29.4 | 43.7 | 63.0 | 69.2 | 75.0 | 82.5 | 82.9 | 84.1 | 86.0 |
| Premiums paid by individuals to Medicare supplementary medical insurance trust fund | 6.2 | 11.9 | 15.4 | 15.5 | 16.3 | 16.3 | 18.0 | 19.6 | 22.0 |
| Out-of-pocket health spending | 108.9 | 146.9 | 162.0 | 175.6 | 184.7 | 193.1 | 202.0 | 214.2 | 230.5 |
| Other private revenues | 22.4 | 36.2 | 48.5 | 51.5 | 53.3 | 51.3 | 51.1 | 52.9 | 56.6 |
| Public | 146.6 | 309.5 | 391.1 | 398.7 | 420.0 | 448.8 | 510.9 | 576.4 | 622.0 |
| Federal Government | 75.1 | 175.6 | 220.1 | 215.0 | 222.5 | 236.9 | 278.1 | 318.3 | 344.0 |
| Employer contributions to private health insurance premiums | 4.9 | 11.5 | 11.4 | 11.4 | 13.2 | 14.3 | 15.8 | 17.7 | 19.7 |
| Medicaid[3] | 28.1 | 78.1 | 97.1 | 101.8 | 110.4 | 120.1 | 133.7 | 150.5 | 160.9 |
| Other[4] | 45.9 | 83.6 | 109.2 | 99.4 | 96.4 | 99.9 | 126.0 | 147.2 | 160.2 |
| State and local government | 71.5 | 133.9 | 171.0 | 183.6 | 197.5 | 211.9 | 232.8 | 258.1 | 278.1 |
| Employer contributions to private health insurance premiums | 16.7 | 38.2 | 46.7 | 48.8 | 53.5 | 58.6 | 66.9 | 77.1 | 86.2 |
| Medicaid[3] | 22.8 | 45.8 | 66.3 | 73.5 | 80.0 | 86.5 | 93.5 | 104.2 | 111.8 |
| Other[5] | 28.8 | 45.0 | 51.8 | 54.8 | 57.0 | 59.4 | 64.5 | 68.4 | 71.5 |
| | | | | | Percent distribution | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Private | 69.3 | 63.9 | 63.0 | 64.2 | 64.4 | 64.4 | 62.8 | 61.6 | 61.5 |
| Private business | 25.6 | 25.8 | 25.4 | 25.9 | 26.6 | 27.2 | 26.9 | 26.4 | 26.2 |
| Employer contribution to private health insurance premiums | 17.7 | 18.9 | 18.5 | 18.9 | 19.5 | 19.9 | 20.0 | 19.8 | 19.9 |
| Private employer contribution to Medicare hospital insurance trust fund[2] | 5.2 | 4.2 | 4.7 | 4.8 | 4.9 | 4.9 | 4.6 | 4.2 | 4.0 |
| Workers compensation and temporary disability insurance | 2.4 | 2.5 | 1.9 | 1.8 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 |
| Industrial inplant health services | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Household | 39.0 | 33.8 | 33.0 | 33.7 | 33.3 | 33.2 | 32.2 | 31.7 | 31.8 |
| Employee contribution to private health insurance premiums and individual policy premiums | 8.8 | 10.1 | 10.2 | 10.3 | 10.0 | 10.0 | 10.2 | 10.5 | 10.8 |
| Employee and self-employment contributions and voluntary premiums paid to Medicare hospital insurance trust fund[2] | 6.2 | 5.1 | 6.0 | 6.2 | 6.4 | 6.5 | 6.0 | 5.6 | 5.3 |
| Premiums paid by individuals to Medicare supplementary medical insurance trust fund | 1.3 | 1.4 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.4 |
| Out-of-pocket health spending | 22.8 | 17.2 | 15.3 | 15.8 | 15.7 | 15.3 | 14.7 | 14.3 | 14.3 |
| Other private revenues | 4.7 | 4.2 | 4.6 | 4.6 | 4.5 | 4.1 | 3.7 | 3.5 | 3.5 |

See footnotes at end of table.



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## Table 127 (page 2 of 2). Expenditures for health services and supplies and percent distribution, by type of payer: United States, selected calendar years 1987–2003

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Type of payer | 1987 | 1993 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | Percent distribution | | | | | | | | |
| Public | 30.7 | 36.1 | 37.0 | 35.8 | 35.6 | 35.6 | 37.2 | 38.4 | 38.5 |
| Federal Government | 15.7 | 20.5 | 20.8 | 19.3 | 18.9 | 18.8 | 20.2 | 21.2 | 21.3 |
| Employer contributions to private health insurance premiums | 1.0 | 1.3 | 1.1 | 1.0 | 1.1 | 1.1 | 1.1 | 1.2 | 1.2 |
| Medicaid[3] | 5.9 | 9.1 | 9.2 | 9.2 | 9.4 | 9.5 | 9.7 | 10.0 | 10.0 |
| Other[4] | 9.6 | 9.8 | 10.3 | 8.9 | 8.2 | 7.9 | 9.2 | 9.8 | 9.9 |
| State and local government | 15.0 | 15.6 | 16.2 | 16.5 | 16.7 | 16.8 | 16.9 | 17.2 | 17.2 |
| Employer contributions to private health insurance premiums | 3.5 | 4.5 | 4.4 | 4.4 | 4.5 | 4.6 | 4.9 | 5.1 | 5.3 |
| Medicaid[3] | 4.8 | 5.3 | 6.3 | 6.6 | 6.8 | 6.9 | 6.8 | 6.9 | 6.9 |
| Other[5] | 6.0 | 5.2 | 4.9 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.4 |

[1]Excludes research and construction.
[2]Includes one-half of self-employment contribution to Medicare hospital insurance trust fund.
[3]Includes Medicaid buy-in premiums for Medicare.
[4]Includes expenditures for Medicare with adjustments for contributions by employers and individuals and premiums paid to the Medicare insurance trust fund and maternal and child health, vocational rehabilitation, Substance Abuse and Mental Health Services Administration, Indian Health Service, Federal workers' compensation, and other miscellaneous general hospital and medical programs, public health activities, Department of Defense, and Department of Veterans Affairs.
[5]Includes other public and general assistance, maternal and child health, vocational rehabilitation, public health activities, hospital subsidies, and employer contributions to Medicare hospital insurance trust fund.

NOTES: This table disaggregates health expenditures according to four classes of payers: businesses, households (individuals), Federal Government, and State and local governments with a small amount of revenue coming from nonpatient revenue sources such as philanthropy. Where businesses or households pay dedicated funds into government health programs (for example, Medicare) or employers and employees share in the cost of health premiums, these costs are assigned to businesses or households accordingly. This results in a lower share of expenditures being assigned to the Federal Government than for tabulations of expenditures by source of funds. Estimates of national health expenditure by source of funds aim to track government-sponsored health programs over time and do not delineate the role of business employers in paying for health care. Figures may not sum to totals due to rounding. These data were revised and differ from previous editions of *Health, United States*.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group. Financing Health Care: Businesses, Households and Governments, 1987–2003. Health Care Financing Review Web Exclusive vol. 1, no. 2. Washington. July 2005.



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## Table 128 (page 1 of 2). Employers' costs per employee-hour worked for total compensation, wages and salaries, and health insurance, according to selected characteristics: United States, selected years 1991–2005

[Data are based on surveys of employers]

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| Characteristic | 1991 | 1994 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount per employee-hour worked | | | | | |
| State and local government | $22.31 | $25.27 | $25.73 | $27.28 | $29.05 | $30.06 | $31.29 | $32.62 | $34.21 | $35.50 |
| Total private industry | 15.40 | 17.08 | 17.49 | 18.50 | 19.85 | 20.81 | 21.71 | 22.37 | 23.29 | 24.17 |
| Industry: | | | | | | | | | | |
| Goods producing | 18.48 | 20.85 | 21.27 | 22.26 | 23.55 | 24.40 | 25.44 | 26.25 | 27.19 | 28.48 |
| Service providing | 14.31 | 15.82 | 16.28 | 17.31 | 18.72 | 19.74 | 20.66 | 21.30 | 22.33 | 23.11 |
| Occupational group:[1] | | | | | | | | | | |
| White collar | 18.15 | 20.26 | 21.10 | 22.38 | 24.19 | 25.34 | 26.43 | 28.85 | --- | --- |
| Blue collar | 15.15 | 16.92 | 17.04 | 17.56 | 18.73 | 19.35 | 20.15 | 21.21 | --- | --- |
| Service | 7.82 | 8.38 | 8.61 | 9.37 | 9.72 | 10.32 | 10.95 | 13.68 | --- | --- |
| Management, professional and related | --- | --- | --- | --- | --- | --- | --- | --- | 40.23 | 42.09 |
| Sales and office | --- | --- | --- | --- | --- | --- | --- | --- | 18.42 | 19.30 |
| Service | --- | --- | --- | --- | --- | --- | --- | --- | 11.66 | 12.07 |
| Natural resources, construction and maintenance | --- | --- | --- | --- | --- | --- | --- | --- | 26.55 | 27.26 |
| Production, transportation and material moving | --- | --- | --- | --- | --- | --- | --- | --- | 20.21 | 20.82 |
| Census region: | | | | | | | | | | |
| Northeast | 17.56 | 20.03 | 20.57 | 20.38 | 22.67 | 23.91 | 25.00 | 25.70 | 26.29 | 27.09 |
| Midwest | 15.05 | 16.26 | 16.30 | 18.15 | 19.22 | 20.47 | 21.25 | 22.40 | 23.26 | 24.23 |
| South | 13.68 | 15.05 | 15.62 | 16.45 | 17.81 | 18.59 | 19.49 | 19.95 | 20.80 | 21.36 |
| West | 15.97 | 18.08 | 18.78 | 19.94 | 20.88 | 21.86 | 22.68 | 23.07 | 24.54 | 25.98 |
| Union status: | | | | | | | | | | |
| Union | 19.76 | 23.26 | 23.31 | 23.59 | 25.88 | 27.80 | 29.42 | 30.68 | 31.94 | 33.17 |
| Nonunion | 14.54 | 16.04 | 16.61 | 17.80 | 19.07 | 19.98 | 20.79 | 21.36 | 22.28 | 23.09 |
| Establishment employment size: | | | | | | | | | | |
| 1–99 employees | 13.38 | 14.58 | 14.85 | 15.92 | 17.16 | 17.86 | 18.51 | 18.93 | 19.47 | 20.22 |
| 100 or more | 17.34 | 19.45 | 20.09 | 21.20 | 22.81 | 24.19 | 25.48 | 26.42 | 27.81 | 28.94 |
| 100–499 | 14.31 | 15.88 | 16.61 | 17.52 | 19.30 | 20.97 | 21.99 | 22.62 | 23.91 | 24.44 |
| 500 or more | 20.60 | 23.35 | 24.03 | 25.56 | 26.93 | 28.17 | 29.79 | 30.94 | 32.54 | 34.59 |
| | | | | | Wages and salaries as a percent of total compensation | | | | | |
| State and local government | 69.6 | 69.5 | 69.8 | 70.3 | 70.8 | 71.0 | 70.8 | 70.0 | 69.2 | 68.3 |
| Total private industry | 72.3 | 71.1 | 71.9 | 72.8 | 73.0 | 72.9 | 72.8 | 72.2 | 71.5 | 71.0 |
| Industry: | | | | | | | | | | |
| Goods producing | 68.7 | 66.5 | 67.6 | 69.0 | 69.0 | 69.1 | 68.7 | 67.7 | 66.7 | 65.5 |
| Service providing | 73.9 | 73.1 | 73.8 | 74.4 | 74.5 | 74.4 | 74.2 | 73.7 | 72.9 | 72.6 |
| Occupational group:[1] | | | | | | | | | | |
| White collar | 73.8 | 72.7 | 73.2 | 73.9 | 74.0 | 73.8 | 73.7 | 72.9 | --- | --- |
| Blue collar | 68.4 | 66.8 | 68.1 | 69.2 | 69.4 | 69.7 | 69.5 | 68.5 | --- | --- |
| Service | 76.2 | 75.5 | 75.8 | 77.4 | 77.9 | 77.5 | 76.9 | 72.4 | --- | --- |
| Management, professional and related | --- | --- | --- | --- | --- | --- | --- | --- | 72.1 | 71.5 |
| Sales and office | --- | --- | --- | --- | --- | --- | --- | --- | 73.0 | 72.6 |
| Service | --- | --- | --- | --- | --- | --- | --- | --- | 75.8 | 75.7 |
| Natural resources, construction and maintenance | --- | --- | --- | --- | --- | --- | --- | --- | 69.1 | 68.0 |
| Production, transportation and material moving | --- | --- | --- | --- | --- | --- | --- | --- | 66.9 | 66.2 |
| Census region: | | | | | | | | | | |
| Northeast | 72.0 | 70.5 | 70.9 | 72.1 | 72.2 | 72.0 | 71.9 | 71.2 | 70.4 | 70.4 |
| Midwest | 71.1 | 69.7 | 71.1 | 71.6 | 72.4 | 71.8 | 72.0 | 71.6 | 71.1 | 70.1 |
| South | 73.3 | 72.1 | 72.7 | 73.9 | 73.5 | 73.7 | 73.6 | 73.2 | 72.5 | 72.1 |
| West | 72.8 | 72.0 | 73.1 | 74.0 | 74.0 | 74.1 | 73.5 | 72.6 | 71.6 | 70.9 |
| Union status: | | | | | | | | | | |
| Union | 65.9 | 63.5 | 64.0 | 65.2 | 65.2 | 66.0 | 65.7 | 65.0 | 63.6 | 62.6 |
| Nonunion | 74.1 | 72.9 | 73.6 | 74.2 | 74.4 | 74.1 | 74.0 | 73.5 | 72.8 | 72.4 |
| Establishment employment size: | | | | | | | | | | |
| 1–99 employees | 74.7 | 73.5 | 74.7 | 75.4 | 75.5 | 75.1 | 75.0 | 74.6 | 74.3 | 73.9 |
| 100 or more | 70.5 | 69.3 | 69.9 | 70.8 | 71.0 | 71.1 | 70.9 | 70.2 | 69.1 | 68.5 |
| 100–499 | 72.1 | 71.6 | 71.6 | 72.3 | 72.8 | 72.5 | 72.2 | 71.4 | 70.7 | 70.2 |
| 500 or more | 69.3 | 67.6 | 68.6 | 69.6 | 69.4 | 69.8 | 69.8 | 69.1 | 67.7 | 67.0 |

See footnotes at end of table.

## Table 128 (page 2 of 2). Employers' costs per employee-hour worked for total compensation, wages and salaries, and health insurance, according to selected characteristics: United States, selected years 1991–2005

[Data are based on surveys of employers]

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| Characteristic | 1991 | 1994 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Health insurance as a percent of total compensation | | | | | | | | | |
| State and local government | 6.9 | 8.2 | 7.7 | 7.5 | 7.8 | 8.5 | 8.6 | 9.2 | 9.8 | 10.2 |
| Total private industry | 6.0 | 6.7 | 5.9 | 5.4 | 5.5 | 6.2 | 5.9 | 6.3 | 6.6 | 6.8 |
| Industry: | | | | | | | | | | |
| Goods producing | 6.9 | 8.1 | 7.2 | 6.6 | 6.9 | 7.6 | 7.2 | 7.5 | 7.8 | 8.0 |
| Service providing | 5.5 | 6.0 | 5.4 | 4.9 | 4.9 | 5.6 | 5.5 | 5.9 | 6.2 | 6.4 |
| Occupational group:[1] | | | | | | | | | | |
| White collar | 5.6 | 6.2 | 5.5 | 5.0 | 5.0 | 5.6 | 5.4 | 6.4 | --- | --- |
| Blue collar | 7.0 | 8.0 | 7.2 | 6.7 | 6.8 | 7.5 | 7.3 | 8.0 | --- | --- |
| Service | 4.6 | 5.4 | 4.8 | 4.3 | 4.3 | 5.0 | 5.1 | 7.0 | --- | --- |
| Management, professional and related | --- | --- | --- | --- | --- | --- | --- | --- | 5.4 | 5.5 |
| Sales and office | --- | --- | --- | --- | --- | --- | --- | --- | 7.3 | 7.5 |
| Service | --- | --- | --- | --- | --- | --- | --- | --- | 6.0 | 6.1 |
| Natural resources, construction and maintenance | --- | --- | --- | --- | --- | --- | --- | --- | 6.9 | 7.5 |
| Production, transportation and material moving | --- | --- | --- | --- | --- | --- | --- | --- | 8.5 | 8.9 |
| Census region: | | | | | | | | | | |
| Northeast | 6.2 | 6.9 | 6.2 | 5.6 | 5.6 | 6.3 | 5.9 | 6.3 | 6.5 | 6.8 |
| Midwest | 6.3 | 7.3 | 6.3 | 5.7 | 5.8 | 6.6 | 6.4 | 6.6 | 7.0 | 7.3 |
| South | 5.5 | 6.3 | 5.9 | 5.3 | 5.4 | 6.2 | 5.8 | 6.2 | 6.5 | 6.6 |
| West | 5.8 | 6.1 | 5.2 | 4.9 | 5.0 | 5.4 | 5.6 | 6.0 | 6.3 | 6.3 |
| Union status: | | | | | | | | | | |
| Union | 8.2 | 9.8 | 8.8 | 8.4 | 8.4 | 8.9 | 8.7 | 9.1 | 9.6 | 10.3 |
| Nonunion | 5.4 | 5.9 | 5.3 | 4.8 | 5.0 | 5.7 | 5.4 | 5.8 | 6.1 | 6.2 |
| Establishment employment size: | | | | | | | | | | |
| 1–99 employees | 5.1 | 5.7 | 5.0 | 4.6 | 4.8 | 5.3 | 5.2 | 5.5 | 5.8 | 5.9 |
| 100 or more | 6.6 | 7.3 | 6.6 | 6.0 | 6.0 | 6.9 | 6.6 | 7.0 | 7.2 | 7.5 |
| 100–499 | 6.3 | 6.5 | 6.3 | 5.8 | 5.6 | 6.6 | 6.4 | 6.9 | 7.1 | 7.5 |
| 500 or more | 6.8 | 7.9 | 6.9 | 6.2 | 6.4 | 7.1 | 6.7 | 7.0 | 7.3 | 7.6 |

--- Data not available.

[1]Starting in 2004, sample establishments were classified by industry categories based on the 2000 North American Industry Classification (NAICS) system, as defined by the U.S. Office of Management and Budget. Within a sample establishment, specific job categories were selected and classified into about 800 occupational classifications according to the 2000 Standard Occupational Classification (SOC) system. Individual occupations were combined to represent one of five higher-level aggregations such as management, professional, and related occupations. For more detailed information on NAICS and SOC, including background and definitions, see the Bureau of Labor Statistics Web sites: www.bls.gov/bls/naics.htm and www.bls.gov/soc/home.htm. NAICS and SOC replace the 1987 Standard Industrial Classification System (SIC) and the Occupational Classification System (OCS).

NOTES: Costs are calculated from March survey data each year. Total compensation includes wages and salaries, and benefits. See Appendix II, Employer costs for employee compensation. Data for additional years are available. See Appendix III.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, National Compensation Survey, Employer Costs for Employee Compensation, March release; News pub no 05–1056, June 16, 2005. Washington, DC. Data are available on the Bureau of Labor Statistics Web site at www.bls.gov/ncs/ect/home.htm.



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## Table 129. Hospital expenses, according to type of ownership and size of hospital: United States, selected years 1980–2003

[Data are based on reporting by a census of hospitals]

| Type of ownership and size of hospital | 1980 | 1990 | 1995 | 2000 | 2002 | 2003 | 1980–90 | 1990–95 | 1995–2000 | 2000–03 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total expenses | Amount in billions | | | | | | Average annual percent change | | | |
| All hospitals | $ 91.9 | $234.9 | $320.3 | $395.4 | $ 462.2 | $ 498.1 | 9.8 | 6.4 | 4.3 | 8.0 |
| Federal | 7.9 | 15.2 | 20.2 | 23.9 | 29.7 | 30.9 | 6.8 | 5.9 | 3.4 | 8.9 |
| Non-Federal[1] | 84.0 | 219.6 | 300.0 | 371.5 | 432.5 | 467.2 | 10.1 | 6.4 | 4.4 | 7.9 |
| Community[2] | 76.9 | 203.7 | 285.6 | 356.6 | 416.6 | 450.1 | 10.2 | 7.0 | 4.5 | 8.1 |
| Nonprofit | 55.8 | 150.7 | 209.6 | 267.1 | 312.7 | 337.7 | 10.4 | 6.8 | 5.0 | 8.1 |
| For profit | 5.8 | 18.8 | 26.7 | 35.0 | 40.1 | 44.0 | 12.5 | 7.3 | 5.6 | 7.9 |
| State-local government | 15.2 | 34.2 | 49.3 | 54.5 | 63.8 | 68.5 | 8.4 | 7.6 | 2.0 | 7.9 |
| 6–24 beds | 0.2 | 0.5 | 1.1 | 1.5 | 2.2 | 2.5 | 9.6 | 17.1 | 6.4 | 18.6 |
| 25–49 beds | 1.7 | 4.0 | 7.2 | 10.4 | 12.6 | 14.0 | 8.9 | 12.5 | 7.6 | 10.4 |
| 50–99 beds | 5.4 | 12.6 | 17.8 | 22.3 | 26.1 | 28.2 | 8.8 | 7.2 | 4.6 | 8.1 |
| 100–199 beds | 12.5 | 33.3 | 50.7 | 63.4 | 71.4 | 75.6 | 10.3 | 8.8 | 4.6 | 6.0 |
| 200–299 beds | 13.4 | 38.7 | 55.8 | 67.1 | 75.6 | 81.0 | 11.2 | 7.6 | 3.8 | 6.5 |
| 300–399 beds | 11.5 | 33.1 | 43.3 | 54.3 | 66.1 | 70.4 | 11.2 | 5.5 | 4.6 | 9.0 |
| 400–499 beds | 10.5 | 25.3 | 33.7 | 41.3 | 47.4 | 51.6 | 9.2 | 5.9 | 4.2 | 7.7 |
| 500 beds or more | 21.6 | 56.2 | 76.1 | 96.3 | 115.1 | 126.9 | 10.0 | 6.3 | 4.8 | 9.6 |
| Expenses per inpatient day | Amount | | | | | | | | | |
| Community[2] | $ 245 | $ 687 | $ 968 | $1,149 | $ 1,290 | $ 1,379 | 10.9 | 7.1 | 3.5 | 6.3 |
| Nonprofit | 246 | 692 | 994 | 1,182 | 1,329 | 1,430 | 10.9 | 7.5 | 3.5 | 6.6 |
| For profit | 257 | 752 | 947 | 1,057 | 1,181 | 1,265 | 11.3 | 4.7 | 2.2 | 6.2 |
| State-local government | 239 | 634 | 878 | 1,064 | 1,188 | 1,238 | 10.2 | 6.7 | 3.9 | 5.2 |
| 6–24 beds | 203 | 526 | 678 | 896 | 1,028 | 1,111 | 10.0 | 5.2 | 5.7 | 7.4 |
| 25–49 beds | 197 | 489 | 696 | 891 | 987 | 1,032 | 9.5 | 7.3 | 5.1 | 5.0 |
| 50–99 beds | 191 | 493 | 647 | 745 | 816 | 893 | 9.9 | 5.6 | 2.9 | 6.2 |
| 100–199 beds | 215 | 585 | 796 | 925 | 1,038 | 1,082 | 10.5 | 6.4 | 3.0 | 5.4 |
| 200–299 beds | 239 | 665 | 943 | 1,122 | 1,263 | 1,343 | 10.8 | 7.2 | 3.5 | 6.2 |
| 300–399 beds | 248 | 731 | 1,070 | 1,277 | 1,398 | 1,522 | 11.4 | 7.9 | 3.6 | 6.0 |
| 400–499 beds | 215 | 756 | 1,135 | 1,353 | 1,583 | 1,714 | 13.4 | 8.5 | 3.6 | 8.2 |
| 500 beds or more | 239 | 825 | 1,212 | 1,468 | 1,641 | 1,750 | 13.2 | 8.0 | 3.9 | 6.0 |
| Expenses per inpatient stay | | | | | | | | | | |
| Community[2] | $1,851 | $4,947 | $6,216 | $6,649 | $ 7,355 | $ 7,796 | 10.3 | 4.7 | 1.4 | 5.4 |
| Nonprofit | 1,902 | 5,001 | 6,279 | 6,717 | 7,458 | 7,905 | 10.2 | 4.7 | 1.4 | 5.6 |
| For profit | 1,676 | 4,727 | 5,425 | 5,642 | 6,161 | 6,590 | 10.9 | 2.8 | 0.8 | 5.3 |
| State-local government | 1,750 | 4,838 | 6,445 | 7,106 | 7,773 | 8,205 | 10.7 | 5.9 | 2.0 | 4.9 |
| 6–24 beds | 1,072 | 2,701 | 3,578 | 3,652 | 4,135 | 4,372 | 9.7 | 5.8 | 0.4 | 6.2 |
| 25–49 beds | 1,138 | 2,967 | 3,797 | 4,381 | 4,848 | 5,005 | 10.1 | 5.1 | 2.9 | 4.5 |
| 50–99 beds | 1,271 | 3,461 | 4,427 | 4,760 | 5,197 | 5,553 | 10.5 | 5.0 | 1.5 | 5.3 |
| 100–199 beds | 1,512 | 4,109 | 5,103 | 5,305 | 5,935 | 6,191 | 10.5 | 4.4 | 0.8 | 5.3 |
| 200–299 beds | 1,767 | 4,618 | 5,851 | 6,392 | 6,951 | 7,317 | 10.1 | 4.8 | 1.8 | 4.6 |
| 300–399 beds | 1,881 | 5,096 | 6,512 | 6,988 | 7,635 | 8,184 | 10.5 | 5.0 | 1.4 | 5.4 |
| 400–499 beds | 2,090 | 5,500 | 7,164 | 7,629 | 8,762 | 9,396 | 10.2 | 5.4 | 1.3 | 7.2 |
| 500 beds or more | 2,517 | 6,667 | 8,531 | 9,149 | 10,007 | 10,640 | 10.2 | 5.1 | 1.4 | 5.2 |

[1]The category of non-Federal hospitals comprises psychiatric, tuberculosis and other respiratory diseases hospitals, and long-term and short-term general and other special hospitals. See Appendix II, Hospital.

[2]Community hospitals are non-Federal short-term general and special hospitals whose facilities and services are available to the public. See Appendix II, Hospital.

NOTES: In 2003 employee payroll and benefit expenses comprised 52 percent of expenses in community hospitals and 64 percent in Federal hospitals. Data for additional years are available. See Appendix III.

SOURCES: American Hospital Association Annual Survey of Hospitals. Hospital Statistics, 1981, 1991–2005 Editions. Chicago, 1981, 1991–2005 (Copyrights 1981, 1991–2005: Used with the permission of the Health Forum LLC, an affiliate of the American Hospital Association); and unpublished data.



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## Table 130. Nursing home average monthly charges per resident and percent of residents, according to primary source of payments and selected facility characteristics: United States, 1985, 1995, and 1999

[Data are based on reporting by a sample of nursing homes]

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| Facility characteristic | Primary source of payment: All sources | Own income or family support[1] | | | Medicare | | | Medicaid | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1999 | 1985 | 1995 | 1999 | 1985 | 1995 | 1999 | 1985 | 1995 | 1999 |
| | Average monthly charge[2] | | | | | | | | | |
| All facilities | $3,891 | $1,450 | $3,081 | $3,947 | $2,141 | $5,546 | $5,764 | $1,504 | $2,769 | $3,505 |
| Ownership | | | | | | | | | | |
| Proprietary | 3,698 | 1,444 | 3,190 | 3,984 | 2,058 | 5,668 | 5,275 | 1,363 | 2,560 | 3,312 |
| Nonprofit and government | 4,225 | 1,462 | 2,967 | 3,903 | * | 5,304 | 6,548 | 1,851 | 3,201 | 3,918 |
| Certification | | | | | | | | | | |
| Both Medicare and Medicaid | 4,060 | --- | 3,365 | 4,211 | --- | 5,472 | 5,887 | --- | 2,910 | 3,626 |
| Medicare only | 4,437 | --- | 3,344 | 3,873 | --- | * | * | ... | ... | ... |
| Medicaid only | 2,508 | --- | 2,352 | 2,533 | ... | ... | ... | --- | 2,069 | 2,501 |
| Neither | 2,360 | --- | 2,390 | 2,685 | ... | ... | ... | ... | ... | ... |
| Bed size | | | | | | | | | | |
| Less than 50 beds | 3,808 | 886 | 3,377 | 3,358 | * | * | * | 1,335 | 2,990 | 3,533 |
| 50–99 beds | 3,627 | 1,388 | 2,849 | 3,698 | 1,760 | 4,929 | * | 1,323 | 2,335 | 3,121 |
| 100–199 beds | 3,867 | 1,567 | 3,138 | 4,160 | 2,192 | 4,918 | 5,318 | 1,413 | 2,659 | 3,487 |
| 200 beds or more | 4,281 | 1,701 | 3,316 | 4,029 | 2,767 | 4,523 | 5,912 | 1,919 | 3,520 | 4,011 |
| Geographic region | | | | | | | | | | |
| Northeast | 4,852 | 1,645 | 4,117 | 5,300 | 2,109 | 4,883 | 6,368 | 2,035 | 3,671 | 4,397 |
| Midwest | 3,474 | 1,398 | 2,650 | 3,413 | 2,745 | 5,439 | 4,726 | 1,382 | 2,478 | 3,239 |
| South | 3,263 | 1,359 | 2,945 | 3,467 | 2,033 | 4,889 | 4,859 | 1,200 | 2,333 | 2,943 |
| West | 4,725 | 1,498 | 3,666 | 4,868 | 1,838 | 8,825 | * | 1,501 | 2,848 | 3,865 |
| | Percent of residents | | | | | | | | | |
| All facilities | 100.0 | 41.6 | 27.8 | 23.7 | 1.4 | 9.9 | 14.7 | 50.4 | 60.2 | 58.7 |
| Ownership | | | | | | | | | | |
| Proprietary | 100.0 | 40.1 | 24.1 | 20.2 | 1.6 | 10.4 | 14.2 | 52.1 | 63.8 | 62.9 |
| Nonprofit and government | 100.0 | 44.9 | 34.3 | 30.2 | * | 9.2 | 15.5 | 46.6 | 54.0 | 51.1 |
| Certification | | | | | | | | | | |
| Both Medicare and Medicaid | 100.0 | --- | 23.1 | 21.5 | --- | 11.6 | 15.5 | --- | 63.9 | 60.4 |
| Medicare only | 100.0 | --- | 71.2 | 71.4 | --- | 16.2 | *21.0 | ... | ... | ... |
| Medicaid only | 100.0 | --- | 32.1 | 21.9 | ... | ... | ... | --- | 63.0 | 69.5 |
| Neither | 100.0 | --- | 91.0 | 73.6 | ... | ... | ... | ... | ... | ... |
| Bed size | | | | | | | | | | |
| Less than 50 beds | 100.0 | 53.1 | 35.3 | 40.3 | * | 13.1 | *15.9 | 33.8 | 49.9 | 42.5 |
| 50–99 beds | 100.0 | 49.5 | 34.5 | 28.3 | * | 6.2 | 12.4 | 42.9 | 57.6 | 56.9 |
| 100–199 beds | 100.0 | 39.6 | 26.2 | 21.8 | 1.5 | 10.6 | 15.0 | 55.2 | 61.5 | 61.0 |
| 200 beds or more | 100.0 | 30.1 | 22.0 | 20.1 | * | 12.1 | 16.3 | 57.7 | 62.4 | 58.1 |
| Geographic region | | | | | | | | | | |
| Northeast | 100.0 | 34.8 | 18.2 | 18.0 | 1.7 | 14.0 | 16.4 | 52.9 | 64.9 | 62.3 |
| Midwest | 100.0 | 49.1 | 36.3 | 32.9 | * | 6.7 | 13.3 | 45.9 | 55.8 | 51.1 |
| South | 100.0 | 39.4 | 26.1 | 19.2 | * | 10.1 | 14.9 | 53.8 | 62.2 | 63.5 |
| West | 100.0 | 40.4 | 27.9 | 23.9 | * | 10.5 | 13.9 | 49.2 | 57.9 | 57.8 |

* Estimates are considered unreliable. Data not shown have a relative standard error greater than 30 percent. After 1995 data preceded by an asterisk have a relative standard error of 20–30 percent.
--- Data not available.
... Category not applicable.
[1]Includes private health insurance.
[2]Includes life-care residents and no-charge residents.

NOTE: Data for additional years are available. See Appendix III.

SOURCES: Hing E, Sekscenski E, Strahan G. The National Nursing Home Survey: 1985 summary for the United States. National Center for Health Statistics. Vital Health Stat 13(97). 1989; and Centers for Disease Control and Prevention, National Center for Health Statistics, National Nursing Home Survey for other data years.

## Table 131. Mental health expenditures, percent distribution, and per capita expenditures, according to type of mental health organization: United States, selected years 1975–2002

[Data are based on an inventory of Mental Health Organizations (SMHO)]

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| Type of organization | 1975 | 1979 | 1983 | 1986 | 1990 | 1994[1] | 1998 | 2000 | 2002[2] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Amount in millions | | | | |
| All organizations | $6,564 | $8,764 | $14,432 | $18,458 | $28,410 | $33,136 | $38,512 | $34,528 | $34,302 |
| State and county psychiatric hospitals | 3,185 | 3,757 | 5,491 | 6,326 | 7,774 | 7,825 | 7,117 | 7,485 | 7,616 |
| Private psychiatric hospitals | 467 | 743 | 1,712 | 2,629 | 6,101 | 6,468 | 4,106 | 3,885 | 3,929 |
| Non-Federal general hospital psychiatric services | 621 | 723 | 2,176 | 2,878 | 4,662 | 5,344 | 5,589 | 5,853 | 5,179 |
| Department of Veterans Affairs medical centers[3] | 699 | 848 | 1,316 | 1,338 | 1,480 | 1,386 | 1,690 | 976 | 1,018 |
| Residential treatment centers for emotionally disturbed children | 279 | 436 | 573 | 978 | 1,969 | 2,360 | 3,557 | 3,781 | 4,496 |
| All other organizations[4] | 1,313 | 2,256 | 3,164 | 4,310 | 6,424 | 9,753 | 16,454 | 12,549 | 12,063 |
| | | | | | Percent distribution | | | | |
| All organizations | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| State and county psychiatric hospitals | 48.5 | 42.9 | 38.0 | 34.3 | 27.4 | 23.6 | 18.5 | 21.7 | 22.2 |
| Private psychiatric hospitals | 7.1 | 8.5 | 11.9 | 14.2 | 21.5 | 19.5 | 10.7 | 11.3 | 11.5 |
| Non-Federal general hospital psychiatric services | 9.5 | 8.2 | 15.1 | 15.6 | 16.4 | 16.1 | 14.5 | 17.0 | 15.1 |
| Department of Veterans Affairs medical centers[3] | 10.6 | 9.7 | 9.1 | 7.2 | 5.2 | 4.2 | 4.4 | 2.8 | 3.0 |
| Residential treatment centers for emotionally disturbed children | 4.2 | 5.0 | 4.0 | 5.3 | 6.9 | 7.1 | 9.2 | 11.0 | 13.1 |
| All other organizations[4] | 20.0 | 25.7 | 21.9 | 23.3 | 22.6 | 29.4 | 42.7 | 36.4 | 35.2 |
| | | | | | Amount per capita[5] | | | | |
| All organizations | $ 31 | $ 40 | $ 62 | $ 77 | $ 116 | $ 128 | $ 143 | $ 122 | $ 119 |
| State and county psychiatric hospitals | 15 | 17 | 24 | 26 | 32 | 30 | 26 | 27 | 26 |
| Private psychiatric hospitals | 2 | 3 | 7 | 11 | 25 | 25 | 15 | 14 | 14 |
| Non-Federal general hospital psychiatric services | 3 | 3 | 9 | 12 | 19 | 21 | 21 | 21 | 18 |
| Department of Veterans Affairs medical centers[3] | 3 | 4 | 6 | 6 | 6 | 5 | 6 | 3 | 4 |
| Residential treatment centers for emotionally disturbed children | 1 | 2 | 2 | 4 | 8 | 9 | 13 | 13 | 16 |
| All other organizations[4] | 6 | 10 | 14 | 18 | 26 | 38 | 61 | 44 | 42 |

[1]Beginning in 1994 data for supportive residential clients (moderately staffed housing arrangements such as supervised apartments, group homes, and halfway houses) are included in the totals and all other organizations. This change affects the comparability of trend data prior to 1994 with data for 1994 and later years.
[2]Preliminary data.
[3]Includes Department of Veterans Affairs neuropsychiatric hospitals, general hospital psychiatric services, and psychiatric outpatient clinics.
[4]Includes freestanding psychiatric outpatient clinics, partial care organizations, multiservice mental health organizations, residential treatment centers for adults, substance abuse organizations, and in 1975 and 1979 Federally funded community mental health centers.
[5]Civilian population as of January 1 each year through 1998. The rates for 2000 and later years are based on the decennial census sample civilian population.

NOTES: Changes in reporting procedures and definitions may affect the comparability of data prior to 1980 with those of later years. Mental health expenditures include salaries, other operating expenditures, and capital expenditures. These data exclude mental health care provided in nonpsychiatric units of hospitals such as general medical units. These data include revisions for 1998 data and differ from the previous editions of *Health, United States*.

SOURCES: Substance Abuse and Mental Health Services Administration, Center for Mental Health Services. Manderscheid RW, Henderson MJ. *Mental health, United States, 2002*. Washington, DC. U.S. Government Printing Office, 2004.



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## Table 132 (page 1 of 3). Private health insurance coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Characteristic | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Number in millions | | | | | |
| Total[2] | 157.5 | 162.7 | 164.2 | 165.8 | 170.8 | 174.3 | 174.0 | 175.3 | 172.4 | 173.6 |
| | | | | | Percent of population | | | | | |
| Total[2] | 76.8 | 75.9 | 71.3 | 70.7 | 72.1 | 72.8 | 71.5 | 71.2 | 69.4 | 68.9 |
| **Age** | | | | | | | | | | |
| Under 18 years | 72.6 | 71.8 | 65.2 | 66.1 | 68.4 | 68.8 | 66.6 | 66.3 | 63.5 | 63.0 |
| Under 6 years | 68.1 | 67.9 | 59.5 | 61.3 | 64.7 | 64.7 | 62.7 | 62.9 | 60.2 | 58.2 |
| 6–17 years | 74.9 | 74.0 | 68.3 | 68.5 | 70.2 | 70.9 | 68.5 | 67.9 | 65.1 | 65.3 |
| 18–44 years | 76.5 | 75.5 | 70.9 | 69.4 | 71.1 | 72.0 | 70.5 | 70.1 | 68.7 | 67.7 |
| 18–24 years | 67.4 | 64.5 | 60.8 | 59.3 | 61.5 | 63.2 | 60.3 | 60.3 | 60.2 | 58.8 |
| 25–34 years | 77.4 | 75.9 | 70.1 | 68.1 | 70.6 | 71.2 | 70.1 | 70.0 | 68.0 | 65.6 |
| 35–44 years | 83.9 | 82.7 | 77.7 | 76.4 | 76.9 | 77.9 | 77.0 | 76.2 | 74.6 | 75.1 |
| 45–64 years | 83.3 | 82.5 | 80.1 | 79.0 | 79.0 | 79.3 | 78.7 | 78.6 | 77.3 | 77.3 |
| 45–54 years | 83.3 | 83.4 | 80.9 | 80.4 | 80.0 | 80.4 | 80.0 | 79.4 | 77.5 | 77.9 |
| 55–64 years | 83.3 | 81.6 | 79.0 | 76.9 | 77.3 | 77.7 | 76.7 | 77.4 | 76.9 | 76.5 |
| **Sex** | | | | | | | | | | |
| Male | 77.3 | 76.1 | 71.6 | 70.9 | 72.2 | 72.9 | 71.6 | 71.2 | 69.0 | 69.0 |
| Female | 76.2 | 75.7 | 70.9 | 70.5 | 72.0 | 72.8 | 71.3 | 71.2 | 69.8 | 68.9 |
| **Race[3]** | | | | | | | | | | |
| White only | 79.9 | 79.1 | 74.5 | 74.2 | 75.9 | 76.9 | 75.7 | 75.1 | 73.4 | 71.5 |
| Black or African American only | 58.1 | 57.7 | 53.0 | 54.7 | 54.7 | 57.2 | 55.9 | 56.5 | 55.1 | 54.9 |
| American Indian and Alaska Native only | 49.1 | 45.5 | 45.3 | 39.4 | 43.4 | 39.5 | 43.7 | 49.0 | 37.9 | 45.0 |
| Asian only | 69.9 | 71.9 | 68.4 | 68.0 | 72.2 | 73.3 | 72.1 | 72.3 | 70.9 | 71.4 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | --- | * | * | * | * | * |
| 2 or more races | --- | --- | --- | --- | --- | 62.7 | 61.4 | 61.5 | 57.1 | 56.3 |
| **Hispanic origin and race[3]** | | | | | | | | | | |
| Hispanic or Latino | 55.7 | 51.5 | 46.4 | 46.4 | 48.7 | 48.9 | 47.8 | 46.1 | 44.4 | 41.9 |
| Mexican | 53.3 | 46.8 | 42.6 | 42.3 | 44.3 | 46.0 | 45.4 | 43.1 | 42.1 | 39.3 |
| Puerto Rican | 48.4 | 45.6 | 47.6 | 47.0 | 51.7 | 50.4 | 51.1 | 50.5 | 50.0 | 48.6 |
| Cuban | 72.5 | 70.3 | 63.6 | 71.0 | 71.7 | 71.3 | 63.9 | 66.1 | 62.0 | 55.9 |
| Other Hispanic or Latino | 61.6 | 61.0 | 51.4 | 49.9 | 51.9 | 52.8 | 50.7 | 49.9 | 46.2 | 45.3 |
| Not Hispanic or Latino | 78.7 | 78.4 | 74.4 | 74.0 | 75.5 | 76.3 | 75.2 | 75.3 | 73.7 | 73.7 |
| White only | 82.3 | 82.4 | 78.6 | 78.1 | 79.7 | 80.4 | 79.5 | 79.4 | 77.9 | 77.8 |
| Black or African American only | 58.3 | 57.8 | 53.4 | 54.9 | 54.9 | 57.3 | 56.0 | 56.7 | 55.2 | 55.5 |
| **Age and percent of poverty level[4]** | | | | | | | | | | |
| All ages:[3] | | | | | | | | | | |
| Below 100 percent | 32.2 | 27.0 | 22.6 | 23.3 | 24.0 | 25.5 | 25.2 | 25.3 | 25.2 | 23.9 |
| 100–149 percent | 62.2 | 55.1 | 47.8 | 43.6 | 45.3 | 42.9 | 41.7 | 41.7 | 38.4 | 37.5 |
| 150–199 percent | 77.2 | 71.0 | 65.1 | 62.9 | 62.2 | 59.4 | 58.5 | 56.7 | 56.2 | 52.2 |
| 200 percent or more | 91.5 | 90.8 | 88.3 | 86.4 | 86.8 | 87.1 | 85.7 | 85.5 | 83.9 | 84.6 |
| Under 18 years: | | | | | | | | | | |
| Below 100 percent | 28.5 | 22.3 | 16.9 | 18.3 | 19.2 | 20.4 | 19.5 | 18.2 | 16.9 | 15.9 |
| 100–149 percent | 66.2 | 59.6 | 48.5 | 43.5 | 46.9 | 42.8 | 39.8 | 40.7 | 35.2 | 33.9 |
| 150–199 percent | 80.9 | 75.9 | 67.4 | 65.7 | 66.1 | 61.0 | 59.7 | 56.3 | 55.3 | 50.9 |
| 200 percent or more | 92.3 | 92.5 | 89.5 | 87.8 | 88.6 | 89.0 | 86.7 | 86.8 | 84.5 | 85.1 |
| **Geographic region** | | | | | | | | | | |
| Northeast | 80.5 | 82.0 | 75.4 | 74.2 | 76.5 | 77.1 | 76.3 | 76.4 | 73.9 | 74.7 |
| Midwest | 80.6 | 81.5 | 77.3 | 77.1 | 79.0 | 80.1 | 78.8 | 78.1 | 76.4 | 75.9 |
| South | 74.3 | 71.4 | 66.9 | 67.3 | 67.7 | 68.0 | 66.8 | 66.0 | 64.6 | 64.0 |
| West | 71.9 | 71.2 | 67.5 | 65.4 | 67.4 | 68.6 | 66.5 | 67.9 | 66.1 | 64.7 |
| **Location of residence** | | | | | | | | | | |
| Within MSA[5] | 77.5 | 76.5 | 72.1 | 71.2 | 73.0 | 74.1 | 72.3 | 72.2 | 70.7 | 70.2 |
| Outside MSA[5] | 75.2 | 73.8 | 67.9 | 68.4 | 68.9 | 67.8 | 67.8 | 67.0 | 64.2 | 63.7 |

See footnotes at end of table.



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## Table 132 (page 2 of 3). Private health insurance coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Private insurance obtained through workplace[6] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
| | Number in millions | | | | | | | | | |
| Total[2] | 141.8 | 146.3 | 150.7 | 155.6 | 159.3 | 162.6 | 162.5 | 164.2 | 161.3 | 159.3 |
| | Percent of population | | | | | | | | | |
| Total[2] | 69.1 | 68.3 | 65.4 | 66.3 | 67.3 | 68.0 | 66.7 | 66.7 | 65.0 | 63.3 |
| Age | | | | | | | | | | |
| Under 18 years | 66.5 | 65.8 | 60.4 | 62.7 | 64.1 | 64.6 | 62.7 | 62.8 | 60.1 | 58.6 |
| Under 6 years | 62.1 | 62.3 | 55.1 | 58.2 | 60.9 | 60.8 | 58.8 | 59.1 | 57.0 | 53.9 |
| 6–17 years | 68.7 | 67.7 | 63.3 | 64.9 | 65.7 | 66.5 | 64.6 | 64.5 | 61.7 | 60.9 |
| 18–44 years | 69.6 | 68.4 | 65.3 | 65.5 | 66.5 | 67.7 | 66.1 | 65.9 | 64.3 | 62.2 |
| 18–24 years | 58.7 | 55.3 | 53.5 | 54.7 | 55.7 | 57.8 | 54.9 | 55.3 | 54.3 | 52.3 |
| 25–34 years | 71.2 | 69.5 | 65.0 | 64.5 | 66.7 | 67.2 | 66.1 | 66.0 | 63.9 | 60.3 |
| 35–44 years | 77.4 | 76.2 | 72.7 | 72.6 | 72.5 | 73.8 | 72.8 | 72.1 | 70.8 | 70.0 |
| 45–64 years | 71.8 | 71.6 | 72.2 | 72.6 | 72.7 | 72.7 | 72.5 | 72.5 | 71.4 | 70.0 |
| 45–54 years | 74.6 | 74.4 | 74.7 | 75.4 | 75.1 | 75.1 | 75.3 | 74.5 | 72.9 | 71.5 |
| 55–64 years | 69.0 | 68.3 | 68.4 | 68.3 | 69.1 | 69.2 | 68.1 | 69.5 | 69.1 | 68.0 |
| Sex | | | | | | | | | | |
| Male | 69.8 | 68.7 | 65.9 | 66.6 | 67.4 | 68.0 | 67.0 | 66.7 | 64.7 | 63.3 |
| Female | 68.4 | 67.9 | 64.9 | 66.0 | 67.1 | 68.0 | 66.5 | 66.6 | 65.2 | 63.3 |
| Race[3] | | | | | | | | | | |
| White only | 72.0 | 71.2 | 68.4 | 69.6 | 70.7 | 71.6 | 70.6 | 70.2 | 68.7 | 65.6 |
| Black or African American only | 52.4 | 52.8 | 49.3 | 52.5 | 52.0 | 54.6 | 53.1 | 54.2 | 52.4 | 51.5 |
| American Indian and Alaska Native only | 45.8 | 40.9 | 40.2 | 37.1 | 41.2 | 36.5 | 41.6 | 47.0 | 35.8 | 40.5 |
| Asian only | 59.0 | 61.1 | 59.6 | 61.4 | 63.8 | 65.4 | 65.1 | 65.9 | 62.5 | 62.1 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | --- | * | * | * | * | * |
| 2 or more races | --- | --- | --- | --- | --- | 59.3 | 59.7 | 57.9 | 54.5 | 53.1 |
| Hispanic origin and race[3] | | | | | | | | | | |
| Hispanic or Latino | 52.0 | 47.3 | 43.4 | 43.9 | 45.8 | 46.1 | 45.0 | 43.8 | 41.9 | 38.9 |
| Mexican | 50.5 | 44.2 | 40.9 | 40.7 | 42.2 | 43.7 | 43.2 | 41.2 | 40.1 | 36.7 |
| Puerto Rican | 45.9 | 42.3 | 44.5 | 45.1 | 49.3 | 47.4 | 49.3 | 47.5 | 48.0 | 45.0 |
| Cuban | 57.4 | 56.5 | 54.0 | 58.1 | 60.2 | 63.5 | 53.4 | 56.6 | 52.1 | 51.1 |
| Other Hispanic or Latino | 57.4 | 54.7 | 46.7 | 46.9 | 48.5 | 49.6 | 47.0 | 47.6 | 43.1 | 41.6 |
| Not Hispanic or Latino | 70.6 | 70.4 | 68.2 | 69.4 | 70.3 | 71.2 | 70.2 | 70.5 | 68.8 | 67.6 |
| White only | 74.0 | 74.0 | 72.1 | 73.1 | 74.2 | 74.8 | 74.1 | 74.1 | 72.8 | 71.3 |
| Black or African American only | 52.6 | 53.0 | 49.8 | 52.8 | 52.2 | 54.6 | 53.3 | 54.4 | 52.6 | 52.0 |
| Age and percent of poverty level[4] | | | | | | | | | | |
| All ages: | | | | | | | | | | |
| Below 100 percent | 24.1 | 19.9 | 17.5 | 19.9 | 20.1 | 21.8 | 20.9 | 21.8 | 21.4 | 19.9 |
| 100–149 percent | 52.4 | 46.4 | 42.1 | 38.8 | 40.4 | 38.4 | 37.1 | 37.0 | 34.3 | 31.8 |
| 150–199 percent | 69.5 | 63.1 | 58.8 | 58.3 | 56.6 | 53.9 | 53.4 | 51.9 | 50.9 | 46.8 |
| 200 percent or more | 85.0 | 83.7 | 82.3 | 81.9 | 81.9 | 82.1 | 81.0 | 80.9 | 79.3 | 78.6 |
| Under 18 years: | | | | | | | | | | |
| Below 100 percent | 23.0 | 17.5 | 13.6 | 16.2 | 16.8 | 17.5 | 16.5 | 16.2 | 14.8 | 14.0 |
| 100–149 percent | 58.3 | 52.5 | 43.6 | 39.6 | 42.6 | 39.2 | 36.3 | 37.0 | 32.5 | 30.1 |
| 150–199 percent | 75.8 | 70.1 | 61.8 | 62.5 | 61.6 | 56.3 | 55.6 | 52.9 | 50.8 | 47.0 |
| 200 percent or more | 86.9 | 86.6 | 84.4 | 83.9 | 83.9 | 84.4 | 82.5 | 82.9 | 80.8 | 79.9 |

See footnotes at end of table.



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## Table 132 (page 3 of 3). Private health insurance coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Private insurance obtained through workplace[6] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
| Geographic region | Percent of population | | | | | | | | | |
| Northeast | 74.0 | 75.0 | 69.8 | 70.9 | 73.0 | 73.5 | 72.1 | 72.9 | 70.5 | 69.4 |
| Midwest | 72.0 | 73.3 | 71.2 | 72.4 | 73.6 | 75.3 | 74.5 | 73.7 | 72.2 | 70.4 |
| South | 66.2 | 63.6 | 61.8 | 62.8 | 63.2 | 63.6 | 62.2 | 61.6 | 60.3 | 58.8 |
| West | 64.7 | 63.9 | 60.4 | 60.6 | 61.3 | 61.7 | 60.6 | 62.1 | 59.9 | 57.5 |
| Location of residence | | | | | | | | | | |
| Within MSA[5] | 70.9 | 69.6 | 66.6 | 67.2 | 68.4 | 69.5 | 67.8 | 67.9 | 66.3 | 64.6 |
| Outside MSA[5] | 65.3 | 63.5 | 60.7 | 62.7 | 63.0 | 61.9 | 62.4 | 61.7 | 59.2 | 58.0 |

* Estimates are considered unreliable. Data not shown have a relative standard error of greater than 30 percent.
- - - Data not available.
[1]In 1997 the National Health Interview Survey (NHIS) was redesigned, including changes to the questions on health insurance coverage. See Appendix I, National Health Interview Survey and Appendix II, Health insurance coverage.
[2]Includes all other races not shown separately and, in 1984 and 1989, unknown poverty level.
[3]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. Starting in 2003, race responses of "other race" and "unspecified multiple race" were treated as missing, and then race was imputed if these were the only race responses. Almost all persons with a race response of "other race" were of Hispanic origin. See Appendix II, Race.
[4]Poverty status was unknown for 10–11 percent of persons under 65 years of age in 1984 and 1989. Missing family income data were imputed for 15–16 percent of persons under 65 years of age in 1994–96, 24 percent in 1997, and 28–31 percent in 1998–2003. See Appendix II, Family income; Poverty level.
[5]MSA is metropolitan statistical area.
[6]Private insurance originally obtained through a present or former employer or union. Starting in 1997 also includes private insurance obtained through workplace, self-employment, or professional association.

NOTES: Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, health insurance supplements (1984, 1989, 1994–1996). Starting with data year 1997 data are from the family core questionnaires.



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## Table 133 (page 1 of 2). Medicaid coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Number in millions | | | | | |
| Total[2] | 14.0 | 15.4 | 26.6 | 22.9 | 21.1 | 21.9 | 23.2 | 25.5 | 29.4 | 30.9 |
| | | | | | Percent of population | | | | | |
| Total[2] | 6.8 | 7.2 | 11.5 | 9.7 | 8.9 | 9.1 | 9.5 | 10.4 | 11.8 | 12.3 |
| **Age** | | | | | | | | | | |
| Under 18 years | 11.9 | 12.6 | 21.5 | 18.4 | 17.1 | 18.1 | 19.6 | 21.5 | 24.8 | 26.0 |
| Under 6 years | 15.5 | 15.7 | 29.3 | 24.7 | 22.4 | 23.5 | 24.7 | 26.2 | 30.0 | 32.3 |
| 6–17 years | 10.1 | 10.9 | 17.4 | 15.2 | 14.5 | 15.5 | 17.2 | 19.2 | 22.3 | 23.0 |
| 18–44 years | 5.1 | 5.2 | 7.8 | 6.6 | 5.8 | 5.7 | 5.6 | 6.3 | 7.1 | 7.4 |
| 18–24 years | 6.4 | 6.8 | 10.4 | 8.8 | 8.0 | 8.1 | 8.1 | 8.4 | 9.9 | 9.6 |
| 25–34 years | 5.3 | 5.2 | 8.2 | 6.8 | 5.7 | 5.7 | 5.5 | 6.2 | 6.6 | 7.8 |
| 35–44 years | 3.5 | 4.0 | 5.9 | 5.2 | 4.6 | 4.3 | 4.3 | 5.1 | 5.9 | 5.6 |
| 45–64 years | 3.4 | 4.3 | 5.6 | 4.6 | 4.5 | 4.4 | 4.5 | 4.7 | 5.3 | 5.3 |
| 45–54 years | 3.2 | 3.8 | 5.1 | 4.0 | 4.1 | 3.9 | 4.2 | 4.4 | 5.1 | 5.0 |
| 55–64 years | 3.6 | 4.9 | 6.4 | 5.6 | 5.0 | 5.3 | 4.9 | 5.2 | 5.8 | 5.8 |
| **Sex** | | | | | | | | | | |
| Male | 5.4 | 5.7 | 9.6 | 8.4 | 7.7 | 7.9 | 8.2 | 9.1 | 10.6 | 10.9 |
| Female | 8.1 | 8.6 | 13.4 | 11.1 | 10.1 | 10.3 | 10.8 | 11.6 | 13.0 | 13.6 |
| **Race[3]** | | | | | | | | | | |
| White only | 4.6 | 5.1 | 8.9 | 7.4 | 6.7 | 6.9 | 7.1 | 8.0 | 9.3 | 10.4 |
| Black or African American only | 20.5 | 19.0 | 28.5 | 22.4 | 21.2 | 20.1 | 21.2 | 22.1 | 23.2 | 23.7 |
| American Indian and Alaska Native only | *28.2 | 29.7 | 19.0 | 19.6 | 15.2 | 21.4 | 15.1 | 16.2 | 21.1 | 18.5 |
| Asian only | *8.7 | *8.8 | 10.5 | 9.6 | 6.7 | 7.9 | 7.5 | 8.4 | 9.8 | 8.0 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | --- | * | * | * | * | * |
| 2 or more races | --- | --- | --- | --- | --- | 19.7 | 19.1 | 17.5 | 21.6 | 23.5 |
| **Hispanic origin and race[3]** | | | | | | | | | | |
| Hispanic or Latino | 13.3 | 13.5 | 21.9 | 17.6 | 15.5 | 15.7 | 15.5 | 17.5 | 20.8 | 21.8 |
| Mexican | 12.2 | 12.4 | 21.6 | 17.2 | 14.3 | 14.5 | 14.0 | 16.6 | 20.2 | 21.7 |
| Puerto Rican | 31.5 | 27.3 | 33.4 | 31.0 | 26.1 | 28.6 | 29.4 | 30.3 | 29.0 | 31.0 |
| Cuban | *4.8 | *7.7 | 13.4 | 7.3 | *8.9 | 7.6 | 9.2 | 11.1 | 14.9 | 13.8 |
| Other Hispanic or Latino | 7.9 | 11.1 | 18.2 | 15.3 | 15.0 | 14.7 | 14.5 | 15.6 | 19.6 | 19.3 |
| Not Hispanic or Latino | 6.2 | 6.6 | 10.2 | 8.7 | 8.0 | 8.2 | 8.5 | 9.2 | 10.3 | 10.6 |
| White only | 3.7 | 4.2 | 7.1 | 6.1 | 5.6 | 5.8 | 6.1 | 6.7 | 7.7 | 8.0 |
| Black or African American only | 20.7 | 19.0 | 28.1 | 22.1 | 21.0 | 20.1 | 21.0 | 22.0 | 23.2 | 23.4 |
| **Age and percent of poverty level[4]** | | | | | | | | | | |
| All ages:[3] | | | | | | | | | | |
| Below 100 percent | 33.0 | 37.6 | 48.4 | 40.5 | 38.9 | 38.8 | 38.4 | 40.0 | 42.8 | 43.2 |
| 100–149 percent | 7.7 | 10.9 | 19.1 | 17.9 | 16.2 | 18.8 | 20.7 | 23.3 | 27.6 | 26.9 |
| 150–199 percent | 3.2 | 5.1 | 8.3 | 8.3 | 7.9 | 10.8 | 11.5 | 14.1 | 16.1 | 17.1 |
| 200 percent or more | 0.6 | 1.1 | 1.7 | 1.8 | 1.9 | 2.1 | 2.3 | 2.6 | 3.1 | 3.3 |
| Under 18 years: | | | | | | | | | | |
| Below 100 percent | 43.2 | 47.9 | 66.0 | 58.0 | 57.0 | 57.7 | 58.5 | 61.5 | 66.4 | 67.5 |
| 100–149 percent | 9.0 | 12.3 | 27.2 | 28.7 | 25.1 | 31.4 | 35.0 | 38.9 | 47.1 | 49.1 |
| 150–199 percent | 4.4 | 6.1 | 13.1 | 13.0 | 13.1 | 17.9 | 21.3 | 25.9 | 29.1 | 33.6 |
| 200 percent or more | 0.8 | 1.8 | 3.3 | 3.1 | 3.4 | 4.2 | 5.1 | 5.7 | 7.2 | 7.6 |

See footnotes at end of table.



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## Table 133 (page 2 of 2). Medicaid coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Geographic region | | | | Percent of population | | | | | | |
| Northeast | 8.6 | 6.6 | 11.7 | 11.3 | 9.8 | 10.0 | 10.6 | 10.8 | 12.5 | 12.9 |
| Midwest | 7.4 | 7.6 | 10.5 | 8.4 | 7.7 | 7.4 | 8.0 | 8.9 | 10.3 | 10.8 |
| South | 5.1 | 6.5 | 11.3 | 8.7 | 8.6 | 9.0 | 9.4 | 10.7 | 12.0 | 12.6 |
| West | 7.0 | 8.5 | 12.9 | 11.7 | 10.1 | 10.7 | 10.4 | 11.0 | 12.7 | 12.8 |
| Location of residence | | | | | | | | | | |
| Within MSA[5] | 7.1 | 7.0 | 11.3 | 9.7 | 8.6 | 8.5 | 8.9 | 9.9 | 11.0 | 11.5 |
| Outside MSA[5] | 6.1 | 7.9 | 12.3 | 10.1 | 10.0 | 11.7 | 11.9 | 12.4 | 15.2 | 15.3 |

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.

- - - Data not available.

[1]In 1997 the National Health Interview Survey (NHIS) was redesigned, including changes to the questions on health insurance coverage. See Appendix I, National Health Interview Survey and Appendix II, Health insurance coverage.

[2]Includes all other races not shown separately and, in 1984 and 1989, unknown poverty level.

[3]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.

[4]Poverty status was unknown for 10–11 percent of persons under 65 years of age in 1984 and 1989. Missing family income data were imputed for 15–16 percent of persons under 65 years of age in 1994–96, 24 percent in 1997, and 28–31 percent in 1998–2003. See Appendix II, Family income; Poverty level.

[5]MSA is metropolitan statistical area.

NOTES: Medicaid includes other public assistance through 1996. Starting in 1997 includes state-sponsored health plans. Starting in 1999 includes State Children's Health Insurance Program (SCHIP). In 2003, 9.4 percent of persons under 65 years of age were covered by Medicaid, 1.2 percent by state-sponsored health plans, and 1.7 percent by SCHIP. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, health insurance supplements (1984, 1989, 1994–1996). Starting with data year 1997 data are from the family core questionnaires.



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## Table 134 (page 1 of 2). No health insurance coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Number in millions | | | | | |
| Total[2] | 29.8 | 33.4 | 37.1 | 41.0 | 39.2 | 38.5 | 41.4 | 40.3 | 41.7 | 41.6 |
| | | | | | Percent of population | | | | | |
| Total[2] | 14.5 | 15.6 | 16.1 | 17.5 | 16.6 | 16.1 | 17.0 | 16.4 | 16.8 | 16.5 |
| Age | | | | | | | | | | |
| Under 18 years | 13.9 | 14.7 | 13.4 | 14.0 | 12.7 | 11.9 | 12.6 | 11.2 | 10.9 | 9.8 |
| Under 6 years | 14.9 | 15.1 | 11.8 | 12.5 | 11.5 | 11.0 | 11.8 | 9.9 | 9.2 | 8.2 |
| 6–17 years | 13.4 | 14.5 | 14.3 | 14.7 | 13.3 | 12.3 | 13.0 | 11.8 | 11.7 | 10.6 |
| 18–44 years | 17.1 | 18.4 | 20.4 | 22.4 | 21.4 | 21.0 | 22.4 | 22.2 | 23.0 | 23.5 |
| 18–24 years | 25.0 | 27.1 | 28.0 | 30.1 | 29.0 | 27.4 | 30.4 | 29.9 | 28.8 | 30.1 |
| 25–34 years | 16.2 | 18.3 | 21.1 | 23.8 | 22.2 | 22.1 | 23.3 | 23.1 | 24.6 | 25.4 |
| 35–44 years | 11.2 | 12.3 | 15.1 | 16.7 | 16.4 | 16.3 | 16.9 | 16.8 | 18.0 | 17.5 |
| 45–64 years | 9.6 | 10.5 | 10.9 | 12.4 | 12.2 | 12.2 | 12.6 | 12.2 | 13.1 | 12.5 |
| 45–54 years | 10.5 | 11.0 | 11.6 | 12.8 | 12.6 | 12.8 | 12.8 | 13.0 | 14.1 | 13.6 |
| 55–64 years | 8.7 | 10.0 | 9.9 | 11.8 | 11.4 | 11.4 | 12.4 | 11.0 | 11.5 | 10.9 |
| Sex | | | | | | | | | | |
| Male | 15.3 | 16.8 | 17.4 | 18.7 | 17.6 | 17.2 | 18.1 | 17.5 | 18.4 | 17.7 |
| Female | 13.8 | 14.4 | 14.8 | 16.3 | 15.6 | 15.0 | 15.9 | 15.3 | 15.2 | 15.3 |
| Race[3] | | | | | | | | | | |
| White only | 13.6 | 14.5 | 15.5 | 16.4 | 15.2 | 14.6 | 15.4 | 14.9 | 15.5 | 16.0 |
| Black or African American only | 19.9 | 21.6 | 18.0 | 20.1 | 20.4 | 19.3 | 19.5 | 18.8 | 18.8 | 18.4 |
| American Indian and Alaska Native only | 22.5 | 28.4 | 34.3 | 38.1 | 38.7 | 38.2 | 38.4 | 33.1 | 39.1 | 35.0 |
| Asian only | 18.5 | 16.9 | 18.6 | 19.5 | 18.3 | 16.8 | 17.6 | 17.3 | 17.4 | 18.2 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | --- | --- | --- | * | * | * | * | * |
| 2 or more races | --- | --- | --- | --- | --- | 14.5 | 16.8 | 16.6 | 17.6 | 15.9 |
| Hispanic origin and race[3] | | | | | | | | | | |
| Hispanic or Latino | 29.5 | 33.7 | 31.4 | 34.5 | 34.1 | 34.0 | 35.6 | 35.0 | 33.9 | 34.7 |
| Mexican | 33.8 | 39.9 | 35.6 | 39.4 | 40.1 | 38.2 | 39.9 | 39.4 | 37.1 | 37.8 |
| Puerto Rican | 18.3 | 24.7 | 17.6 | 19.0 | 18.9 | 19.4 | 16.4 | 15.5 | 19.2 | 17.7 |
| Cuban | 21.6 | 20.6 | 22.3 | 21.1 | 18.5 | 20.4 | 25.4 | 20.4 | 20.8 | 29.1 |
| Other Hispanic or Latino | 27.4 | 25.8 | 30.2 | 33.0 | 31.2 | 30.7 | 33.4 | 33.2 | 33.2 | 33.4 |
| Not Hispanic or Latino | 13.2 | 13.7 | 14.2 | 15.2 | 14.1 | 13.5 | 14.0 | 13.3 | 13.9 | 13.3 |
| White only | 12.0 | 12.2 | 13.0 | 13.8 | 12.5 | 12.1 | 12.5 | 11.8 | 12.5 | 11.9 |
| Black or African American only | 19.6 | 21.4 | 17.9 | 20.0 | 20.4 | 19.2 | 19.5 | 18.7 | 18.7 | 18.1 |
| Age and percent of poverty level[4] | | | | | | | | | | |
| All ages: | | | | | | | | | | |
| Below 100 percent | 33.9 | 35.0 | 29.6 | 33.7 | 34.1 | 33.8 | 34.2 | 33.1 | 30.3 | 31.1 |
| 100–149 percent | 27.2 | 31.1 | 31.6 | 35.1 | 35.4 | 34.1 | 34.9 | 31.7 | 32.2 | 31.9 |
| 150–199 percent | 17.3 | 21.7 | 24.0 | 26.3 | 25.9 | 26.9 | 27.0 | 26.4 | 25.2 | 27.6 |
| 200 percent or more | 6.0 | 7.1 | 8.7 | 10.1 | 9.3 | 9.2 | 10.1 | 10.0 | 11.1 | 10.0 |
| Under 18 years: | | | | | | | | | | |
| Below 100 percent | 29.0 | 31.4 | 20.0 | 23.2 | 22.7 | 22.3 | 22.0 | 20.7 | 17.0 | 16.8 |
| 100–149 percent | 22.8 | 26.1 | 24.8 | 26.5 | 27.4 | 24.2 | 25.4 | 19.6 | 19.4 | 16.2 |
| 150–199 percent | 12.7 | 15.8 | 18.0 | 19.9 | 17.5 | 19.1 | 17.7 | 17.4 | 14.3 | 14.9 |
| 200 percent or more | 4.2 | 4.5 | 6.4 | 7.1 | 6.0 | 5.4 | 6.5 | 5.8 | 6.7 | 5.5 |

See footnotes at end of table.



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## Table 134 (page 2 of 2). No health insurance coverage among persons under 65 years of age, according to selected characteristics: United States, selected years 1984–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

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| Characteristic | 1984 | 1989 | 1995 | 1997[1] | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Geographic region | | | | | Percent of population | | | | | |
| Northeast | 10.2 | 10.9 | 13.3 | 13.5 | 12.3 | 12.2 | 12.2 | 11.7 | 12.8 | 11.3 |
| Midwest | 11.3 | 10.7 | 12.2 | 13.2 | 11.9 | 11.5 | 12.3 | 11.7 | 12.5 | 12.4 |
| South | 17.7 | 19.7 | 19.4 | 20.9 | 20.1 | 19.9 | 20.5 | 20.2 | 20.3 | 19.8 |
| West | 18.2 | 18.8 | 17.9 | 20.6 | 20.0 | 18.5 | 20.7 | 19.0 | 19.1 | 19.9 |
| Location of residence | | | | | | | | | | |
| Within MSA[5] | 13.6 | 15.2 | 15.5 | 16.9 | 15.9 | 15.4 | 16.6 | 15.9 | 16.3 | 16.0 |
| Outside MSA[5] | 16.6 | 17.0 | 18.6 | 19.8 | 19.1 | 18.8 | 18.6 | 18.2 | 18.7 | 18.7 |

* Estimates are considered unreliable. Data not shown have a relative standard error of greater than 30 percent.
- - - Data not available.
[1]In 1997 the National Health Interview Survey (NHIS) was redesigned, including changes to the questions on health insurance coverage. See Appendix I, National Health Interview Survey and Appendix II, Health insurance coverage.
[2]Includes all other races not shown separately and, in 1984 and 1989, unknown poverty level.
[3]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[4]Poverty status was unknown for 10–11 percent of persons under 65 years of age in 1984 and 1989. Missing family income data were imputed for 15–16 percent of persons under 65 years of age in 1994–96, 24 percent in 1997, and 28–31 percent in 1998–2003. See Appendix II, Family income; Poverty level.
[5]MSA is metropolitan statistical area.

NOTES: Persons not covered by private insurance, Medicaid, State Children's Health Insurance Program (SCHIP), public assistance (through 1996), state-sponsored or other government-sponsored health plans (starting in 1997), Medicare, or military plans are considered to have no health insurance coverage and are included in this table. See Appendix II, Health insurance coverage. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, health insurance supplements (1984, 1989, 1994–1996). Starting with data year 1997 data are from the family core questionnaires.



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## Table 135 (page 1 of 3). Health insurance coverage for persons 65 years of age and over, according to type of coverage and selected characteristics: United States, selected years 1989–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Private insurance[1] | | | | | | Private insurance obtained through workplace[1,2] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1989 | 1995 | 2000 | 2001 | 2002 | 2003 | 1989 | 1995 | 2000 | 2001 | 2002 | 2003 |
| | Number in millions | | | | | | | | | | | |
| Total[3] | 22.4 | 23.5 | 21.2 | 21.3 | 20.6 | 21.5 | 11.2 | 12.4 | 12.0 | 12.2 | 11.8 | 11.9 |
| | Percent of population | | | | | | | | | | | |
| Total[3] | 76.5 | 74.6 | 63.4 | 63.1 | 60.9 | 62.7 | 38.4 | 39.5 | 35.9 | 36.2 | 34.9 | 34.8 |
| Age | | | | | | | | | | | | |
| 65–74 years | 78.2 | 75.1 | 63.1 | 63.4 | 60.9 | 62.3 | 43.7 | 43.3 | 39.6 | 39.8 | 38.0 | 38.2 |
| 75 years and over | 73.9 | 73.9 | 63.9 | 62.7 | 60.8 | 63.1 | 30.2 | 34.1 | 31.4 | 32.0 | 31.4 | 31.0 |
| 75–84 years | 75.9 | 75.7 | 64.9 | 64.2 | 61.7 | 64.0 | 32.0 | 36.0 | 33.2 | 33.4 | 33.1 | 32.5 |
| 85 years and over | 65.5 | 67.3 | 59.8 | 57.4 | 57.7 | 59.8 | 22.8 | 27.3 | 24.8 | 26.8 | 25.4 | 26.2 |
| Sex | | | | | | | | | | | | |
| Male | 77.5 | 76.4 | 64.7 | 64.2 | 62.2 | 64.1 | 43.5 | 44.2 | 40.4 | 40.6 | 39.2 | 38.6 |
| Female | 75.8 | 73.3 | 62.5 | 62.3 | 59.9 | 61.6 | 34.8 | 36.2 | 32.6 | 33.0 | 31.8 | 32.0 |
| Race[4] | | | | | | | | | | | | |
| White only | 80.1 | 78.3 | 67.2 | 66.7 | 64.3 | 65.7 | 39.9 | 41.0 | 37.4 | 37.6 | 36.0 | 35.7 |
| Black or African American only | 43.0 | 41.8 | 36.1 | 38.3 | 36.5 | 37.6 | 24.8 | 26.5 | 25.7 | 28.5 | 27.2 | 28.3 |
| American Indian and Alaska Native only | 46.8 | *39.9 | * | *32.6 | * | *37.3 | *21.3 | *29.4 | * | * | * | * |
| Asian only | 48.4 | 45.8 | 42.9 | 41.3 | 40.7 | 40.2 | *30.2 | 27.0 | 25.0 | 23.8 | 28.0 | 25.9 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | * | * | * | * | --- | --- | * | * | * | * |
| 2 or more races | --- | --- | 65.5 | 48.5 | 55.1 | 53.0 | --- | --- | 49.7 | 31.2 | 35.2 | 31.7 |
| Hispanic origin and race[4] | | | | | | | | | | | | |
| Hispanic or Latino | 44.8 | 40.9 | 24.6 | 25.3 | 23.8 | 24.0 | 24.5 | 20.3 | 16.4 | 17.6 | 17.3 | 17.6 |
| Mexican | 36.4 | 33.3 | 21.7 | 25.8 | 22.3 | 25.7 | 22.2 | 17.8 | 13.8 | 18.0 | 16.8 | 19.5 |
| Not Hispanic or Latino | 77.6 | 76.3 | 65.5 | 65.2 | 63.1 | 65.1 | 38.9 | 40.5 | 36.9 | 37.3 | 35.9 | 35.9 |
| White only | 81.4 | 80.4 | 69.1 | 68.8 | 66.4 | 68.6 | 40.4 | 42.2 | 38.3 | 38.6 | 37.0 | 37.0 |
| Black or African American only | 43.0 | 41.5 | 36.1 | 38.3 | 36.6 | 37.6 | 24.8 | 26.1 | 25.7 | 28.6 | 27.2 | 28.1 |
| Percent of poverty level[5] | | | | | | | | | | | | |
| Below 100 percent | 46.3 | 40.3 | 34.1 | 32.8 | 30.7 | 33.2 | 11.5 | 13.9 | 12.7 | 15.2 | 12.7 | 12.9 |
| 100–149 percent | 67.5 | 67.6 | 47.0 | 48.3 | 46.9 | 47.2 | 22.3 | 26.7 | 18.9 | 22.6 | 19.8 | 16.8 |
| 150–199 percent | 81.1 | 75.9 | 61.8 | 61.8 | 58.7 | 61.8 | 39.5 | 38.8 | 29.2 | 28.8 | 28.6 | 26.9 |
| 200 percent or more | 86.6 | 85.7 | 72.8 | 71.4 | 69.7 | 71.1 | 52.3 | 50.6 | 45.5 | 44.1 | 43.4 | 44.0 |
| Geographic region | | | | | | | | | | | | |
| Northeast | 76.5 | 76.1 | 66.9 | 66.4 | 65.8 | 70.6 | 43.6 | 44.9 | 38.9 | 38.9 | 39.8 | 39.5 |
| Midwest | 82.2 | 82.3 | 76.0 | 72.5 | 71.8 | 74.5 | 41.0 | 45.3 | 41.3 | 40.7 | 37.2 | 39.1 |
| South | 73.4 | 71.1 | 58.8 | 60.6 | 57.6 | 56.0 | 33.2 | 34.6 | 32.4 | 34.5 | 33.6 | 31.4 |
| West | 75.1 | 68.9 | 51.9 | 52.1 | 48.3 | 51.4 | 38.2 | 34.2 | 31.9 | 30.7 | 29.4 | 30.7 |
| Location of residence | | | | | | | | | | | | |
| Within MSA[6] | 77.1 | 74.8 | 61.7 | 61.5 | 60.1 | 62.1 | 41.3 | 41.5 | 37.2 | 36.8 | 35.9 | 36.7 |
| Outside MSA[6] | 75.0 | 74.1 | 68.8 | 68.3 | 63.5 | 64.6 | 30.8 | 32.6 | 32.0 | 34.2 | 31.6 | 28.5 |

See footnotes at end of table.



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## Table 135 (page 2 of 3). Health insurance coverage for persons 65 years of age and over, according to type of coverage and selected characteristics: United States, selected years 1989–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Medicare health maintenance organization[1,7] | | | | | | Medicaid[1,8] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1989 | 1995 | 2000 | 2001 | 2002 | 2003 | 1989 | 1995 | 2000 | 2001 | 2002 | 2003 |
| | | | | | | Number in millions | | | | | | |
| Total[3] | --- | --- | 5.1 | 4.3 | 4.0 | 3.4 | 2.0 | 3.0 | 2.5 | 2.7 | 2.7 | 2.7 |
| | | | | | | Percent of population | | | | | | |
| Total[3] | --- | --- | 15.2 | 12.9 | 11.8 | 10.0 | 7.0 | 9.4 | 7.5 | 8.0 | 7.8 | 8.0 |
| Age | | | | | | Percent of population | | | | | | |
| 65–74 years | --- | --- | 15.7 | 12.7 | 11.7 | 9.5 | 6.3 | 8.4 | 7.6 | 7.6 | 7.9 | 8.0 |
| 75 years and over | --- | --- | 14.5 | 13.1 | 11.9 | 10.6 | 8.2 | 10.9 | 7.4 | 8.4 | 7.7 | 7.9 |
| 75–84 years | --- | --- | 15.4 | 13.4 | 12.6 | 10.9 | 7.9 | 9.9 | 7.1 | 7.9 | 7.8 | 7.6 |
| 85 years and over | --- | --- | 11.0 | 11.9 | 9.2 | 9.7 | 9.7 | 14.3 | 8.4 | 10.1 | 7.3 | 9.1 |
| Sex | | | | | | | | | | | | |
| Male | --- | --- | 15.5 | 12.4 | 12.3 | 9.9 | 4.9 | 5.7 | 5.4 | 5.9 | 5.6 | 5.7 |
| Female | --- | --- | 14.9 | 13.2 | 11.4 | 10.2 | 8.5 | 12.1 | 9.0 | 9.5 | 9.5 | 9.6 |
| Race[4] | | | | | | | | | | | | |
| White only | --- | --- | 15.1 | 12.9 | 11.6 | 10.0 | 5.5 | 7.2 | 5.5 | 6.1 | 6.1 | 6.2 |
| Black or African American only | --- | --- | 14.6 | 11.4 | 10.6 | 9.4 | 20.5 | 27.5 | 19.4 | 19.9 | 19.5 | 19.2 |
| American Indian and Alaska Native only | --- | --- | * | * | * | * | *30.9 | * | *35.4 | * | * | *32.7 |
| Asian only | --- | --- | 16.7 | 13.4 | 18.6 | 15.2 | *21.3 | 33.6 | 21.0 | 22.9 | 20.0 | 28.5 |
| Native Hawaiian and Other Pacific Islander only | --- | --- | * | * | * | * | --- | --- | * | * | * | * |
| 2 or more races | --- | --- | *30.4 | *16.5 | *15.2 | * | --- | --- | * | *19.1 | * | *15.5 |
| Hispanic origin and race[4] | | | | | | | | | | | | |
| Hispanic or Latino | --- | --- | 24.7 | 19.9 | 21.8 | 18.9 | 25.6 | 31.1 | 28.4 | 29.0 | 27.9 | 27.3 |
| Mexican | --- | --- | 23.7 | 18.2 | 19.0 | 14.5 | 27.4 | 31.6 | 26.6 | 25.7 | 23.6 | 25.7 |
| Not Hispanic or Latino | --- | --- | 14.6 | 12.5 | 11.2 | 9.5 | 6.4 | 8.3 | 6.3 | 6.8 | 6.6 | 6.8 |
| White only | --- | --- | 14.5 | 12.5 | 11.1 | 9.3 | 4.8 | 5.9 | 4.6 | 4.9 | 5.0 | 4.8 |
| Black or African American only | --- | --- | 14.5 | 11.4 | 10.5 | 9.5 | 20.4 | 27.6 | 19.4 | 19.8 | 19.4 | 18.8 |
| Percent of poverty level[5] | | | | | | | | | | | | |
| Below 100 percent | --- | --- | 15.1 | 9.1 | 9.1 | 9.4 | 28.1 | 36.2 | 28.1 | 31.0 | 29.5 | 31.8 |
| 100–149 percent | --- | --- | 16.4 | 12.8 | 11.8 | 10.7 | 9.0 | 12.8 | 13.7 | 15.0 | 12.8 | 13.3 |
| 150–199 percent | --- | --- | 15.7 | 14.1 | 12.8 | 11.7 | 4.7 | 5.8 | 5.4 | 6.8 | 6.6 | 6.4 |
| 200 percent or more | --- | --- | 14.8 | 13.3 | 12.0 | 9.7 | 2.2 | 2.2 | 2.8 | 3.0 | 3.1 | 3.1 |
| Geographic region | | | | | | | | | | | | |
| Northeast | --- | --- | 12.6 | 13.5 | 10.3 | 10.3 | 5.4 | 8.9 | 7.2 | 7.7 | 7.5 | 6.5 |
| Midwest | --- | --- | 8.4 | 7.5 | 5.9 | 4.0 | 3.6 | 5.8 | 4.5 | 5.1 | 5.1 | 4.9 |
| South | --- | --- | 13.1 | 10.1 | 8.8 | 8.0 | 9.2 | 11.4 | 9.3 | 9.2 | 9.2 | 9.1 |
| West | --- | --- | 30.6 | 23.8 | 26.4 | 21.9 | 9.3 | 11.3 | 8.4 | 9.7 | 9.0 | 11.3 |
| Location of residence | | | | | | | | | | | | |
| Within MSA[6] | --- | --- | 18.6 | 15.7 | 14.5 | 12.5 | 6.4 | 8.8 | 7.0 | 7.9 | 7.4 | 7.7 |
| Outside MSA[6] | --- | --- | 4.4 | 3.1 | 3.0 | *1.7 | 8.6 | 11.5 | 8.8 | 8.3 | 9.3 | 8.8 |

See footnotes at end of table.



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## Table 135 (page 3 of 3). Health insurance coverage for persons 65 years of age and over, according to type of coverage and selected characteristics: United States, selected years 1989–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.
- - - Data not available.
[1]Almost all persons 65 years of age and over are also covered by Medicare.
[2]Private insurance originally obtained through a present or former employer or union. Starting in 1997, also includes private insurance obtained through workplace, self-employed, or professional association.
[3]Includes all other races not shown separately and, in 1984 and 1989, unknown poverty level.
[4]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999, race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[5]Poverty status was unknown for 15–18 percent of persons 65 years of age and over in 1984 and 1989. Missing family income data were imputed for 22–25 percent of persons 65 years of age and over in 1994–96, 36 percent in 1997, 41 percent in 1998, and 44–47 percent in 1999–2003. See Appendix II, Family income; Poverty level.
[6]MSA is metropolitan statistical area.
[7]Persons reporting Medicare coverage are considered to have health maintenance organization (HMO) coverage if they responded yes when asked if they were under a Medicare managed care arrangement such as an HMO.
[8]Includes public assistance through 1996. Starting with data year 1997 includes State-sponsored health plans. In 2003 the percent of the population 65 years of age and over covered by Medicaid was 7.3 percent, and 0.6 percent were covered by State-sponsored health plans.

NOTES: In 1997 the National Health Interview Survey (NHIS) was redesigned, including changes to the questions on health insurance coverage. See Appendix I, National Health Interview Survey and Appendix II, Health insurance coverage. Percents do not add to 100 because (1) elderly persons with more than one type of insurance in addition to Medicare appear in more than one column, (2) elderly persons with Medicare fee-for-service only are not shown, and (3) the percent of elderly persons without health insurance (1.1 percent in 2003) is not shown. Standard errors are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, health insurance supplements (1984, 1989, 1994–1996). Starting with data year 1997, data are from the family core questionnaires.



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## Table 136 (page 1 of 2). Health maintenance organization (HMO) coverage among persons under 65 years of age by private insurance and Medicaid, according to selected characteristics: United States, 1998–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Total[1] | | | | Private[2] | | | | Medicaid[3] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1998 | 2000 | 2002 | 2003 | 1998 | 2000 | 2002 | 2003 | 1998 | 2000 | 2002 | 2003 |
| | Number of persons in millions | | | | | | | | | | | |
| Total under age 65 years[4] | 83.2 | 82.9 | 77.0 | 71.2 | 72.3 | 71.8 | 64.0 | 57.8 | 10.7 | 10.9 | 13.0 | 13.3 |
| | Percent of population | | | | | | | | | | | |
| Total under age 65 years[4] | 35.2 | 34.0 | 31.0 | 28.3 | 30.5 | 29.5 | 25.8 | 22.9 | 4.5 | 4.5 | 5.2 | 5.3 |
| Age | | | | | | | | | | | | |
| Under 18 years | 39.4 | 37.6 | 35.4 | 33.1 | 30.1 | 28.3 | 24.6 | 21.9 | 9.4 | 9.4 | 11.0 | 11.3 |
| Under 6 years | 41.7 | 39.8 | 37.4 | 35.1 | 29.2 | 27.6 | 23.4 | 20.7 | 12.7 | 12.4 | 14.2 | 14.5 |
| 6–17 years | 38.3 | 36.6 | 34.5 | 32.1 | 30.5 | 28.6 | 25.1 | 22.5 | 7.7 | 8.0 | 9.5 | 9.8 |
| 18–44 years | 33.4 | 32.5 | 29.2 | 25.9 | 30.6 | 29.8 | 25.9 | 22.6 | 2.8 | 2.7 | 3.3 | 3.2 |
| 18–24 years | 28.8 | 28.3 | 25.6 | 21.8 | 25.0 | 24.3 | 21.3 | 17.9 | 3.9 | 4.0 | 4.4 | 3.9 |
| 25–34 years | 34.8 | 33.8 | 30.4 | 25.8 | 31.8 | 31.3 | 27.1 | 22.3 | 2.9 | 2.6 | 3.3 | 3.5 |
| 35–44 years | 34.9 | 33.7 | 30.4 | 28.5 | 32.7 | 31.8 | 27.8 | 25.9 | 2.0 | 1.9 | 2.5 | 2.5 |
| 45–64 years | 33.0 | 32.6 | 29.3 | 27.0 | 31.0 | 30.4 | 26.8 | 24.6 | 1.6 | 1.8 | 2.1 | 2.1 |
| 45–54 years | 34.3 | 33.4 | 30.3 | 27.9 | 32.5 | 31.4 | 28.1 | 25.7 | 1.6 | 1.9 | 2.1 | 2.1 |
| 55–64 years | 31.1 | 31.4 | 27.7 | 25.7 | 28.7 | 28.8 | 24.9 | 23.0 | 1.7 | 1.8 | 2.2 | 2.2 |
| Sex | | | | | | | | | | | | |
| Male | 34.2 | 33.1 | 30.2 | 27.3 | 30.4 | 29.2 | 25.6 | 22.7 | 3.7 | 3.8 | 4.6 | 4.6 |
| Female | 36.1 | 35.0 | 31.8 | 29.2 | 30.7 | 29.7 | 25.9 | 23.2 | 5.3 | 5.1 | 5.8 | 6.0 |
| Race[5] | | | | | | | | | | | | |
| White only | 33.9 | 32.9 | 29.4 | 26.8 | 30.6 | 29.7 | 25.5 | 22.6 | 3.2 | 3.2 | 3.8 | 4.2 |
| Black or African American only | 40.9 | 40.1 | 37.9 | 36.3 | 29.1 | 29.3 | 26.5 | 24.0 | 11.6 | 10.8 | 11.5 | 12.3 |
| American Indian and Alaska Native only | 30.3 | 22.2 | 18.7 | 19.7 | 21.9 | 14.6 | *10.8 | 13.4 | *8.2 | *6.9 | * | *6.0 |
| Asian only | 41.6 | 39.6 | 36.2 | 31.5 | 37.5 | 36.3 | 32.0 | 28.8 | 4.0 | *3.1 | 4.3 | *2.6 |
| Native Hawaiian and Other Pacific Islander only | --- | * | * | * | --- | * | * | * | --- | * | * | * |
| 2 or more races | --- | 39.9 | 34.2 | 33.5 | --- | 29.6 | 24.2 | 21.9 | --- | 10.4 | 10.3 | 11.6 |
| Hispanic origin and race[5] | | | | | | | | | | | | |
| Hispanic or Latino | 34.6 | 33.7 | 32.9 | 29.5 | 26.8 | 26.2 | 23.5 | 20.0 | 7.7 | 7.6 | 9.4 | 9.5 |
| Mexican | 31.6 | 31.2 | 31.4 | 27.6 | 24.9 | 24.0 | 21.6 | 18.6 | 6.6 | 7.3 | 9.7 | 9.1 |
| Puerto Rican | 44.8 | 43.9 | 39.7 | 39.9 | 27.9 | 29.3 | 27.3 | 22.7 | 16.2 | 14.6 | 12.5 | 17.4 |
| Cuban | 42.0 | 40.3 | 41.7 | 30.3 | 36.5 | 35.4 | 36.1 | 26.3 | * | *4.2 | *5.3 | *3.4 |
| Other Hispanic or Latino | 35.3 | 35.4 | 32.9 | 30.7 | 28.4 | 29.7 | 25.3 | 22.5 | 6.9 | 5.8 | 7.6 | 8.1 |
| Not Hispanic or Latino | 35.2 | 34.1 | 30.7 | 28.1 | 31.1 | 30.0 | 26.2 | 23.5 | 4.1 | 4.0 | 4.5 | 4.6 |
| White only | 34.0 | 32.7 | 29.1 | 26.4 | 31.2 | 30.0 | 25.9 | 23.2 | 2.7 | 2.7 | 3.1 | 3.1 |
| Black or African American only | 40.6 | 40.0 | 37.9 | 36.3 | 29.1 | 29.3 | 26.5 | 24.2 | 11.3 | 10.7 | 11.5 | 12.2 |
| Percent of poverty level[6] | | | | | | | | | | | | |
| Below 100 percent | 30.9 | 29.2 | 29.3 | 28.0 | 9.3 | 9.8 | 8.2 | 7.3 | 21.3 | 19.4 | 21.2 | 20.6 |
| 100–149 percent | 26.6 | 26.3 | 26.9 | 23.3 | 18.7 | 16.8 | 14.7 | 11.9 | 7.8 | 9.2 | 12.1 | 11.2 |
| 150–199 percent | 30.3 | 30.0 | 27.6 | 24.8 | 26.9 | 24.6 | 21.3 | 17.6 | 3.2 | 5.3 | 6.3 | 7.2 |
| 200 percent or more | 37.8 | 36.5 | 32.3 | 29.5 | 36.9 | 35.5 | 31.3 | 28.3 | 0.8 | 0.9 | 1.0 | 1.1 |
| Geographic region | | | | | | | | | | | | |
| Northeast | 44.4 | 44.6 | 39.4 | 37.8 | 39.7 | 40.7 | 35.1 | 32.3 | 4.8 | 3.9 | 4.4 | 5.4 |
| Midwest | 29.9 | 26.6 | 25.3 | 23.4 | 25.8 | 23.5 | 21.0 | 18.9 | 4.0 | 3.0 | 4.3 | 4.6 |
| South | 30.7 | 30.4 | 27.4 | 24.2 | 26.2 | 25.2 | 21.2 | 18.4 | 4.3 | 5.1 | 6.1 | 5.8 |
| West | 40.7 | 39.3 | 36.4 | 32.9 | 35.4 | 33.7 | 30.7 | 27.6 | 5.1 | 5.5 | 5.6 | 5.2 |

See footnotes at end of table.



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## Table 136 (page 2 of 2). Health maintenance organization (HMO) coverage among persons under 65 years of age by private insurance and Medicaid, according to selected characteristics: United States, 1998–2003

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Characteristic | Total[1] | | | | Private[2] | | | | Medicaid[3] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1998 | 2000 | 2002 | 2003 | 1998 | 2000 | 2002 | 2003 | 1998 | 2000 | 2002 | 2003 |
| | Percent of population | | | | | | | | | | | |
| Location of residence | | | | | | | | | | | | |
| Within MSA[7] | 38.4 | 36.8 | 33.5 | 30.6 | 33.7 | 32.4 | 28.5 | 25.4 | 4.5 | 4.3 | 5.0 | 5.1 |
| Outside MSA[7] | 22.9 | 22.4 | 20.6 | 18.6 | 18.4 | 17.3 | 14.4 | 12.7 | 4.5 | 5.0 | 6.3 | 5.9 |

- - - Data not available.
* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20–30 percent. Data not shown have an RSE of greater than 30 percent.
[1]Includes persons with private, Medicaid, or Medicare health maintenance organization (HMO) coverage.
[2]Persons reporting private health insurance coverage are considered to have HMO coverage if they responded HMO or Individual Practice Association (IPA) when asked their plan type.
[3]Persons reporting Medicaid coverage are considered to have HMO coverage if they must choose from a book or list of doctors or the doctor is assigned or if they are required to sign up with a certain primary care doctor, group of doctors, or certain clinic for all routine care.
[4]Includes all other races not shown separately.
[5]The race groups, white, black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and 2 or more races, include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with data year 1999 race-specific estimates are tabulated according to 1997 Standards for Federal data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single race categories plus multiple race categories shown in the table conform to 1997 Standards. Starting with data year 1999, race-specific estimates are for persons who reported only one racial group; the category "2 or more races" includes persons who reported more than one racial group. Prior to data year 1999, data were tabulated according to 1977 Standards with four racial groups and the category "Asian only" included Native Hawaiian and Other Pacific Islander. Estimates for single race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. See Appendix II, Race.
[6]Missing family income data were imputed for 24 percent of persons under 65 years of age in 1997 and 28–31 percent in 1998–2003. See Appendix II, Family income; Poverty level.
[7]MSA is metropolitan statistical area.

NOTES: Standard errors for selected years are available in the spreadsheet version of this table. See www.cdc.gov/nchs/hus.htm. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census. Estimates for 2000–2002 were recalculated using 2000-based weights and may differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey. Data are from the family core questionnaires.



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## Table 137. Health maintenance organizations (HMOs) and enrollment, according to model type, geographic region, and Federal program: United States, selected years 1976–2004

[Data are based on a census of health maintenance organizations]

Click here for spreadsheet version

| Plans and enrollment | 1976 | 1980 | 1985 | 1990 | 1995 | 1998 | 2000 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| Plans | | | | | Number | | | | |
| All plans | 174 | 235 | 478 | 572 | 562 | 651 | 568 | 435 | 412 |
| Model type:[1] | | | | | | | | | |
| Individual practice association[2] | 41 | 97 | 244 | 360 | 332 | 317 | 278 | 188 | 176 |
| Group[3] | 122 | 138 | 234 | 212 | 108 | 116 | 101 | 102 | 96 |
| Mixed | --- | --- | --- | --- | 122 | 212 | 188 | 145 | 140 |
| Geographic region: | | | | | | | | | |
| Northeast | 29 | 55 | 81 | 115 | 100 | 107 | 98 | 81 | 77 |
| Midwest | 52 | 72 | 157 | 160 | 157 | 185 | 161 | 130 | 126 |
| South | 23 | 45 | 141 | 176 | 196 | 237 | 203 | 138 | 126 |
| West | 70 | 63 | 99 | 121 | 109 | 122 | 106 | 86 | 83 |
| Enrollment[1] | | | | | Number of persons in millions | | | | |
| Total | 6.0 | 9.1 | 21.0 | 33.0 | 50.9 | 76.6 | 80.9 | 71.8 | 68.8 |
| Model type:[1] | | | | | | | | | |
| Individual practice association[2] | 0.4 | 1.7 | 6.4 | 13.7 | 20.1 | 32.6 | 33.4 | 27.9 | 24.6 |
| Group[3] | 5.6 | 7.4 | 14.6 | 19.3 | 13.3 | 13.8 | 15.2 | 16.1 | 15.3 |
| Mixed | --- | --- | --- | --- | 17.6 | 30.1 | 32.3 | 27.8 | 28.9 |
| Federal program:[4] | | | | | | | | | |
| Medicaid[5] | --- | 0.3 | 0.6 | 1.2 | 3.5 | 7.8 | 10.8 | 14.5 | 14.3 |
| Medicare | --- | 0.4 | 1.1 | 1.8 | 2.9 | 5.7 | 6.6 | 4.9 | 4.9 |
| | | | | | Percent of HMO enrollees | | | | |
| Model type:[1] | | | | | | | | | |
| Individual practice association[2] | 6.6 | 18.7 | 30.4 | 41.6 | 39.4 | 42.6 | 41.3 | 38.9 | 35.8 |
| Group[3] | 93.4 | 81.3 | 69.6 | 58.4 | 26.0 | 18.0 | 18.9 | 22.4 | 22.2 |
| Mixed | --- | --- | --- | --- | 34.5 | 39.2 | 39.9 | 38.7 | 42.0 |
| Federal program:[4] | | | | | | | | | |
| Medicaid[5] | --- | 2.9 | 2.7 | 3.5 | 6.9 | 10.2 | 13.3 | 20.2 | 20.8 |
| Medicare | --- | 4.3 | 5.1 | 5.4 | 5.7 | 7.4 | 8.1 | 6.9 | 7.1 |
| | | | | | Percent of population enrolled in HMOs | | | | |
| Total | 2.8 | 4.0 | 8.9 | 13.4 | 19.4 | 28.6 | 30.0 | 24.6 | 23.4 |
| Geographic region: | | | | | | | | | |
| Northeast | 2.0 | 3.1 | 7.9 | 14.6 | 24.4 | 37.8 | 36.5 | 31.8 | 30.1 |
| Midwest | 1.5 | 2.8 | 9.7 | 12.6 | 16.4 | 22.7 | 23.2 | 19.7 | 18.7 |
| South | 0.4 | 0.8 | 3.8 | 7.1 | 12.4 | 21.0 | 22.6 | 17.1 | 16.0 |
| West | 9.7 | 12.2 | 17.3 | 23.2 | 28.6 | 39.1 | 41.7 | 35.8 | 34.4 |

--- Data not available.

[1]Enrollment or number of plans may not equal total because some plans did not report these characteristics.

[2]An HMO operating under an individual practice association model contracts with an association of physicians from various settings (a mixture of solo and group practices) to provide health services.

[3]Group includes staff, group, and network model types. See Appendix II, Health maintenance organization.

[4]Federal program enrollment in HMOs refers to enrollment by Medicaid or Medicare beneficiaries, where the Medicaid or Medicare program contracts directly with the HMO to pay the appropriate annual premium.

[5]Data for 1990 and later include enrollment in managed care health insuring organizations.

NOTES: Data as of June 30 in 1976–80, and January 1 from 1990 onward. Open-ended enrollment in HMO plans, amounting to 6.9 million on January 1, 2004, is included from 1994 onward. See Appendix II, Health maintenance organization. HMOs in Guam are included starting in 1994; HMOs in Puerto Rico, starting in 1998. In 2004 HMO enrollment in Guam was 28,000 and in Puerto Rico, 1,618,000. Some data for 2003 have been revised and differ from the previous edition of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCES: InterStudy National Health Maintenance Organization Census. Annual Report on the Growth of HMOs in the U.S., 1984–1985 editions; The InterStudy Edge, 1990, vol. 2; The InterStudy Competitive Edge, Part II Managed Care Industry Report, 1991–2004. St. Paul, Minnesota (Copyrights 1985, 1990, 1991–2004: Used with the permission of InterStudy); Office of Health Maintenance Organizations: Summary of the National HMO census of prepaid plans—June 1976 and National HMO Census 1980. Public Health Service. Washington. U.S. Government Printing Office. DHHS Pub. No. (PHS) 80-50159; Population estimates used for calculations of regional percents from the U.S. Bureau of the Census at www.census.gov/popest/states/tables/NST-EST2004-08.xls.



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## Table 138 (page 1 of 2). Medical care benefits for employees of private establishments by size of establishment and occupation: United States, selected years 1990–97

[Data are based on a survey of employers]

Click here for spreadsheet version

| Size of establishment and type of benefit | All | | | Professional, technical, and related | | | Clerical and sales | | | Blue collar and service | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 1994 | 1996 | 1990 | 1994 | 1996 | 1990 | 1994 | 1996 | 1990 | 1994 | 1996 |
| Small private establishments[1] | Percent of all employees | | | | | | | | | | | |
| Participation in medical care benefit: | | | | | | | | | | | | |
| Full-time employees | 69 | 66 | 64 | 82 | 80 | 76 | 75 | 70 | 69 | 60 | 57 | 56 |
| Part-time employees | 6 | 7 | 6 | 6 | 11 | 14 | 7 | 9 | 9 | 6 | 5 | 3 |
| Type of medical care benefit among participating full-time employees | Percent of participating full-time employees | | | | | | | | | | | |
| Fee arrangement | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Traditional fee-for-service | 74 | 55 | 36 | 69 | 53 | 31 | 77 | 55 | 34 | 73 | 57 | 41 |
| Preferred provider organization (PPO) | 13 | 24 | 35 | 16 | 27 | 41 | 13 | 24 | 36 | 11 | 23 | 32 |
| Health maintenance organization (HMO) | 14 | 19 | 27 | 15 | 20 | 27 | 10 | 19 | 28 | 15 | 20 | 25 |
| Other | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 2 |
| Individual coverage: | | | | | | | | | | | | |
| Employee contributions not required | 58 | 47 | 48 | 56 | 49 | 49 | 53 | 44 | 46 | 62 | 48 | 48 |
| Employee contributions required | 42 | 53 | 52 | 44 | 51 | 51 | 47 | 56 | 54 | 38 | 52 | 51 |
| Family coverage: | | | | | | | | | | | | |
| Employee contributions not required | 32 | 19 | 24 | 28 | 17 | 21 | 29 | 15 | 20 | 37 | 23 | 29 |
| Employee contributions required | 68 | 81 | 75 | 72 | 83 | 78 | 71 | 85 | 80 | 63 | 77 | 70 |
| | Average monthly contribution | | | | | | | | | | | |
| Individual coverage: | | | | | | | | | | | | |
| Average monthly employee contribution: | | | | | | | | | | | | |
| Total | $ 25 | $ 41 | $ 43 | $ 24 | $ 47 | $ 41 | $ 24 | $ 41 | $ 42 | $ 27 | $ 38 | $ 44 |
| Non-HMO | 25 | 39 | 43 | 24 | 46 | 40 | 24 | 38 | 43 | 28 | 36 | 45 |
| HMO | 25 | 49 | 41 | 24 | 48 | 42 | 27 | 50 | 42 | 25 | 47 | 41 |
| Family coverage: | | | | | | | | | | | | |
| Average monthly employee contribution: | | | | | | | | | | | | |
| Total | 109 | 160 | 182 | 112 | 181 | 190 | 106 | 160 | 181 | 111 | 149 | 177 |
| Non-HMO | 104 | 151 | 181 | 110 | 173 | 192 | 102 | 155 | 181 | 101 | 137 | 175 |
| HMO | 135 | 190 | 182 | 118 | 204 | 183 | 134 | 178 | 183 | 145 | 191 | 182 |

See footnotes at end of table.



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## Table 138 (page 2 of 2). Medical care benefits for employees of private establishments by size of establishment and occupation: United States, selected years 1990–97

[Data are based on a survey of employers]

Click here for spreadsheet version

| Size of establishment and type of benefit | All | | | Professional, technical, and related | | | Clerical and sales | | | Blue collar and service | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1995 | 1997 | 1991 | 1995 | 1997 | 1991 | 1995 | 1997 | 1991 | 1995 | 1997 |
| Medium and large private establishments[2] | Percent of all employees | | | | | | | | | | | |
| Participation in medical care benefit: | | | | | | | | | | | | |
| Full-time employees | 83 | 77 | 76 | 85 | 80 | 79 | 81 | 76 | 78 | 84 | 75 | 74 |
| Part-time employees | 28 | 19 | 21 | 42 | 31 | 29 | 26 | 20 | 20 | 26 | 15 | 19 |
| Type of medical care benefit among participating full-time employees | Percent of participating full-time employees | | | | | | | | | | | |
| Fee arrangement | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Traditional fee-for-service | 67 | 37 | 27 | 62 | 29 | 20 | 59 | 30 | 22 | 73 | 45 | 33 |
| Preferred provider organization (PPO) | 16 | 34 | 40 | 19 | 36 | 40 | 21 | 36 | 42 | 12 | 33 | 39 |
| Health maintenance organization (HMO) | 17 | 27 | 33 | 18 | 33 | 40 | 19 | 32 | 36 | 14 | 21 | 28 |
| Other | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| Individual coverage: | | | | | | | | | | | | |
| Employee contributions not required | 49 | 33 | 31 | 45 | 21 | 20 | 43 | 24 | 24 | 55 | 44 | 40 |
| Employee contributions required | 51 | 67 | 69 | 55 | 79 | 80 | 57 | 76 | 76 | 45 | 56 | 60 |
| Family coverage: | | | | | | | | | | | | |
| Employee contributions not required | 31 | 22 | 20 | 25 | 11 | 10 | 27 | 15 | 14 | 37 | 33 | 29 |
| Employee contributions required | 69 | 78 | 80 | 75 | 89 | 90 | 73 | 85 | 86 | 63 | 67 | 71 |
| | Average monthly contribution | | | | | | | | | | | |
| Individual coverage: | | | | | | | | | | | | |
| Average monthly employee contribution: | | | | | | | | | | | | |
| Total | $ 27 | $ 34 | $ 39 | $ 26 | $ 35 | $ 37 | $ 28 | $ 36 | $ 39 | $ 26 | $ 32 | $ 40 |
| Non-HMO | 26 | 33 | 42 | 26 | 33 | 40 | 27 | 34 | 41 | 25 | 32 | 43 |
| HMO | 29 | 36 | 34 | 29 | 38 | 33 | 32 | 39 | 36 | 28 | 32 | 34 |
| Family coverage: | | | | | | | | | | | | |
| Average monthly employee contribution: | | | | | | | | | | | | |
| Total | 97 | 118 | 130 | 96 | 120 | 125 | 108 | 127 | 135 | 91 | 112 | 131 |
| Non-HMO | 92 | 112 | 132 | 93 | 116 | 128 | 104 | 120 | 134 | 84 | 106 | 134 |
| HMO | 118 | 133 | 126 | 110 | 128 | 120 | 121 | 141 | 138 | 122 | 130 | 124 |

[1]Less than 100 employees in all private nonfarm industries.
[2]100 or more employees in all private nonfarm industries.

NOTE: In 1992–93, 88 percent of full-time employees in private establishments were offered health care plans by their employers (96 percent in medium and large private establishments and 80 percent in small private establishments). In 1999 the National Compensation Survey was redesigned. Starting in 1999, only participation rates in medical care benefits for full-time and part-time employees are available for this table, but not details on type of coverage or employee contributions. In 2000 in medium and large private establishments, the participation rate in health benefits was 67 percent for full-time employees and 28 percent for part-time employees; in small private establishments, 56 percent of full-time and 6 percent of part-time employees received health benefits through their employers.

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics, National Compensation Survey; Employee benefits in small private establishments, 1990 Bulletin 2388, September 1991, 1994 Bulletin 2475, April 1996, and 1996 Bulletin 2507, April 1999. Employee benefits in medium and large private establishments, 1991 Bulletin 2422, May 1993, 1997 Bulletin 2517, Sept. 1999, and news release USDL 97–246, July 25, 1997. Blostin AP and Pfuntner JN. Employee medical care contributions on the rise. Compensation and Working Conditions, Spring 1998.



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## Table 139 (page 1 of 2). Medicare enrollees and expenditures and percent distribution, according to type of service: United States and other areas, selected years 1970–2004

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Type of service* | *1970* | *1980* | *1990* | *1995* | *2000* | *2001* | *2002* | *2003* | *2004*[1] |
|---|---|---|---|---|---|---|---|---|---|
| Enrollees | | | | Number in millions | | | | | |
| Total[2] | 20.4 | 28.4 | 34.3 | 37.6 | 39.7 | 40.1 | 40.5 | 41.1 | 41.7 |
| Hospital insurance | 20.1 | 28.0 | 33.7 | 37.2 | 39.3 | 39.7 | 40.1 | 40.6 | 41.2 |
| Supplementary medical insurance | 19.5 | 27.3 | 32.6 | 35.6 | 37.3 | 37.7 | 38.0 | 38.4 | 38.8 |
| Expenditures | | | | Amount in billions | | | | | |
| Total | $ 7.5 | $ 36.8 | $110.8 | $184.0 | $221.8 | $244.8 | $265.7 | $280.8 | $308.9 |
| Total hospital insurance (HI) | 5.3 | 25.6 | 66.8 | 117.4 | 131.1 | 143.4 | 152.5 | 154.6 | 170.6 |
| HI payments to managed care organizations[3] | --- | 0.0 | 2.7 | 6.7 | 21.4 | 20.8 | 19.2 | 19.5 | 20.8 |
| HI payments for fee-for-service utilization | 5.3 | 25.5 | 64.2 | 110.7 | 109.7 | 122.6 | 133.3 | 135.1 | 149.8 |
| Inpatient hospital | 4.8 | 24.1 | 56.9 | 82.3 | 87.1 | 95.6 | 104.1 | 108.6 | 116.2 |
| Skilled nursing facility | 0.2 | 0.4 | 2.5 | 9.1 | 11.1 | 13.4 | 15.3 | 14.8 | 16.9 |
| Home health agency | 0.1 | 0.5 | 3.7 | 16.2 | 3.8 | 4.2 | 5.0 | 4.8 | 5.8 |
| Home health agency transfer[4] | --- | --- | --- | --- | 1.7 | 3.1 | 1.2 | –2.2 | – |
| Hospice | --- | --- | 0.3 | 1.9 | 3.0 | 3.7 | 4.9 | 6.2 | 7.6 |
| Administrative expenses[5] | 0.2 | 0.5 | 0.8 | 1.2 | 2.9 | 2.5 | 2.8 | 2.8 | 3.3 |
| Total supplementary medical insurance (SMI) | 2.2 | 11.2 | 44.0 | 66.6 | 90.7 | 101.4 | 113.2 | 126.1 | 138.3 |
| SMI payments to managed care organizations[3] | 0.0 | 0.2 | 2.8 | 6.6 | 18.4 | 17.6 | 17.5 | 17.3 | 18.7 |
| SMI payments for fee-for-service utilization[6] | 2.2 | 11.0 | 41.2 | 60.0 | 72.3 | 83.8 | 95.7 | 108.9 | 119.6 |
| Physician/supplies[7] | 1.8 | 8.2 | 29.6 | --- | --- | --- | --- | --- | --- |
| Outpatient hospital[8] | 0.1 | 1.9 | 8.5 | --- | --- | --- | --- | --- | --- |
| Independent laboratory[9] | 0.0 | 0.1 | 1.5 | --- | --- | --- | --- | --- | --- |
| Physician fee schedule | --- | --- | --- | 31.7 | 37.0 | 42.0 | 44.8 | 48.2 | 53.8 |
| Durable medical equipment | --- | --- | --- | 3.7 | 4.7 | 5.4 | 6.6 | 7.7 | 8.0 |
| Laboratory[10] | --- | --- | --- | 4.3 | 4.0 | 4.4 | 5.0 | 5.5 | 6.0 |
| Other[11] | --- | --- | --- | 9.9 | 13.7 | 16.0 | 19.6 | 22.6 | 25.0 |
| Hospital[12] | --- | --- | --- | 8.7 | 8.5 | 12.8 | 13.5 | 15.3 | 17.4 |
| Home health agency | – | 0.2 | 0.1 | 0.2 | 4.4 | 4.4 | 5.1 | 5.1 | 5.9 |
| Home health agency transfer[4] | --- | --- | --- | --- | –1.7 | –3.1 | –1.2 | 2.2 | – |
| Administrative expenses[5] | 0.2 | 0.6 | 1.5 | 1.6 | 1.8 | 1.8 | 2.3 | 2.4 | 3.4 |
| | | | | Percent distribution of expenditures | | | | | |
| Total hospital insurance (HI) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| HI payments to managed care organizations[3] | --- | 0.0 | 4.0 | 5.7 | 16.3 | 14.5 | 12.6 | 12.6 | 12.2 |
| HI payments for fee-for-service utilization | 100.0 | 99.6 | 96.1 | 94.3 | 83.7 | 85.5 | 87.4 | 87.4 | 87.8 |
| Inpatient hospital | 90.6 | 94.5 | 85.1 | 70.1 | 66.5 | 66.7 | 68.2 | 70.3 | 68.1 |
| Skilled nursing facility | 3.8 | 1.6 | 3.7 | 7.8 | 8.5 | 9.4 | 10.1 | 9.6 | 9.9 |
| Home health agency | 1.9 | 2.0 | 5.5 | 13.8 | 2.9 | 2.9 | 3.3 | 3.1 | 3.4 |
| Home health agency transfer[4] | --- | --- | --- | --- | 1.3 | 2.2 | 0.8 | –1.4 | – |
| Hospice | --- | --- | 0.4 | 1.6 | 2.3 | 2.6 | 3.2 | 4.0 | 4.4 |
| Administrative expenses[5] | 3.8 | 2.0 | 1.2 | 1.0 | 2.2 | 1.7 | 1.9 | 1.8 | 2.0 |

See footnotes at end of table.



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## Table 139 (page 2 of 2). Medicare enrollees and expenditures and percent distribution, according to type of service: United States and other areas, selected years 1970–2004

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Type of service | 1970 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004[1] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Percent distribution of expenditures | | | | |
| Total supplementary medical insurance (SMI) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| SMI payments to managed care organizations[3] | 0.0 | 1.8 | 6.4 | 9.9 | 20.3 | 17.3 | 15.5 | 13.7 | 13.5 |
| SMI payments for fee-for-service utilization[6] | 100.0 | 98.2 | 93.6 | 90.1 | 79.8 | 82.7 | 84.5 | 86.3 | 86.5 |
| Physician/supplies[7] | 85.7 | 73.2 | 67.3 | --- | --- | --- | --- | --- | --- |
| Outpatient hospital[8] | 4.8 | 17.0 | 19.3 | --- | --- | --- | --- | --- | --- |
| Independent laboratory[9] | 0.0 | 0.9 | 3.4 | --- | --- | --- | --- | --- | --- |
| Physician fee schedule | --- | --- | --- | 47.5 | 40.8 | 41.5 | 39.6 | 38.2 | 38.9 |
| Durable medical equipment | --- | --- | --- | 5.5 | 5.2 | 5.4 | 5.8 | 6.1 | 5.8 |
| Laboratory[10] | --- | --- | --- | 6.4 | 4.4 | 4.3 | 4.4 | 4.3 | 4.3 |
| Other[11] | --- | --- | --- | 14.8 | 15.1 | 15.8 | 17.3 | 17.9 | 18.1 |
| Hospital[12] | --- | --- | --- | 13.0 | 9.4 | 12.6 | 12.0 | 12.2 | 12.6 |
| Home health agency | 0.0 | 1.8 | 0.2 | 0.3 | 4.8 | 4.4 | 4.5 | 4.0 | 4.2 |
| Home health agency transfer[4] | --- | --- | --- | 0.0 | –1.9 | –3.1 | –1.1 | 1.7 | – |
| Administrative expenses[5] | 9.5 | 5.4 | 3.4 | 2.4 | 2.0 | 1.8 | 2.0 | 1.9 | 2.5 |

--- Data not available.
0.0 Quantity greater than 0 but less than 0.05.
– Quantity zero.
[1]Preliminary figures.
[2]Average number enrolled in the hospital insurance (HI) and/or supplementary medical insurance (SMI) programs for the calendar year. See Appendix II, Medicare.
[3]Medicare-approved managed care organizations.
[4]Reflects home health transfer amounts between HI and SMI.
[5]Includes research, costs of experiments and demonstration projects, and peer review activity.
[6]Type of service reporting categories for fee-for-service reimbursement differ before and after 1991.
[7]Includes payment for physicians, practitioners, durable medical equipment, and all suppliers other than Independent laboratory, which is shown separately through 1990. Beginning in 1991, those physician services subject to the Physician fee schedule are so broken out. Payments for laboratory services paid under the Laboratory fee schedule and performed in a physician office are included under "Laboratory" beginning in 1991. Payments for durable medical equipment are broken out and so labeled beginning in 1991. The remaining services from the "Physician" category are included in "Other."
[8]Includes payments for hospital outpatient department services, for skilled nursing facility outpatient services, for Part B services received as an inpatient in a hospital or skilled nursing facility setting, and for other types of outpatient facilities. Beginning in 1991, payments for hospital outpatient department services, except for laboratory services, are listed under "Hospital." Hospital outpatient laboratory services are included in the "Laboratory" line.
[9]Beginning in 1991, those independent laboratory services that were paid under the laboratory fee schedule (most of independent lab) are included in the "Laboratory" line; the remaining services are included in "Physician fee schedule" and "Other" lines.
[10]Payments for laboratory services paid under the laboratory fee schedule performed in a physician office, independent lab, or in a hospital outpatient department.
[11]Includes payments for physician-administered drugs; free-standing ambulatory surgical center facility services; ambulance services; supplies; free-standing end-stage renal disease (ESRD) dialysis facility services; rural health clinics; outpatient rehabilitation facilities; psychiatric hospitals; and federally qualified health centers.
[12]Includes the hospital facility costs for Medicare Part B services that are predominantly in the outpatient department, with the exception of hospital outpatient laboratory services, which are included on the "Laboratory" line. Physician reimbursement is included on the "Physician fee schedule" line.

NOTES: Percents are calculated using unrounded data. Table includes service disbursements as of February 2005 for Medicare enrollees residing in Puerto Rico, Virgin Islands, Guam, other outlying areas, foreign countries, and unknown residence. Totals do not necessarily equal the sum of rounded components. Some numbers in this table have been revised and differ from previous editions of *Health, United States*. Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, Medicare and Medicaid Cost Estimates Group, Medicare Administrative Data.



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## Table 140. Medicare enrollees and program payments among fee-for-service Medicare beneficiaries, according to sex and age: United States and other areas, 1994–2002

[Data are compiled from administrative data by the Centers for Medicare & Medicaid Services]

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| Sex and age | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Fee-for-service enrollees in thousands | | | | |
| Total | 34,076 | 34,062 | 33,704 | 33,009 | 32,349 | 32,179 | 32,740 | 33,860 | 34,977 |
| Sex | | | | | | | | | |
| Male | 14,533 | 14,563 | 14,440 | 14,149 | 13,902 | 13,872 | 14,195 | 14,746 | 15,314 |
| Female | 19,543 | 19,499 | 19,264 | 18,860 | 18,477 | 18,307 | 18,545 | 19,113 | 19,664 |
| Age | | | | | | | | | |
| Under 65 years | 4,031 | 4,239 | 4,413 | 4,498 | 4,617 | 4,742 | 4,907 | 5,172 | 5,448 |
| 65–74 years | 16,713 | 16,373 | 15,810 | 15,099 | 14,433 | 14,072 | 14,230 | 14,689 | 15,107 |
| 75–84 years | 9,845 | 9,911 | 9,915 | 9,847 | 9,722 | 9,748 | 9,919 | 10,211 | 10,533 |
| 85 years and over | 3,486 | 3,540 | 3,566 | 3,565 | 3,577 | 3,618 | 3,684 | 3,787 | 3,889 |
| | | | | | Fee-for-service program payments in millions | | | | |
| Total | $146,549 | $158,980 | $167,063 | $175,423 | $168,164 | $166,687 | $174,261 | $197,505 | $215,411 |
| Sex | | | | | | | | | |
| Male | 63,907 | 68,758 | 71,011 | 75,357 | 72,883 | 73,171 | 76,230 | 86,314 | 94,292 |
| Female | 82,642 | 90,222 | 95,052 | 100,066 | 95,281 | 93,516 | 98,031 | 111,190 | 121,118 |
| Age | | | | | | | | | |
| Under 65 years | 18,835 | 21,029 | 24,160 | 25,798 | 23,746 | 24,262 | 25,773 | 29,720 | 33,248 |
| 65–74 years | 55,147 | 58,093 | 58,737 | 59,687 | 57,342 | 56,031 | 57,494 | 64,634 | 70,018 |
| 75–84 years | 50,719 | 55,256 | 58,058 | 61,708 | 59,745 | 59,518 | 62,685 | 70,850 | 77,073 |
| 85 years and over | 21,847 | 24,602 | 26,108 | 28,231 | 27,331 | 26,875 | 28,309 | 32,300 | 35,072 |
| | | | | | Percent distribution of fee-for-service program payments | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Sex | | | | | | | | | |
| Male | 43.6 | 43.2 | 42.5 | 43.0 | 43.3 | 43.9 | 43.7 | 43.7 | 43.8 |
| Female | 56.4 | 56.8 | 56.9 | 57.0 | 56.7 | 56.1 | 56.3 | 56.3 | 56.2 |
| Age | | | | | | | | | |
| Under 65 years | 12.9 | 13.2 | 14.5 | 14.7 | 14.1 | 14.6 | 14.8 | 15.0 | 15.4 |
| 65–74 years | 37.6 | 36.5 | 35.2 | 34.0 | 34.1 | 33.6 | 33.0 | 32.7 | 32.5 |
| 75–84 years | 34.6 | 34.8 | 34.8 | 35.2 | 35.5 | 35.7 | 36.0 | 35.9 | 35.8 |
| 85 years and over | 14.9 | 15.5 | 15.6 | 16.1 | 16.3 | 16.1 | 16.2 | 16.4 | 16.3 |
| | | | | | Average fee-for-service payment per enrollee | | | | |
| Total | $ 4,301 | $ 4,667 | $ 4,957 | $ 5,314 | $ 5,198 | $ 5,180 | $ 5,323 | $ 5,833 | $ 6,159 |
| Sex | | | | | | | | | |
| Male | 4,397 | 4,721 | 4,918 | 5,326 | 5,243 | 5,275 | 5,370 | 5,853 | 6,157 |
| Female | 4,229 | 4,627 | 4,934 | 5,306 | 5,165 | 5,108 | 5,286 | 5,818 | 6,159 |
| Age | | | | | | | | | |
| Under 65 years | 4,673 | 4,960 | 5,475 | 5,735 | 5,143 | 5,117 | 5,252 | 5,746 | 6,102 |
| 65–74 years | 3,300 | 3,548 | 3,715 | 3,953 | 3,973 | 3,982 | 4,040 | 4,400 | 4,635 |
| 75–84 years | 5,152 | 5,576 | 5,856 | 6,267 | 6,145 | 6,106 | 6,320 | 6,939 | 7,317 |
| 85 years and over | 6,267 | 6,950 | 7,321 | 7,919 | 7,641 | 7,428 | 7,684 | 8,529 | 9,019 |

NOTES: Table includes data for Medicare enrollees residing in Puerto Rico, Virgin Islands, Guam, other outlying areas, foreign countries, and unknown residence. Number of fee-for-service enrollees is based on 5-percent annual Denominator File using the Centers for Medicare & Medicaid Services' (CMS) Enrollment Database and Group Health Plan data. Fee-for-service program payments are based on a 5-percent annual Denominator File and fee-for-service billing reimbursement for a 5-percent sample of Medicare beneficiaries as recorded in CMS' National Claims History using CMS' Enrollment Database, Group Health Plan, and National Claims History data.

SOURCE: Centers for Medicare & Medicaid Services, Office of Research, Development, and Information. Health Care Financing Review: Medicare and Medicaid Statistical Supplements for years 1996 to 2004. Website: www.cms.hhs.gov/review/supp/.



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## Table 141 (page 1 of 2). Medicare beneficiaries by race and ethnicity, according to selected characteristics: United States, 1992 and 2001

[Data are based on household interviews of a sample of current Medicare beneficiaries and Medicare administrative records]

Click here for spreadsheet version

| Characteristic | All | | Not Hispanic or Latino | | | | Hispanic or Latino | |
|---|---|---|---|---|---|---|---|---|
| | | | White | | Black or African American | | | |
| | 1992 | 2001 | 1992 | 2001 | 1992 | 2001 | 1992 | 2001 |
| | Number of beneficiaries in millions | | | | | | | |
| All Medicare beneficiaries | 36.8 | 41.2 | 30.9 | 32.7 | 3.3 | 3.8 | 1.9 | 3.0 |
| | Percent distribution of beneficiaries | | | | | | | |
| All Medicare beneficiaries | 100.0 | 100.00 | 84.2 | 79.8 | 8.9 | 9.3 | 5.2 | 7.2 |
| Medical care use | Percent of beneficiaries with at least one service | | | | | | | |
| All Medicare beneficiaries: | | | | | | | | |
| Long-term care facility stay | 7.7 | 9.1 | 8.0 | 9.8 | 6.2 | 8.1 | 4.2 | 4.8 |
| Community-only residents: | | | | | | | | |
| Inpatient hospital | 17.9 | 19.8 | 18.1 | 20.1 | 18.4 | 20.2 | 16.6 | 16.2 |
| Outpatient hospital | 57.9 | 70.3 | 57.8 | 71.4 | 61.1 | 69.1 | 53.1 | 61.6 |
| Physician/supplier[1] | 92.4 | 95.3 | 93.0 | 96.3 | 89.1 | 92.1 | 87.9 | 91.8 |
| Dental | 40.4 | 44.0 | 43.1 | 48.3 | 23.5 | 21.8 | 29.1 | 30.9 |
| Prescription medicine | 85.2 | 91.6 | 85.5 | 92.1 | 83.1 | 90.3 | 84.6 | 90.2 |
| Expenditures | Expenditures per beneficiary | | | | | | | |
| All Medicare beneficiaries: | | | | | | | | |
| Total health care[2] | $6,716 | $11,403 | $6,816 | $11,478 | $7,043 | $13,279 | $5,784 | $8,903 |
| Long-term care facility[3] | 1,581 | 2,503 | 1,674 | 2,636 | 1,255 | 2,753 | *758 | 1,486 |
| Community-only residents: | | | | | | | | |
| Total personal health care | 5,054 | 8,626 | 4,988 | 8,636 | 5,530 | 9,483 | 4,938 | 7,121 |
| Inpatient hospital | 2,098 | 2,771 | 2,058 | 2,739 | 2,493 | 3,411 | 1,999 | 2,835 |
| Outpatient hospital | 504 | 957 | 478 | 896 | 668 | 1,483 | 511 | 812 |
| Physician/supplier[1] | 1,524 | 2,760 | 1,525 | 2,801 | 1,398 | 2,581 | 1,587 | 2,609 |
| Dental | 142 | 271 | 153 | 300 | 70 | 107 | 97 | 206 |
| Prescription medicine | 468 | 1,338 | 481 | 1,369 | 417 | 1,271 | 389 | 1,069 |
| Long-term care facility residents only: | | | | | | | | |
| Long-term care facility[4] | 23,054 | $35,384 | 23,177 | 33,939 | 21,272 | 33,903 | *25,026 | 31,788 |
| Sex | Percent distribution of beneficiaries | | | | | | | |
| Both sexes | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Male | 42.9 | 43.8 | 42.7 | 43.6 | 42.0 | 42.2 | 46.7 | 46.7 |
| Female | 57.1 | 56.2 | 57.3 | 56.4 | 58.0 | 57.9 | 53.3 | 54.3 |
| Eligibility criteria and age | | | | | | | | |
| All Medicare beneficiaries[5] | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| Disabled | 10.2 | 13.9 | 8.6 | 11.9 | 19.1 | 25.6 | 16.5 | 19.2 |
| Under 45 years | 3.5 | 3.8 | 2.9 | 3.2 | 7.6 | 7.9 | 6.9 | 4.6 |
| 45–64 years | 6.5 | 10.1 | 5.8 | 8.7 | 11.5 | 17.8 | 9.6 | 14.6 |
| Aged | 89.8 | 86.1 | 91.4 | 88.1 | 81.0 | 74.4 | 83.5 | 80.8 |
| 65–74 years | 51.5 | 45.3 | 52.0 | 45.5 | 48.0 | 40.0 | 49.4 | 48.2 |
| 75–84 years | 28.8 | 30.2 | 29.5 | 31.3 | 24.0 | 25.7 | 27.1 | 24.0 |
| 85 years and over | 9.7 | 10.7 | 9.9 | 11.3 | 9.0 | 8.7 | 6.9 | 8.7 |
| Living arrangement | | | | | | | | |
| All living arrangements | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Alone | 27.0 | 28.9 | 27.5 | 29.3 | 27.7 | 30.7 | 20.2 | 24.9 |
| With spouse | 51.2 | 49.5 | 53.3 | 51.6 | 33.3 | 30.7 | 50.4 | 49.3 |
| With children | 9.1 | 9.3 | 7.7 | 7.3 | 16.8 | 21.0 | 16.6 | 13.5 |
| With others | 7.6 | 7.4 | 6.2 | 6.5 | 18.1 | 13.3 | 10.8 | 9.3 |
| Long-term care facility | 5.1 | 5.0 | 5.3 | 5.3 | 4.0 | 4.4 | *2.0 | 2.9 |

See footnotes at end of table.



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## Table 141 (page 2 of 2). Medicare beneficiaries by race and ethnicity, according to selected characteristics: United States, 1992 and 2001

[Data are based on household interviews of a sample of current Medicare beneficiaries and Medicare administrative records]

Click here for spreadsheet version

| Characteristic | All | | Not Hispanic or Latino | | | | Hispanic or Latino | |
|---|---|---|---|---|---|---|---|---|
| | | | White | | Black or African American | | | |
| | 1992 | 2001 | 1992 | 2001 | 1992 | 2001 | 1992 | 2001 |
| Age and limitation of activity[6] | Percent distribution of beneficiaries | | | | | | | |
| Disabled | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| None | 22.7 | 28.3 | 21.8 | 27.0 | 26.2 | 32.9 | 21.2 | 27.4 |
| IADL only | 39.0 | 35.3 | 38.9 | 34.5 | 35.8 | 36.0 | 46.1 | 36.6 |
| 1 or 2 ADL | 21.2 | 20.2 | 21.5 | 21.6 | 21.2 | 20.0 | *20.9 | 14.4 |
| 3–5 ADL | 17.2 | 16.2 | 17.9 | 16.9 | *16.8 | 11.2 | *11.9 | 21.6 |
| 65–74 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| None | 67.0 | 70.9 | 68.7 | 27.0 | 55.1 | 64.2 | 59.2 | 69.7 |
| IADL only | 17.8 | 16.1 | 17.0 | 34.5 | 22.9 | 20.3 | *20.9 | 16.4 |
| 1 or 2 ADL | 10.4 | 8.4 | 9.6 | 21.6 | 14.4 | 8.5 | *15.7 | 8.4 |
| 3–5 ADL | 4.8 | 4.6 | 4.6 | 4.2 | *7.6 | 7.0 | *4.2 | 5.5 |
| 75–84 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| None | 46.6 | 52.6 | 47.5 | 53.5 | 42.0 | 45.9 | 44.3 | 49.9 |
| IADL only | 23.9 | 23.2 | 23.6 | 23.0 | 26.7 | 25.0 | *27.8 | 23.7 |
| 1 or 2 ADL | 16.5 | 13.0 | 16.8 | 12.8 | 15.3 | 14.0 | *14.9 | 15.6 |
| 3–5 ADL | 13.0 | 11.2 | 12.2 | 10.8 | *15.9 | 15.1 | *13.0 | *10.78 |
| 85 years and over | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| None | 19.9 | 25.1 | 20.2 | 25.8 | *19.6 | 23.0 | *19.7 | *19.1 |
| IADL only | 20.9 | 24.8 | 20.2 | 24.6 | *22.1 | 24.5 | *24.7 | 25.0 |
| 1 or 2 ADL | 23.5 | 20.9 | 23.5 | 20.7 | *24.3 | 21.7 | *23.7 | *22.24 |
| 3–5 ADL | 35.8 | 29.3 | 36.1 | 28.9 | *34.0 | 30.8 | *31.8 | 33.7 |

* Estimates are considered unreliable. Cell is based on 50 persons or fewer or the estimate has a relative standard error of 30 percent or higher.

[1]Physician/supplier services include medical and osteopathic doctor and health practitioner visits; diagnostic laboratory and radiology services; medical and surgical services; and durable medical equipment and nondurable medical supplies.

[2]Total health care expenditures by Medicare beneficiaries, including expenses paid by Medicare and all other sources of payment for the following services: inpatient hospital, outpatient hospital, physician/supplier, dental, prescription medicine, home health, and hospice and long-term care facility care. Does not include health insurance premiums.

[3]Expenditures for long-term care in facilities include facility room and board expenses for beneficiaries who resided in a facility for the full year, for beneficiaries who resided in a facility for part of the year and in the community for part of the year, and expenditures for short-term facility stays for full-year or part-year community residents. See Appendix II, Long-term care facility.

[4]Expenditures for long-term care in facilities include facility room and board expenses for beneficiaries who resided in a facility for the full year and for beneficiaries who resided in a facility for part of the year and in the community for part of the year. It does not include expenditures for short-term facility stays for full-year community residents. See Appendix II, Long-term care facility.

[5]Medicare beneficiaries with end-stage renal disease (ESRD) are included within the subgroups "Aged" and "Disabled."

[6]See Appendix II for definitions of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). Includes data for both community and long-term care facility residents.

NOTES: Percents and percent distributions are calculated using unrounded numbers. Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Health and Health Care of the Medicare Population; www.cms.hhs.gov/mcbs/Publdt.asp.



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## Table 142. Medicaid recipients and medical vendor payments, according to basis of eligibility, and race and ethnicity: United States, selected fiscal years 1972–2001

[Data are compiled by the Centers for Medicare & Medicaid Services from the Medicaid Data System]

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| Basis of eligibility and race and ethnicity | 1972 | 1980 | 1990 | 1995 | 1997 | 1998[1] | 1999[2] | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| Recipients | | | | Number in millions | | | | | |
| All recipients | 17.6 | 21.6 | 25.3 | 36.3 | 34.9 | 40.6 | 40.1 | 42.8 | 46.0 |
| | | | | Percent of recipients | | | | | |
| Basis of eligibility:[3] | | | | | | | | | |
| Aged (65 years and over) | 18.8 | 15.9 | 12.7 | 11.4 | 11.3 | 9.8 | 9.4 | 8.7 | 8.3 |
| Blind and disabled | 9.8 | 13.5 | 14.7 | 16.1 | 17.6 | 16.3 | 16.7 | 16.1 | 15.4 |
| Adults in families with dependent children[4] | 17.8 | 22.6 | 23.8 | 21.0 | 19.5 | 19.5 | 18.7 | 20.5 | 21.1 |
| Children under age 21[5] | 44.5 | 43.2 | 44.4 | 47.3 | 45.3 | 46.7 | 46.9 | 46.1 | 45.7 |
| Other Title XIX[6] | 9.0 | 6.9 | 3.9 | 1.7 | 6.3 | 7.8 | 8.4 | 8.6 | 9.5 |
| Race and ethnicity:[7] | | | | | | | | | |
| White | --- | --- | 42.8 | 45.5 | 44.4 | 41.3 | --- | --- | 40.2 |
| Black or African American | --- | --- | 25.1 | 24.7 | 23.5 | 24.2 | --- | --- | 23.1 |
| American Indian or Alaska Native | --- | --- | 1.0 | 0.8 | 1.0 | 0.8 | --- | --- | 1.3 |
| Asian or Pacific Islander | --- | --- | 2.0 | 2.2 | 1.9 | 2.5 | --- | --- | 3.0 |
| Hispanic or Latino | --- | --- | 15.2 | 17.2 | 14.3 | 15.6 | --- | --- | 17.9 |
| Unknown | --- | --- | 14.0 | 9.6 | 14.9 | 15.5 | --- | --- | 14.6 |
| Vendor payments[8] | | | | Amount in billions | | | | | |
| All payments | $ 6.3 | $ 23.3 | $ 64.9 | $120.1 | $124.4 | $ 142.3 | $ 153.5 | $ 168.3 | $ 186.3 |
| | | | | Percent distribution | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Basis of eligibility: | | | | | | | | | |
| Aged (65 years and over) | 30.6 | 37.5 | 33.2 | 30.4 | 30.3 | 28.5 | 27.7 | 26.4 | 25.9 |
| Blind and disabled | 22.2 | 32.7 | 37.6 | 41.1 | 43.5 | 42.4 | 42.9 | 43.2 | 43.1 |
| Adults in families with dependent children[4] | 15.3 | 13.9 | 13.2 | 11.2 | 9.9 | 10.4 | 10.3 | 10.6 | 10.7 |
| Children under age 21[5] | 18.1 | 13.4 | 14.0 | 15.0 | 14.1 | 16.0 | 15.7 | 15.9 | 16.3 |
| Other Title XIX[6] | 13.9 | 2.6 | 1.6 | 1.2 | 2.2 | 2.6 | 3.4 | 3.9 | 3.9 |
| Race and ethnicity:[7] | | | | | | | | | |
| White | --- | --- | 53.4 | 54.3 | 55.0 | 54.3 | --- | --- | 54.4 |
| Black or African American | --- | --- | 18.3 | 19.2 | 18.5 | 19.6 | --- | --- | 19.8 |
| American Indian or Alaska Native | --- | --- | 0.6 | 0.5 | 0.6 | 0.8 | --- | --- | 1.1 |
| Asian or Pacific Islander | --- | --- | 1.0 | 1.2 | 0.9 | 1.4 | --- | --- | 2.5 |
| Hispanic or Latino | --- | --- | 5.3 | 7.3 | 6.8 | 8.2 | --- | --- | 9.4 |
| Unknown | --- | --- | 21.3 | 17.6 | 18.2 | 15.7 | --- | --- | 12.9 |
| Vendor payments per recipient[8] | | | | | Amount | | | | |
| All recipients | $ 358 | $1,079 | $2,568 | $3,311 | $3,568 | $ 3,501 | $ 3,819 | $ 3,936 | $ 4,053 |
| Basis of eligibility: | | | | | | | | | |
| Aged (65 years and over) | 580 | 2,540 | 6,717 | 8,868 | 9,538 | 10,242 | 11,268 | 11,929 | 12,725 |
| Blind and disabled | 807 | 2,618 | 6,564 | 8,435 | 8,832 | 9,095 | 9,832 | 10,559 | 11,318 |
| Adults in families with dependent children[4] | 307 | 662 | 1,429 | 1,777 | 1,809 | 1,876 | 2,104 | 2,030 | 2,059 |
| Children under age 21[5] | 145 | 335 | 811 | 1,047 | 1,111 | 1,203 | 1,282 | 1,358 | 1,448 |
| Other Title XIX[6] | 555 | 398 | 1,062 | 2,380 | 1,242 | 1,166 | 1,532 | 1,778 | 1,680 |
| Race and ethnicity:[7] | | | | | | | | | |
| White | --- | --- | 3,207 | 3,953 | 4,421 | 4,609 | --- | --- | 5,489 |
| Black or African American | --- | --- | 1,878 | 2,568 | 2,798 | 2,836 | --- | --- | 3,480 |
| American Indian or Alaska Native | --- | --- | 1,706 | 2,142 | 2,500 | 3,297 | --- | --- | 3,452 |
| Asian or Pacific Islander | --- | --- | 1,257 | 1,713 | 1,610 | 1,924 | --- | --- | 3,283 |
| Hispanic or Latino | --- | --- | 903 | 1,400 | 1,699 | 1,842 | --- | --- | 2,126 |
| Unknown | --- | --- | 3,909 | 6,099 | 4,356 | 3,531 | --- | --- | 3,576 |

--- Data not available.

[1]Prior to 1999 recipient counts exclude those individuals who only received coverage under prepaid health care and for whom no direct vendor payments were made during the year; and vendor payments exclude payments to health maintenance organizations and other prepaid health plans ($19.3 billion in 1998 and $18 billion in 1997). The total number of persons who were Medicaid eligible and enrolled was 41.4 million in 1998, 41.6 million in 1997, and 41.2 million in 1996 (HCFA Medicaid Statistics, Program and Financial Statistics FY1996, FY1997, and FY1998, unpublished).

[2]Starting in 1999, the Medicaid data system was changed. See Appendix I, Medicaid Data System.

[3]In 1980 and 1985 recipients are included in more than one category. In 1990–96, 0.2–2.5 percent of recipients have unknown basis of eligibility. From 1997 onwards, unknowns are included in Other Title XIX.

[4]Includes adults in the Aid to Families with Dependent Children (AFDC) program. From 1997 onwards includes adults in the Temporary Assistance for Needy Families (TANF) program. From 2001 onwards includes women in the Breast and Cervical Cancer Prevention and Treatment Program.

[5]Includes children in the AFDC program. From 1997 onwards includes children and foster care children in the TANF program.

[6]Includes some participants in the Supplemental Security Income program and other people deemed medically needy in participating States. From 1997 onwards excludes foster care children and includes unknown eligibility.

[7]Race and ethnicity as determined on initial Medicaid application. Categories are mutually exclusive. Starting in 2001, Hispanic category included Hispanic persons regardless of race. Persons indicating more than one race were included in the unknown category.

[8]Vendor payments exclude disproportionate share hospital payments ($15.5 billion in FY2001).

NOTES: 1972 data are for fiscal year ending June 30. All other years are for fiscal year ending September 30. Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of Information Services, Enterprise Databases Group, Division of Information Distribution, Medicaid Data System. Before 1999 Medicaid Statistical Report HCFA–2082. From 1999 onwards Medicaid Statistical Information System, MSIS.
www.cms.hhs.gov/medicaid/msis/mstats.asp.



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## Table 143 (page 1 of 2). Medicaid recipients and medical vendor payments, according to type of service: United States, selected fiscal years 1972–2001

[Data are compiled by the Centers for Medicare & Medicaid Services from the Medicaid Data System]

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| Type of service | 1972 | 1980 | 1990 | 1995 | 1997 | 1998[1] | 1999[2] | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| Recipients | | | | Number in millions | | | | | |
| All recipients | 17.6 | 21.6 | 25.3 | 36.3 | 34.9 | 40.6 | 40.2 | 42.8 | 46.0 |
| | | | | Percent of recipients | | | | | |
| Inpatient hospital | 16.1 | 17.0 | 18.2 | 15.3 | 13.6 | 10.5 | 11.2 | 11.5 | 10.6 |
| Mental health facility | 0.2 | 0.3 | 0.4 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| Mentally retarded intermediate care facility | --- | 0.6 | 0.6 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| Nursing facility | --- | --- | --- | 4.6 | 4.6 | 4.0 | 4.0 | 4.0 | 3.7 |
| Skilled | 3.1 | 2.8 | 2.4 | --- | --- | --- | --- | --- | --- |
| Intermediate care | --- | 3.7 | 3.4 | --- | --- | --- | --- | --- | --- |
| Physician | 69.8 | 63.7 | 67.6 | 65.6 | 60.7 | 45.6 | 45.7 | 44.7 | 43.5 |
| Dental | 13.6 | 21.5 | 18.0 | 17.6 | 17.0 | 12.2 | 14.0 | 13.8 | 15.3 |
| Other practitioner | 9.1 | 15.0 | 15.3 | 15.2 | 14.7 | 10.7 | 9.9 | 11.1 | 11.1 |
| Outpatient hospital | 29.6 | 44.9 | 49.0 | 46.1 | 39.1 | 29.9 | 30.9 | 30.9 | 29.8 |
| Clinic | 2.8 | 7.1 | 11.1 | 14.7 | 13.5 | 13.0 | 16.8 | 17.9 | 18.4 |
| Laboratory and radiological | 20.0 | 14.9 | 35.5 | 36.0 | 31.8 | 23.1 | 25.4 | 26.6 | 26.8 |
| Home health | 0.6 | 1.8 | 2.8 | 4.5 | 5.3 | 3.0 | 2.0 | 2.3 | 2.2 |
| Prescribed drugs | 63.3 | 63.4 | 68.5 | 65.4 | 60.1 | 47.6 | 49.4 | 48.0 | 47.6 |
| Family planning | ... | 5.2 | 6.9 | 6.9 | 6.0 | 4.9 | --- | --- | --- |
| Early and periodic screening | ... | ... | 11.7 | 18.2 | 18.5 | 15.2 | --- | --- | --- |
| Rural health clinic | ... | ... | 0.9 | 3.4 | 4.1 | --- | --- | --- | --- |
| Capitated payment services | --- | --- | --- | --- | --- | 49.7 | 51.5 | 49.7 | 50.5 |
| Primary care case management | --- | --- | --- | --- | --- | --- | 9.7 | 13.0 | 13.9 |
| Personal support | --- | --- | --- | --- | --- | --- | 10.1 | 10.6 | 10.8 |
| Other care | 14.4 | 11.9 | 20.3 | 31.5 | 35.5 | 36.0 | 21.6 | 21.4 | 21.5 |
| Vendor payments[3] | | | | Amount in billions | | | | | |
| All payments | $ 6.3 | $ 23.3 | $ 64.9 | $120.1 | $124.4 | $142.3 | $153.5 | $168.3 | $186.3 |
| | | | | Percent distribution | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Inpatient hospital | 40.6 | 27.5 | 25.7 | 21.9 | 18.6 | 15.1 | 14.5 | 14.4 | 13.9 |
| Mental health facility | 1.8 | 3.3 | 2.6 | 2.1 | 1.6 | 2.0 | 1.1 | 1.1 | 1.1 |
| Mentally retarded intermediate care facility | --- | 8.5 | 11.3 | 8.6 | 7.9 | 6.7 | 6.1 | 5.6 | 5.2 |
| Nursing facility | --- | --- | --- | 24.2 | 24.5 | 22.4 | 21.7 | 20.5 | 20.0 |
| Skilled | 23.3 | 15.8 | 12.4 | --- | --- | --- | --- | --- | --- |
| Intermediate care | --- | 18.0 | 14.9 | --- | --- | --- | --- | --- | --- |
| Physician | 12.6 | 8.0 | 6.2 | 6.1 | 5.7 | 4.3 | 4.3 | 4.0 | 4.0 |
| Dental | 2.7 | 2.0 | 0.9 | 0.8 | 0.8 | 0.6 | 0.8 | 0.8 | 1.0 |
| Other practitioner | 0.9 | 0.8 | 0.6 | 0.8 | 0.8 | 0.4 | 0.3 | 0.4 | 0.4 |
| Outpatient hospital | 5.8 | 4.7 | 5.1 | 5.5 | 5.0 | 4.0 | 4.0 | 4.2 | 4.0 |
| Clinic | 0.7 | 1.4 | 2.6 | 3.6 | 3.4 | 2.8 | 3.8 | 3.7 | 3.0 |
| Laboratory and radiological | 1.3 | 0.5 | 1.1 | 1.0 | 0.8 | 0.7 | 0.8 | 0.8 | 0.9 |
| Home health | 0.4 | 1.4 | 5.2 | 7.8 | 9.8 | 1.9 | 1.9 | 1.9 | 1.9 |
| Prescribed drugs | 8.1 | 5.7 | 6.8 | 8.1 | 9.6 | 9.5 | 10.8 | 11.9 | 12.7 |
| Family planning | ... | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | --- | --- | --- |
| Early and periodic screening | ... | ... | 0.3 | 1.0 | 1.3 | 0.9 | --- | --- | --- |
| Rural health clinic | ... | ... | 0.1 | 0.2 | 0.2 | --- | --- | --- | --- |
| Capitated payment services | --- | --- | --- | --- | --- | 13.6 | 14.0 | 14.5 | 15.7 |
| Primary care case management | --- | --- | --- | --- | --- | --- | 0.3 | 0.1 | 0.1 |
| Personal support | --- | --- | --- | --- | --- | --- | 6.9 | 6.9 | 7.0 |
| Other care | 1.8 | 1.9 | 3.7 | 7.7 | 8.9 | 13.6 | 8.6 | 8.8 | 9.2 |

See footnotes at end of table.



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## Table 143 (page 2 of 2). Medicaid recipients and medical vendor payments, according to type of service: United States, selected fiscal years 1972–2001

[Data are compiled by the Centers for Medicare & Medicaid Services from the Medicaid Data System]

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| Type of service | 1972 | 1980 | 1990 | 1995 | 1997 | 1998[1] | 1999[2] | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| Vendor payments per recipient[3] | | | | | Amount | | | | |
| Total payment per recipient | $ 358 | $ 1,079 | $ 2,568 | $ 3,311 | $ 3,568 | $ 3,501 | $ 3,819 | $ 3,936 | $ 4,053 |
| Inpatient hospital | 903 | 1,742 | 3,630 | 4,735 | 4,877 | 5,031 | 4,943 | 4,919 | 5,313 |
| Mental health facility | 2,825 | 11,742 | 18,548 | 29,847 | 22,990 | 20,701 | 18,094 | 17,800 | 21,482 |
| Mentally retarded intermediate care facility | --- | 16,438 | 50,048 | 68,613 | 72,033 | 74,960 | 76,443 | 79,330 | 83,227 |
| Nursing facility | --- | --- | --- | 17,424 | 19,029 | 19,379 | 20,568 | 20,220 | 21,894 |
| Skilled | 2,665 | 6,081 | 13,356 | --- | --- | --- | --- | --- | --- |
| Intermediate care | --- | 5,326 | 11,236 | --- | --- | --- | --- | --- | --- |
| Physician | 65 | 136 | 235 | 309 | 333 | 327 | 357 | 356 | 371 |
| Dental | 71 | 99 | 130 | 160 | 175 | 182 | 214 | 238 | 270 |
| Other practitioner | 37 | 61 | 96 | 178 | 190 | 135 | 118 | 139 | 149 |
| Outpatient hospital | 70 | 113 | 269 | 397 | 453 | 474 | 491 | 533 | 546 |
| Clinic | 82 | 209 | 602 | 804 | 902 | 742 | 860 | 805 | 662 |
| Laboratory and radiological | 23 | 38 | 80 | 90 | 93 | 100 | 114 | 113 | 131 |
| Home health | 229 | 847 | 4,733 | 5,740 | 6,575 | 2,206 | 3,571 | 3,135 | 3,478 |
| Prescribed drugs | 46 | 96 | 256 | 413 | 571 | 699 | 837 | 975 | 1,083 |
| Family planning | ... | 72 | 151 | 206 | 200 | 223 | --- | --- | --- |
| Early and periodic screening | ... | ... | 67 | 177 | 251 | 216 | --- | --- | --- |
| Rural health clinic | ... | ... | 154 | 174 | 213 | --- | --- | --- | --- |
| Capitated payment services | --- | --- | --- | --- | --- | 955 | 1,040 | 1,148 | 1,257 |
| Primary care case management | --- | --- | --- | --- | --- | --- | 119 | 30 | 29 |
| Personal support | --- | --- | --- | --- | --- | --- | 2,583 | 2,543 | 2,639 |
| Other care | 44 | 172 | 465 | 807 | 891 | 1,331 | 1,508 | 1,600 | 1,734 |

--- Data not available.
... Category not applicable.
[1]Prior to 1999 recipient counts exclude those individuals who only received coverage under prepaid health care and for whom no direct vendor payments were made during the year; and vendor payments exclude payments to health maintenance organizations and other prepaid health plans ($19.3 billion in 1998 and $18 billion in 1997). The total number of persons who were Medicaid eligible and enrolled was 41.4 million in 1998, 41.6 million in 1997, and 41.2 million in 1996 (HCFA Medicaid Statistics, Program and Financial Statistics FY1996, FY1997, and FY1998, unpublished).
[2]Starting in 1999, the Medicaid data system was changed. See Appendix I, Medicaid Data System.
[3]Payments exclude disproportionate share hospital payments ($15.5 billion in FY2001).

NOTES: 1972 data are for fiscal year ending June 30. All other years are for fiscal year ending September 30. Unknown services are included with Other care (0.1 percent of recipients and 0.2 percent of payments in 2001). Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of Information Services, Enterprise Databases Group, Division of Information Distribution, Medicaid Data System. Before 1999 Medicaid Statistical Report HCFA–2082. From 1999 onwards Medicaid Statistical Information System, MSIS.
www.cms.hhs.gov/medicaid/msis/mstats.asp.



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## Table 144. Department of Veterans Affairs health care expenditures and use, and persons treated according to selected characteristics: United States, selected fiscal years 1970–2003

[Data are compiled from patient records, enrollment information, and budgetary data by the Department of Veterans Affairs]

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| | 1970 | 1980 | 1990 | 1995 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Health care expenditures | | | | Amount in millions | | | | | |
| All expenditures[1] | $1,689 | $ 5,981 | $11,500 | $16,126 | $17,876 | $19,327 | $21,316 | $23,003 | $25,647 |
| | | | | Percent distribution | | | | | |
| All services | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Inpatient hospital | 71.3 | 64.3 | 57.5 | 49.0 | 38.8 | 37.3 | 34.7 | 33.6 | 32.2 |
| Outpatient care | 14.0 | 19.1 | 25.3 | 30.2 | 44.0 | 45.7 | 48.0 | 48.8 | 49.5 |
| Nursing home care | 5.5 | 7.1 | 9.5 | 10.0 | 8.5 | 8.2 | 8.1 | 8.0 | 8.1 |
| All other[2] | 9.1 | 9.6 | 7.7 | 10.8 | 8.7 | 8.8 | 9.2 | 9.6 | 10.2 |
| Health care use | | | | Number in thousands | | | | | |
| Inpatient hospital stays[3] | 787 | 1,248 | 1,029 | 879 | 611 | 579 | 584 | 590 | 588 |
| Outpatient visits | 7,312 | 17,971 | 22,602 | 27,527 | 36,928 | 38,370 | 42,901 | 46,058 | 49,760 |
| Nursing home stays[4] | 47 | 57 | 75 | 79 | 92 | 91 | 93 | 87 | 93 |
| Inpatients[5] | | | | | | | | | |
| Total | --- | --- | 598 | 527 | 447 | 417 | 426 | 436 | 443 |
| | | | | Percent distribution | | | | | |
| Total | --- | --- | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Veterans with service-connected disability | --- | --- | 38.9 | 39.3 | 33.8 | 34.4 | 34.6 | 35.2 | 36.2 |
| Veterans without service-connected disability | --- | --- | 60.3 | 59.9 | 65.3 | 64.7 | 64.5 | 63.9 | 62.9 |
| Low income | --- | --- | 54.8 | 56.2 | 44.8 | 41.7 | 41.4 | 40.9 | 40.8 |
| Veterans receiving aid and attendance or housebound benefits or who are catastrophically disabled[6] | --- | --- | --- | --- | 12.8 | 16.0 | 15.7 | 13.6 | 13.5 |
| Veterans receiving medical care subject to copayments[7] | --- | --- | 2.8 | 2.8 | 4.7 | 5.2 | 6.0 | 7.7 | 8.0 |
| Other and unknown[8] | --- | --- | 2.7 | 0.9 | 3.0 | 1.8 | 1.4 | 1.7 | 0.6 |
| Nonveterans | --- | --- | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 |
| Outpatients[5] | | | | Number in thousands | | | | | |
| Total | --- | --- | 2,564 | 2,790 | 3,400 | 3,657 | 4,072 | 4,456 | 4,715 |
| | | | | Percent distribution | | | | | |
| Total | --- | --- | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Veterans with service-connected disability | --- | --- | 38.3 | 37.5 | 30.5 | 30.7 | 30.0 | 29.5 | 30.3 |
| Veterans without service-connected disability | --- | --- | 49.8 | 50.5 | 60.6 | 60.8 | 62.5 | 63.9 | 63.4 |
| Low income | --- | --- | 41.1 | 42.2 | 38.8 | 37.6 | 36.6 | 34.1 | 32.7 |
| Veterans receiving aid and attendance or housebound benefits or who are catastrophically disabled[6] | --- | --- | --- | --- | 3.2 | 3.8 | 3.7 | 3.3 | 3.4 |
| Veterans receiving medical care subject to copayments[7] | --- | --- | 3.6 | 4.2 | 11.7 | 15.4 | 19.9 | 23.6 | 26.1 |
| Other and unknown[8] | --- | --- | 5.1 | 4.1 | 6.9 | 4.0 | 2.3 | 2.9 | 1.1 |
| Nonveterans | --- | --- | 11.8 | 12.0 | 8.9 | 8.5 | 7.5 | 6.6 | 6.3 |

--- Data not available.

[1]Health care expenditures exclude construction, medical administration, and miscellaneous operating expenses at Department of Veterans Affairs headquarters.

[2]Includes miscellaneous benefits and services, contract hospitals, education and training, subsidies to State veterans hospitals, nursing homes and residential rehabilitation treatment programs (formerly domiciliaries), and the Civilian Health and Medical Program of the Department of Veterans Affairs.

[3]One-day dialysis patients were included in 1980. Interfacility transfers were included beginning in 1990.

[4]Includes Department of Veterans Affairs nursing home and residential rehabilitation treatment program (formerly domiciliary) stays, and community nursing home care stays.

[5]Individuals. The inpatient and outpatient totals are not additive since almost all inpatients are also treated as outpatients.

[6]Veterans who are receiving aid and attendance or housebound benefits; veterans who have been determined by the Department of Veterans Affairs to be catastrophically disabled.

[7]Financial means-tested veterans who receive medical care subject to copayments according to income level.

[8]Prisoner of war, exposed to Agent Orange, and so forth. Prior to fiscal year 1994, veterans who reported exposure to Agent Orange were classified as exempt. Beginning in fiscal year 1994 those veterans reporting Agent Orange exposure but not treated for it were means tested and placed in the low income or other group depending on income.

NOTES: Figures may not add to totals due to rounding. In 1970, the fiscal year ended June 30; 1980 and later the fiscal year ended September 30. The veteran population was estimated at 25.2 million at the end of FY 2003, with 38 percent age 65 or over, compared with 11 percent in 1980. Seventeen percent had served during World War II, 14 percent during the Korean conflict, 33 percent during the Vietnam era, 15 percent during the Persian Gulf War, and 25 percent during peacetime. These percentages add to more than 100 due to veterans serving during more than one war. Beginning in fiscal year 1995 categories for health care expenditures and health care use were revised. In fiscal year 1999 a new priority system for reporting data was introduced and starting in 1999, data reflect the new categories. Data for additional years are available. See Appendix III.

SOURCES: Department of Veterans Affairs (VA), Office of the Assistant Deputy Under Secretary for Health, National Patient Care Database, National Enrollment Database, budgetary data, and unpublished data. Veteran population estimates were provided by the VA's Office of the Actuary.



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## Table 145 (page 1 of 2). Personal health care per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

Click here for spreadsheet version

| Geographic region and State[1] | 1991 | 1994 | 1995 | 1996 | 1997 | 1998 | 1991–98 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| United States | $2,685 | $3,193 | $3,334 | $3,472 | $3,606 | $3,759 | 4.9 | 1.00 |
| New England | 3,115 | 3,745 | 3,945 | 4,092 | 4,303 | 4,540 | 5.5 | 1.21 |
| Connecticut | 3,338 | 3,900 | 4,138 | 4,250 | 4,442 | 4,656 | 4.9 | 1.24 |
| Maine | 2,464 | 3,018 | 3,256 | 3,512 | 3,755 | 4,025 | 7.3 | 1.07 |
| Massachusetts | 3,334 | 4,056 | 4,200 | 4,347 | 4,556 | 4,810 | 5.4 | 1.28 |
| New Hampshire | 2,511 | 3,029 | 3,264 | 3,441 | 3,650 | 3,840 | 6.3 | 1.02 |
| Rhode Island | 2,943 | 3,569 | 3,867 | 3,978 | 4,235 | 4,497 | 6.2 | 1.20 |
| Vermont | 2,393 | 2,890 | 3,133 | 3,273 | 3,455 | 3,654 | 6.2 | 0.97 |
| Mideast[2] | 3,108 | 3,748 | 3,905 | 4,063 | 4,209 | 4,386 | 5.0 | 1.17 |
| Delaware | 2,878 | 3,565 | 3,737 | 3,847 | 4,083 | 4,258 | 5.8 | 1.13 |
| Maryland | 2,796 | 3,291 | 3,401 | 3,573 | 3,696 | 3,848 | 4.7 | 1.02 |
| New Jersey | 2,966 | 3,622 | 3,830 | 4,009 | 4,080 | 4,197 | 5.1 | 1.12 |
| New York | 3,288 | 3,997 | 4,162 | 4,346 | 4,486 | 4,706 | 5.3 | 1.25 |
| Pennsylvania | 2,988 | 3,547 | 3,683 | 3,791 | 4,003 | 4,168 | 4.9 | 1.11 |
| Great Lakes | 2,666 | 3,172 | 3,318 | 3,467 | 3,606 | 3,733 | 4.9 | 0.99 |
| Illinois | 2,743 | 3,259 | 3,394 | 3,535 | 3,653 | 3,801 | 4.8 | 1.01 |
| Indiana | 2,508 | 3,052 | 3,156 | 3,196 | 3,416 | 3,566 | 5.2 | 0.95 |
| Michigan | 2,643 | 3,114 | 3,289 | 3,457 | 3,602 | 3,676 | 4.8 | 0.98 |
| Ohio | 2,709 | 3,209 | 3,353 | 3,542 | 3,635 | 3,747 | 4.7 | 1.00 |
| Wisconsin | 2,610 | 3,138 | 3,306 | 3,476 | 3,654 | 3,845 | 5.7 | 1.02 |
| Plains | 2,544 | 3,115 | 3,271 | 3,436 | 3,592 | 3,797 | 5.9 | 1.01 |
| Iowa | 2,524 | 3,014 | 3,165 | 3,368 | 3,519 | 3,765 | 5.9 | 1.00 |
| Kansas | 2,574 | 3,067 | 3,249 | 3,412 | 3,573 | 3,707 | 5.3 | 0.99 |
| Minnesota | 2,606 | 3,246 | 3,439 | 3,614 | 3,791 | 3,986 | 6.3 | 1.06 |
| Missouri | 2,555 | 3,159 | 3,262 | 3,390 | 3,531 | 3,754 | 5.6 | 1.00 |
| Nebraska | 2,383 | 2,947 | 3,083 | 3,287 | 3,407 | 3,627 | 6.2 | 0.96 |
| North Dakota | 2,555 | 3,155 | 3,420 | 3,540 | 3,680 | 3,881 | 6.2 | 1.03 |
| South Dakota | 2,394 | 2,880 | 3,068 | 3,253 | 3,453 | 3,650 | 6.2 | 0.97 |
| Southeast | 2,557 | 3,081 | 3,241 | 3,400 | 3,557 | 3,686 | 5.4 | 0.98 |
| Alabama | 2,561 | 3,059 | 3,234 | 3,422 | 3,626 | 3,630 | 5.1 | 0.97 |
| Arkansas | 2,408 | 2,840 | 3,012 | 3,177 | 3,355 | 3,540 | 5.7 | 0.94 |
| Florida | 2,976 | 3,523 | 3,632 | 3,774 | 3,875 | 4,046 | 4.5 | 1.08 |
| Georgia | 2,527 | 3,007 | 3,170 | 3,291 | 3,412 | 3,505 | 4.8 | 0.93 |
| Kentucky | 2,424 | 2,898 | 3,098 | 3,300 | 3,519 | 3,711 | 6.3 | 0.99 |
| Louisiana | 2,619 | 3,243 | 3,376 | 3,496 | 3,639 | 3,742 | 5.2 | 1.00 |
| Mississippi | 2,190 | 2,686 | 2,933 | 3,145 | 3,286 | 3,474 | 6.8 | 0.92 |
| North Carolina | 2,271 | 2,854 | 3,040 | 3,232 | 3,420 | 3,535 | 6.5 | 0.94 |
| South Carolina | 2,276 | 2,839 | 2,985 | 3,131 | 3,399 | 3,529 | 6.5 | 0.94 |
| Tennessee | 2,594 | 3,186 | 3,415 | 3,569 | 3,728 | 3,808 | 5.6 | 1.01 |
| Virginia | 2,378 | 2,743 | 2,858 | 3,009 | 3,155 | 3,284 | 4.7 | 0.87 |
| West Virginia | 2,568 | 3,233 | 3,442 | 3,649 | 3,858 | 4,044 | 6.7 | 1.08 |
| Southwest | 2,373 | 2,794 | 2,934 | 3,075 | 3,194 | 3,339 | 5.0 | 0.89 |
| Arizona | 2,407 | 2,729 | 2,769 | 2,862 | 2,935 | 3,100 | 3.7 | 0.82 |
| New Mexico | 2,211 | 2,609 | 2,744 | 2,943 | 3,058 | 3,209 | 5.5 | 0.85 |
| Oklahoma | 2,336 | 2,819 | 3,014 | 3,188 | 3,268 | 3,397 | 5.5 | 0.90 |
| Texas | 2,387 | 2,821 | 2,975 | 3,117 | 3,255 | 3,397 | 5.2 | 0.90 |
| Rocky Mountains | 2,267 | 2,608 | 2,751 | 2,874 | 3,010 | 3,145 | 4.8 | 0.84 |
| Colorado | 2,481 | 2,835 | 2,977 | 3,071 | 3,202 | 3,331 | 4.3 | 0.89 |
| Idaho | 2,082 | 2,436 | 2,580 | 2,765 | 2,883 | 3,035 | 5.5 | 0.81 |
| Montana | 2,304 | 2,655 | 2,876 | 2,917 | 3,114 | 3,314 | 5.3 | 0.88 |
| Utah | 1,960 | 2,250 | 2,349 | 2,506 | 2,638 | 2,731 | 4.8 | 0.73 |
| Wyoming | 2,234 | 2,658 | 2,850 | 3,046 | 3,185 | 3,381 | 6.1 | 0.90 |

See footnotes at end of table.



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## Table 145 (page 2 of 2). Personal health care per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Geographic region and State*[1] | *1991* | *1994* | *1995* | *1996* | *1997* | *1998* | *1991–98* | *1998* |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| Far West | $2,634 | $3,028 | $3,109 | $3,183 | $3,255 | $3,414 | 3.8 | 0.91 |
| Alaska | 2,459 | 2,811 | 3,050 | 3,227 | 3,340 | 3,442 | 4.9 | 0.92 |
| California | 2,690 | 3,071 | 3,132 | 3,200 | 3,265 | 3,429 | 3.5 | 0.91 |
| Hawaii | 2,638 | 3,248 | 3,462 | 3,656 | 3,664 | 3,770 | 5.2 | 1.00 |
| Nevada | 2,393 | 2,829 | 2,881 | 2,949 | 3,028 | 3,147 | 4.0 | 0.84 |
| Oregon | 2,337 | 2,780 | 2,924 | 3,019 | 3,160 | 3,334 | 5.2 | 0.89 |
| Washington | 2,545 | 2,946 | 3,075 | 3,142 | 3,225 | 3,382 | 4.1 | 0.90 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]The Mideast region includes spending in the District of Columbia (DC), although it is not listed separately. Per capita spending in DC is substantially higher than per capita spending in most states. Most of this higher spending comes from spending on hospital care. One contributing factor to higher spending is the concentration of several higher-cost academic medical centers in a very small geographic area populated with a small number of people. Another factor could be the inability of current data sources and methods to accurately portray spending flows between providers located in DC and beneficiary resident locations. As a result, per capita spending in DC is not shown.

NOTES: Personal health care includes the following types of services: hospital care, physician and other professional services, nursing home care and home health care, drugs and nondurable products, dental services, durable products, and other personal health care not otherwise specified. Per capita expenditures for each category except the last three are shown in tables 141–144. Services not shown separately accounted for 6 percent of personal health care expenditures in 1991 and 10 percent in 1998. Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 146 (page 1 of 2). Hospital care per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | 1991 | 1994 | 1995 | 1996 | 1997 | 1998 | 1991–98 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| United States | $1,109 | $1,279 | $1,310 | $1,344 | $1,372 | $1,405 | 3.4 | 1.00 |
| New England | 1,253 | 1,438 | 1,463 | 1,503 | 1,562 | 1,613 | 3.7 | 1.15 |
| Connecticut | 1,206 | 1,345 | 1,343 | 1,387 | 1,423 | 1,478 | 2.9 | 1.05 |
| Maine | 1,015 | 1,204 | 1,296 | 1,385 | 1,441 | 1,501 | 5.7 | 1.07 |
| Massachusetts | 1,416 | 1,636 | 1,635 | 1,675 | 1,738 | 1,807 | 3.5 | 1.29 |
| New Hampshire | 987 | 1,123 | 1,180 | 1,187 | 1,235 | 1,234 | 3.2 | 0.88 |
| Rhode Island | 1,191 | 1,368 | 1,473 | 1,498 | 1,632 | 1,626 | 4.5 | 1.16 |
| Vermont | 948 | 1,135 | 1,244 | 1,259 | 1,304 | 1,328 | 4.9 | 0.95 |
| Mideast[2] | 1,320 | 1,553 | 1,575 | 1,616 | 1,645 | 1,656 | 3.3 | 1.18 |
| Delaware | 1,187 | 1,457 | 1,513 | 1,467 | 1,565 | 1,581 | 4.2 | 1.13 |
| Maryland | 1,158 | 1,312 | 1,360 | 1,424 | 1,457 | 1,486 | 3.6 | 1.06 |
| New Jersey | 1,187 | 1,430 | 1,424 | 1,509 | 1,467 | 1,481 | 3.2 | 1.05 |
| New York | 1,380 | 1,646 | 1,672 | 1,726 | 1,754 | 1,769 | 3.6 | 1.26 |
| Pennsylvania | 1,332 | 1,520 | 1,548 | 1,538 | 1,610 | 1,599 | 2.6 | 1.14 |
| Great Lakes | 1,134 | 1,317 | 1,361 | 1,405 | 1,455 | 1,471 | 3.8 | 1.05 |
| Illinois | 1,238 | 1,416 | 1,455 | 1,491 | 1,531 | 1,558 | 3.3 | 1.11 |
| Indiana | 1,048 | 1,239 | 1,273 | 1,228 | 1,365 | 1,413 | 4.4 | 1.01 |
| Michigan | 1,129 | 1,318 | 1,393 | 1,444 | 1,474 | 1,489 | 4.0 | 1.06 |
| Ohio | 1,132 | 1,325 | 1,366 | 1,434 | 1,459 | 1,437 | 3.5 | 1.02 |
| Wisconsin | 998 | 1,151 | 1,173 | 1,266 | 1,336 | 1,377 | 4.7 | 0.98 |
| Plains | 1,069 | 1,269 | 1,317 | 1,365 | 1,415 | 1,460 | 4.6 | 1.04 |
| Iowa | 1,095 | 1,269 | 1,325 | 1,406 | 1,455 | 1,520 | 4.8 | 1.08 |
| Kansas | 1,083 | 1,278 | 1,333 | 1,369 | 1,412 | 1,428 | 4.0 | 1.02 |
| Minnesota | 933 | 1,060 | 1,104 | 1,156 | 1,249 | 1,254 | 4.3 | 0.89 |
| Missouri | 1,170 | 1,437 | 1,464 | 1,476 | 1,494 | 1,566 | 4.3 | 1.11 |
| Nebraska | 1,043 | 1,258 | 1,316 | 1,419 | 1,433 | 1,507 | 5.4 | 1.07 |
| North Dakota | 1,062 | 1,357 | 1,466 | 1,532 | 1,647 | 1,741 | 7.3 | 1.24 |
| South Dakota | 1,106 | 1,269 | 1,370 | 1,436 | 1,499 | 1,534 | 4.8 | 1.09 |
| Southeast | 1,085 | 1,253 | 1,297 | 1,343 | 1,378 | 1,409 | 3.8 | 1.00 |
| Alabama | 1,109 | 1,284 | 1,376 | 1,445 | 1,473 | 1,432 | 3.7 | 1.02 |
| Arkansas | 1,028 | 1,167 | 1,228 | 1,320 | 1,354 | 1,430 | 4.8 | 1.02 |
| Florida | 1,130 | 1,267 | 1,290 | 1,317 | 1,322 | 1,371 | 2.8 | 0.98 |
| Georgia | 1,089 | 1,249 | 1,270 | 1,299 | 1,309 | 1,329 | 2.9 | 0.95 |
| Kentucky | 1,067 | 1,220 | 1,266 | 1,340 | 1,411 | 1,479 | 4.8 | 1.05 |
| Louisiana | 1,207 | 1,453 | 1,502 | 1,520 | 1,563 | 1,601 | 4.1 | 1.14 |
| Mississippi | 1,025 | 1,231 | 1,365 | 1,456 | 1,443 | 1,551 | 6.1 | 1.10 |
| North Carolina | 972 | 1,169 | 1,246 | 1,306 | 1,366 | 1,373 | 5.1 | 0.98 |
| South Carolina | 1,073 | 1,303 | 1,326 | 1,345 | 1,467 | 1,480 | 4.7 | 1.05 |
| Tennessee | 1,122 | 1,311 | 1,296 | 1,346 | 1,379 | 1,375 | 3.0 | 0.98 |
| Virginia | 1,016 | 1,113 | 1,167 | 1,212 | 1,258 | 1,286 | 3.4 | 0.92 |
| West Virginia | 1,186 | 1,381 | 1,452 | 1,562 | 1,635 | 1,693 | 5.2 | 1.20 |
| Southwest | 992 | 1,137 | 1,157 | 1,191 | 1,205 | 1,255 | 3.4 | 0.89 |
| Arizona | 920 | 1,000 | 998 | 1,012 | 1,022 | 1,085 | 2.4 | 0.77 |
| New Mexico | 1,051 | 1,213 | 1,218 | 1,267 | 1,313 | 1,389 | 4.1 | 0.99 |
| Oklahoma | 1,000 | 1,152 | 1,210 | 1,275 | 1,282 | 1,307 | 3.9 | 0.93 |
| Texas | 1,001 | 1,159 | 1,179 | 1,211 | 1,225 | 1,274 | 3.5 | 0.91 |
| Rocky Mountains | 921 | 1,013 | 1,067 | 1,097 | 1,131 | 1,164 | 3.4 | 0.83 |
| Colorado | 986 | 1,067 | 1,114 | 1,111 | 1,139 | 1,147 | 2.2 | 0.82 |
| Idaho | 848 | 933 | 978 | 1,073 | 1,094 | 1,163 | 4.6 | 0.83 |
| Montana | 983 | 1,111 | 1,232 | 1,206 | 1,333 | 1,440 | 5.6 | 1.02 |
| Utah | 781 | 882 | 917 | 978 | 995 | 1,016 | 3.8 | 0.72 |
| Wyoming | 1,038 | 1,142 | 1,238 | 1,341 | 1,380 | 1,439 | 4.8 | 1.02 |

See footnotes at end of table.



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## Table 146 (page 2 of 2). Hospital care per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| *Geographic region and State*[1] | *1991* | *1994* | *1995* | *1996* | *1997* | *1998* | *1991–98* | *1998* |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| Far West | $ 974 | $1,093 | $1,099 | $1,098 | $1,088 | $1,146 | 2.3 | 0.82 |
| Alaska | 1,118 | 1,306 | 1,447 | 1,496 | 1,502 | 1,496 | 4.3 | 1.06 |
| California | 998 | 1,106 | 1,103 | 1,092 | 1,076 | 1,145 | 2.0 | 0.81 |
| Hawaii | 1,074 | 1,318 | 1,371 | 1,462 | 1,413 | 1,391 | 3.8 | 0.99 |
| Nevada | 879 | 1,013 | 1,001 | 1,021 | 1,027 | 1,033 | 2.3 | 0.74 |
| Oregon | 822 | 964 | 1,001 | 1,021 | 1,049 | 1,112 | 4.4 | 0.79 |
| Washington | 904 | 1,038 | 1,061 | 1,078 | 1,085 | 1,116 | 3.1 | 0.79 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]The Mideast region includes spending in the District of Columbia (DC), although it is not listed separately. Per capita spending in DC is substantially higher than per capita spending in most states. Most of this higher spending comes from spending on hospital care. One contributing factor to higher spending is the concentration of several higher-cost academic medical centers in a very small geographic area populated with a small number of people. Another factor could be the inability of current data sources and methods to accurately portray spending flows between providers located in DC and beneficiary resident locations. As a result, per capita spending in DC is not shown.

NOTE: Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 147. Physician and other professional services per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | 1991 | 1994 | 1995 | 1996 | 1997 | 1998 | 1991–98 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| United States | $ 795 | $ 932 | $ 972 | $1,003 | $1,043 | $1,095 | 4.7 | 1.00 |
| New England | 823 | 980 | 1,045 | 1,080 | 1,163 | 1,246 | 6.1 | 1.14 |
| Connecticut | 945 | 1,072 | 1,182 | 1,188 | 1,249 | 1,304 | 4.7 | 1.19 |
| Maine | 621 | 736 | 796 | 847 | 929 | 1,020 | 7.4 | 0.93 |
| Massachusetts | 845 | 1,035 | 1,073 | 1,117 | 1,224 | 1,316 | 6.5 | 1.20 |
| New Hampshire | 726 | 881 | 964 | 1,039 | 1,101 | 1,189 | 7.3 | 1.09 |
| Rhode Island | 751 | 890 | 974 | 974 | 1,022 | 1,128 | 6.0 | 1.03 |
| Vermont | 634 | 752 | 796 | 838 | 911 | 988 | 6.5 | 0.90 |
| Mideast[2] | 812 | 982 | 1,027 | 1,044 | 1,079 | 1,136 | 4.9 | 1.04 |
| Delaware | 843 | 1,002 | 1,011 | 1,024 | 1,084 | 1,123 | 4.2 | 1.03 |
| Maryland | 871 | 1,056 | 1,060 | 1,080 | 1,099 | 1,140 | 3.9 | 1.04 |
| New Jersey | 879 | 1,052 | 1,153 | 1,155 | 1,193 | 1,225 | 4.9 | 1.12 |
| New York | 758 | 936 | 982 | 1,006 | 1,044 | 1,112 | 5.6 | 1.01 |
| Pennsylvania | 806 | 954 | 980 | 998 | 1,034 | 1,103 | 4.6 | 1.01 |
| Great Lakes | 747 | 882 | 914 | 944 | 963 | 1,015 | 4.5 | 0.93 |
| Illinois | 751 | 901 | 929 | 970 | 991 | 1,046 | 4.9 | 0.95 |
| Indiana | 681 | 820 | 828 | 860 | 883 | 944 | 4.8 | 0.86 |
| Michigan | 744 | 855 | 889 | 918 | 937 | 973 | 3.9 | 0.89 |
| Ohio | 776 | 882 | 911 | 943 | 941 | 992 | 3.6 | 0.91 |
| Wisconsin | 751 | 955 | 1,030 | 1,033 | 1,083 | 1,151 | 6.3 | 1.05 |
| Plains | 690 | 852 | 892 | 937 | 983 | 1,051 | 6.2 | 0.96 |
| Iowa | 662 | 798 | 823 | 856 | 888 | 956 | 5.4 | 0.87 |
| Kansas | 757 | 879 | 940 | 969 | 993 | 1,039 | 4.6 | 0.95 |
| Minnesota | 775 | 1,020 | 1,107 | 1,189 | 1,260 | 1,347 | 8.2 | 1.23 |
| Missouri | 649 | 781 | 787 | 822 | 869 | 938 | 5.4 | 0.86 |
| Nebraska | 580 | 723 | 724 | 750 | 790 | 839 | 5.4 | 0.77 |
| North Dakota | 671 | 826 | 915 | 911 | 880 | 914 | 4.5 | 0.83 |
| South Dakota | 590 | 733 | 764 | 815 | 908 | 998 | 7.8 | 0.91 |
| Southeast | 765 | 899 | 936 | 969 | 1,018 | 1,059 | 4.8 | 0.97 |
| Alabama | 777 | 902 | 913 | 941 | 1,020 | 1,075 | 4.7 | 0.98 |
| Arkansas | 707 | 808 | 842 | 836 | 903 | 941 | 4.2 | 0.86 |
| Florida | 1,033 | 1,182 | 1,178 | 1,201 | 1,235 | 1,273 | 3.0 | 1.16 |
| Georgia | 767 | 883 | 966 | 1,007 | 1,066 | 1,091 | 5.2 | 1.00 |
| Kentucky | 656 | 783 | 862 | 898 | 935 | 976 | 5.8 | 0.89 |
| Louisiana | 702 | 829 | 844 | 867 | 917 | 968 | 4.7 | 0.88 |
| Mississippi | 564 | 661 | 719 | 757 | 838 | 879 | 6.5 | 0.80 |
| North Carolina | 627 | 782 | 811 | 854 | 891 | 941 | 6.0 | 0.86 |
| South Carolina | 571 | 705 | 747 | 784 | 846 | 896 | 6.7 | 0.82 |
| Tennessee | 720 | 877 | 999 | 1,052 | 1,112 | 1,149 | 6.9 | 1.05 |
| Virginia | 716 | 822 | 827 | 865 | 894 | 928 | 3.8 | 0.85 |
| West Virginia | 682 | 862 | 896 | 923 | 983 | 1,040 | 6.2 | 0.95 |
| Southwest | 718 | 809 | 856 | 887 | 935 | 989 | 4.7 | 0.90 |
| Arizona | 856 | 920 | 918 | 949 | 982 | 1,037 | 2.8 | 0.95 |
| New Mexico | 591 | 689 | 735 | 810 | 843 | 878 | 5.8 | 0.80 |
| Oklahoma | 656 | 765 | 804 | 841 | 886 | 948 | 5.4 | 0.87 |
| Texas | 711 | 803 | 861 | 887 | 941 | 995 | 4.9 | 0.91 |
| Rocky Mountains | 678 | 764 | 796 | 830 | 877 | 925 | 4.5 | 0.84 |
| Colorado | 788 | 897 | 929 | 964 | 1,007 | 1,058 | 4.3 | 0.97 |
| Idaho | 618 | 693 | 739 | 767 | 813 | 852 | 4.7 | 0.78 |
| Montana | 609 | 639 | 696 | 730 | 777 | 825 | 4.4 | 0.75 |
| Utah | 557 | 629 | 637 | 675 | 726 | 763 | 4.6 | 0.70 |
| Wyoming | 594 | 693 | 746 | 760 | 811 | 896 | 6.0 | 0.82 |
| Far West | 977 | 1,108 | 1,148 | 1,181 | 1,212 | 1,261 | 3.7 | 1.15 |
| Alaska | 701 | 740 | 792 | 866 | 902 | 953 | 4.5 | 0.87 |
| California | 1,039 | 1,184 | 1,221 | 1,259 | 1,290 | 1,340 | 3.7 | 1.22 |
| Hawaii | 799 | 1,012 | 1,118 | 1,214 | 1,235 | 1,311 | 7.3 | 1.20 |
| Nevada | 898 | 960 | 993 | 1,000 | 1,035 | 1,085 | 2.7 | 0.99 |
| Oregon | 737 | 854 | 899 | 911 | 963 | 1,001 | 4.5 | 0.91 |
| Washington | 831 | 914 | 957 | 969 | 988 | 1,037 | 3.2 | 0.95 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]The Mideast region includes spending in the District of Columbia (DC), although it is not listed separately.

NOTE: Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 148. Nursing home care and home health care per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | 1991 | 1994 | 1995 | 1996 | 1997 | 1998 | 1991–98 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| United States | $290 | $374 | $398 | $420 | $430 | $433 | 5.9 | 1.00 |
| New England | 492 | 618 | 656 | 688 | 693 | 702 | 5.2 | 1.62 |
| Connecticut | 578 | 734 | 780 | 827 | 847 | 860 | 5.8 | 1.99 |
| Maine | 384 | 492 | 516 | 525 | 532 | 538 | 4.9 | 1.24 |
| Massachusetts | 534 | 664 | 702 | 735 | 733 | 739 | 4.7 | 1.71 |
| New Hampshire | 268 | 375 | 419 | 450 | 465 | 470 | 8.3 | 1.08 |
| Rhode Island | 443 | 541 | 571 | 587 | 574 | 606 | 4.6 | 1.40 |
| Vermont | 316 | 357 | 378 | 403 | 412 | 411 | 3.9 | 0.95 |
| Mideast[2] | 447 | 548 | 578 | 609 | 623 | 648 | 5.5 | 1.50 |
| Delaware | 328 | 417 | 455 | 492 | 495 | 520 | 6.8 | 1.20 |
| Maryland | 247 | 323 | 344 | 354 | 369 | 395 | 7.0 | 0.91 |
| New Jersey | 309 | 425 | 474 | 499 | 513 | 514 | 7.5 | 1.19 |
| New York | 628 | 730 | 749 | 784 | 789 | 827 | 4.0 | 1.91 |
| Pennsylvania | 353 | 452 | 489 | 530 | 559 | 582 | 7.4 | 1.34 |
| Great Lakes | 306 | 381 | 405 | 425 | 442 | 445 | 5.5 | 1.03 |
| Illinois | 286 | 359 | 379 | 391 | 403 | 409 | 5.2 | 0.94 |
| Indiana | 331 | 426 | 443 | 459 | 470 | 464 | 4.9 | 1.07 |
| Michigan | 246 | 295 | 316 | 339 | 374 | 342 | 4.8 | 0.79 |
| Ohio | 341 | 438 | 468 | 500 | 511 | 549 | 7.1 | 1.27 |
| Wisconsin | 360 | 424 | 454 | 466 | 480 | 478 | 4.2 | 1.10 |
| Plains | 327 | 404 | 425 | 453 | 465 | 474 | 5.5 | 1.09 |
| Iowa | 326 | 400 | 424 | 461 | 476 | 502 | 6.4 | 1.16 |
| Kansas | 289 | 357 | 374 | 404 | 420 | 421 | 5.5 | 0.97 |
| Minnesota | 412 | 490 | 502 | 505 | 496 | 503 | 2.9 | 1.16 |
| Missouri | 285 | 371 | 401 | 443 | 473 | 476 | 7.6 | 1.10 |
| Nebraska | 289 | 378 | 397 | 431 | 441 | 459 | 6.8 | 1.06 |
| North Dakota | 378 | 405 | 423 | 442 | 455 | 470 | 3.2 | 1.09 |
| South Dakota | 274 | 345 | 359 | 387 | 391 | 401 | 5.6 | 0.93 |
| Southeast | 240 | 340 | 368 | 396 | 406 | 404 | 7.7 | 0.93 |
| Alabama | 213 | 303 | 333 | 357 | 369 | 360 | 7.8 | 0.83 |
| Arkansas | 251 | 332 | 359 | 376 | 410 | 415 | 7.4 | 0.96 |
| Florida | 282 | 404 | 439 | 464 | 465 | 471 | 7.6 | 1.09 |
| Georgia | 201 | 288 | 303 | 311 | 308 | 308 | 6.3 | 0.71 |
| Kentucky | 253 | 345 | 377 | 411 | 446 | 458 | 8.8 | 1.06 |
| Louisiana | 265 | 389 | 424 | 471 | 470 | 431 | 7.2 | 1.00 |
| Mississippi | 210 | 307 | 327 | 367 | 382 | 366 | 8.3 | 0.84 |
| North Carolina | 242 | 355 | 381 | 413 | 433 | 430 | 8.5 | 0.99 |
| South Carolina | 197 | 274 | 304 | 337 | 340 | 349 | 8.5 | 0.81 |
| Tennessee | 286 | 410 | 448 | 478 | 491 | 474 | 7.5 | 1.09 |
| Virginia | 177 | 236 | 247 | 271 | 289 | 296 | 7.6 | 0.68 |
| West Virginia | 237 | 329 | 375 | 411 | 414 | 414 | 8.3 | 0.96 |
| Southwest | 205 | 287 | 318 | 346 | 358 | 340 | 7.5 | 0.79 |
| Arizona | 162 | 247 | 248 | 257 | 251 | 242 | 5.9 | 0.56 |
| New Mexico | 149 | 190 | 221 | 239 | 242 | 238 | 6.9 | 0.55 |
| Oklahoma | 257 | 363 | 412 | 440 | 426 | 402 | 6.6 | 0.93 |
| Texas | 209 | 291 | 327 | 361 | 381 | 362 | 8.2 | 0.84 |
| Rocky Mountains | 193 | 248 | 260 | 274 | 283 | 277 | 5.3 | 0.64 |
| Colorado | 203 | 254 | 266 | 289 | 307 | 307 | 6.1 | 0.71 |
| Idaho | 176 | 254 | 266 | 279 | 281 | 272 | 6.4 | 0.63 |
| Montana | 249 | 336 | 346 | 331 | 322 | 317 | 3.5 | 0.73 |
| Utah | 166 | 189 | 203 | 213 | 218 | 202 | 2.9 | 0.47 |
| Wyoming | 173 | 266 | 281 | 301 | 308 | 296 | 8.0 | 0.68 |
| Far West | 173 | 226 | 236 | 240 | 242 | 245 | 5.1 | 0.57 |
| Alaska | 95 | 121 | 127 | 99 | 97 | 90 | –0.8 | 0.21 |
| California | 155 | 208 | 218 | 224 | 228 | 232 | 5.9 | 0.54 |
| Hawaii | 160 | 189 | 195 | 206 | 215 | 223 | 4.8 | 0.51 |
| Nevada | 143 | 249 | 229 | 218 | 207 | 203 | 5.1 | 0.47 |
| Oregon | 246 | 267 | 275 | 288 | 299 | 300 | 2.8 | 0.69 |
| Washington | 256 | 321 | 344 | 329 | 323 | 326 | 3.5 | 0.75 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]The Mideast region includes spending in the District of Columbia (DC), although it is not listed separately.

NOTE: Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 149. Drugs and other nondurables per capita expenditures, by geographic region and State: United States, selected years 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | 1991 | 1994 | 1995 | 1996 | 1997 | 1998 | 1991–98 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | Per capita expenditures | | | | | | Average annual percent change | Ratio to U.S. per capita expenditures |
| United States | $260 | $313 | $337 | $370 | $406 | $451 | 8.2 | 1.00 |
| New England | 265 | 323 | 348 | 380 | 418 | 479 | 8.8 | 1.06 |
| Connecticut | 280 | 344 | 375 | 410 | 448 | 521 | 9.3 | 1.15 |
| Maine | 225 | 277 | 301 | 342 | 398 | 449 | 10.4 | 1.00 |
| Massachusetts | 267 | 323 | 347 | 375 | 410 | 469 | 8.4 | 1.04 |
| New Hampshire | 261 | 314 | 336 | 366 | 402 | 455 | 8.2 | 1.01 |
| Rhode Island | 281 | 343 | 373 | 413 | 451 | 511 | 8.9 | 1.13 |
| Vermont | 230 | 277 | 298 | 321 | 351 | 401 | 8.2 | 0.89 |
| Mideast[2] | 274 | 337 | 365 | 405 | 449 | 506 | 9.1 | 1.12 |
| Delaware | 267 | 324 | 349 | 395 | 456 | 524 | 10.1 | 1.16 |
| Maryland | 274 | 306 | 319 | 356 | 406 | 449 | 7.3 | 0.99 |
| New Jersey | 304 | 381 | 416 | 455 | 498 | 562 | 9.2 | 1.25 |
| New York | 262 | 326 | 356 | 399 | 437 | 492 | 9.4 | 1.09 |
| Pennsylvania | 274 | 337 | 366 | 404 | 452 | 513 | 9.4 | 1.14 |
| Great Lakes | 261 | 319 | 345 | 381 | 413 | 453 | 8.2 | 1.00 |
| Illinois | 255 | 310 | 335 | 368 | 393 | 430 | 7.7 | 0.95 |
| Indiana | 264 | 331 | 361 | 389 | 422 | 449 | 7.9 | 1.00 |
| Michigan | 279 | 341 | 371 | 418 | 458 | 498 | 8.6 | 1.10 |
| Ohio | 260 | 313 | 338 | 371 | 407 | 448 | 8.1 | 0.99 |
| Wisconsin | 245 | 298 | 320 | 352 | 379 | 434 | 8.5 | 0.96 |
| Plains | 246 | 298 | 320 | 348 | 379 | 429 | 8.3 | 0.95 |
| Iowa | 240 | 292 | 316 | 348 | 375 | 426 | 8.6 | 0.94 |
| Kansas | 245 | 292 | 312 | 344 | 379 | 413 | 7.7 | 0.92 |
| Minnesota | 233 | 286 | 309 | 340 | 372 | 424 | 8.9 | 0.94 |
| Missouri | 263 | 316 | 336 | 355 | 387 | 442 | 7.7 | 0.98 |
| Nebraska | 257 | 319 | 345 | 380 | 414 | 476 | 9.2 | 1.06 |
| North Dakota | 237 | 286 | 307 | 332 | 358 | 392 | 7.4 | 0.87 |
| South Dakota | 220 | 264 | 280 | 302 | 323 | 363 | 7.4 | 0.81 |
| Southeast | 268 | 328 | 356 | 392 | 434 | 482 | 8.8 | 1.07 |
| Alabama | 271 | 327 | 351 | 385 | 432 | 471 | 8.2 | 1.04 |
| Arkansas | 266 | 322 | 346 | 388 | 418 | 464 | 8.3 | 1.03 |
| Florida | 285 | 359 | 395 | 444 | 488 | 552 | 9.9 | 1.22 |
| Georgia | 255 | 308 | 333 | 364 | 403 | 441 | 8.1 | 0.98 |
| Kentucky | 275 | 335 | 363 | 399 | 444 | 499 | 8.9 | 1.11 |
| Louisiana | 272 | 330 | 357 | 381 | 415 | 456 | 7.6 | 1.01 |
| Mississippi | 253 | 304 | 325 | 355 | 396 | 444 | 8.4 | 0.98 |
| North Carolina | 251 | 305 | 331 | 366 | 411 | 452 | 8.8 | 1.00 |
| South Carolina | 240 | 298 | 325 | 364 | 412 | 449 | 9.4 | 0.99 |
| Tennessee | 286 | 348 | 376 | 408 | 453 | 507 | 8.5 | 1.12 |
| Virginia | 254 | 307 | 333 | 360 | 393 | 434 | 7.9 | 0.96 |
| West Virginia | 287 | 357 | 392 | 422 | 477 | 524 | 9.0 | 1.16 |
| Southwest | 258 | 309 | 332 | 362 | 392 | 433 | 7.7 | 0.96 |
| Arizona | 254 | 313 | 342 | 371 | 400 | 443 | 8.3 | 0.98 |
| New Mexico | 228 | 268 | 284 | 312 | 332 | 363 | 6.9 | 0.80 |
| Oklahoma | 246 | 304 | 333 | 362 | 384 | 424 | 8.1 | 0.94 |
| Texas | 264 | 313 | 333 | 364 | 397 | 439 | 7.5 | 0.97 |
| Rocky Mountains | 231 | 280 | 301 | 328 | 353 | 390 | 7.7 | 0.86 |
| Colorado | 231 | 281 | 304 | 325 | 347 | 389 | 7.8 | 0.86 |
| Idaho | 226 | 275 | 297 | 325 | 352 | 386 | 7.9 | 0.86 |
| Montana | 236 | 289 | 311 | 338 | 358 | 397 | 7.7 | 0.88 |
| Utah | 236 | 282 | 302 | 336 | 369 | 394 | 7.6 | 0.87 |
| Wyoming | 222 | 259 | 275 | 304 | 332 | 370 | 7.5 | 0.82 |
| Far West | 243 | 274 | 288 | 308 | 339 | 374 | 6.4 | 0.83 |
| Alaska | 228 | 257 | 275 | 301 | 323 | 360 | 6.7 | 0.80 |
| California | 239 | 264 | 275 | 292 | 323 | 355 | 5.8 | 0.79 |
| Hawaii | 314 | 353 | 372 | 388 | 407 | 431 | 4.7 | 0.96 |
| Nevada | 256 | 329 | 362 | 391 | 429 | 472 | 9.1 | 1.05 |
| Oregon | 238 | 294 | 316 | 349 | 378 | 422 | 8.5 | 0.94 |
| Washington | 252 | 290 | 308 | 335 | 369 | 416 | 7.4 | 0.92 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]The Mideast region includes spending in the District of Columbia (DC), although it is not listed separately.

NOTE: Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.

## Table 150. Medicare expenditures as a percent of total personal health care expenditures by geographic region and State: United States, 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | | | | Percent | | | | |
| United States | 17.3 | 17.9 | 18.3 | 19.5 | 20.5 | 21.0 | 21.2 | 20.6 |
| New England | 16.5 | 17.4 | 18.1 | 19.1 | 20.3 | 21.2 | 21.0 | 20.2 |
| Connecticut | 15.5 | 16.5 | 17.4 | 18.5 | 19.7 | 20.6 | 20.5 | 20.5 |
| Maine | 16.4 | 16.6 | 16.8 | 18.2 | 19.1 | 19.5 | 19.6 | 19.0 |
| Massachusetts | 17.4 | 18.4 | 19.2 | 20.1 | 21.7 | 22.6 | 22.1 | 20.7 |
| New Hampshire | 13.9 | 14.5 | 14.5 | 15.8 | 16.4 | 16.9 | 16.7 | 16.6 |
| Rhode Island | 17.9 | 18.5 | 18.8 | 20.1 | 20.5 | 22.4 | 22.8 | 22.0 |
| Vermont | 15.0 | 15.4 | 15.6 | 16.5 | 17.2 | 17.6 | 17.3 | 16.6 |
| Mideast | 17.5 | 18.2 | 18.6 | 19.3 | 20.1 | 20.6 | 21.1 | 21.1 |
| Delaware | 15.1 | 15.9 | 16.0 | 16.3 | 16.5 | 17.4 | 16.9 | 17.4 |
| District of Columbia | 13.1 | 12.3 | 12.6 | 13.2 | 14.0 | 15.2 | 16.1 | 16.9 |
| Maryland | 16.3 | 17.2 | 17.4 | 17.9 | 18.1 | 18.3 | 18.8 | 19.2 |
| New Jersey | 16.8 | 18.5 | 18.8 | 19.1 | 19.7 | 19.8 | 21.1 | 21.4 |
| New York | 16.1 | 16.6 | 17.0 | 17.8 | 18.9 | 19.3 | 19.8 | 19.6 |
| Pennsylvania | 21.2 | 21.6 | 22.3 | 23.0 | 24.1 | 24.9 | 24.9 | 24.8 |
| Great Lakes | 17.0 | 17.6 | 17.7 | 18.8 | 19.8 | 20.0 | 20.1 | 20.0 |
| Illinois | 16.9 | 17.3 | 17.5 | 18.7 | 19.4 | 19.5 | 19.5 | 19.2 |
| Indiana | 16.8 | 17.5 | 17.6 | 18.6 | 19.9 | 20.5 | 20.4 | 19.8 |
| Michigan | 17.7 | 18.6 | 18.9 | 20.2 | 21.4 | 21.7 | 21.8 | 22.0 |
| Ohio | 17.5 | 18.1 | 18.1 | 19.1 | 20.2 | 20.3 | 20.9 | 21.1 |
| Wisconsin | 15.2 | 15.6 | 15.3 | 16.0 | 16.6 | 16.8 | 16.8 | 16.2 |
| Plains | 17.0 | 17.4 | 17.4 | 17.9 | 18.7 | 18.8 | 18.9 | 18.1 |
| Iowa | 17.5 | 18.0 | 17.7 | 18.1 | 18.7 | 18.6 | 18.8 | 17.8 |
| Kansas | 17.4 | 17.9 | 18.0 | 18.8 | 19.8 | 19.8 | 20.4 | 19.6 |
| Minnesota | 14.4 | 14.6 | 14.3 | 14.4 | 15.0 | 15.2 | 15.1 | 14.7 |
| Missouri | 19.1 | 20.0 | 20.3 | 21.2 | 22.4 | 22.4 | 22.4 | 21.1 |
| Nebraska | 15.9 | 15.7 | 15.7 | 16.4 | 17.2 | 17.4 | 18.0 | 17.2 |
| North Dakota | 16.4 | 16.4 | 16.7 | 17.1 | 17.3 | 17.0 | 17.2 | 16.7 |
| South Dakota | 16.5 | 17.0 | 16.7 | 17.2 | 17.8 | 17.8 | 17.7 | 17.3 |
| Southeast | 19.3 | 20.0 | 20.3 | 21.8 | 22.9 | 23.3 | 23.3 | 22.5 |
| Alabama | 19.6 | 20.8 | 21.3 | 22.6 | 23.6 | 23.7 | 23.4 | 22.6 |
| Arkansas | 21.8 | 21.7 | 21.3 | 22.7 | 23.7 | 23.9 | 23.8 | 23.1 |
| Florida | 23.3 | 24.2 | 25.1 | 27.2 | 28.6 | 28.8 | 29.0 | 28.1 |
| Georgia | 15.9 | 17.0 | 16.6 | 17.5 | 18.3 | 18.5 | 18.4 | 17.3 |
| Kentucky | 18.8 | 19.2 | 19.5 | 20.8 | 21.2 | 21.4 | 21.2 | 20.2 |
| Louisiana | 19.4 | 20.1 | 20.5 | 22.9 | 24.9 | 26.5 | 26.9 | 26.3 |
| Mississippi | 21.0 | 22.5 | 22.4 | 24.1 | 25.4 | 26.7 | 27.0 | 25.1 |
| North Carolina | 17.5 | 17.4 | 17.3 | 18.1 | 19.4 | 19.6 | 19.4 | 19.3 |
| South Carolina | 15.1 | 15.9 | 16.3 | 18.6 | 19.4 | 20.2 | 19.8 | 19.7 |
| Tennessee | 18.7 | 19.4 | 19.9 | 21.1 | 21.7 | 22.1 | 21.6 | 20.6 |
| Virginia | 14.9 | 15.8 | 15.9 | 17.1 | 17.9 | 18.3 | 18.5 | 18.0 |
| West Virginia | 20.5 | 21.3 | 20.5 | 21.7 | 22.5 | 23.7 | 23.9 | 23.1 |
| Southwest | 16.4 | 16.8 | 17.3 | 19.4 | 21.1 | 21.9 | 22.3 | 21.0 |
| Arizona | 19.7 | 19.6 | 19.3 | 20.4 | 21.7 | 22.2 | 22.6 | 21.1 |
| New Mexico | 14.7 | 14.6 | 14.6 | 16.1 | 17.2 | 17.4 | 17.5 | 16.9 |
| Oklahoma | 19.1 | 19.7 | 20.0 | 22.4 | 24.3 | 25.0 | 25.5 | 24.0 |
| Texas | 15.4 | 15.9 | 16.6 | 19.0 | 20.8 | 21.6 | 22.0 | 20.9 |
| Rocky Mountains | 13.9 | 14.6 | 15.1 | 16.2 | 17.2 | 17.4 | 17.2 | 16.4 |
| Colorado | 13.4 | 14.0 | 14.6 | 15.8 | 16.9 | 17.4 | 17.1 | 16.5 |
| Idaho | 15.1 | 15.9 | 15.9 | 17.3 | 18.3 | 18.3 | 18.6 | 17.7 |
| Montana | 17.1 | 17.9 | 18.4 | 19.1 | 18.9 | 19.1 | 19.1 | 18.4 |
| Utah | 12.4 | 13.2 | 13.8 | 14.7 | 16.1 | 16.1 | 15.8 | 14.7 |
| Wyoming | 14.3 | 15.2 | 16.2 | 17.2 | 18.1 | 17.3 | 17.1 | 16.1 |
| Far West | 16.1 | 16.2 | 17.0 | 18.2 | 19.2 | 19.7 | 20.1 | 19.3 |
| Alaska | 6.5 | 6.9 | 7.1 | 7.8 | 8.7 | 9.0 | 9.3 | 9.1 |
| California | 16.5 | 16.5 | 17.5 | 18.9 | 20.1 | 20.7 | 21.1 | 20.1 |
| Hawaii | 12.1 | 12.6 | 12.8 | 13.0 | 13.6 | 13.4 | 14.3 | 14.1 |
| Nevada | 16.3 | 16.7 | 18.1 | 19.1 | 20.2 | 20.9 | 21.7 | 20.7 |
| Oregon | 17.2 | 17.5 | 17.4 | 18.3 | 19.0 | 19.4 | 19.5 | 19.1 |
| Washington | 15.0 | 15.3 | 15.2 | 15.8 | 16.3 | 16.5 | 17.0 | 16.7 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 151. Medicaid expenditures as a percent of total personal health care expenditures by geographic region and State: United States, 1991–98

[Data are compiled from various sources by the Centers for Medicare & Medicaid Services]

Click here for spreadsheet version

| Geographic region and State[1] | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|
| | | | | Percent | | | | |
| United States | 13.2 | 13.7 | 14.7 | 15.2 | 15.6 | 15.9 | 15.7 | 15.7 |
| New England | 17.0 | 16.7 | 16.6 | 18.0 | 18.8 | 17.8 | 18.6 | 18.8 |
| Connecticut | 15.7 | 14.8 | 15.9 | 17.0 | 18.0 | 17.7 | 18.5 | 17.5 |
| Maine | 18.3 | 19.0 | 21.3 | 22.1 | 21.1 | 21.1 | 21.9 | 21.1 |
| Massachusetts | 18.1 | 17.3 | 16.2 | 18.0 | 19.2 | 17.3 | 18.3 | 19.3 |
| New Hampshire | 11.7 | 12.4 | 13.2 | 14.5 | 15.6 | 15.1 | 15.7 | 15.6 |
| Rhode Island | 18.6 | 21.5 | 20.9 | 21.2 | 20.7 | 20.6 | 21.4 | 21.6 |
| Vermont | 15.6 | 15.2 | 15.6 | 16.7 | 17.0 | 17.6 | 17.3 | 18.0 |
| Mideast | 18.1 | 18.5 | 19.3 | 20.1 | 21.0 | 21.7 | 21.5 | 22.2 |
| Delaware | 10.2 | 10.4 | 11.0 | 11.4 | 12.7 | 14.3 | 12.6 | 12.5 |
| District of Columbia | 19.2 | 18.5 | 20.5 | 21.7 | 20.9 | 20.9 | 22.5 | 20.5 |
| Maryland | 11.7 | 12.2 | 12.5 | 13.2 | 13.5 | 13.5 | 13.8 | 12.7 |
| New Jersey | 13.1 | 12.3 | 13.6 | 13.9 | 14.0 | 13.9 | 14.6 | 14.0 |
| New York | 26.4 | 26.5 | 27.5 | 28.4 | 29.8 | 30.7 | 29.7 | 31.5 |
| Pennsylvania | 10.4 | 12.3 | 12.0 | 13.3 | 14.0 | 15.4 | 16.1 | 16.3 |
| Great Lakes | 12.2 | 13.3 | 14.4 | 14.3 | 14.4 | 14.8 | 14.6 | 14.5 |
| Illinois | 9.1 | 11.8 | 13.2 | 13.5 | 14.2 | 15.1 | 15.1 | 14.8 |
| Indiana | 14.0 | 14.9 | 16.4 | 14.0 | 12.0 | 13.2 | 12.1 | 12.0 |
| Michigan | 12.2 | 12.6 | 14.2 | 14.6 | 15.0 | 15.1 | 15.3 | 14.9 |
| Ohio | 14.0 | 14.5 | 15.0 | 15.2 | 15.6 | 15.4 | 15.4 | 15.6 |
| Wisconsin | 14.1 | 14.0 | 14.0 | 14.0 | 13.7 | 13.6 | 13.5 | 13.4 |
| Plains | 12.1 | 13.0 | 13.4 | 13.8 | 13.9 | 13.9 | 13.8 | 14.3 |
| Iowa | 11.9 | 12.0 | 12.5 | 12.8 | 12.8 | 13.0 | 12.8 | 15.4 |
| Kansas | 9.7 | 10.3 | 11.3 | 11.4 | 10.7 | 10.7 | 10.8 | 10.8 |
| Minnesota | 15.5 | 15.2 | 16.0 | 16.7 | 16.9 | 16.5 | 15.4 | 15.4 |
| Missouri | 10.3 | 13.0 | 12.7 | 13.2 | 13.6 | 13.5 | 14.3 | 14.4 |
| Nebraska | 11.4 | 11.8 | 12.9 | 12.8 | 12.6 | 13.2 | 13.4 | 14.4 |
| North Dakota | 14.9 | 14.1 | 14.5 | 14.0 | 13.6 | 14.3 | 14.2 | 13.8 |
| South Dakota | 12.7 | 13.0 | 13.7 | 13.8 | 13.7 | 13.8 | 13.1 | 13.4 |
| Southeast | 11.7 | 12.2 | 13.4 | 14.0 | 14.4 | 14.2 | 14.1 | 14.0 |
| Alabama | 8.8 | 10.1 | 10.8 | 11.5 | 12.2 | 12.7 | 13.1 | 13.0 |
| Arkansas | 13.6 | 14.9 | 15.4 | 15.3 | 15.5 | 15.6 | 15.3 | 15.5 |
| Florida | 8.5 | 9.1 | 9.9 | 10.2 | 10.6 | 10.4 | 10.7 | 10.4 |
| Georgia | 12.1 | 11.8 | 12.8 | 14.0 | 13.8 | 13.5 | 12.8 | 12.2 |
| Kentucky | 13.8 | 15.4 | 16.2 | 16.6 | 16.1 | 16.6 | 17.7 | 16.9 |
| Louisiana | 17.8 | 17.7 | 22.1 | 24.3 | 23.1 | 20.0 | 18.9 | 19.1 |
| Mississippi | 14.8 | 14.7 | 15.4 | 16.4 | 16.8 | 16.8 | 16.8 | 15.8 |
| North Carolina | 12.9 | 13.3 | 14.3 | 14.8 | 16.7 | 17.3 | 17.2 | 16.9 |
| South Carolina | 14.8 | 15.3 | 15.9 | 16.5 | 16.7 | 16.6 | 16.0 | 16.6 |
| Tennessee | 12.6 | 13.9 | 14.1 | 15.6 | 17.1 | 16.3 | 16.4 | 17.4 |
| Virginia | 8.9 | 9.0 | 9.8 | 9.8 | 10.1 | 10.1 | 10.2 | 9.9 |
| West Virginia | 15.3 | 17.5 | 19.7 | 19.5 | 18.6 | 17.7 | 17.0 | 17.3 |
| Southwest | 11.1 | 12.1 | 13.0 | 13.7 | 13.5 | 13.6 | 13.2 | 12.6 |
| Arizona | 8.6 | 11.0 | 11.3 | 12.0 | 11.8 | 12.2 | 12.2 | 12.0 |
| New Mexico | 12.1 | 13.1 | 14.3 | 15.5 | 16.5 | 18.3 | 17.9 | 17.7 |
| Oklahoma | 12.3 | 12.5 | 12.2 | 11.2 | 11.0 | 10.9 | 10.9 | 11.8 |
| Texas | 11.4 | 12.2 | 13.4 | 14.3 | 14.1 | 14.0 | 13.5 | 12.5 |
| Rocky Mountains | 10.2 | 10.9 | 11.4 | 11.8 | 11.8 | 12.2 | 11.9 | 11.9 |
| Colorado | 9.1 | 10.1 | 10.5 | 11.1 | 11.3 | 11.6 | 11.5 | 11.4 |
| Idaho | 10.7 | 11.1 | 11.3 | 11.3 | 11.3 | 12.1 | 12.2 | 12.1 |
| Montana | 13.5 | 13.7 | 15.2 | 15.2 | 14.4 | 15.4 | 14.3 | 13.8 |
| Utah | 10.8 | 11.3 | 11.7 | 11.8 | 11.8 | 12.0 | 11.4 | 11.8 |
| Wyoming | 10.1 | 11.3 | 11.8 | 12.7 | 12.6 | 12.9 | 12.7 | 12.3 |
| Far West | 10.9 | 10.9 | 12.4 | 12.8 | 13.3 | 14.3 | 14.0 | 13.3 |
| Alaska | 13.8 | 14.7 | 17.3 | 16.3 | 15.9 | 17.1 | 17.5 | 16.9 |
| California | 10.8 | 10.7 | 12.3 | 12.6 | 12.9 | 14.1 | 13.7 | 12.7 |
| Hawaii | 9.1 | 8.7 | 10.0 | 12.5 | 16.0 | 13.9 | 13.4 | 14.2 |
| Nevada | 7.7 | 8.7 | 9.2 | 8.7 | 9.2 | 9.0 | 9.0 | 9.1 |
| Oregon | 10.4 | 10.8 | 11.8 | 13.2 | 14.8 | 15.2 | 14.5 | 15.3 |
| Washington | 12.9 | 13.1 | 14.3 | 14.8 | 15.3 | 16.3 | 16.3 | 16.2 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Accounts, State Health Expenditures. www.cms.hhs.gov/statistics/nhe/state-estimates-residence/.



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## Table 152 (page 1 of 2). State mental health agency per capita expenditures for mental health services and average annual percent change by geographic region and State: United States, selected fiscal years 1981–2002

[Data are based on reporting by State mental health agencies]

Click here for spreadsheet version

| Geographic region and State[1] | 1981 | 1983 | 1985 | 1987 | 1990 | 1993 | 1997 | 2001 | 2002 | 1981–90 | 1990–2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount per capita | | | | | | | | | Average annual percent change | |
| United States | $ 27 | $31 | $35 | $ 38 | $ 48 | $ 54 | $ 64 | $ 81 | $ 88 | 6.6 | 5.2 |
| New England: | | | | | | | | | | | |
| Connecticut | 32 | 39 | 44 | 56 | 73 | 82 | 99 | 129 | 138 | 9.6 | 5.4 |
| Maine | 25 | 32 | 36 | 42 | 67 | 70 | 88 | 107 | 118 | 11.6 | 4.8 |
| Massachusetts | 32 | 36 | 46 | 62 | 84 | 83 | 90 | 107 | 107 | 11.3 | 2.0 |
| New Hampshire | 35 | 39 | 42 | 36 | 63 | 78 | 99 | 112 | 116 | 6.7 | 5.2 |
| Rhode Island | 36 | 32 | 35 | 41 | 50 | 61 | 63 | 88 | 88 | 3.7 | 4.8 |
| Vermont | 32 | 40 | 44 | 44 | 54 | 74 | 92 | 130 | 145 | 6.0 | 8.6 |
| Mideast: | | | | | | | | | | | |
| Delaware | 44 | 51 | 46 | 41 | 55 | 56 | 73 | 93 | 86 | 2.5 | 3.8 |
| District of Columbia[2] | --- | 23 | 28 | 130 | 268 | 315 | 337 | 398 | 409 | --- | 3.6 |
| Maryland | 33 | 37 | 40 | 49 | 61 | 64 | 76 | 127 | 136 | 7.1 | 6.9 |
| New Jersey | 26 | 31 | 36 | 43 | 57 | 68 | 69 | 90 | 120 | 9.1 | 6.4 |
| New York | 67 | 74 | 90 | 99 | 118 | 131 | 113 | 176 | 184 | 6.5 | 3.8 |
| Pennsylvania | 41 | 47 | 52 | 50 | 57 | 68 | 68 | 152 | 166 | 3.7 | 9.3 |
| Great Lakes: | | | | | | | | | | | |
| Illinois | 18 | 21 | 24 | 25 | 34 | 36 | 51 | 64 | 69 | 7.3 | 6.1 |
| Indiana | 19 | 23 | 27 | 31 | 47 | 39 | 40 | 65 | 69 | 10.6 | 3.3 |
| Michigan | 33 | 39 | 49 | 61 | 74 | 75 | 87 | 90 | 91 | 9.4 | 1.7 |
| Ohio | 25 | 29 | 30 | 34 | 41 | 47 | 52 | 61 | 61 | 5.7 | 3.4 |
| Wisconsin | 22 | 27 | 28 | 31 | 37 | 35 | 44 | 72 | 91 | 5.9 | 7.8 |
| Plains: | | | | | | | | | | | |
| Iowa | 8 | 10 | 11 | 12 | 17 | 13 | 29 | 73 | 53 | 8.7 | 9.9 |
| Kansas | 18 | 22 | 27 | 28 | 35 | 48 | 59 | 60 | 70 | 7.7 | 5.9 |
| Minnesota[3] | 17 | 30 | 32 | 42 | 54 | 69 | 87 | 105 | 115 | 8.8 | 6.5 |
| Missouri | 24 | 25 | 28 | 32 | 35 | 41 | 56 | 60 | 69 | 4.3 | 5.8 |
| Nebraska | 17 | 19 | 21 | 21 | 29 | 34 | 39 | 51 | 56 | 6.1 | 5.6 |
| North Dakota | 39 | 42 | 36 | 42 | 40 | 43 | 48 | 79 | 82 | 0.3 | 6.2 |
| South Dakota | 17 | 21 | 22 | 27 | 25 | 47 | 54 | 61 | 65 | 4.4 | 8.3 |
| Southeast: | | | | | | | | | | | |
| Alabama | 20 | 24 | 28 | 29 | 38 | 43 | 47 | 57 | 60 | 7.4 | 3.9 |
| Arkansas | 17 | 20 | 24 | 24 | 26 | 30 | 30 | 28 | 28 | 4.8 | 0.6 |
| Florida | 20 | 23 | 26 | 25 | 37 | 31 | 44 | 35 | 44 | 7.1 | 1.5 |
| Georgia | 25 | 26 | 23 | 32 | 51 | 49 | 47 | 46 | 47 | 8.2 | –0.7 |
| Kentucky | 15 | 17 | 19 | 23 | 23 | 25 | 35 | 49 | 51 | 4.9 | 6.9 |
| Louisiana | 19 | 23 | 26 | 25 | 28 | 39 | 43 | 45 | 48 | 4.4 | 4.6 |
| Mississippi | 14 | 16 | 24 | 22 | 34 | 41 | 56 | 87 | 89 | 10.4 | 8.3 |
| North Carolina | 24 | 29 | 38 | 41 | 46 | 50 | 62 | 76 | 50 | 7.5 | 0.7 |
| South Carolina | 31 | 33 | 33 | 45 | 51 | 56 | 64 | 74 | 70 | 5.7 | 2.7 |
| Tennessee | 18 | 20 | 23 | 24 | 29 | 37 | 23 | 69 | 84 | 5.4 | 9.3 |
| Virginia | 23 | 29 | 32 | 35 | 45 | 40 | 49 | 65 | 67 | 7.7 | 3.4 |
| West Virginia | 20 | 20 | 22 | 23 | 24 | 22 | 23 | 26 | 47 | 2.0 | 5.8 |
| Southwest: | | | | | | | | | | | |
| Arizona | 10 | 10 | 12 | 16 | 27 | 60 | 68 | 89 | 102 | 11.7 | 11.7 |
| New Mexico | 24 | 25 | 25 | 24 | 23 | 24 | 31 | 33 | 29 | –0.5 | 2.0 |
| Oklahoma | 22 | 33 | 31 | 30 | 36 | 38 | 41 | 39 | 41 | 5.6 | 1.1 |
| Texas | 13 | 16 | 17 | 19 | 23 | 31 | 39 | 38 | 38 | 6.5 | 4.3 |
| Rocky Mountains: | | | | | | | | | | | |
| Colorado | 24 | 25 | 28 | 30 | 34 | 41 | 57 | 64 | 67 | 3.9 | 5.8 |
| Idaho | 13 | 15 | 15 | 17 | 20 | 26 | 29 | 46 | 40 | 4.9 | 5.9 |
| Montana | 25 | 28 | 29 | 28 | 28 | 34 | 93 | 124 | 132 | 1.3 | 13.8 |
| Utah | 13 | 16 | 17 | 19 | 21 | 25 | 28 | 33 | 69 | 5.5 | 10.4 |
| Wyoming | 23 | 28 | 31 | 30 | 35 | 42 | 43 | 61 | 78 | 4.8 | 6.9 |

See footnotes at end of table.



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## Table 152 (page 2 of 2). State mental health agency per capita expenditures for mental health services and average annual percent change by geographic region and State: United States, selected fiscal years 1981–2002

[Data are based on reporting by State mental health agencies]

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| *Geographic region and State*[1] | *1981* | *1983* | *1985* | *1987* | *1990* | *1993* | *1997* | *2001* | *2002* | *1981–90* | *1990–2002* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount per capita | | | | | | | | | Average annual percent change | |
| Far West: | | | | | | | | | | | |
| Alaska | $38 | $41 | $45 | $50 | $72 | $86 | $79 | $ 81 | $ 88 | 7.4 | 1.7 |
| California | 28 | 29 | 34 | 30 | 42 | 50 | 58 | 92 | 105 | 4.6 | 7.9 |
| Hawaii | 19 | 22 | 23 | 26 | 38 | 71 | 85 | 175 | 162 | 8.0 | 12.8 |
| Nevada | 22 | 25 | 26 | 28 | 33 | 32 | 45 | 57 | 59 | 4.6 | 5.0 |
| Oregon | 21 | 21 | 25 | 28 | 41 | 60 | 68 | 97 | 60 | 7.7 | 3.2 |
| Washington | 18 | 24 | 30 | 37 | 43 | 66 | 79 | 88 | 92 | 10.2 | 6.5 |

- - - Data not available.

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic divisions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

[2]Transfer of St. Elizabeths Hospital from the National Institute of Mental Health to the District of Columbia Office of Mental Health took place over the years 1985–93.

[3]Data for 1981 not comparable with later years' data for Minnesota. Average annual percent change is for 1983–90.

NOTES: Expenditures are for mental illness, excluding mental retardation and substance abuse. Starting in 1990 data for Puerto Rico, and starting in 1993 data for Guam are included in the U.S. total. States may vary in type of funds included in mental health expenditures. Medicaid revenues for community programs and children's mental health expenditures are not included by some states. Funds for mental health services in jails or prisons are included by some states. State data omissions and inclusions are likely to be consistent across years.

SOURCES: National Association of State Mental Health Program Directors and the National Association of State Mental Health Program Directors Research Institute, Inc. Lutterman T, Hollen V, Shaw R. Funding sources and expenditures of state mental health agencies: fiscal year 2002. Final report. Oct. 2004; Website: www.nri-inc.org.



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## Table 153 (page 1 of 2). Medicare enrollees, enrollees in managed care, payments per enrollee, and short-stay hospital utilization by geographic region and State: United States, 1994 and 2002

[Data are compiled by the Centers for Medicare & Medicaid Services]

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| Geographic division and State[1] | Enrollment in thousands[2] | Percent of enrollees in managed care[3] | | Payment per fee-for-service enrollee | | Short-stay hospital utilization: Discharges per 1,000 enrollees[4] | | Short-stay hospital utilization: Average length of stay in days[4] | |
|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 1994 | 2002 | 1994 | 2002 | 1994 | 2002 | 1994 | 2002 |
| United States[5] | 39,597 | 7.9 | 13.9 | $4,375 | $6,271 | 345 | 370 | 7.5 | 5.9 |
| New England: | | | | | | | | | |
| Connecticut | 520 | 2.6 | 6.2 | 4,426 | 6,772 | 287 | 317 | 8.1 | 6.1 |
| Maine | 223 | 0.1 | 0.1 | 3,464 | 5,037 | 322 | 308 | 7.6 | 5.6 |
| Massachusetts | 958 | 6.1 | 21.8 | 5,147 | 7,065 | 350 | 363 | 7.6 | 5.7 |
| New Hampshire | 175 | 0.2 | 1.1 | 3,414 | 5,030 | 281 | 268 | 7.6 | 5.6 |
| Rhode Island | 170 | 7.0 | 33.1 | 4,148 | 5,907 | 312 | 346 | 8.1 | 6.2 |
| Vermont | 92 | 0.1 | 0.0 | 3,182 | 5,070 | 283 | 265 | 7.6 | 5.8 |
| Mideast: | | | | | | | | | |
| Delaware | 120 | 0.2 | 1.1 | 4,712 | 6,356 | 326 | 332 | 8.1 | 6.4 |
| District of Columbia | 75 | 3.9 | 6.6 | 5,655 | 7,731 | 376 | 389 | 10.1 | 7.5 |
| Maryland | 665 | 1.4 | 3.1 | 4,997 | 7,284 | 362 | 393 | 7.5 | 5.4 |
| New Jersey | 1,219 | 2.6 | 8.9 | 4,531 | 7,834 | 354 | 378 | 10.2 | 7.2 |
| New York | 2,722 | 6.2 | 17.1 | 4,855 | 7,180 | 334 | 369 | 11.2 | 7.7 |
| Pennsylvania | 2,098 | 3.3 | 24.0 | 5,212 | 6,781 | 379 | 406 | 8.0 | 6.0 |
| Great Lakes: | | | | | | | | | |
| Illinois | 1,641 | 5.5 | 6.2 | 4,324 | 6,193 | 374 | 420 | 7.3 | 5.7 |
| Indiana | 858 | 2.6 | 2.7 | 3,945 | 5,534 | 345 | 354 | 6.9 | 5.6 |
| Michigan | 1,420 | 0.7 | 2.4 | 4,307 | 6,582 | 328 | 376 | 7.6 | 5.9 |
| Ohio | 1,719 | 2.4 | 14.3 | 3,982 | 6,037 | 350 | 390 | 7.1 | 5.5 |
| Wisconsin | 788 | 2.0 | 3.2 | 3,246 | 5,114 | 310 | 326 | 6.8 | 5.3 |
| Plains: | | | | | | | | | |
| Iowa | 477 | 3.1 | 3.6 | 3,080 | 4,931 | 322 | 350 | 6.6 | 5.3 |
| Kansas | 387 | 3.3 | 6.1 | 3,847 | 5,500 | 348 | 372 | 6.5 | 5.4 |
| Minnesota | 667 | 19.6 | 12.8 | 3,394 | 5,213 | 334 | 354 | 5.7 | 4.9 |
| Missouri | 875 | 3.4 | 14.2 | 4,191 | 5,826 | 349 | 406 | 7.3 | 5.6 |
| Nebraska | 258 | 2.2 | 3.8 | 2,926 | 5,189 | 281 | 287 | 6.3 | 5.3 |
| North Dakota | 103 | 0.6 | 0.6 | 3,218 | 4,703 | 327 | 295 | 6.3 | 5.3 |
| South Dakota | 119 | 0.1 | 1.3 | 2,952 | 4,498 | 356 | 324 | 6.1 | 5.0 |
| Southeast: | | | | | | | | | |
| Alabama | 709 | 0.8 | 6.8 | 4,454 | 5,973 | 413 | 456 | 7.0 | 5.5 |
| Arkansas | 438 | 0.2 | 0.5 | 3,719 | 5,466 | 366 | 404 | 7.0 | 5.8 |
| Florida | 2,900 | 13.8 | 19.9 | 5,027 | 7,055 | 326 | 376 | 7.1 | 5.8 |
| Georgia | 963 | 0.4 | 4.2 | 4,402 | 5,839 | 378 | 369 | 6.9 | 5.8 |
| Kentucky | 637 | 2.3 | 3.2 | 3,862 | 5,783 | 396 | 421 | 7.2 | 5.6 |
| Louisiana | 612 | 0.4 | 12.2 | 5,468 | 7,417 | 399 | 466 | 7.2 | 6.1 |
| Mississippi | 428 | 0.1 | 0.7 | 4,189 | 6,265 | 423 | 450 | 7.4 | 6.4 |
| North Carolina | 1,180 | 0.5 | 4.4 | 3,465 | 5,557 | 314 | 370 | 8.0 | 5.8 |
| South Carolina | 592 | 0.1 | 0.3 | 3,777 | 5,900 | 319 | 382 | 8.3 | 6.2 |
| Tennessee | 861 | 0.3 | 6.0 | 4,441 | 6,152 | 375 | 398 | 7.1 | 5.9 |
| Virginia | 929 | 1.5 | 2.0 | 3,748 | 5,296 | 348 | 349 | 7.3 | 5.8 |
| West Virginia | 342 | 8.3 | 7.1 | 3,798 | 5,585 | 420 | 432 | 7.1 | 5.7 |
| Southwest: | | | | | | | | | |
| Arizona | 707 | 24.8 | 29.9 | 4,442 | 5,499 | 292 | 313 | 5.9 | 5.1 |
| New Mexico | 243 | 13.6 | 15.2 | 3,110 | 4,735 | 301 | 279 | 6.0 | 5.4 |
| Oklahoma | 517 | 2.5 | 8.3 | 4,098 | 6,112 | 355 | 416 | 7.0 | 5.7 |
| Texas | 2,342 | 4.1 | 8.1 | 4,703 | 6,736 | 333 | 387 | 7.2 | 5.9 |
| Rocky Mountains: | | | | | | | | | |
| Colorado | 487 | 17.2 | 28.5 | 3,935 | 5,448 | 302 | 306 | 6.0 | 4.9 |
| Idaho | 174 | 2.5 | 9.3 | 3,045 | 4,867 | 274 | 290 | 5.2 | 4.7 |
| Montana | 140 | 0.4 | 0.5 | 3,114 | 4,653 | 306 | 299 | 5.9 | 4.9 |
| Utah | 216 | 9.4 | 3.2 | 3,443 | 4,752 | 238 | 257 | 5.4 | 4.7 |
| Wyoming | 68 | 3.3 | 1.7 | 3,537 | 4,896 | 315 | 318 | 5.6 | 4.9 |

See footnotes at end of table.

## Table 153 (page 2 of 2). Medicare enrollees, enrollees in managed care, payments per enrollee, and short-stay hospital utilization by geographic region and State: United States, 1994 and 2002

[Data are compiled by the Centers for Medicare & Medicaid Services]

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| Geographic division and State[1] | Enrollment in thousands[2] | Percent of enrollees in managed care[3] | | Payment per fee-for-service enrollee | | Short-stay hospital utilization: Discharges per 1,000 enrollees[4] | | Short-stay hospital utilization: Average length of stay in days[4] | |
|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 1994 | 2002 | 1994 | 2002 | 1994 | 2002 | 1994 | 2002 |
| Far West: | | | | | | | | | |
| Alaska | 45 | 0.6 | 0.6 | 3,687 | 5,642 | 269 | 294 | 6.3 | 5.9 |
| California | 4,004 | 30.0 | 35.1 | 5,219 | 6,942 | 366 | 328 | 6.1 | 6.1 |
| Hawaii | 174 | 29.8 | 33.9 | 3,069 | 4,454 | 301 | 225 | 9.1 | 7.5 |
| Nevada | 269 | 19.0 | 30.9 | 4,306 | 6,070 | 291 | 302 | 7.0 | 6.2 |
| Oregon | 512 | 27.7 | 34.3 | 3,285 | 4,933 | 305 | 315 | 5.2 | 4.6 |
| Washington | 762 | 12.5 | 17.8 | 3,401 | 5,280 | 269 | 271 | 5.3 | 4.9 |

0.0 less than 0.05.

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent States. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

[2]Total persons enrolled in hospital insurance, supplementary medical insurance, or both, as of July 1. Includes fee-for-service and managed care enrollees.

[3]Includes enrollees in Medicare-approved managed care organizations.

[4]Data are for fee-for-service enrollees only.

[5]Includes residents of any of the 50 States and the District of Columbia. Excludes Puerto Rico, Guam, Virgin Islands, residence unknown, foreign countries, and other outlying areas not shown separately.

NOTES: Enrollment and percent of enrollees in managed care are based on a 5-percent annual Denominator File using the Centers for Medicare & Medicaid Services' (CMS) Enrollment Database and Group Health Plan data. Payments per fee-for-service enrollee are based on fee-for-service billing reimbursement for a 5-percent sample of Medicare beneficiaries as recorded in CMS' National Claims History. Short-stay hospital utilization is based on the Medicare Provider Analysis and Review (MEDPAR) stay records for a 20-percent sample of Medicare beneficiaries.
Figures may not sum to totals due to rounding. Data for additional years are available. See Appendix III.

SOURCE: Centers for Medicare & Medicaid Services, Office of Research, Development, and Information. Health Care Financing Review: Medicare and Medicaid Statistical Supplements for the years 1996 to 2004. Website: www.cms.hhs.gov/review/supp/.



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## Table 154 (page 1 of 2). Medicaid recipients, recipients in managed care, payments per recipient, and recipients per 100 persons below the poverty level by geographic region and State: United States, selected fiscal years 1989–2001

[Data are compiled from Medicaid administrative records by the Centers for Medicare & Medicaid Services]

Click here for spreadsheet version

| Geographic region and State[1] | Recipients in thousands | | Percent of recipients in managed care | | Payments per recipient | | | Recipients per 100 persons below the poverty level | |
|---|---|---|---|---|---|---|---|---|---|
| | 1996[2] | 2001 | 1996[2] | 2001 | 1990 | 1996[2] | 2001 | 1989–90 | 2000–2001 |
| United States | 36,118 | 45,972 | 40 | 57 | $2,568 | $3,369 | $4,053 | 75 | 139 |
| New England: | | | | | | | | | |
| Connecticut | 329 | 685 | 61 | 72 | 4,829 | 6,179 | 4,324 | 167 | 236 |
| Maine | 167 | 252 | 1 | 43 | 3,248 | 4,321 | 5,808 | 88 | 187 |
| Massachusetts | 715 | 1,055 | 70 | 65 | 4,622 | 5,285 | 5,486 | 103 | 177 |
| New Hampshire | 100 | 97 | 16 | 8 | 5,423 | 5,496 | 7,121 | 53 | 134 |
| Rhode Island | 130 | 188 | 63 | 68 | 3,778 | 5,280 | 5,823 | 163 | 198 |
| Vermont | 102 | 150 | – | 61 | 2,530 | 2,954 | 3,616 | 108 | 222 |
| Mideast: | | | | | | | | | |
| Delaware | 82 | 123 | 78 | 82 | 3,004 | 3,773 | 4,891 | 68 | 190 |
| District of Columbia | 143 | 141 | 55 | 64 | 2,629 | 4,955 | 5,900 | 86 | 159 |
| Maryland | 399 | 656 | 64 | 68 | 3,300 | 5,138 | 5,041 | 74 | 171 |
| New Jersey | 714 | 881 | 43 | 60 | 4,054 | 5,217 | 5,693 | 83 | 126 |
| New York | 3,281 | 3,591 | 23 | 26 | 5,099 | 6,811 | 7,725 | 95 | 137 |
| Pennsylvania | 1,168 | 1,558 | 53 | 76 | 2,449 | 3,993 | 4,901 | 88 | 137 |
| Great Lakes: | | | | | | | | | |
| Illinois | 1,454 | 1,658 | 13 | 9 | 2,271 | 3,689 | 4,916 | 69 | 120 |
| Indiana | 594 | 777 | 31 | 70 | 3,859 | 4,130 | 4,319 | 45 | 146 |
| Michigan | 1,172 | 1,353 | 73 | 90 | 2,094 | 2,867 | 3,930 | 85 | 141 |
| Ohio | 1,478 | 1,498 | 32 | 21 | 2,566 | 3,729 | 5,365 | 98 | 120 |
| Wisconsin | 434 | 637 | 32 | 52 | 3,179 | 4,384 | 5,027 | 95 | 129 |
| Plains: | | | | | | | | | |
| Iowa | 308 | 320 | 41 | 89 | 2,589 | 3,534 | 5,197 | 80 | 152 |
| Kansas | 251 | 273 | 32 | 58 | 2,524 | 3,425 | 5,026 | 71 | 103 |
| Minnesota | 455 | 601 | 33 | 64 | 3,709 | 5,342 | 6,271 | 70 | 180 |
| Missouri | 636 | 979 | 35 | 45 | 2,002 | 3,171 | 3,709 | 63 | 191 |
| Nebraska | 191 | 243 | 27 | 75 | 2,595 | 3,548 | 4,487 | 61 | 154 |
| North Dakota | 61 | 64 | 55 | 58 | 3,955 | 4,889 | 5,933 | 58 | 85 |
| South Dakota | 77 | 110 | 65 | 97 | 3,368 | 4,114 | 3,896 | 51 | 164 |
| Southeast: | | | | | | | | | |
| Alabama | 546 | 882 | 11 | 54 | 1,731 | 2,675 | 3,338 | 43 | 112 |
| Arkansas | 363 | 532 | 39 | 58 | 2,267 | 3,375 | 3,250 | 55 | 109 |
| Florida | 1,638 | 2,472 | 64 | 62 | 2,273 | 2,851 | 3,474 | 55 | 131 |
| Georgia | 1,185 | 1,514 | 32 | 84 | 3,190 | 2,604 | 2,677 | 64 | 145 |
| Kentucky | 641 | 807 | 53 | 81 | 2,089 | 3,014 | 4,031 | 81 | 162 |
| Louisiana | 778 | 805 | 6 | 7 | 2,247 | 3,154 | 3,582 | 58 | 109 |
| Mississippi | 510 | 708 | 7 | 51 | 1,354 | 2,633 | 3,081 | 67 | 146 |
| North Carolina | 1,130 | 1,310 | 37 | 70 | 2,531 | 3,255 | 4,201 | 66 | 131 |
| South Carolina | 503 | 761 | 1 | 6 | 2,343 | 3,026 | 4,071 | 52 | 144 |
| Tennessee | 1,409 | 1,602 | 100 | 100 | 1,896 | 2,049 | 2,534 | 67 | 195 |
| Virginia | 623 | 620 | 68 | 61 | 2,596 | 2,849 | 4,383 | 53 | 114 |
| West Virginia | 395 | 349 | 30 | 46 | 1,443 | 2,855 | 4,487 | 80 | 127 |
| Southwest: | | | | | | | | | |
| Arizona | 528 | 763 | 86 | 96 | --- | --- | 3,214 | --- | 106 |
| New Mexico | 318 | 385 | 45 | 64 | 2,120 | 2,757 | 3,851 | 39 | 122 |
| Oklahoma | 358 | 589 | 19 | 68 | 2,516 | 2,852 | 3,422 | 56 | 108 |
| Texas | 2,572 | 2,660 | 4 | 41 | 1,928 | 2,672 | 3,626 | 47 | 86 |
| Rocky Mountains: | | | | | | | | | |
| Colorado | 271 | 393 | 80 | 92 | 2,705 | 3,815 | 4,969 | 45 | 107 |
| Idaho | 119 | 157 | 37 | 28 | 2,973 | 3,402 | 4,541 | 36 | 92 |
| Montana | 101 | 108 | 59 | 64 | 2,793 | 3,478 | 4,390 | 47 | 83 |
| Utah | 152 | 233 | 82 | 93 | 2,279 | 2,775 | 4,571 | 72 | 102 |
| Wyoming | 51 | 51 | 1 | – | 2,036 | 3,571 | 4,755 | 59 | 101 |

See footnotes at end of table.



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## Table 154 (page 2 of 2). Medicaid recipients, recipients in managed care, payments per recipient, and recipients per 100 persons below the poverty level by geographic region and State: United States, selected fiscal years 1989–2001

[Data are compiled from Medicaid administrative records by the Centers for Medicare & Medicaid Services]

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| Geographic region and State[1] | Recipients in thousands | | Percent of recipients in managed care | | Payments per recipient | | | Recipients per 100 persons below the poverty level | |
|---|---|---|---|---|---|---|---|---|---|
| | 1996[2] | 2001 | 1996[2] | 2001 | 1990 | 1996[2] | 2001 | 1989–90 | 2000–2001 |
| Far West: | | | | | | | | | |
| Alaska | 69 | 105 | – | – | 3,562 | 4,027 | 5,314 | 70 | 188 |
| California | 5,107 | 8,583 | 23 | 52 | 1,795 | 2,178 | 2,315 | 88 | 188 |
| Hawaii | 41 | - - - | 80 | 78 | 2,252 | 6,574 | - - - | 73 | - - - |
| Nevada | 109 | 154 | 41 | 38 | 3,161 | 3,361 | 3,886 | 37 | 91 |
| Oregon | 450 | 582 | 91 | 87 | 2,283 | 2,915 | 3,245 | 74 | 142 |
| Washington | 621 | 958 | 100 | 100 | 2,128 | 2,242 | 2,833 | 98 | 151 |

– Quantity zero.
- - - Data not available.
[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent States. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.
[2]Prior to 1999 recipient counts exclude those individuals who only received coverage under prepaid health care and for whom no direct vendor payments were made during the year; and vendor payments exclude payments to health maintenance organizations and other prepaid health plans ($15 billion in 1996). The total number of persons who were Medicaid eligible and enrolled was 41.2 million in 1996 (CMS Medicaid Statistics, Program and Financial Statistics FY1996, unpublished).

NOTES: Payments exclude disproportionate share hospital payments ($15.5 billion in FY2001). Data for additional years are available. See Appendix III.

SOURCES: Centers for Medicare & Medicaid Services, Office of Information Services, Enterprise Databases Group, Division of Information Distribution, Medicaid Data System; Department of Commerce, Bureau of the Census, Housing and Household Economic Statistics Division.



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## Table 155. Persons enrolled in health maintenance organizations (HMOs) by geographic region and State: United States, selected years 1980–2004

[Data are based on a census of health maintenance organizations]

Click here for spreadsheet version

| Geographic region and State[1] | 2004 | 1980 | 1985 | 1990 | 1995 | 1998 | 2000 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | Percent of population | | | | | | | |
| United States[2] | 68,808 | 4.0 | 7.9 | 13.4 | 19.4 | 28.6 | 30.0 | 24.6 | 23.4 |
| New England: | | | | | | | | | |
| Connecticut | 1,362 | 2.4 | 7.1 | 19.9 | 21.2 | 42.9 | 44.6 | 37.8 | 39.1 |
| Maine | 259 | 0.4 | 0.3 | 2.6 | 7.0 | 19.1 | 22.3 | 21.1 | 19.8 |
| Massachusetts | 2,405 | 2.9 | 13.7 | 26.5 | 39.0 | 54.2 | 53.0 | 38.7 | 37.4 |
| New Hampshire | 284 | 1.2 | 5.6 | 9.6 | 18.5 | 33.8 | 33.7 | 25.9 | 22.1 |
| Rhode Island | 340 | 3.7 | 9.1 | 20.6 | 19.6 | 29.8 | 38.1 | 31.7 | 31.6 |
| Vermont | 59 | – | – | 6.4 | 12.5 | – | 4.6 | 9.9 | 9.6 |
| Mideast: | | | | | | | | | |
| Delaware | 120 | – | 3.9 | 17.5 | 18.4 | 48.1 | 22.0 | 15.3 | 14.7 |
| District of Columbia[3] | 162 | --- | --- | --- | --- | 33.0 | 35.2 | 27.8 | 28.8 |
| Maryland[4] | 1,698 | 2.0 | 4.8 | 14.2 | 29.5 | 43.6 | 43.9 | 30.6 | 30.8 |
| New Jersey | 2,136 | 2.0 | 5.6 | 12.3 | 14.7 | 31.3 | 30.9 | 27.0 | 24.7 |
| New York | 5,743 | 5.5 | 8.0 | 15.1 | 26.6 | 37.8 | 35.8 | 32.4 | 29.9 |
| Pennsylvania | 3,856 | 1.2 | 5.0 | 12.5 | 21.5 | 37.1 | 33.9 | 31.7 | 31.2 |
| Great Lakes: | | | | | | | | | |
| Illinois | 1,625 | 1.9 | 7.1 | 12.6 | 17.2 | 20.8 | 21.0 | 14.7 | 12.8 |
| Indiana | 702 | 0.5 | 3.6 | 6.1 | 8.3 | 14.0 | 12.4 | 11.9 | 11.3 |
| Michigan | 2,744 | 2.4 | 9.9 | 15.2 | 20.5 | 25.3 | 27.1 | 26.0 | 27.2 |
| Ohio | 2,059 | 2.2 | 6.7 | 13.3 | 16.3 | 23.4 | 25.1 | 18.6 | 18.0 |
| Wisconsin | 1,556 | 8.5 | 17.8 | 21.7 | 24.0 | 30.8 | 30.2 | 29.1 | 28.4 |
| Plains: | | | | | | | | | |
| Iowa | 295 | 0.2 | 4.8 | 10.1 | 4.5 | 4.9 | 7.4 | 9.5 | 10.0 |
| Kansas | 175 | – | 3.3 | 7.9 | 4.7 | 14.4 | 17.9 | 7.8 | 6.4 |
| Minnesota | 1,335 | 9.9 | 22.2 | 16.4 | 26.5 | 32.4 | 29.9 | 27.6 | 26.4 |
| Missouri | 1,564 | 2.3 | 6.0 | 8.2 | 18.5 | 33.7 | 35.2 | 32.3 | 27.4 |
| Nebraska | 130 | 1.1 | 1.8 | 5.1 | 8.6 | 16.9 | 11.2 | 8.8 | 7.5 |
| North Dakota | 2 | 0.4 | 2.5 | 1.7 | 1.2 | 2.2 | 2.5 | 0.4 | 0.3 |
| South Dakota | 82 | – | – | 3.3 | 2.8 | 5.1 | 6.7 | 10.6 | 10.7 |
| Southeast: | | | | | | | | | |
| Alabama | 128 | 0.3 | 0.9 | 5.3 | 7.3 | 10.8 | 7.2 | 3.8 | 2.8 |
| Arkansas | 145 | – | 0.1 | 2.2 | 3.8 | 10.7 | 10.4 | 7.1 | 5.3 |
| Florida | 4,225 | 1.5 | 5.6 | 10.6 | 18.8 | 31.5 | 31.4 | 26.0 | 24.8 |
| Georgia | 1,193 | 0.1 | 2.9 | 4.8 | 7.6 | 15.5 | 17.4 | 13.4 | 13.7 |
| Kentucky | 1,164 | 0.9 | 1.6 | 5.7 | 16.1 | 35.1 | 31.5 | 31.2 | 28.3 |
| Louisiana | 524 | 0.6 | 0.9 | 5.4 | 7.2 | 16.6 | 17.0 | 12.2 | 11.7 |
| Mississippi | 12 | – | – | – | 0.7 | 3.6 | 1.1 | 0.8 | 0.4 |
| North Carolina | 836 | 0.6 | 1.6 | 4.8 | 8.3 | 17.1 | 17.8 | 11.6 | 9.9 |
| South Carolina | 253 | 0.2 | 1.0 | 1.9 | 5.5 | 9.9 | 9.9 | 6.5 | 6.1 |
| Tennessee | 749 | – | 1.8 | 3.7 | 12.2 | 24.1 | 33.0 | 18.0 | 12.8 |
| Virginia[4] | 1,343 | – | 1.1 | 6.1 | 7.7 | 16.9 | 18.5 | 16.5 | 18.2 |
| West Virginia[4] | 179 | 0.7 | 1.7 | 3.9 | 5.8 | 10.7 | 10.3 | 10.1 | 9.9 |
| Southwest: | | | | | | | | | |
| Arizona | 1,112 | 6.0 | 10.3 | 16.2 | 25.8 | 30.3 | 30.9 | 21.3 | 19.9 |
| New Mexico | 577 | 1.4 | 2.0 | 12.7 | 15.1 | 32.3 | 37.7 | 30.3 | 30.8 |
| Oklahoma | 277 | – | 2.1 | 5.5 | 7.6 | 13.8 | 14.7 | 13.9 | 7.9 |
| Texas | 2,354 | 0.6 | 3.4 | 6.9 | 12.0 | 17.8 | 18.5 | 12.8 | 10.6 |
| Rocky Mountains: | | | | | | | | | |
| Colorado | 1,244 | 6.9 | 10.8 | 20.0 | 23.3 | 36.4 | 39.5 | 30.3 | 27.3 |
| Idaho | 39 | 1.2 | – | 1.8 | 1.4 | 5.7 | 7.9 | 2.8 | 2.9 |
| Montana | 86 | – | – | 1.0 | 2.4 | 3.9 | 7.0 | 5.2 | 9.3 |
| Utah | 598 | 0.6 | 8.8 | 13.9 | 25.1 | 35.6 | 35.3 | 25.9 | 25.4 |
| Wyoming | 11 | – | – | – | – | 0.7 | 1.4 | 2.4 | 2.2 |
| Far West: | | | | | | | | | |
| Alaska | – | – | – | – | – | – | – | – | – |
| California | 17,022 | 16.8 | 22.5 | 30.7 | 36.0 | 47.1 | 53.5 | 48.5 | 48.0 |
| Hawaii | 373 | 15.3 | 18.1 | 21.6 | 21.0 | 32.8 | 30.0 | 30.0 | 29.7 |
| Nevada | 538 | – | 5.8 | 8.5 | 15.9 | 26.8 | 23.5 | 21.1 | 24.0 |
| Oregon | 778 | 12.0 | 14.0 | 24.7 | 40.0 | 45.3 | 41.1 | 24.2 | 21.8 |
| Washington | 786 | 9.4 | 8.7 | 14.6 | 18.7 | 26.3 | 15.2 | 15.1 | 12.8 |

– Quantity zero. --- Data not available.

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent states. These BEA geographic regions differ from Bureau of the Census geographic regions and divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

[2]HMOs in Guam are included starting in 1994; HMOs in Puerto Rico, starting in 1998. In 2004 HMO enrollment in Guam was 28,000 and in Puerto Rico, 1,618,000.

[3]Data for District of Columbia (DC) not included for 1980–96 because data not adjusted for high proportion of enrollees of DC-based HMOs living in Maryland and Virginia.

[4]Includes partial enrollment for five plans serving the District of Columbia.

NOTES: 1980–90 are for pure HMO enrollment at midyear. Starting in 1994 data are for pure and open-ended enrollment as of January 1. In 1990 open-ended enrollment accounted for 3 percent of HMO enrollment compared with 10 percent in 2004. See Appendix II, Health maintenance organization. Data for additional years are available. See Appendix III.

SOURCE: InterStudy National Health Maintenance Organization Census. The InterStudy Edge, Managed care: A decade in review 1980–1990. The InterStudy Competitive Edge, Part II Managed Care Industry Report, 1995–2004. St. Paul, Minnesota (Copyrights 1991, 1995–2004; Used with the permission of InterStudy).



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## Table 156. Persons without health insurance coverage by State: United States, average annual 1995–97, 1998–2000, and 2001–03

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Click here for spreadsheet version

| Geographic region and State[1] | 1995–97 | 1998–2000 | 2001–03 |
|---|---|---|---|
| | Percent of population | | |
| United States | 15.7 | 14.4 | 15.1 |
| New England: | | | |
| Connecticut | 10.6 | 9.5 | 10.4 |
| Maine | 13.5 | 11.5 | 10.7 |
| Massachusetts | 12.0 | 9.2 | 9.6 |
| New Hampshire | 10.4 | 8.6 | 9.9 |
| Rhode Island | 11.0 | 6.9 | 9.3 |
| Vermont | 11.3 | 10.3 | 9.9 |
| Mideast: | | | |
| Delaware | 14.1 | 11.2 | 10.1 |
| District of Columbia | 16.1 | 14.5 | 13.3 |
| Maryland | 13.4 | 11.9 | 13.2 |
| New Jersey | 15.8 | 12.9 | 13.7 |
| New York | 16.6 | 15.3 | 15.5 |
| Pennsylvania | 9.8 | 8.3 | 10.7 |
| Great Lakes: | | | |
| Illinois | 11.6 | 13.3 | 14.0 |
| Indiana | 11.5 | 11.3 | 12.9 |
| Michigan | 10.1 | 10.6 | 11.0 |
| Ohio | 11.6 | 10.2 | 11.7 |
| Wisconsin | 7.9 | 9.3 | 9.5 |
| Plains: | | | |
| Iowa | 11.6 | 8.2 | 9.5 |
| Kansas | 11.8 | 11.0 | 10.9 |
| Minnesota | 9.1 | 8.2 | 8.2 |
| Missouri | 13.5 | 9.0 | 10.9 |
| Nebraska | 10.4 | 9.5 | 10.3 |
| North Dakota | 11.1 | 12.1 | 10.5 |
| South Dakota | 10.2 | 12.0 | 11.0 |
| Southeast: | | | |
| Alabama | 14.0 | 14.2 | 13.3 |
| Arkansas | 21.3 | 15.3 | 16.6 |
| Florida | 18.9 | 17.2 | 17.6 |
| Georgia | 17.8 | 15.2 | 16.4 |
| Kentucky | 15.0 | 13.1 | 13.3 |
| Louisiana | 18.8 | 19.5 | 19.4 |
| Mississippi | 19.4 | 15.7 | 17.0 |
| North Carolina | 15.3 | 13.7 | 16.1 |
| South Carolina | 16.2 | 13.8 | 13.1 |
| Tennessee | 14.5 | 10.8 | 11.8 |
| Virginia | 12.9 | 12.9 | 12.5 |
| West Virginia | 15.8 | 15.2 | 14.8 |
| Southwest: | | | |
| Arizona | 23.0 | 19.5 | 17.3 |
| New Mexico | 23.5 | 22.6 | 21.3 |
| Oklahoma | 18.0 | 17.7 | 18.7 |
| Texas | 24.4 | 22.2 | 24.6 |
| Rocky Mountains: | | | |
| Colorado | 15.5 | 14.1 | 16.3 |
| Idaho | 16.1 | 16.5 | 17.5 |
| Montana | 15.3 | 18.3 | 16.1 |
| Utah | 12.4 | 13.2 | 13.6 |
| Wyoming | 15.0 | 15.1 | 16.5 |
| Far West: | | | |
| Alaska | 14.7 | 18.1 | 17.8 |
| California | 20.7 | 19.2 | 18.7 |
| Hawaii | 8.3 | 9.8 | 9.9 |
| Nevada | 17.3 | 17.5 | 18.3 |
| Oregon | 13.7 | 13.7 | 14.8 |
| Washington | 12.4 | 12.8 | 14.3 |

[1]Data are shown for Bureau of Economic Analysis (BEA) regions that are constructed to show economically interdependent States. These BEA geographic regions differ from Bureau of the Census geographic divisions shown in some *Health, United States* tables. See Appendix II, Geographic region and division.

NOTES: Methodology and sample size changed in 1999 and 2000. Beginning with data for 1997, people with no coverage other than access to the Indian Health Service are no longer considered covered by health insurance. The effect of this change on the number uninsured is negligible. Starting in 1999 estimates reflect the results of follow-up verification questions and implementation of Census 2000-based population controls. In 1999 the use of verification questions decreased the percent uninsured by 1.2 percentage points. See Appendix I, Current Population Survey.

SOURCES: U.S. Bureau of the Census, Current Population Survey, Bennefield RL. Health Insurance Coverage: 1997; Mills RJ. Health Insurance Coverage: 2000; DeNavas-Walt C, Proctor BD, and Mills RJ. Income, Poverty, and Health Insurance Coverage in the United States: 2003. Current population reports, series P–60 nos 202; 215; 226. Washington, DC: U.S. Government Printing Office, 2004. Available at www.census.gov/hhes/www/hlthins/reports.html.



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# Appendix I

# Data Sources

This report consolidates the most current data on the health of the population of the United States, the availability and use of health resources, and health care expenditures. Information was obtained from data files and published reports of many Federal Government and private and global agencies and organizations. In each case, the sponsoring agency or organization collected data using its own methods and procedures. Therefore, data in this report vary considerably with respect to source, method of collection, definitions, and reference period.

Although a detailed description and comprehensive evaluation of each data source are beyond the scope of this Appendix, users should be aware of the general strengths and weaknesses of the different data collection systems. For example, population-based surveys obtain socioeconomic data, data on family characteristics, and information on the impact of an illness, such as days lost from work or limitation of activity. These data are limited by the amount of information a respondent remembers or is willing to report. A respondent may not know detailed medical information, such as precise diagnoses or the types of operations performed, and therefore cannot report it. In contrast, record-based surveys, which collect data from physician and hospital records, usually have good diagnostic information but little or no information about the socioeconomic characteristics of individuals or the impact of illnesses on individuals.

The populations covered by different data collection systems may not be the same, and understanding the differences is critical to interpreting the data. Data on vital statistics and national expenditures cover the entire population. Most data on morbidity and utilization of health resources cover only the civilian noninstitutionalized population. Such statistics may not include data for military personnel, who are usually young; for institutionalized people, who may be any age; or for nursing home residents, who are usually old.

All data collection systems are subject to error, and records may be incomplete or contain inaccurate information. Respondents may not remember essential information, a question may not mean the same thing to different respondents, and some institutions or individuals may not respond at all. It is not always possible to measure the magnitude of these errors or their effect on the data. Where possible, table notes describe the universe and method of data collection to assist users in evaluating data quality.

Some information is collected in more than one survey, and estimates of the same statistic may vary among surveys because of different survey methodologies, sampling frames, questionnaires, definitions, and tabulation categories. For example, cigarette use is measured by the National Health Interview Survey, the National Survey on Drug Use & Health, the Monitoring the Future Survey, and the Youth Risk Behavior Survey, all of which use slightly different questions of persons of differing ages and interview in different settings (at school compared with at home), so estimates will differ.

Overall estimates generally have relatively small sampling errors, but estimates for certain population subgroups may be based on small numbers and have relatively large sampling errors. Numbers of births and deaths from the vital statistics system represent complete counts (except for births in those States where data are based on a 50-percent sample for certain years). Therefore, they are not subject to sampling error. However, when the figures are used for analytical purposes, such as the comparison of rates over a period, the number of events that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances. When the number of events is small and the probability of such an event is rare, estimates may be unstable and considerable caution must be observed in interpreting the statistics. Estimates that are unreliable because of large sampling errors or small numbers of events are noted with asterisks in selected tables. The criteria used to designate unreliable estimates are indicated in notes to the applicable tables.

Government data sources are listed alphabetically by data set name; private and global sources are listed separately. To the extent possible, government data systems are described using a standard format. "Overview" is a brief, general statement about the purpose or objectives of the data system. "Selected Content" lists major data elements that are collected or estimated using interpolation or modeling. "Data Years" gives the years that the survey or data system has existed or been fielded. "Coverage" describes the population that the data system represents; for example, residents of the United States, the noninstitutionalized population, persons in specific population groups, or other entities that comprise the survey. The "Methodology" section presents a short description of methods used to collect data. "Sample Size



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and Response Rates" are given for surveys. "Issues Affecting Interpretation" describes major changes in the data collection methodology or other factors that must be considered when analyzing trends—for example, a major survey redesign that may introduce a discontinuity in the trend. For more information about the methodology, data files, and history of a data source, consult the "References" and Web sites at the end of each summary. For more information about private and global organizations' data sources, refer to the organization's Web sites.

## Government Sources

### Abortion Surveillance

#### Centers for Disease Control and Prevention National Center for Chronic Disease Prevention and Health Promotion

*Overview:* The abortion surveillance program documents the number and characteristics of women obtaining legal induced abortions, monitors unintended pregnancy, and assists efforts to identify and reduce preventable causes of morbidity and mortality associated with abortions.

*Selected Content:* Content includes age, race/ethnicity, marital status, previous live births, period of gestation, and previous induced abortions of women obtaining legal induced abortions.

*Data Years:* Between 1973 and 1997, the number of abortions is based on reporting from 52 reporting areas: 50 States, the District of Columbia, and New York City. In 1998 and 1999, the Centers for Disease Control and Prevention (CDC) compiled abortion data from 48 reporting areas: Alaska, California, New Hampshire, and Oklahoma did not report, and data for these areas were not estimated. In 2000 and 2001, Oklahoma again reported these data, increasing the number of reporting areas to 49.

*Coverage:* The system includes women of all ages, including adolescents, who obtain legal induced abortions.

*Methodology:* Beginning with data year 2000, data concerning the number and characteristics of women who obtain legal induced abortions are provided for 49 reporting areas by central health agencies, such as State health departments and the health departments of New York City and the District of Columbia and by hospitals and other medical facilities. In general, the procedures are reported by the State in which the procedure is performed (i.e., State of occurrence). In 2000, three States (Delaware, Maryland, and Wisconsin) reported characteristics only for women who were residents and who obtained abortions in the State. One State (Iowa) provided numbers and characteristics only for State residents. While the total number of legal induced abortions is available for those 49 reporting areas, not all areas collect information on the characteristics of women who obtain abortions. The number of areas reporting each characteristic and the number of areas with complete data for each characteristic vary from year to year. For example, in 2000, the number of areas reporting different characteristics ranged from 26 areas reporting Hispanic ethnicity and 37 areas reporting race and marital status to 47 areas reporting age. Data from reporting areas with more than 15 percent unknown for a given characteristic are excluded from the analysis of that characteristic.

*Issues Affecting Interpretation:* Between 1989 and 1997, the total number of abortions reported to CDC was about 10 percent less than the total estimated independently by the Alan Guttmacher Institute (AGI), a not-for-profit organization for reproductive health research, policy analysis, and public education. In 1998–99, the total number of abortions reported to CDC was about 33 percent less than the total estimated by AGI. The four reporting areas (the largest of which was California) that did not report abortions to CDC in 1998 accounted for 18 percent of all abortions tallied by AGI's 1995–96 survey. See Appendix I, *Alan Guttmacher Institute Abortion Provider Survey.*

*Reference:*

Centers for Disease Control and Prevention, CDC Surveillance Summaries, November 26, 2004. MMWR 2004; 53(SS09);1–32, Abortion Surveillance—United States, 2001.

*For More Information:* See the NCCDPHP surveillance and research Web site at http://www.cdc.gov/reproductivehealth/Data_Stats/index.htm.



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## AIDS Surveillance

### Centers for Disease Control and Prevention National Center for HIV, STD, and TB Prevention

*Overview:* Acquired immunodeficiency syndrome (AIDS) surveillance data are used to detect and monitor cases of human immunodeficiency virus (HIV) disease and AIDS in the United States, identify epidemiologic trends, identify unusual cases requiring follow-up, and inform public health efforts to prevent and control the disease.

*Selected Content:* Data collected on cases diagnosed with AIDS include age, sex, race/ethnicity, mode of exposure, and geographic region.

*Data Years:* Reports on AIDS cases are available from the beginning of the epidemic in 1981.

*Coverage:* All 50 States, the District of Columbia, U.S. dependencies and possessions, and independent nations in free association with the United States report AIDS cases to CDC using a uniform surveillance case definition and case report form.

*Methodology:* AIDS surveillance is conducted by health departments in each State or territory and the District of Columbia. Although surveillance activities range from passive to active, most areas employ multifaceted active surveillance programs, which include four major reporting sources of AIDS information: hospitals and hospital-based physicians, physicians in nonhospital practice, public and private clinics, and medical record systems (death certificates, tumor registries, hospital discharge abstracts, and communicable disease reports). Using a standard confidential case report form, the health departments collect information that is then transmitted electronically without personal identifiers to CDC.

Adjustments of the estimated data on HIV infection (not AIDS) and on AIDS to account for reporting delays are calculated by a maximum likelihood statistical procedure that takes into account the differences in reporting delays among exposure, geographic, racial/ethnic, age, sex, and vital status categories and is based on the assumption that reporting delays in these categories have not changed over time. AIDS surveillance data are provisional and are updated annually.

*Issues Affecting Interpretation:* Although completeness of reporting of AIDS cases to State and local health departments differs by geographic region and patient population, studies conducted by State and local health departments indicate that the reporting of AIDS cases in most areas of the United States is more than 85 percent complete. To assess trends in AIDS cases, deaths, and prevalence, it is preferable to use case data adjusted for reporting delays and presented by year of diagnosis instead of straight counts of cases presented by year of report.

The original definition of AIDS was modified in 1985 and 1987. The case definition for adults and adolescents was modified again in 1993. The revisions incorporated a broader range of AIDS-indicator diseases and conditions and used HIV diagnostic tests to improve the sensitivity and specificity of the definition. Laboratory and diagnostic criteria for the 1987 pediatric case definition were updated in 1994. Effective January 2000, the surveillance case definition for HIV infection was revised to reflect advances in laboratory HIV virologic tests. The definition incorporates the reporting criteria for HIV infection and AIDS into a single case definition for adults and children.

Decreases in AIDS incidence and in the number of AIDS deaths, first noted in 1996, have been ascribed to the effect of new treatments, which prevent or delay the onset of AIDS and premature death among HIV-infected persons and result in an increase in the number of persons living with HIV and AIDS. A growing number of States require confidential reporting of persons with HIV infection and participate in CDC's integrated HIV/AIDS surveillance system that compiles information on the population of persons newly diagnosed and living with HIV infection.

*Reference:*

Centers for Disease Control and Prevention, HIV/AIDS Surveillance Report, published annually at www.cdc.gov/hiv/stats/hasrlink.htm.

*For More Information:* See the NCHSTP Web site at www.cdc.gov/nchstp/od/nchstp.html.

## Census of Fatal Occupational Injuries (CFOI)

### Bureau of Labor Statistics

*Overview:* The Census of Fatal Occupational Injuries (CFOI) compiles comprehensive and timely information on fatal work injuries occurring in the 50 States and the District of



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Columbia to monitor workplace safety and to inform private and public health efforts to improve workplace safety.

*Selected Content:* Information is collected about each workplace fatality, including occupation and other worker characteristics, equipment involved, and circumstances of the event.

*Data Years:* Data have been collected annually since 1992.

*Coverage:* The data cover all 50 States and the District of Columbia.

*Methodology:* CFOI is administered by the Bureau of Labor Statistics (BLS) in conjunction with participating State agencies to compile counts that are as complete as possible to identify, verify, and profile fatal work injuries. Key information about each workplace fatality (occupation and other worker characteristics, equipment or machinery involved, and circumstances of the event) is obtained by cross-referencing source records. For a fatality to be included in the census, the decedent must have been employed (that is, working for pay, compensation, or profit) at the time of the event, engaged in a legal work activity, or present at the site of the incident as a requirement of his or her job. These criteria are generally broader than those used by Federal and State agencies administering specific laws and regulations. Fatalities that occur during a person's commute to or from work are excluded from the census counts.

Data for the CFOI are compiled from various Federal, State, and local administrative sources—including death certificates, workers' compensation reports and claims, reports to various regulatory agencies, medical examiner reports, and police reports—as well as news reports. Diverse sources are used because studies have shown that no single source captures all job-related fatalities. Source documents are matched so that each fatality is counted only once. To ensure that a fatality occurred while the decedent was at work, information is verified from two or more independent source documents or from a source document and a follow-up questionnaire.

*Issues Affecting Interpretation:* The number of occupational fatalities and fatality rates are periodically revised. States have up to 1 year to update their initial published State counts. States may identify additional fatal work injuries after data collection closeout for a reference year. In addition, other fatalities excluded from the published count because of insufficient information to determine work relationship may subsequently be verified as work related. Increases in the published counts based on additional information have averaged less than 100 fatalities per year, or less than 1.5 percent of the total.

Beginning with the 2003 data year, CFOI began using the 2002 North American Industry Classification System (NAICS) to classify industries. Prior to 2003, the program used the Standard Industrial Classification (SIC) system and the Census Bureau occupational classification system. Although some titles in SIC and NAICS are similar, there is limited compatibility between the two systems because the industry groupings are defined differently. See Appendix II, *Industry of employment.*

*Reference:*

Bureau of Labor Statistics. National Census of Fatal Occupational Injuries in 2003. Washington, DC: U.S. Department of Labor, September 2004.

*For More Information:* See the CFOI Web site at www.bls.gov/iif/oshcfoi1.htm.

## Consumer Price Index (CPI)

### Bureau of Labor Statistics

*Overview:* The Consumer Price Index (CPI) is designed to produce a monthly measure of the average change in the prices paid by urban consumers for a fixed market basket of goods and services.

*Selected Content:* Price indexes are available for the United States, the four census regions, size of city, cross-classifications of regions and size-classes, and 26 local areas. Indexes are available for major groups of consumer expenditures (food and beverages, housing, apparel, transportation, medical care, recreation, education and communications, and other goods and services), for items within each group, and for special categories, such as services. Monthly indexes are available for the United States, the four census regions, and some local areas. More detailed item indexes are available for the United States than for regions and local areas. Indexes are available for two population groups: a CPI for All Urban Consumers (CPI-U), which covers approximately 87 percent of the total population, and a CPI for Urban Wage Earners and Clerical Workers (CPI-W), which covers 32 percent of the population.



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*Data Years:* The index has been constructed annually since 1978.

*Coverage:* The all-urban index (CPI-U) introduced in 1978 covers residents of metropolitan areas as well as residents of urban parts of nonmetropolitan areas (about 87 percent of the U.S. population in 2000).

*Methodology:* In calculating the index, price changes for the various items in each location were averaged together with weights that represent their importance in the spending of all urban consumers. Local data were then combined to obtain a U.S. city average.

The index measures price changes from a designated reference date, 1982–84, which equals 100. An increase of 22 percent, for example, is shown as 122. Change can also be expressed in dollars as follows: the price of a base period "market basket" of goods and services bought by all urban consumers has risen from $100 in 1982–84 to $184 in 2003.

The current revision of the CPI, completed in 2000, reflects spending patterns based on the Survey of Consumer Expenditures from 1993 to 1995, the 1990 Census of Population, and the ongoing Point-of-Purchase Survey. Using an improved sample design, prices for the goods and services required to calculate the index are collected in urban areas throughout the country and from retail and service establishments. Data on rents are collected from tenants of rented housing and residents of owner-occupied housing units. Food, fuels, and other goods and services are priced monthly in urban locations. Price information is obtained through visits or calls by trained BLS field representatives using computer-assisted telephone interviews.

*Issues Affecting Interpretation:* A 1987 revision changed the treatment of health insurance in the cost-weight definitions for medical care items. This change has no effect on the overall index result but provides a clearer picture of the role of health insurance in the CPI. As part of the revision, three new indexes have been created by separating previously combined items, for example, eye care is separated from other professional services, and inpatient and outpatient treatment is separated from other hospital and medical care services.

Effective January 1997, the hospital index was restructured by combining the three categories—room, inpatient services, and outpatient services—into one category: hospital services. In addition, new procedures for hospital data collection identify a payor, diagnosis, and the payor's reimbursement arrangement from selected hospital bills.

*References:*

Bureau of Labor Statistics. Handbook of Methods. BLS Bulletin 2490. Washington, DC: U.S. Department of Labor. April 1997; Revising the Consumer Price Index, Monthly Labor Review, Dec 1996.

Ford IK, Ginsburg DH. "Medical Care in the Consumer Price Index," in Medical Care Output and Productivity Studies in Income and Wealth, vol 62, Cutler DM, Berndt ER, eds., Chicago: University of Chicago Press, pp. 203–19, 2001.

*For More Information:* See the BLS/CPI Web site at www.bls.gov/cpi/home.htm.

## Current Population Survey (CPS)

### Census Bureau Bureau of Labor Statistics

*Overview:* The Current Population Survey (CPS) provides current estimates and trends in employment, unemployment, and other characteristics of the general labor force, the population as a whole, and various population subgroups.

*Selected Content:* Estimates of poverty and health insurance coverage presented in *Health, United States* from the CPS are derived from the Annual Social and Economic Supplement (ASEC), formerly called the Annual Demographic Supplement (ADS), or simply the "March Supplement." The ASEC includes a series of questions asked each March in addition to core CPS questions. Information is gathered on more than 50 different sources of income, including noncash income sources such as food stamps, school lunch program, employer-provided group health insurance plan, employer-provided pension plan, personal health insurance, Medicaid, Medicare, CHAMPUS or military health care, and energy assistance. Comprehensive work experience information is given on the employment status, occupation, and industry of persons interviewed.

*Data Years:* The basic CPS has been conducted since 1945, although some data were collected prior to that time. Collection of income data began in 1948.

*Coverage:* The CPS sample is located in 754 sample areas, with coverage in every State and the District of Columbia.



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The adult universe (i.e., population of marriageable age) is composed of persons 15 years of age and over in the civilian noninstitutionalized population for CPS labor force data. The sample for the March CPS supplement is expanded to include members of the Armed Forces who are living in civilian housing or with their family on a military base, as well as additional Hispanic households that are not included in the monthly labor force estimates.

*Methodology:* The basic CPS sample is selected from multiple frames using multiple stages of selection. Each unit is selected with a known probability to represent similar units in the universe. The sample design is a State-based design, with the sample in each State being independent of the others.

The additional Hispanic sample is from the previous November's basic CPS sample. If a person is identified as being of Hispanic origin from the November interview and is still residing at the same address in March, that housing unit is eligible for the March survey. This amounts to a near doubling of the Hispanic sample since there is no overlap of housing units between the basic CPS samples in November and March.

For all CPS data files a single weight is prepared and used to compute the monthly labor force status estimates. An additional weight was prepared for the earnings universe that roughly corresponds to wage and salary workers in the two outgoing rotations. The difference in content of the March CPS supplement requires the presentation of additional weights: a household weight, a family weight, and a March supplement weight. The final weight is the product of (1) the basic weight, (2) adjustments for special weighting, (3) noninterview adjustment, (4) first stage ratio adjustment factor, and (5) second-stage ratio adjustment factor. This final weight should be used when producing estimates from the basic CPS data. Differences in the questionnaire, sample, and data uses for the March CPS supplement result in the need for additional adjustment procedures to produce what is called the March supplement weight.

*Sample Size and Response Rate:* Beginning with 2001, the State Children's Health Insurance Program (SCHIP) sample expansion was introduced. This included an increase in the basic CPS sample to 60,000 households per month. Prior to 2001 estimates were based on 50,000 households per month. The expansion also included an additional 12,000 households that were allocated differentially across States, based on prior information of the number of uninsured children in each State, to produce statistically reliable current State data on the number of low-income children who do not have health insurance coverage. In an average month, the nonresponse rate for the basic CPS is about 6–7 percent.

*Issues Affecting Interpretation:* Over the years, the number of income questions has expanded, questions on work experience and other characteristics have been added, and the month of interview was moved to March.

In 1994, major changes were introduced, which included a complete redesign of the questionnaire including new health insurance questions and the introduction of computer-assisted interviewing for the entire survey. In addition, there were revisions to some of the labor force concepts and definitions. Prior to the redesign, CPS data were primarily collected using a paper-and-pencil form. Beginning in 1994, population controls were based on the 1990 census and adjusted for the estimated population undercount. Starting with *Health, United States, 2003*, poverty estimates for data years 2000 and beyond were recalculated based on the expanded SCHIP sample, and census 2000-based population controls were implemented. Beginning with 2002 data, 1997 race standards were implemented in which people could report more than one race.

*Reference:*

U.S. Census Bureau. Technical Paper 63RV. Current Population Survey: Design and Methodology. TP63RV, March 2002 found at www.census.gov/prod/2002pubs/tp63rv.pdf.

*For More Information:* See the CPS Web site at www.bls.census.gov/cps/cpsmain.htm.

## Department of Veterans Affairs National Patient Care Database and National Enrollment Database

### Department of Veterans Affairs

*Overview:* The Department of Veterans Affairs (VA) compiles and analyzes multiple data sets on the health and health care of its clients and other veterans to monitor access and quality of care and to conduct program and policy evaluations.



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*Selected Content:* VA maintains the National Patient Care Database (NPCD) and the National Enrollment Database (NED).

The NPCD is a nationwide system that contains a statistical record for each episode of care provided under VA auspices in VA and non-VA hospitals, nursing homes, VA residential rehabilitation treatment programs (formerly called domiciliaries), and VA outpatient clinics. Three major extracts from the NPCD are the patient treatment file (PTF), the patient census file (PCF), and the outpatient clinic file (OPC).

The PTF collects data at the time of the patient's discharge on each episode of inpatient care provided to patients at VA hospitals, VA nursing homes, VA residential rehabilitation treatment programs, community nursing homes, and other non-VA facilities. The PTF record contains the scrambled social security number (SSN), dates of inpatient treatment, date of birth, State and county of residence, type of disposition, place of disposition after discharge, and ICD–9–CM diagnostic and procedure or operative codes for each episode of care.

The PCF collects data on each patient remaining in a VA medical facility at midnight at the end of each quarter of the fiscal year. The census record includes information similar to that reported in the PTF record.

The outpatient clinic file (OPC) collects data on each instance of medical treatment provided to a veteran in an outpatient setting. The OPC record includes the age, scrambled social security number, State and county of residence, VA eligibility code, clinic(s) visited, purpose of visit, and date of visit for each episode of care.

The VA also maintains the National Enrollment Database (NED) as the official repository of enrollment information for each veteran enrolled in the VA health care system.

*Coverage:* U.S. veterans who receive services within the VA medical system are included. Data are available for some nonveterans who receive care at VA facilities.

*Methodology:* NPCD is the source data for the Veterans Health Administration (VHA) Medical SAS Datasets. NPCD is the VHA's centralized relational database (a data warehouse) that receives encounter data from VHA clinical information systems. It is updated daily. Data are collected locally at each VA medical center and are transmitted electronically to the VA Austin Automation Center for use in providing nationwide statistics, reports, and comparisons.

In all of the medical data sets, each patient has a unique identifier, which is a formula-based encryption of the individual's SSN. The identifier is consistent for a given patient across data sets and fiscal years. An extract containing selected information from the NPCD, the NED, and the cost distribution system is produced by the Austin Automation Center.

*Issues Affecting Interpretation:* The databases include users of the VA health care system. VA eligibility is a hierarchy based on service-connected disabilities, income, age, and availability of services. Therefore, different VA programs may serve populations with different sociodemographic characteristics than other health care systems.

*For More Information:* See the VHA Information Systems Web site at www.virec.research.med.va.gov/Support/Training-newUsersToolkit/IntroToVAData.htm.

## Employee Benefits Survey—See National Compensation Survey

## Medicaid Data System

### Centers for Medicare & Medicaid Services

*Overview:* The Centers for Medicare & Medicaid Services (CMS) works with its State partners to collect data on persons served by the Medicaid program to monitor and evaluate access and quality of care, trends in program eligibility, characteristics of enrollees, changes in payment policy, and other program-related issues.

*Selected Content:* Data collected include medical vendor payments for Medicaid recipients by type of service and information on the characteristics of Medicaid recipients, including race/ethnicity, age, and basis of eligibility.

*Data Years:* Selected State data are available from 1992 on. Data for the 50 States and the District of Columbia are available from 1999 on.

*Coverage:* The data include individuals enrolled in the Medicaid program or receiving Medicaid benefits.

*Methodology:* The primary data sources for Medicaid statistical data are the Medicaid Statistical Information System (MSIS) and the CMS-64 reports.



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MSIS is the basic source of State-reported eligibility and claims data on the Medicaid population, and their characteristics, utilization, and payments. Beginning in FY 1999, as a result of legislation enacted from the Balanced Budget Act of 1997, States are required to submit individual eligibility and claims data tapes to CMS quarterly through MSIS. Prior to FY 1999, States were required to submit an annual HCFA-2082 report, designed to collect aggregated statistical data on eligibles, recipients, services, and expenditures during a Federal fiscal year (October 1 through September 30). The data reported for each year represented people on the Medicaid rolls, recipients of Medicaid services, and payments for claims adjudicated during the year. The data reflected bills adjudicated or processed during the year, rather than services used during the year. States summarized and reported the data processed through their own Medicaid claims processing and payment operations, unless they opted to participate in MSIS, in which case the HCFA-2082 report was produced by the Health Care Financing Administration (the predecessor to CMS).

The CMS-64 is a product of the financial budget and grant system. The CMS-64 is a statement of expenditures for the Medicaid program that States submit to CMS 30 days after each quarter. The report is an accounting statement of actual expenditures made by the States for which they are entitled to receive Federal reimbursement under title XIX for that quarter. The amount claimed on the CMS-64 is a summary of expenditures derived from source documents, such as invoices, cost reports, and eligibility records.

The CMS-64 shows the disposition of Medicaid grant funds for the quarter being reported and previous years, the recoupments made or refunds received, and income earned on grant funds. The data on the CMS-64 are used to reconcile the monetary advance made on the basis of States' funding estimates filed prior to the beginning of the quarter on the CMS-37. As such, the CMS-64 is the primary source for making adjustments for any identified overpayments and underpayments to the States. Also incorporated into this process are disallowance actions forwarded from other Federal financial adjustments. Finally, the CMS-64 provides information that forms the basis for a series of Medicaid financial reports and budget analyses. Also included are third party liability (TPL) collections tables. TPL refers to the legal obligation of certain health care sources to pay the medical claims of Medicaid recipients before Medicaid pays these claims. Medicaid pays only after the TPL sources have met their legal obligation to pay.

*Issues Affecting Interpretation: Health, United States* Medicaid tables are based on MSIS data. Users of Medicaid data may note apparent inconsistencies in Medicaid data that are primarily due to the difference in information captured in MSIS versus CMS-64 reports. The most substantive difference is due to payments made to "disproportionate share hospitals." Payments to disproportionate share hospitals do not appear in MSIS because States directly reimburse these hospitals and there is no fee-for-service billing. Other less significant differences between MSIS and CMS-64 occur because adjudicated claims data are used in MSIS versus actual payments reflected in the CMS-64. Differences also may occur because of internal State practices for capturing and reporting these data through two separate systems. Finally, national totals for the CMS-64 are different because they include other jurisdictions, such as the Northern Mariana Islands and American Samoa.

*For More Information:* See the CMS Web site at http://www.cms.hhs.gov/medicaid/ or the Research Data Assistance Center (ResDAC) Web site at www.resdac.umn.edu/medicaid/data_available.asp. Also see Appendix II, *Medicaid.*

## Medical Expenditure Panel Survey (MEPS)

### Agency for Healthcare Research and Quality

*Overview:* The Medical Expenditure Panel Survey (MEPS) produces nationally representative estimates of health care use, expenditures, sources of payment, insurance coverage, and quality of care for the U.S. civilian noninstitutionalized population.

*Selected Content:* MEPS data in *Health, United States* include total health care expenses and prescribed medicine expenses, presented by sociodemographic characteristics, type of health insurance, and sources of payment.

*Data Years:* The 1977 National Medical Care Expenditure Survey and the 1987 National Medical Expenditure Survey (NMES) are earlier versions of this survey. Since 1996, MEPS has been conducted on an annual basis.



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*Coverage:* U.S. civilian noninstitutionalized population is the primary population represented. The 1987 and 1996 surveys also had an institutionalized population component.

*Methodology:* MEPS is a national probability survey conducted on an annual basis since 1996. The panel design of the survey features several rounds of interviewing covering 2 full calendar years. The MEPS consists of three components: the Household Component (HC), the Medical Provider Component (MPC), and the Insurance Component (IC).

The HC is a nationally representative survey of the civilian noninstitutionalized population drawn from a subsample of households that participated in the prior year's National Health Interview Survey conducted by the National Center for Health Statistics. Missing expenditure data are imputed using data collected in the MPC whenever possible.

Data are collected in MPC to improve the accuracy of expenditure estimates derived solely from the HC. The MPC is particularly useful in obtaining expenditure information for persons enrolled in managed care plans and Medicaid recipients. The MPC collects data from hospitals, physicians, and home health providers that were reported in the HC as providing care to MEPS sample persons. Sample sizes for the MPC vary from year to year depending on the HC sample size and the MPC sampling rates for providers.

The IC consists of two subcomponent samples: a household sample and list sample. The household sample collects detailed information from employers on the health insurance held by and offered to respondents to the MEPS-HC. The list sample collects data on the types and costs of workplace health insurance from a total of about 40,000 business establishments and governments each year.

The MEPS updates the 1987 NMES. The NMES consists of two components: the Household Survey (HS) and the Medical Provider Survey (MPS). The NMES-HS Component was designed to provide nationally representative estimates of health insurance status, health insurance coverage, and health care use for the U.S. civilian noninstitutionalized population for the calendar year 1987. Data from the NMES-MPS component were used in conjunction with HS data to produce estimates of health care expenditures. The NMES-HS consisted of four rounds of household interviews. Income was collected in a special supplement administered early in 1988. Events under the scope of the NMES-MPS included medical services provided by or under the direction of a physician, all hospital events, and home health care. The sample of events included in the NMES-MPS was all events for persons covered by Medicaid and for a 25 percent sample of NMES-HS respondents. Missing expenditure data were imputed.

*Sample Size and Response Rate:* For MEPS first core household interview, 17,500 households were selected. The sample sizes for the MEPS-HC are approximately 10,000 families in 1996 and 1998–2000, 13,500 families in 1997 and 2001, and 15,000 families annually beginning in 2002. The full-year household core response rate has generally been about 66 percent. The 12-month joint core questionnaire/health questionnaire/access supplement response rate for the household component of the NMES was 80 percent.

*Issues Affecting Interpretation:* The 1987 estimates are based on the NMES, and 1996 and later years estimates are based on the MEPS. Because expenditures in NMES were based primarily on charges while those for MEPS were based on payments, data for NMES were adjusted to be more comparable to MEPS using estimated charge-to-payment ratios for 1987. For a detailed explanation of this adjustment, see Zuvekas and Cohen, 2002.

*References:*

Hahn B, Lefkowitz D. Annual expenses and sources of payment for health care services (AHRQ pub no 93–0007). National Medical Expenditure Survey Research Findings 14, Agency for Healthcare Research and Quality pub no 93–0007. Rockville, MD: Public Health Service, November 1992.

Cohen SB. Sample design of the 1997 Medical Expenditure Panel Survey Household Component. MEPS Methodology Report No. 11. AHRQ pub no. 01–0001. Rockville MD: Agency for Healthcare Research and Quality. 2000.

Zuvekas S, Cohen S. A guide to comparing health care estimates in the 1996 Medical Expenditure Panel Survey to the 1987 National Medical Expenditure Survey. Inquiry; 39(1):76–86. 2002.

*For More Information:* See the MEPS Web site at www.meps.ahrq.gov.



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## Medicare Administrative Data

### Centers for Medicare & Medicaid Services

*Overview:* The Centers for Medicare & Medicaid Services (CMS) collects and synthesizes Medicare enrollment, spending, and claims data to monitor and evaluate access to and quality of care, trends in utilization, changes in payment policy, and other program-related issues.

*Selected Content:* Data include claims information for services furnished to Medicare beneficiaries and Medicare enrollment data. Claims data include type of service, procedures, diagnoses, dates of service, and claim amount. Enrollment data include date of birth, sex, race/ethnicity, and reason for entitlement.

*Data Years:* Some data files are available as far back as 1987, but CMS no longer provides technical support for files with data prior to 1996.

*Coverage:* Enrollment data are for all persons enrolled in the Medicare program. Claims data include data for Medicare beneficiaries who filed claims.

*Methodology:* The claims and utilization data files contain extensive utilization information at various levels of summarization for a variety of providers and services. There are many types and levels of these files, including the National Claims History (NCH) files, the Standard Analytic Files (SAF), Medicare Provider and Analysis Review (MedPAR) files, Medicare enrollment files, and various other files.

The National Claims History (NCH) 100 Percent Nearline File contains all institutional and noninstitutional claims and provides records of every Medicare claim submitted, including adjustment claims. The Standard Analytical Files (SAFs) contain final action claims data in which all adjustments have been resolved. These files contain information collected by Medicare to pay for health care services provided to a Medicare beneficiary. SAFs are available for each institutional (inpatient, outpatient, skilled nursing facility, hospice, or home health agency) and noninstitutional (physician and durable medical equipment providers) claim type. The record unit of SAFs is the claim (some episodes of care may have more than one claim). SAF files include the Inpatient SAF, the Skilled Nursing Facility SAF, the Outpatient SAF, the Home Health Agency SAF, the Hospice SAF, the Clinical Laboratory SAF, and the Durable Medical Equipment SAF.

Medicare Provider and Analysis Review (MedPAR) files contain inpatient hospital and skilled nursing facility (SNF) final action stay records. Each MedPAR record represents a stay in an inpatient hospital or SNF. An inpatient "stay" record summarizes all services rendered to a beneficiary from the time of admission to a facility through discharge. Each MedPAR record may represent one claim or multiple claims, depending on the length of a beneficiary's stay and the amount of inpatient services used throughout the stay.

The Denominator File contains demographic and enrollment information about each beneficiary enrolled in Medicare during a calendar year. The information in the Denominator File is "frozen" in March of the following calendar year. Some of the information contained in this file includes the beneficiary unique identifier, State and county codes, ZIP code, date of birth, date of death, sex, race, age, monthly entitlement indicators (for Medicare Part A, Medicare Part B, or Part A and Part B), reasons for entitlement, State buy-in indicators, and monthly managed care indicators (yes/no). The Denominator File is used to determine beneficiary demographic characteristics, entitlement, and beneficiary participation in Medicare Managed Care Organizations.

The Vital Status File contains demographic information about each beneficiary ever entitled to Medicare. Some of the information contained in this file includes the beneficiary unique identifier, State and county codes, ZIP code, date of birth, date of death, sex, race, and age. Often the Vital Status File is used to obtain recent death information for a cohort of Medicare beneficiaries.

The Group Health Plan (GHP) Master File contains data on beneficiaries who are currently enrolled or have ever been enrolled in a Managed Care Organization (MCO) under contract with CMS. Each record represents one beneficiary, and each beneficiary has one record. Some of the information contained in this file includes the Beneficiary Unique Identifier number, date of birth, date of death, State and county, and managed care enrollment information such as dates of membership and MCO contract number. The GHP Master File is used to identify the exact MCO in which beneficiaries were enrolled.

*Issues Affecting Interpretation:* Because Medicare managed care programs may not file claims, files based only on claims data will exclude care for persons enrolled in Medicare managed care programs. In addition, to maintain a manageable file size, some files are based on a sample of



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enrollees, rather than on all Medicare enrollees. Coding changes and interpretation of Medicare coverage rules have also changed over the life of the Medicare program.

*For More Information:* See the CMS Research Data Assistance Center (ResDAC) Web site at http://www.resdac.umn.edu/medicare/index.asp or the CMS Web site at http://www.cms.hhs.gov/medicare/. Also see Appendix II, *Medicare*.

## Medicare Current Beneficiary Survey (MCBS)

### Centers for Medicare & Medicaid Services

*Overview:* The Medicare Current Beneficiary Survey (MCBS) produces nationally representative estimates of health status, health care use and expenditures, health insurance coverage, and socioeconomic and demographic characteristics of Medicare beneficiaries. It is used to estimate expenditures and sources of payment for all services used by Medicare beneficiaries, including co-payments, deductibles, and noncovered services; to ascertain all types of health insurance coverage and relate coverage to sources of payment; and to trace processes over time, such as changes in health status, spending down to Medicaid eligibility, and the effects of program changes.

*Selected Content:* The survey collects data on utilization of health services, health and functional status, health care expenditures, and health insurance and beneficiary information (such as income, assets, living arrangement, family assistance, and quality of life).

*Data Years:* The first round of interviewing was conducted from September through December 1991, and the survey has been continuously in the field since then. The data are designed to support both cross-sectional and longitudinal analyses.

*Coverage:* The MCBS is a continuous survey of a nationally representative sample of aged, institutionalized, and disabled Medicare beneficiaries.

*Methodology:* The longitudinal design of the survey allows each sample person to be interviewed three times a year for 4 years, whether he or she resides in the community or a facility or moves between the two settings, using the version of the questionnaire appropriate to the setting. Sample persons in the community are interviewed using computer-assisted personal interviewing (CAPI) survey instruments. Because long-term care facility residents often are in poor health, information about institutionalized patients is collected from proxy respondents, such as nurses and other primary caregivers affiliated with the facility. The sample is selected from the Medicare enrollment files, with oversampling among disabled persons under age 65 years and among persons 80 years of age and over.

Medicare claims are linked to survey-reported events to produce the Cost and Use file that provides complete expenditure and source of payment data on all health care services, including those not covered by Medicare. The Access to Care file contains information on beneficiaries' access to health care, satisfaction with care, and usual source of care. The sample for this file represents the "always enrolled" population—those who participated in the Medicare program for the entire year. In contrast, the Cost and Use file represents the "ever enrolled" population, including those who enter Medicare during the year and those who died.

*Sample Size and Response Rate:* Each fall, about one-third of the sample is retired and roughly 6,000 new sample persons are included in the survey—the exact number chosen is based on projections of target samples of 12,000 persons with 3 years of cost and use information distributed appropriately across the sample cells. In the community, response rates for initial interviews range in the mid- to high 80s; once respondents have completed the first interview, their participation in subsequent rounds is 95 percent or more. In recent rounds, data have been collected from approximately 15,000 to 19,000 beneficiaries, with the peaks occurring in fall rounds because of the annual and HMO samples. Roughly 90 percent of the sample is made up of persons who live in the community, with the remaining persons living in long-term care facilities. Response rates for facility interviews approach 100 percent.

*Issues Affecting Interpretation:* Because only Medicare enrollees are included in the survey, the survey excludes a small proportion of persons age 65 and over who are not enrolled in Medicare, which should be noted when using the MCBS to make estimates of the entire population age 65 and over in the United States.



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*References:*

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Lo A, Chu A, Apodaca R. Redesign of the Medicare Current Beneficiary Survey Sample, Rockville, MD: Westat, Inc., 2003, found at www.cms.hhs.gov/MCBS/PubBIB/Mbib8.pdf.

*For More Information:* See the MCBS Web site at www.cms.hhs.gov/mcbs/default.asp.

## Monitoring the Future Study (MTF)

### National Institute on Drug Abuse

*Overview:* Monitoring the Future (MTF) is an ongoing study of the behaviors, attitudes, and values of American secondary school students, college students, and young adults.

*Selected Content:* Data collected include lifetime, annual, and 30-day prevalence of use of specific illegal drugs and substances, inhalants, tobacco, and alcohol. Data are also collected on usage levels, frequency of use, perceived risks associated with use, opinions about whether use is approved or disapproved by others, and opinions about availability of the substances.

*Data Years:* MTF has been conducted annually since 1975, initially with high school seniors; ongoing panel studies of representative samples from each graduating class have been conducted by mail since 1976; annual surveys of 8th and 10th graders were initiated in 1991.

*Coverage:* MTF surveys a sample of high school seniors, 10th graders, and 8th graders selected to be representative of all seniors, 10th graders, and 8th graders in public and private high schools in the continental United States.

*Methodology:* The survey design is a multistage random sample with stage one being selection of particular geographic areas, stage two selection of one or more schools in each area, and stage three selection of students within each school. Data are collected using self-administered questionnaires conducted in the classroom by representatives of the Institute for Social Research. Dropouts and students who are absent on the day of the survey are excluded. Recognizing that the dropout population is at higher risk for drug use, this survey was expanded to include similar nationally representative samples of 8th and 10th graders in 1991, who have lower dropout rates than seniors and include future high-risk 12th grade dropouts. Statistics that are published in the *Dropout Rates in the United States: 2001* (published by the National Center for Educational Statistics, Pub. No. NCES 2005–046) stated that, among persons 15–16 years of age, 3.9 percent have dropped out of school, 2.8 percent for persons 17 years of age, 6.6 percent for persons 18 years of age, and 8.4 percent for persons 19 years of age but dropout rates are higher for certain race and ethnic groups, notably Hispanics.

*Sample Size and Response Rates:* In 2004 approximately 49,500 8th, 10th, and 12th graders in 406 schools were surveyed. The annual senior samples comprised roughly 15,200 seniors in 128 public and private high schools nationwide. The 10th-grade samples involved about 16,800 students in 131 schools, and the 8th-grade samples had approximately 17,400 students in 147 schools. Response rates were 82 percent, 88 percent, and 89 percent for 12th, 10th and 8th graders and have been relatively constant across time. Absentees constitute virtually all of the nonresponding students.

*Issues Affecting Interpretation:* Estimates of substance use for youth based on the National Survey on Drug Use & Health (NSDUH) are not directly comparable with estimates based on the MTF and the Youth Risk Behavior Surveillance System (YRBSS). In addition to the fact that the MTF excludes dropouts and absentees, rates are not directly comparable across these surveys because of differences in populations covered, sample design, questionnaires, interview setting, and statistical approaches to make the survey estimates generalizable to the entire population. The NSDUH survey collects data in homes, whereas the MTF and YRBSS collect data in school classrooms. The NSDUH estimates are tabulated by age, while the MTF and YRBSS estimates are tabulated by grade, representing different ages as well as different populations.

*References:*

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*For More Information:* See the NIDA Web site at http://www.nida.nih.gov/Infofax/HSYouthtrends.html or the Monitoring the Future Web site at www.monitoringthefuture.org/.

## National Ambulatory Medical Care Survey (NAMCS)

### Centers for Disease Control and Prevention National Center for Health Statistics

*Overview:* The National Ambulatory Medical Care Survey (NAMCS) is a national survey designed to provide information about the provision and use of medical care services in office-based physician practices in the United States.

*Selected Content:* Data are collected from medical records on type of providers seen; reason for visit; diagnoses; drugs ordered, provided, or continued; and selected procedures and tests ordered or performed during the visit. Patient data include age, sex, race, and expected source of payment. Data are also collected on selected characteristics of physician practices.

*Data Years:* The NAMCS, which began in 1973, was conducted annually until 1981, once in 1985, and resumed an annual schedule in 1989.

*Coverage:* The scope of the survey covers patient encounters in the offices of nonfederally employed physicians classified by the American Medical Association or American Osteopathic Association as "office-based, patient care" physicians. Patient encounters with physicians engaged in prepaid practices—health maintenance organizations (HMOs), independent practice organizations (IPAs), and other prepaid practices—are included in NAMCS. Excluded are visits to hospital-based physicians, visits to specialists in anesthesiology, pathology, and radiology, and visits to physicians who are principally engaged in teaching, research, or administration. Telephone contacts and nonoffice visits are also excluded.

*Methodology:* A multistage probability design is employed. The first-stage sample consisted of 84 primary sampling units (PSUs) in 1985, and beginning in 1989, 112 PSUs, which were selected from about 1,900 such units into which the United States had been divided. In each sample PSU, a sample of practicing non-Federal office-based physicians is selected from master files maintained by the American Medical Association and the American Osteopathic Association. The final stage involves systematic random samples of office visits during randomly assigned 7-day reporting periods. In 1985 the survey excluded Alaska and Hawaii. Starting in 1989, the survey included all 50 States and the District of Columbia.

The U.S. Census Bureau acts as the data collection agent for the NAMCS. Screening interviews are conducted by Census field representatives to obtain information about physicians' office-based practices and to ensure that the practice is within the scope of the survey. Field representatives visit eligible physicians prior to their participation in the survey to provide them with survey materials and instruct them on how to sample patient visits and complete "Patient Record" forms. Participants are asked to complete forms for a systematic random sample of approximately 30 office visits occurring during a randomly assigned 1-week period, but increasingly Patient Record forms are abstracted by field representatives.

Sample data are weighted to produce national estimates. The estimation procedure used in the NAMCS has three basic components: inflation by the reciprocal of the probability of selection, adjustment for nonresponse, and ratio adjustment to fixed totals.

*Sample Size and Response Rate:* In the 2002 survey, a sample of 3,150 physicians was selected: 2,095 were in scope and 1,492 participated for a response rate of 71 percent. Data were provided on 28,738 visits. In 2003 a sample of 3,000 physicians was selected; 2,007 were in scope and 1,407 participated for a response rate of 67 percent. Data were provided for 25,288 visits.

*Issues Affecting Interpretation:* The NAMCS Patient Record form is modified approximately every 2 years to reflect changes in physician practice characteristics, patterns of care, and technological innovations. Examples of recent changes include the number of drugs recorded on the Patient Record form, and checkboxes for specific tests or procedures performed. Some physician practices are out of scope (e.g., single-specialty radiology practices) which affects the



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generalizability of results. Sample sizes vary by survey year. For some years, it is suggested that analysts combine 2 or more years of data if they wish to examine relatively rare populations or events. In *Health, United States, 2005,* data for survey years 2001–02 were revised to be consistent with the weighting scheme introduced in the 2003 NAMCS data. For more information on the new weighting scheme, see "National Ambulatory Medical Care Survey: 2003 summary," Advance Data From Vital and Health Statistics (forthcoming).

*Reference:*

Woodwell DA , Cherry DK. National Ambulatory Medical Care Survey: 2002 summary. Advance data from vital and health statistics; no 346. Hyattsville, MD: National Center for Health Statistics. 2004.

*For More Information:* See the Ambulatory Health Care Data Web site at www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm.

## National Compensation Survey

### Bureau of Labor Statistics

*Overview:* The National Compensation Survey (NCS) provides comprehensive measures of occupational earnings, compensation cost trends, benefit incidence, and detailed plan provisions.

*Selected Content:* Detailed occupational earnings are collected for metropolitan and nonmetropolitan areas and broad geographic regions, and on a national basis. The Employment Cost Index (ECI) and Employer Costs for Employee Compensation (ECEC) are compensation measures derived from the NCS. ECI measures changes in labor costs. Average hourly employer cost for employee compensation is presented in the ECEC. National benefits data are presented for three broad occupational groupings: professional, technical, and related; clerical and sales; and blue-collar and service employees. Data are also available by goods- and service-producing occupations, union affiliation, and full- and part-time status.

*Data Years:* The NCS replaces three existing BLS surveys: Employment Cost Index (ECI), Occupational Compensation Survey Program (OCSP), and Employee Benefits Survey (EBS). The ECI and EBS were fully integrated into the NCS in 1999. Prior to 1999, the EBS were collected for small private establishments (those employing fewer than 100 workers) and from State and local governments (regardless of employment size). In odd-numbered years, data were collected for medium and large private establishments (those employing 100 workers or more). The ECI was created in the mid-1970s. The EBS was added to an existing data collection effort, the National Pay Survey, in the late 1970s. The Employer Cost for Employee Compensation product was developed in 1987.

*Coverage:* The NCS provides information for the Nation, for 81 metropolitan areas and 73 nonmetropolitan counties representing the United States, and for the 9 census divisions (although not all areas have information for all occupations). It includes both full-time and part-time workers who are paid a wage or salary. It excludes agriculture, fishing and forestry industries, private household workers, and the Federal Government. The NCS only includes establishments with at least 50 workers.

*Methodology:* Conducted quarterly by The Bureau of Labor Statistics' Office of Compensation and Working Conditions, the sample for the NCS is selected using a three-stage design. The first stage involves the selection of areas. The NCS sample consists of 154 metropolitan and nonmetropolitan areas that represent the Nation's 326 metropolitan statistical areas and the remaining portions of the 50 States. In the second stage, establishments are systematically selected with probability of selection proportionate to their relative employment size within the industry. Use of this technique means that the larger an establishment's employment, the greater its chance of selection.

The third stage of sampling is a probability sample of occupations within a sampled establishment. This step is performed by the BLS field economist during an interview with the respondent establishment in which selection of an occupation is based on probability of selection proportionate to employment in the establishment. Each occupation is classified under its corresponding major occupational group using the Occupational Classification System Manual (OCSM) and the Census Occupation Index, which are based on the 1990 U.S. Census.

Data collection is conducted by BLS field economists. Data are gathered from each establishment on the primary business activity of the establishment, types of occupations, number of employees, wages and salaries and benefits, hours of work, and duties and responsibilities. Wage data obtained



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by occupation and work level allows NCS to publish occupational wage statistics for localities, census divisions, and the Nation.

*Sample Size and Response Rates:* The NCS sample consists of 154 metropolitan and nonmetropolitan areas that represent the Nation's 326 metropolitan statistical areas and the remaining portions of the 50 States. The 2003 NCS benefits incidence survey obtained data from 2,924 private industry establishments, representing nearly 103 million workers; of this number, nearly 79 million were full-time workers, and the remainder were part-time workers.

*Issues Affecting Interpretation:* Because the NCS merges separate surveys, trend analyses prior to 2000 should be interpreted with care. The industrial coverage, establishment size coverage, and geographic coverage for the EBS survey changed since 1990. All surveys conducted from 1979 to 1989 excluded part-time employees and establishments in Alaska and Hawaii. The surveys conducted from 1979 to 1986 covered only medium and large private establishments and excluded most of the service industries. Establishments that employed at least 50, 100, or 250 workers, depending on the industry, were included. The survey conducted in 1987 consisted of State and local governments with 50 or more employees. The surveys carried out in 1988 and 1989 included all private-sector establishments that employed 100 or more employees.

The Employer Costs for Employee Compensation (ECEC) switched to new industry and occupation classification systems with the release of the March 2004 data. The 2002 North American Industry Classification System (NAICS) is now used to classify industries and the 2000 Standard Occupational Classification (SOC) system is used to classify occupations. ECEC data by the present classification systems—the 1987 Standard Industrial Classification System (SIC) and the 1990 Occupational Classification System (OCS)—will no longer be produced. The ECEC was the first National Compensation Survey product to make this transition. For more information about this transition see http://www.bls.gov/ncs/ect/sp/ecsm0001.htm.

*References:*

U.S. Department of Labor, Bureau of Labor Statistics, Employer Costs for Employee Compensation Summary—March, 2004, found at www.bls.gov/news.release/ecec.nr0.htm.

The National Compensation Survey: Compensation Statistics for the 21st Century, found at www.bls.gov/opub/cwc/archive/winter2000art1.pdf.

*For More Information:* See the National Compensation Survey Web site at www.bls.gov/ncs.

## National Health Accounts

### Centers for Medicare & Medicaid Services

*Overview:* National Health Accounts provide estimates of how much money is spent on different types of health care-related services and programs in the United States.

*Selected Content:* National Health Expenditures measure spending for health care in the United States by type of service delivered (such as hospital care, physician services, nursing home care) and source of funding for those services (such as private health insurance, Medicare, Medicaid, and out-of-pocket spending).

*Data Years:* Expenditure estimates are available starting from 1960 in data files or in published articles.

*Methodology:* The American Hospital Association (AHA) data on hospital finances are the primary source for estimates relating to hospital care. The salaries of physicians and dentists on the staffs of hospitals, hospital outpatient clinics, hospital-based home health agencies, and nursing home care provided in the hospital setting are considered to be components of hospital care. Expenditures for home health care and for services of health professionals (for example, doctors, chiropractors, private duty nurses, therapists, and podiatrists) are estimated primarily using a combination of data from the U.S. Census Bureau Services Annual Survey and the quinquennial Census of Service Industries.

The estimates of retail spending for prescription drugs are based on household and industry data on prescription drug transactions. Expenditures for other medical nondurables and for vision products and other medical durables purchased in retail outlets are based on estimates of personal consumption expenditures prepared by the U.S. Department of Commerce's Bureau of Economic Analysis, U.S. Bureau of Labor Statistics/Consumer Expenditure Survey; the 1987 National Medical Expenditure Survey and the 1996 Medical Expenditure Panel Survey conducted by the Agency for Healthcare Research and Quality; and spending by Medicare



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and Medicaid. Those durable and nondurable products provided to inpatients in hospitals or nursing homes, and those provided by licensed professionals or through home health agencies are excluded here, but they are included with the expenditure estimates of the provider service category.

Nursing home expenditures cover care rendered in establishments providing inpatient nursing and health-related personal care through active treatment programs for medical and health-related conditions. These establishments cover skilled nursing and intermediate care facilities, including those for the mentally retarded. Spending estimates are primarily based on data from the U.S. Census Bureau's Services Annual Survey and the quinquennial Census of Service Industries.

Expenditures for construction include those spent on the erection or renovation of hospitals, nursing homes, medical clinics, and medical research facilities, but not for private office buildings providing office space for private practitioners. Expenditures for noncommercial research (the cost of commercial research by drug companies is assumed to be imbedded in the price charged for the product; to include this item again would result in double counting) are developed from information gathered by the National Institutes of Health and the National Science Foundation.

Source of funding estimates likewise come from a multiplicity of sources. Data on the Federal health programs are taken from administrative records maintained by the servicing agencies. Among the sources used to estimate State and local government spending for health are the U.S Census Bureau's Government Finances and the National Academy of Social Insurance reports on State-operated workers' compensation programs. Federal and State and local expenditures for education and training of medical personnel are excluded from these measures where they are separable. For the private financing of health care, data on the financial experience of health insurance organizations come from special Centers for Medicare & Medicaid Services analyses of private health insurers and from the Bureau of Labor Statistics' survey on the cost of employer-sponsored health insurance and on consumer expenditures. Information on out-of-pocket spending from the U.S. Census Bureau Services Annual Survey; U.S. Bureau of Labor Statistics Consumer Expenditure Survey; the 1987 National Medical Expenditure Survey and the Medical Expenditure Panel Surveys conducted by the Agency for Healthcare Research and Quality; and from private surveys conducted by the American Hospital Association, American Medical Association, American Dental Association, and IMS Health, an organization that collects data from the pharmaceutical industry, is used to develop estimates of direct spending by customers.

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Growth Slows In 2003. Health Affairs; 4(1):185–194. 2005.

Levit K, Smith C, Cowan C, Sensenig A, Catlin A, and the Health Accounts Team. Health Spending Rebound Continues in 2002. Health Affairs; 23(1):147–159. 2004.

*For More Information:* See the Centers for Medicare & Medicaid Services National Health Accounts Web site at http://cms.hhs.gov/statistics/nhe.

### State Health Expenditures

*Overview:* Estimates of personal health care spending by State are created using the same definitions of health care sectors used in producing the National Health Expenditures (NHE). These estimates are useful in measuring the role of health spending in States' economies.

*Selected Content:* Health Accounts by State provide estimates of health care spending by type of establishment delivering care (such as hospitals, physicians and clinics, and nursing homes) and for medical products (such as prescription drugs, over-the-counter medicines and sundries, and durable medical products such as eyeglasses and hearing aids) purchased in retail outlets. Source of funding estimates by State are also provided for Medicare and Medicaid.

*Data Years:* Annual State health expenditures are available for 1980–98.

*Methodology:* The same data sources used in creating NHE are also used to create State estimates whenever possible. Additional sources are employed when surveys used to create valid national estimates lack sufficient sample size to create valid State-level estimates. State-level data are used to estimate State-by-State distribution of health spending, and NHE national totals for the specific type of service or source of funds are used to control the level of State-by-State distributions. This procedure implicitly assumes that national spending estimates can be created more accurately than State-specific expenditures.



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The NHE data that were used as national totals for these State estimates were published in *Health, United States, 2001*, and differ from the sum of State estimates because national totals included expenditures for persons living in U.S. territories and for military and Federal civilian employees and their families stationed overseas. The sum of the State-level expenditures exclude health spending for those groups. Starting with *Health, United States, 2002*, NHE reflect new data and benchmark revisions incorporated after completion of the State estimates and incorporate a conceptual revision to exclude spending for persons living in U.S. territories and military and Federal civilian employees and their families living overseas.

Starting in *Health, United States, 2002*, State estimates are based on the location of the beneficiary's residence. This differs from previous estimates published in *Health, United States*, which presented spending based on the health care provider's location. State estimates were first constructed based on the provider's location because data available to estimate spending by State primarily comes from providers and represents the State-of-provider location. However, the most useful unit for analyzing spending trends and differences are per capita units, which are based on spending estimates for the State in which people reside. Therefore, State-of-provider-based expenditures are adjusted to a State-of-residence basis using interstate border-crossing flow patterns that represent travel patterns across State borders for health care.

Data for the interstate border-crossing flow patterns are based on Medicare claims. Medicare is the only comprehensive source on which to base interstate flows of spending between State-of-provider and State-of-beneficiary residence. Data for non-Medicare payers (excluding Medicaid) are also based on Medicare flow patterns but are further adjusted for age-specific service mix variation in hospital and physician services. Medicaid services are not adjusted because it is assumed that care provided to eligible State residents is most often provided by in-State providers and further assumed that spending by Medicaid is identical on a residence and provider basis.

In addition to differences noted earlier, national totals for residence-based State health expenditures may differ slightly from national totals for provider-based expenditures because of inflows and outflows of health care spending to the U.S. territories. Because flow patterns are based on Medicare data, we are able to adjust for services that Medicare beneficiaries receive outside of the United States and for services received by Medicare beneficiaries in the United States who either live in the U.S. territories or in other countries. Similar adjustments for the non-Medicare, non-Medicaid population are not possible.

*For More Information:* See the Centers for Medicare & Medicaid Services National Health Expenditures Web site at http://cms.hhs.gov/statistics/nhe/#state.

## National Health Care Survey (NHCS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Health Care Survey (NHCS) is a family of surveys that collect data from medical records of health care providers and establishments about the utilization of health services and characteristics of providers and their patients.

*Selected Content:* The components of the NHCS represent the major sectors of the U.S. health care system providing data on ambulatory, inpatient, and long-term care settings. This family of surveys includes the following components:

- National Ambulatory Medical Care Survey (NAMCS)
- National Hospital Ambulatory Medical Care Survey (NHAMCS)
- National Hospital Discharge Survey (NHDS)
- National Survey of Ambulatory Surgery (NSAS)
- National Home and Hospice Care Survey (NHHCS)
- National Nursing Home Survey (NHHS)

*Methodology:* Each survey in the family is based on a multistage sampling design that includes the health care facilities or providers and their records. Data are collected through abstraction of medical records, completion of encounter forms, compilation of data from State and professional associations, purchase of data from commercial abstraction services, and surveys of providers. Data from all survey components are collected from the establishment, and in no case is information received directly from the person receiving care.

*For More Information:* See the NHCS Web site at www.cdc.gov/nchs/nhcs.htm.



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## National Health and Nutrition Examination Survey (NHANES)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Health and Nutrition Examination Survey (NHANES) program includes a series of cross-sectional nationally representative health examination surveys conducted in mobile examination units or clinics (MECs). In the first series of surveys, the National Health Examination Survey (NHES), data were collected on the prevalence of certain chronic diseases, the distributions of various physical and psychological measures, and measures of growth and development. In 1971 a nutrition surveillance component was added and the survey name changed to the National Health and Nutrition Examination Survey.

*Selected Content:* The NHANES surveys have collected data on chronic disease prevalence and conditions (including undiagnosed conditions) and risk factors such as obesity and smoking, serum cholesterol levels, hypertension, diet and nutritional status, immunization status, infectious disease prevalence, health insurance, and measures of environmental exposures. Other topics addressed include hearing, vision, mental health, anemia, diabetes, cardiovascular disease, osteoporosis, oral health, mental health, pharmaceuticals used, and physical fitness.

NHES I data were collected on the prevalence of certain chronic diseases as well as the distributions of various physical and psychological measures, including blood pressure and serum cholesterol levels. NHES II and NHES III focused on factors related to growth and development in children and youth.

In NHANES I, data were collected on indicators of the nutritional and health status of the American people through dietary intake data, biochemical tests, physical measurements, and clinical assessments for evidence of nutritional deficiency. Detailed examinations were given by dentists, ophthalmologists, and dermatologists, with an assessment of need for treatment. In addition, data were obtained for a subsample of adults on overall health care needs and behavior, and more detailed examination data were collected on cardiovascular, respiratory, arthritic, and hearing conditions. For NHANES II the nutrition component was expanded. In the medical area primary emphasis was placed on diabetes, kidney and liver functions, allergy, and speech pathology. The third National Health and Nutrition Examination Survey (NHANES III) also included data on antibodies, spirometry, and bone health.

Beginning in 1999 with continuous NHANES, new topics include cardiorespiratory fitness, physical functioning, lower extremity disease, full body scan (DXA) for body fat as well as bone density, and tuberculosis infection.

*Data Years:* Data have been collected from surveys conducted during 1960–62 (NHES I), 1963–65 (NHES II), 1966–70 (NHES III), 1971–74 (NHANES I), 1976–80 (NHANES II), 1982–84 (HHANES), and 1988–94 (NHANES III). Beginning in 1999, the survey has been conducted continuously.

*Coverage:* With the exception of the Hispanic Health and Nutrition Examination Survey (see *Methodology*, below), the NHES and NHANES provide estimates of the health status of the civilian noninstitutionalized population of the United States. NHES II and NHES III examined probability samples of the Nation's noninstitutionalized children ages 6–11 years and 12–17 years, respectively.

The NHANES I target population was the civilian noninstitutionalized population 1–74 years of age residing in the coterminous United States, except for people residing on any of the reservation lands set aside for the use of American Indians.

The NHANES II target population was the civilian noninstitutionalized population 6 months–74 years of age residing in the United States, including Alaska and Hawaii.

In Hispanic Health and Nutrition Examination Survey (HHANES) three geographically and ethnically distinct populations were studied: Mexican Americans living in Texas, New Mexico, Arizona, Colorado, and California; Cuban Americans living in Dade County, Florida; and Puerto Ricans living in parts of New York, New Jersey, and Connecticut.

The NHANES III target population was the civilian noninstitutionalized population 2 months of age and over. The sample design provided for oversampling among children 2–35 months of age, persons 70 years of age and over, black Americans, and Mexican Americans.

Beginning in 1999 NHANES oversampled low-income persons, adolescents 12–19 years of age, persons 60 years of age and over, African Americans, and Mexican Americans.



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The sample is not designed to give a nationally representative sample for the total population of Hispanics residing in the United States.

*Methodology:* The NHANES includes clinical examinations, selected medical and laboratory tests, and self-reported data. The NHANES and previous surveys interviewed persons in their homes and conducted medical examinations, including laboratory analysis of blood, urine, and other tissue samples. Medical examinations and laboratory tests follow very specific protocols and are as standard as possible to ensure comparability across sites and providers. In addition to the MEC examinations, a small number of survey participants receive an abbreviated health examination in their homes if they are unable to come to the MEC.

For the first program or cycle of the NHES I, a highly stratified multistage probability sample was selected to represent the 111 million civilian noninstitutionalized adults 18–79 years of age in the United States at that time. The sample areas consisted of 42 primary sampling units (PSUs) from the 1,900 geographic units. NHES II and NHES III were also multistage stratified probability samples of clusters of households in land-based segments. NHES II and III used the same 40 PSUs.

For NHANES I the sample areas consisted of 65 PSUs. A subsample of persons 25–74 years of age was selected to receive the more detailed health examination. Groups at high risk of malnutrition were oversampled.

NHANES II used a multistage probability design that involved selection of PSUs, segments (clusters of households) within PSUs, households, eligible persons, and finally, sample persons. The sample design provided for oversampling among persons 6 months–5 years of age, 60–74 years of age, and those living in poverty areas.

HHANES was similar in content and design to NHANES I and II. The major difference between HHANES and the previous national surveys is that HHANES used a probability sample of three special subgroups of the population living in selected areas of the United States rather than a national probability sample. The three HHANES universes included approximately 84, 57, and 59 percent of the respective 1980 Mexican-, Cuban-, and Puerto Rican-origin populations in the continental United States.

The survey for the NHANES III was conducted from 1988 to 1994 and consisted of two phases of equal length and sample size. Phase 1 and Phase 2 comprised random samples of the civilian U.S. population living in households. About 40,000 persons 2 months of age and over were selected and asked to complete an extensive interview and an examination. Participants were selected from households in 81 counties across the United States. Children age 2 months to 5 years and persons 60 years of age and over were oversampled to provide precise descriptive information on the health status of selected population groups of the United States

Beginning in 1999, NHANES became a continuous, annual survey, which also allows increased flexibility in survey content. Since April 1999, NHANES collects data every year from a representative sample of the civilian U.S. population, newborns and older, by in-home personal interviews and physical examinations in the MEC. The sample design is a complex, multistage, clustered design using unequal probabilities of selection. The first-stage sample frame for continuous NHANES during 1999–2001 was the list of PSUs selected for the design of the National Health Interview Survey (NHIS). Typically, an NHANES PSU is a county. For 2002, an independent sample of PSUs (based on current census data) was selected. This independent design will be used for the period 2002–06. For 1999, because of delay in the start of data collection, 12 distinct PSUs were in the annual sample. For each year 2000–02, 15 PSUs were selected. The within-PSU design involves forming secondary sampling units that are nested within census tracts, selecting dwelling units within secondary units, and then selecting sample persons within dwelling units. The final sample person selection involves differential probabilities of selection according to demographic variables sex (male or female), race/ethnicity (Mexican American, black, all others), and age. Because of the differential probabilities of selection, dwelling units are screened for potential sample persons. Sample weights are available and should be used in estimation of descriptive statistics. The complex design features should be used in estimating standard errors for the descriptive estimates.

The estimation procedure used to produce national statistics for all NHANES involved inflation by the reciprocal of the probability of selection, adjustment for nonresponse, and poststratified ratio adjustment to population totals. Sampling errors also were estimated to measure the reliability of the statistics.



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*Sample Size and Response Rates:* NHES I sampled 7,710 adults. The examination response rate was 86.5 percent. NHES II sampled 7,417 children and reported a response rate of 96 percent for the questionnaire sample and 73 percent for the examination sample. NHES III sampled 7,514 youths and reported a response rate of 90 percent.

A sample of 28,043 persons was selected for NHANES I. Household interviews were completed for more than 96 percent of the persons selected, and about 75 percent (20,749) were examined. A sample of 27,801 persons was selected for NHANES II; 73.1 percent (20,322 persons) were examined.

In the HHANES, 9,894 persons in the Southwest were selected (75 percent or 7,462 were examined); in Dade County, 2,244 persons were selected (60 percent or 1,357 were examined); and, in the Northeast, 3,786 persons were selected (75 percent or 2,834 were examined). Over the 6-year survey period of NHANES III, 39,695 persons were selected, the household interview response rate was 86 percent, and the medical examination response rate was 78 percent.

In the sample selection for NHANES 1999–2000, there were 22,839 dwelling units screened. Of these, 6,005 households had at least one eligible sample person identified for interviewing. A total of 12,160 eligible sample persons were identified. The overall response rate in NHANES 1999–2000 for those interviewed was 81.9 percent (9,965 of 12,160), and the response rate for those examined was 76.3 percent (9,282 of 12,160). For NHANES 2001–02 there were 13,156 persons selected in the sample, of which 83.9 percent (11,039) were interviewed and 79.7 percent (10,480) of the 13,156 selected completed the health examination component of the survey.

*Issues Affecting Interpretation:* Data elements, lab tests performed, and the technological sophistication of medical examination and laboratory equipment have changed over time. Therefore, trend analyses should carefully examine how specific data elements were collected across the different NHANES and NHES surveys.

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*For More Information:* See the NHANES Web site at www.cdc.gov/nchs/nhanes.htm.

## National Health Interview Survey (NHIS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Health Interview Survey (NHIS) monitors the health of the U.S. population through the collection and analysis of data on a broad range of health



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topics. A major strength of this survey lies in the ability to analyze health measures by many demographic and socioeconomic characteristics.

*Selected Content:* The NHIS obtains information during household interviews on illnesses, injuries, activity limitation, chronic conditions, health insurance coverage, utilization of health care, and other health topics. Demographic data include gender, age, education, race/ethnicity (reported by respondent or proxy), place of birth, income, and place of residence. Other data collected include risk factors, such as lack of exercise, smoking, alcohol consumption, and use of prevention services such as vaccinations, mammography, and pap smears. Special modules and supplements focus on different issues each year and have included topics, such as HIV/AIDS, aging, cancer screening, prevention, alternative and complementary medicine, and many other topics.

*Data Years:* The NHIS has been conducted annually since 1957, with a major redesign every 10–15 years.

*Coverage:* The NHIS covers the civilian noninstitutionalized population of the United States. Excluded are patients in long-term care facilities, persons on active duty with the Armed Forces (although their dependents are included), and U.S. nationals living in foreign countries.

*Methodology:* The NHIS is a cross-sectional household interview survey. Sampling and interviewing are continuous throughout each year. The sampling plan follows a multistage area probability design that permits the representative sampling of households. The sampling plan was last redesigned in 1995. Information for only the current sampling plan covering the design years of 1995–2004 is presented. The first stage consists of a sample of 358 primary sampling units (PSUs) drawn from approximately 1,900 geographically defined PSUs that cover the 50 States and the District of Columbia. A PSU consists of a county, a small group of contiguous counties, or a metropolitan statistical area.

Within a PSU, two types of second-stage units are used: area segments and permit area segments. Area segments are defined geographically and contain an expected 8 or 12 addresses. Permit area segments cover geographical areas containing housing units built after the 1990 census. The permit area segments are defined using updated lists of building permits issued in the PSU since 1990 and contain an expected four addresses. Within each segment all occupied households at the sample addresses are targeted for interview.

The total NHIS sample of PSUs is subdivided into four separate panels, or subdesigns, such that each panel is a representative sample of the U.S. population. This design feature has a number of advantages, including flexibility for the total sample size. The households selected for interview each week in the NHIS are a probability sample representative of the target population.

The NHIS that was fielded from 1982–96 consisted of two parts: (1) a set of basic health and demographic items (known as the Core questionnaire), and (2) one or more sets of questions on current health topics (known as Supplements). The Core questionnaire remained the same over that time period whereas the current health topics changed depending on data needs.

The NHIS questionnaire revision first implemented in 1997 has three parts or modules: a Basic module, a Periodic module, and a Topical module. The Basic module corresponds to the core questionnaire before revision. It remains largely unchanged from year to year and allows for trend analysis and for data from more than 1 year to be pooled to increase sample size for analytic purposes. The Basic module contains three components: the Family Core, the Sample Adult Core, and the Sample Child Core. The Family Core component collects information on everyone in the family and allows the NHIS to serve as a sampling frame for additional integrated surveys as needed. Information collected on the Family Core for all family members includes household composition and sociodemographic characteristics, tracking information, information for matches to administrative data bases, health insurance coverage, and basic indicators of health status and utilization of health care services.

From each family in the NHIS, one sample adult and, for families with children under 18 years of age, one sample child are randomly selected to participate in the Sample Adult Core and the Sample Child Core questionnaires. Because some health issues are different for children and adults, these two questionnaires differ in some items but both collect basic information on health status, use of health care services, health conditions, and health behaviors.

*Sample Size and Response Rates:* Since 1997, the sample numbered about 100,000 persons with about 30,000 persons participating in the sample adult and about 15,000 persons in the sample child questionnaire. In recent years, the total household response rate was about 90 percent. Response rates for special health topics (supplements) have generally



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been lower. For example, the response rate was 80 percent for the 1994 Year 2000 Supplement, which included questions about cigarette smoking and use of such preventive services as mammography. Since 1997, the final response rate for the sample adult supplement was 70–80 percent and 78–84 percent for the sample child supplement.

*Issues Affecting Interpretation:* In 1997, the questionnaire was redesigned and some basic concepts were changed and other concepts were measured in different ways. For some questions, there was a change in the reference period. Also in 1997, the collection methodology changed from paper and pencil questionnaires to computer-assisted personal interviewing (CAPI). Because of the major redesigns of the questionnaire in 1997, most trend tables in *Health, United States* begin with 1997 data. Starting with *Health, United States, 2005*, estimates for 2000 and later years use weights derived from the 2000 census.

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*For More Information:* See the NHIS Web site at http://www.cdc.gov/nchs/nhis.htm.

## National Health Provider Inventory (NHPI)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Health Provider Inventory (NHPI) is an inventory of nursing homes, home health agencies, and hospices. The NHPI and its predecessor inventories served as sampling frames for the NCHS National Nursing Home Survey and National Home and Hospice Care Survey.

*Selected Content:* Information collected included facility ownership, size, services provided, geographic location, and some resident or client characteristics.

*Data Years:* The NHPI was conducted in 1991 and has not been repeated.

*Coverage:* The NHPI included nursing homes, board and care homes, home health agencies, and hospices.

*Methodology:* The National Master Facility Inventories (NMFIs), forerunners of the National Health Provider Inventory (NHPI), were a series of inventories of inpatient health facilities in the United States conducted by NCHS. The inventories included hospitals, nursing and related-care homes, and other custodial care facilities. The last NMFI was conducted in 1982. In 1986 the inventory was changed to the Inventory of Long-Term Care Places (ILTCP) and included nursing and related-care homes and facilities for the mentally retarded. In 1991 the inventory was changed to NHPI.

## National Home and Hospice Care Survey (NHHCS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Home and Hospice Care Survey (NHHCS) collects data on the characteristics and care provided by home health care agencies and hospices as well as characteristics of patients receiving these services.

*Selected Content:* The NHHCS provides information on home health and hospice care from two perspectives—that of the provider of services and that of the recipient. Data collected at the home health care and hospice agency level include number of clients served, ownership and affiliations, certification status, and services provided. At the patient level, data are collected on demographic characteristics, diagnoses, living arrangements, caregiver status, enrollment date, discharge disposition (for discharge sample), selected therapies and treatments provided, aids and special devices used, activities of daily living (ADL) assistance received from the agency, vision and hearing impairments, continence, payment source, and care charges.

*Data Years:* Initiated in 1992, the NHHCS was also conducted in 1993, 1994, 1996, 1998, and 2000. The survey is currently undergoing a major redesign.



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*Coverage:* The survey covers agencies and the current patients and discharges from agencies that provide home health and hospice care services in the United States. Agencies may be freestanding health facilities or units of larger organizations, such as hospitals or nursing homes. Agencies providing only durable medical equipment are excluded. Only agencies providing home health or hospice care services to patients at the time of the survey are eligible to participate.

*Methodology:* The sample design for the 1992–94 NHHCS was a stratified three-stage probability design. Primary sampling units were selected at the first stage, agencies were selected at the second stage, and up to six current patients and six discharges were selected at the third stage. The sample design for the 1996, 1998, and 2000 NHHCS was a two-stage probability design in which agencies were selected at the first stage and current patients and discharges were selected at the second stage. Current patients were those on the rolls of the agency as of midnight the day before the survey. Discharges were selected to estimate the number of discharges from the agency during the 12 months before the survey. Agency characteristics were obtained through interviews with the agency administrators and staff. Sample patients and discharges were selected, and questionnaires were completed by interviewing the staff member most familiar with the care provided to the patient. Respondents were requested to refer to the medical records for the patient.

Estimates based on the NHHCS are derived by a multistage estimation procedure that has three principle components: inflation by the reciprocals of the probabilities of sample selection; adjustment for nonresponse; and ratio adjustment to fixed totals. The data from the surveys are adjusted for three types of nonresponse: an in-scope sample agency did not respond; an agency did not complete the sampling lists used to select the patient or discharge samples; and the agency did not complete the questionnaire for the sample patient or discharge.

*Sample Size and Response Rates:* The original sampling frame consisted of all home health care agencies and hospices identified in the 1991 National Health Provider Inventory (NHPI). The 1992 sample contained 1,500 agencies. These agencies were revisited during the 1993 survey (excluding agencies that had been found to be out of scope for the survey). In 1994 in-scope agencies identified in the 1993 survey were revisited, along with 100 newly identified agencies added to the sample. In 1996, the universe was again updated and a new sample of 1,200 agencies was drawn. In 1998, a sample of 1,350 agencies was selected from a universe of home health agencies and hospices obtained from various national organizations and other sources. In 2000, 1,800 agencies were sampled from the universe that was obtained from SMG Home Healthcare Market Database and the membership list of the National Hospice and Palliative Care Organization. The response rates during the 1992–2000 survey years have been greater than 92 percent at the agency level, mid-90 to mid-80 percent for current patients, and low 90 to low 80 percent for discharges.

*Issues Affecting Interpretation:* Characteristics of agencies and current patients reflect the situation on a given day when the survey was being conducted. Because frequent short-term users are less likely to be enrolled with the agency on any given day than long-term users, the current patient component tends to underestimate those patients with a very short length of service. The discharge component is designed to estimate the number of discharges that occur over a 12-month period. Estimates of discharges may underestimate those patients who tend to receive care for longer periods of time. Caution should be made in comparing estimates from the resident and discharge samples. Finally, various survey items have been added or modified over the survey years, which may preclude comparisons from previous years or trend analyses.

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*For More Information:* See the National Health Care Survey (NHCS) Web site at www.cdc.gov/nchs/nhcs.htm or the National Home and Hospice Care Survey Web site at www.cdc.gov/nchs/about/major/nhhcsd/nhhcsd.htm.

## National Hospital Ambulatory Medical Care Survey (NHAMCS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Hospital Ambulatory Medical Care Survey (NHAMCS) collects data on the utilization and provision of medical care services provided in hospital emergency and outpatient departments.

*Selected Content:* Data are collected from medical records on type of providers seen; reason for visit; diagnoses; drugs ordered, provided, or continued; and selected procedures and tests performed during the visit. Patient data include age, sex, race, and expected source of payment. Data are also collected on selected characteristics of hospitals included in the survey.

*Data Years:* Annual data collection began in 1992.

*Coverage:* The survey is a representative sample of visits to emergency departments (EDs) and outpatient departments (OPDs) of non-Federal, short-stay, or general hospitals. Telephone contacts are excluded.

*Methodology:* A four-stage probability sample design is used in NHAMCS, involving samples of primary sampling units (PSUs), hospitals within PSUs, clinics within OPDs, and patient visits within clinics. The first stage sample of the NHAMCS consists of 112 PSUs selected from 1,900 such units comprising the United States. Within PSUs, 600 general and short-stay hospitals were sampled and assigned to 1 of 16 panels. In any given year, 13 panels are included. Each panel is assigned to a 4-week reporting period during the calendar year.

In the NHAMCS outpatient department survey, a clinic is defined as an administrative unit of the OPD in which ambulatory medical care is provided under the supervision of a physician. Clinics where only ancillary services, such as radiology, laboratory services, physical rehabilitation, renal dialysis, and pharmacy, are provided, or other settings in which physician services are not typically provided, are considered out of scope. If a hospital OPD has five or fewer in-scope clinics, all are included in the sample. For hospital OPDs with more than five clinics, a systematic sample of clinics proportional to size is included in the survey.

The U.S. Census Bureau acts as the data collection agent for the NHAMCS. Census field representatives contact sample hospitals to determine whether they have a 24-hour ED or an OPD that offers physician services. Visits to eligible EDs and OPDs are systematically sampled over the 4-week reporting period such that about 100 ED encounters and about 200 OPD encounters are selected. Hospital staff are asked to complete "Patient Record" forms for each sampled visit, but Census field representatives typically abstract data for more than half of these visits.

Sample data are weighted to produce national estimates. The estimation procedure used in the NHAMCS has three basic components: inflation by the reciprocal of the probability of selection, adjustment for nonresponse, and ratio adjustment to fixed totals.

*Sample Size and Response Rates:* In any given year, the hospital sample consists of approximately 500 hospitals, of which 80 percent have EDs and about half have eligible OPDs. Typically, about 1,000 clinics are selected from participating hospital OPDs. In 2002 the number of patient record forms (PRFs) completed for EDs was 37,337 and for OPDs 35,586. In 2003 the number of PRFs completed for EDs was 40, 253 and for OPDs 34,492. In 2002 the hospital response rate for NHAMCS was 95 percent for EDs and 87 percent for OPDs. In 2003 the hospital response rate was 85 percent for EDs and 83 percent for OPDs.

*Issues Affecting Interpretation:* The NHAMCS PRF is modified approximately every 2 years to reflect change in physician practice characteristics, patterns of care, and technological innovations. Examples of recent changes are the number of drugs recorded on the PRF form, and checkboxes of specific tests or procedures performed. For analyses that present visit rates per population, the civilian noninstitutionalized population is used as the denominator. However, visits to hospital EDs or OPDs can also include persons who reside in institutional settings.

*Reference:*

McCaig LF, McLemore T. Plan and operation of the National Hospital Ambulatory Medical Care Survey.



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National Center for Health Statistics. Vital Health Stat Series no 1(34). 1994.

*For More Information:* See the National Health Care Survey (NHCS) Web site at www.cdc.gov/nchs/nhcs.htm or the Ambulatory Health Care Web site at www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm.

## National Hospital Discharge Survey (NHDS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Hospital Discharge Survey (NHDS) collects and produces national estimates on characteristics of inpatient stays in non-Federal short-stay hospitals in the United States.

*Selected Content:* Patient information collected includes demographics, length of stay, diagnoses, and procedures. Hospital characteristics collected include region, ownership, and bedsize.

*Data Years:* The NHDS has been conducted annually since 1965.

*Coverage:* The survey design covers the 50 States and the District of Columbia. Included in the survey are hospitals with an average length of stay of less than 30 days for all inpatients, general hospitals, and children's general hospitals. Excluded are Federal, military, and Department of Veterans Affairs hospitals, as well as hospital units of institutions (such as prison hospitals), and hospitals with fewer than six beds staffed for patient use. All discharged patients from in-scope hospitals are included in the survey; however, newborns are not included in *Health, United States*.

*Methodology:* The design implemented in 1965 continued through 1987, and a redesign with a new sample of hospitals fielded in 1988 is currently in place. The sample for the 1965 NHDS was selected in 1964 from a frame of short-stay hospitals listed in the National Master Facility Inventory. A two-stage stratified sample design was used, with hospitals stratified according to bedsize and geographic region. Sample hospitals were selected with probabilities ranging from certainty for the largest hospitals to 1 in 40 for the smallest hospitals. Within each participating hospital, a systematic random sample was selected from a daily listing sheet of discharges. Within-hospital sampling rates for discharges varied inversely with the probability of hospital selection, so the overall probability of selecting a discharge was approximately the same across the sample.

Data collection was conducted by means of manual abstraction of patient information from sampled medical records. Sample selection and transcription of information from inpatient medical records to NHDS survey forms were performed by hospital staff, representatives of NCHS, or both. In 1985, a second data collection procedure was introduced. The procedure involved the purchase of computer data tapes from commercial abstracting services that contained automated discharge data for some hospitals participating in the NHDS. This procedure was used in approximately 17 percent of the sample hospitals for 1985–87. Discharges on these computer files were subjected to the NHDS sampling specifications as well as the computer edits and estimation procedures. Two data collection methods, manual and automated, continue to be used in the NHDS.

A redesign of the NHDS was implemented for the 1988 survey. Under the redesign, hospitals were selected using a modified three-stage stratified design. Units selected at the first stage consisted of either hospitals or geographic areas. The geographic areas were Primary Sample Units (PSUs) used for the 1985–94 National Health Interview Survey, which are geographic areas such as counties or townships. Hospitals within PSUs were then selected at the second stage. Strata at this stage were defined by geographic region, PSU size, abstracting service status, and hospital specialty-size groups. Within these strata, hospitals were selected with probabilities proportional to their annual number of discharges. At the third stage, a sample of discharges was selected by a systematic random sampling technique. The sampling rate was determined by the hospital's sampling stratum and the type of data collection system (manual or automated) used. Discharge records from hospitals submitting data via commercial abstracting services and selected State data systems (approximately 41 percent of sample hospitals) were arrayed by primary diagnoses, patient sex and age group, and date of discharge, before sampling.

The NHDS hospital sample is updated every 3 years by continuing the sampling process among hospitals that become eligible for the survey during the intervening years and by deleting hospitals that were no longer eligible. This process was conducted in 1991, 1994, 1997, 2000, and 2003.



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The basic unit of estimation for NHDS is a sampled discharge. The basic estimation procedure involves inflation by the reciprocal of the probability of selection. There are adjustments for nonresponding hospitals and discharges; a postratio adjustment to fixed totals is employed.

*Sample Size and Response Rate:* In 2003, 501 hospitals were selected: 479 were within scope, 426 participated (89 percent), and approximately 320,000 medical records were abstracted.

*Issues Affecting Interpretation:* In 1988, the NHDS was redesigned. Caution is required in comparing trend data from before and after the redesign There are also annual modifications to the ICD–9–CM affecting diagnoses and procedure categories. See related Appendix II, *ICD–9–CM*, tables IX and X.

Hospital utilization rates per 1,000 population were computed using estimates of the civilian population of the United States as of July 1 of each year. Rates for 1990 through 1999 use postcensal estimates of the civilian population based on the 1990 census adjusted for net underenumeration using the 1990 National Population Adjustment Matrix from the U.S. Census Bureau. The estimates for 2000 and beyond that appear in *Health, United States, 2003* and later editions were calculated using estimates of the civilian population based on census 2000, and therefore are not strictly comparable with postcensal rates calculated for the 1990s. See related *Population Census and Population Estimates* in Appendix I.

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*For More Information:* See the National Health Care Survey Web site at www.cdc.gov/nchs.nhcs.htm or the National Hospital Discharge Survey Web site at www.cdc.gov/nchs/about/major/hdasd/nhds.htm.

## National Immunization Survey (NIS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics and National Immunization Program

*Overview:* The National Immunization Survey (NIS) is a continuing nationwide telephone sample survey to monitor vaccination coverage rates among children 19–35 months of age.

*Selected Content:* Data collected include vaccination status and timing for diphtheria, tetanus toxoids, and pertussis vaccine (DTP/DT/DTaP); Polio vaccine; Measles, mumps, and rubella vaccine (MMR); Haemophilius influenzae type b vaccine (Hib); Hepatitis B vaccine (Hep B); Varicella vaccine; Pneumococcal conjugate vaccine (PCV); and Combined series (4:3:1:3) by race/ethnicity, poverty status, location of residence, geographic division, State, and selected urban areas.

*Data Years:* Annual data collection was initiated beginning with the data year 1994. Data collection for Varicella began in July 1996; data collection for PCV began in July 2001.

*Coverage:* Children 19–35 months of age in the civilian noninstitutionalized population are represented in this survey. Estimates of vaccine-specific coverage are available for the Nation, States, and 28 urban areas. In 2003, about 81.3 percent of the age-eligible children were up-to-date for the 4:3:1:3 series.

*Methodology:* The NIS is a nationwide telephone sample survey of households with age-eligible children. The NIS uses a two-phase sample design. First, a random-digit dialing (RDD) sample of telephone numbers is drawn. When households with age-eligible children are contacted, the interviewer collects information on the vaccinations received by all age-eligible children and obtains permission to contact the children's immunization providers. In the second phase, immunization providers are sent vaccination history questionnaires by mail. Providers' responses are compared with information obtained from households to provide a more accurate estimate of vaccination coverage levels. Final



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estimates are adjusted for households without telephones and nonresponse.

*Sample Size and Response Rates:* In 2003, vaccination data were collected for 30,930 children aged 19–35 months. In 2003 the household interview rate was 69.8 percent. Vaccination information from providers was obtained for 69 percent of all children who were eligible for provider follow-up in 2003.

*Issues Affecting Interpretation:* For the 1998 data year, a new estimation procedure was implemented to obtain vaccination coverage rates from the provider data. Published estimates of vaccination coverage based on NIS data for years prior to 1998 (e.g., estimates published in MMWR articles) may differ slightly from estimates published in *Health, United States* and on the NIS Web site for the same NIS data. All public-use data files include the sampling weight for the new estimation procedure.

*References:*

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*For More Information:* See the NIS Web site at http://www.cdc.gov/nis.

## National Medical Expenditure Survey (NMES)—See Medical Expenditure Panel Survey

## National Notifiable Disease Surveillance System (NNDSS)

### Centers for Disease Control and Prevention

*Overview:* This system provides weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists.

*Selected Content:* Data include incidence of reportable diseases using uniform case definitions.

*Data Years:* The first annual summary of The Notifiable Diseases in 1912 included reports of 10 diseases from 19 States, the District of Columbia, and Hawaii. By 1928, all States, the District of Columbia, Hawaii, and Puerto Rico were participating in national reporting of 29 specified diseases. At their annual meeting in 1950, the State and Territorial Health Officers authorized a conference of State and territorial epidemiologists whose purpose was to determine which diseases should be reported to the Public Health Service. In 1961, CDC assumed responsibility for the collection and publication of data concerning nationally notifiable diseases.

*Coverage:* Notifiable disease reports are received from health departments in the 50 States, five territories, New York City, and the District of Columbia. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction, depending on case status classification (i.e., confirmed, probable, or suspect).

*Methodology:* CDC, in partnership with the Council of State and Territorial Epidemiologists (CSTE), operates the National Notifiable Diseases Surveillance System (NNDSS). Notifiable disease surveillance is conducted by public health practitioners at local, State, and national levels to support disease prevention and control activities. The system also provides annual summaries of the data. CSTE and CDC annually review the status of national infectious disease surveillance and recommend additions or deletions to the list of nationally notifiable diseases based on the need to respond to emerging priorities. For example, Q fever and tularemia became nationally notifiable in 2000. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and State level. Therefore, the list of diseases that are considered notifiable varies slightly by State. For example, reporting of cyclosporiasis to CDC is not done by some States in which this disease is not notifiable to local or State authorities.

State epidemiologists report cases of notifiable diseases to CDC, which tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States* (entitled *Annual Summary* before 1985).

*Issues Affecting Interpretation:* These data must be interpreted in light of reporting practices. Some diseases that cause severe clinical illness (for example, plague and rabies) are



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most likely reported accurately if diagnosed by a clinician. However, persons who have diseases that are clinically mild and infrequently associated with serious consequences (for example, salmonellosis) might not seek medical care from a health care provider. Even if these less severe diseases are diagnosed, they are less likely to be reported.

The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of State and local officials responsible for disease control and public health surveillance. Finally, factors such as changes in case definitions for public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

*Reference:*

Centers for Disease Control and Prevention. Summary of notifiable diseases—United States, 2003. MMWR 52 no 54. April 22, 2005. found at http://www.cdc.gov/mmwr/summary.html.

*For More Information:* See the NNDSS Web site at www.cdc.gov/epo/dphs/nndsshis.htm.

## National Nursing Home Survey (NNHS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Nursing Home Survey (NNHS) provides information on characteristics of nursing homes and their residents and staff.

*Selected Content:* The NNHS provides information on nursing homes from two perspectives—that of the provider of services and that of the recipient. Data about the facilities include characteristics, such as bed size, ownership, affiliation, Medicare/Medicaid certification, specialty units, services offered, number and characteristics of staff, expenses, and charges. Data about the current residents and discharges include demographic characteristics, health status, level of assistance needed with activities of daily living, vision and hearing impairment, continence, services received, sources of payment, and discharge disposition (for discharges).

*Data Years:* NCHS conducted six NNHS: the first survey August 1973–April 1974; the second May–December 1977; the third August 1985–January 1986; the fourth July–December 1995; the fifth July–December 1997; and the sixth July–December 1999. The next NNHS, which has undergone a major redesign, was conducted in 2004 and data will be released some time in 2006.

*Coverage:* The initial NNHS, conducted in 1973–74, included the universe of nursing homes that provided some level of nursing care and excluded homes providing only personal or domiciliary care. The 1977 NNHS encompassed all types of nursing homes, including personal care and domiciliary care homes. The 1985 NNHS was designed to be similar to the 1973–74 survey in that it excluded personal or domiciliary care homes. However in 1985, an unknown number of residential care facilities were present in the sampling frame. These facilities were identified in the 1986 inventory survey and can be removed from the estimate of facilities and beds for 1985. The 1995, 1997, and 1999 NNHS also included only nursing homes that provided some level of nursing care and excluded homes providing only personal or domiciliary care, similar to the 1985 and 1973–74 surveys.

Data were collected from nursing homes in all 50 States and the District of Columbia (DC) in the 1995–1999 surveys, but in 1973–74, 1977, and 1985, data were only collected in the 48 contiguous States and DC. Data on current residents were collected in all surveys; data on discharges were collected in 1977, 1985, 1997, and 1999. Expense data were collected in 1977, 1985, and 1995. Data on characteristics of staff were collected in 1973–74, 1977, and 1985.

*Methodology:* The survey uses a stratified two-stage probability design. The first stage is the selection of facilities, and the second stage is the selection of residents and discharges. Up to six current residents and six discharges are selected. Information on the facility is collected through a personal interview with the administrator or staff designated by the administrator. Resident data were provided by staff familiar with the care provided to the resident. Staff relied on the medical record and personal knowledge of the resident. In addition to employee data that were collected during the interview with the administrator, in several years staffing data were collected via a self-administered questionnaire. Discharge data were based on information recorded in the medical record.



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Current residents are those on the facility's roster as of the night before the survey. Included are all residents for whom beds are maintained even though they may be away on an overnight leave or in the hospital. Discharges are those who are formally discharged from care by the facility during a designated month randomly selected for each facility before data collection. Both live and deceased discharges are included. Residents were counted more than once if they were discharged more than once during the reference period.

Statistics for the NNHS are derived by a multistage estimation procedure that has three major components: (a) inflation by the reciprocals of the probabilities of sample selection; (b) adjustment for nonresponse; and (c) ratio adjustment to fixed totals. The surveys are adjusted for four types of nonresponse: (1) when an eligible nursing facility did not respond; (2) when the facility failed to complete the sampling lists; (3) when the facility did not complete the facility questionnaire but did complete the questionnaire for residents in the facility; and (4) when the facility did not provide information to complete the questionnaire for the sample resident or discharge.

*Sample Size and Response Rates:* In 1973–74 the sample of 2,118 homes was selected from the 1971 National Master Facility Inventory (NMFI) and from those that opened for business in 1972. For the 1977 NNHS the sample of 1,698 facilities was selected from nursing homes in the sampling frame, which consisted of all homes listed in the 1973 NMFI and those opening for business between 1973 and December 1976. The sample for the 1985 survey consisted of the 1,220 facilities selected from the 1982 NMFI, data for homes identified in the 1982 Complement Survey of the NMFI, data on hospital-based nursing homes obtained from the Health Care Financing Administration (now known as the Centers for Medicare & Medicaid Services), and data on nursing homes open for business between 1982 and June 1, 1984. The 1995 sample of 1,500 homes was selected from a sampling frame consisting of nursing homes from the 1991 National Health Provider Inventory (NHPI) and updated lists from the Agency Reporting System (ARS). ARS was an ongoing system designed to periodically update the NHPI and consisted primarily of lists or directories of facilities from State agencies, Federal agencies, and national voluntary organizations. For the 1997 survey, data were obtained from about 1,488 nursing homes from a sampling frame consisting of nursing homes listed on the 1991 NHPI that was updated with a current listing of nursing facilities supplied by the Health Care Finance Administration and other national organizations. The facility frame for the 1999 NNHS consisted of all nursing homes identified in the 1997 NNHS and updated with current nursing facilities listed by the Centers for Medicare & Medicaid Services and other national organizations. The 1999 sample consisted of 1,496 nursing homes. In 1995, 1997, and 1999, facility-level response rates were over 93 percent.

*Issues Affecting Interpretation:* Samples of discharges and residents contain different populations with different characteristics. The resident sample is more likely to contain long-term nursing home residents and, conversely, to underestimate short nursing home stays. Because short-term residents are less likely to be on the nursing home rolls on a given night, they are less likely to be sampled. Estimates of discharges underestimate long nursing home stays. In addition, analysts should ensure that the underlying populations are similar across survey years—for example, whether the survey includes personal or domiciliary care homes.

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*For More Information:* See the National Health Care Survey Web site at www.cdc.gov/nchs/nhcs.htm and the NNHS Web site at www.cdc.gov/nchs/about/major/nnhsd/nnhsd.htm.

## National Survey on Drug Use and Health (NSDUH)

### Substance Abuse and Mental Health Services Administration

*Overview:* The National Survey on Drug Use & Health (NSDUH), formerly called the National Household Survey on Drug Abuse (NHSDA), collects data on substance abuse and dependence, mental health problems, and receipt of substance abuse and mental health treatment.

*Selected Content:* NSDUH reports on the prevalence, patterns, and consequences of drug and alcohol use and abuse in the general U.S. civilian noninstitutionalized population age 12 and over. Data are collected on the use of illicit drugs, the nonmedical use of licit drugs, and use of alcohol and tobacco products. The survey is conducted annually and is designed to produce drug and alcohol use incidence and prevalence estimates. Data are also collected periodically on special topics of interest such as criminal behavior, treatment, mental health, and attitudes about drugs.

*Data Years:* The NHSDA survey has been conducted since 1971. In 1999, the NHSDA underwent a major redesign affecting the method of data collection, sample design, sample size, and oversampling. In 2002, the survey underwent a name change to NSDUH as well as additional improvements and modifications to the survey.

*Coverage:* The survey is representative of persons 12 years of age and over in the civilian noninstitutionalized population in the United States. This includes civilians living on military bases and persons living in noninstitutionalized group quarters, such as college dormitories, rooming houses, and shelters. Persons excluded from the survey include homeless people who do not use shelters, active military personnel, and residents of institutional group quarters, such as jails and hospitals.

*Methodology:* The data collection method is in-person interviews conducted with a sample of individuals at their place of residence. Prior to 1999, the NSDUH used a paper-and-pencil interviewing (PAPI) methodology. Since 1999, the interview has been carried out with computer assisted interviewing (CAI) methodology. The survey uses a combination of computer-assisted personal-interviewing (CAPI), conducted by the interviewer for some basic demographic information, and audio computer-assisted self-interviewing (ACASI) for most of the questions. ACASI provides a highly private and confidential means of responding to questions to increase the level of honest reporting of illicit drug use and other sensitive behavior. The 2003 NSDUH employed a 50-State sample design with an independent, multistage area probability sample for each of the 50 States and the District of Columbia to support the development of both national and State-level estimates. Each State was stratified into regions (48 regions in each of 8 large States, 12 regions in each of 42 small States and the District of Columbia). At the first stage of sampling, 8 area segments were selected in each region, for a total of 7,200 sample units nationally. The design also oversampled youths and young adults, so that each State's sample was approximately equally distributed among three major age groups: 12–17 years, 18–25 years, and 26 years or over.

Sample Size and Response Rate: Nationally, 130,605 addresses were screened for the 2003 survey, and 67,784 completed interviews were obtained. The survey was conducted from January to December 2003. Weighted response rates for household screening and for interviewing were 90.7 and 77.4 percent, respectively.

*Issues Affecting Interpretation:* Several improvements to the survey were implemented in 2002. In addition to the name change, respondents were offered a $30 incentive payment for participation in the survey starting in 2002, and quality control procedures for data collection were enhanced in 2001 and 2002. Because of these improvements and modifications, estimates from the NSDUH completed in 2002 and later should not be compared with estimates from the 2001 or earlier versions of the survey. The data collected in 2002 represent a new baseline for tracking trends in substance use and other measures. Estimates of substance use for youth based on the NSDUH are not directly comparable with estimates based on Monitoring the Future (MTF) and Youth Risk Behavior Surveillance System (YRBSS). In addition to the fact that the MTF excludes dropouts and absentees, rates are not directly comparable across these surveys because of differences in populations covered, sample design, questionnaires, interview setting, and statistical approaches to make the survey estimates generalizable to the entire population. The NSDUH survey collects data in homes,



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whereas the MTF and YRBSS collect data in school classrooms. The NSDUH estimates are tabulated by age, while the MTF and YRBSS estimates are tabulated by grade, representing different ages as well as different populations.

*References:*

Substance Abuse and Mental Health Services Administration. Results from the 2003 National Survey on Drug Use and Health: National Findings. Office of Applied Studies, NSDUH Series H–25, DHHS Publication No. SMA 04–3964. Rockville, MD. 2004.

Wright D, Sathe N. State estimates of substance use from the 2002–2003 national surveys on drug use and health (DHHS Publication No. SMA 05–3989, NSDUH Series H-26). Substance Abuse and Mental Health Services Administration. Rockville, MD: Office of Applied Studies. 2004.

Cowan CD. Coverage, sample design, and weighting in three Federal surveys. Journal of Drug Issues; 31(3):595–614. 2001.

*For More Information:* See the NSDUH Web site at https://nsduhweb.rti.org/ or the SAMHSA Office of Applied Studies Web site at http://oas.samhsa.gov/.

## National Survey of Family Growth (NSFG)

### Centers for Disease Control and Prevention National Center for Health Statistics

*Overview:* The National Survey of Family Growth (NSFG) provides national data on factors affecting birth and pregnancy rates, adoption, and maternal and infant health.

*Selected Content:* Data elements include sexual activity, marriage, divorce and remarriage, unmarried cohabitation, contraception and sterilization, infertility, breastfeeding, pregnancy loss, low birthweight, and use of medical care for family planning and infertility.

*Data Years:* Six cycles of the survey have been completed: 1973, 1976, 1982, 1988, 1995, and 2002.

*Coverage:* The 1973–95 cycles of the National Survey of Family Growth (NSFG) were based on samples of women ages 15–44 years in the civilian noninstitutionalized population of the United States. The first and second cycles (1973 and 1976) excluded most women who had never been married. The third, fourth, and fifth cycles (1982, 1988, and 1995) included all women ages 15–44 years in the civilian noninstitutional population of the United States. The sixth cycle (2002) included men and women 15–44 years of age in the household population of the United States.

*Methodology:* Interviews are conducted in person by professional female interviewers using a standardized questionnaire. In all cycles, black women were sampled at higher rates than white women so that detailed statistics for black women could be produced. In cycles 5 and 6 (1995 and 2002), Hispanics were also oversampled.

To make national estimates from the sample for the millions of women ages 15–44 years in the United States, data for the interviewed sample women were (a) inflated by the reciprocal of the probability of selection at each stage of sampling (for example, if there was a 1 in 5,000 chance that a woman would be selected for the sample, her sampling weight was 5,000); (b) adjusted for nonresponse; and (c) poststratified, or forced to agree with benchmark population values based on data from the U.S. Census Bureau.

*Sample Size and Response Rates:* For Cycle 1, from 101 PSUs, 10,879 women 15–44 years of age were selected, 9,797 of these were interviewed. In Cycle 2, from 79 PSUs, 10,202 eligible women were identified; of these, 8,611 were interviewed. In Cycle 3, household screener interviews were completed in 29,511 households (95.1 percent). Of the 9,964 eligible women identified, 7,969 were interviewed. In Cycle 4, 10,566 eligible women ages 15–44 years were sampled. Interviews were completed with 8,450 women. The response rate for the 1990 telephone reinterview was 68 percent of those responding to the 1988 survey and still eligible for the 1990 survey. In Cycle 5, of the 13,795 eligible women in the sample, 10,847 were interviewed. In Cycle 6, from 120 PSUs, 7,643 (about 80 percent) of interviews were completed with eligible women and 4,928 (78 percent) interviews were completed with men.

*References:*

French DK. National Survey of Family Growth, Cycle I: Sample design, estimation procedures, and variance estimation. National Center for Health Statistics. Vital Health Stat Series no 2(76). 1978.

Grady WR. National Survey of Family Growth, Cycle II: Sample design, estimation procedures, and variance



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estimation. National Center for Health Statistics. Vital Health Stat Series no 2(87). 198l.

Bachrach CA, Horn MC, Mosher WD, Shimizu I. National Survey of Family Growth, Cycle III: Sample design, weighting, and variance estimation. National Center for Health Statistics. Vital Health Stat Series no 2(98). 1985.

Judkins DR, Mosher WD, Botman SL. National Survey of Family Growth: Design, estimation, and inference. National Center for Health Statistics. Vital Health Stat Series no 2(109). 1991.

Goksel H, Judkins DR, Mosher WD. Nonresponse adjustments for a telephone follow-up to a National In-Person Survey. Journal of Official Statistics; 8(4):417–32. 1992.

Kelly JE, Mosher WD, Duffer AP, Kinsey SH. Plan and operation of the 1995 National Survey of Family Growth. Vital Health Stat 1(36). 1997.

Potter FJ, Iannacchione VG, Mosher WD, Mason RE, Kavee JD. Sampling weights, imputation, and variance estimation in the 1995 National Survey of Family Growth. Vital Health Stat Series no 2(124). 1998.

Groves R, Mosher W, Benson G, et al. Plan and operation of the 2002 National Survey of Family Growth. National Center for Health Statistics. Vital Health Stat Series no 1(42). Forthcoming.

*For More Information:* See the NCHS Web site at www.cdc.gov/nchs/nsfg.htm.

## National Vital Statistics System (NVSS)

### Centers for Disease Control and Prevention

### National Center for Health Statistics

*Overview:* The National Vital Statistics System (NVSS) collects and publishes official national statistics on births, deaths, fetal deaths, and prior to 1996, marriages and divorces occurring in the United States based on U.S. Standard Certificates. Fetal deaths are classified and tabulated separately from other deaths. Detailed descriptions of the five Vital Statistics files (birth file, mortality file, multiple cause of death file, linked birth/infant death data set, and compressed mortality file) are presented separately below.

*Data Years:* The death-registration area for 1900 consisted of 10 States, the District of Columbia, and a number of cities located in nonregistration States; it covered 40 percent of the continental U.S. population. The birth registration area was established in 1915 with 10 States and the District of Columbia. The birth and death registration areas continued to expand until 1933, when they included all 48 States and the District of Columbia. Alaska and Hawaii were added to both registration areas in 1959 and 1960, the years in which they gained statehood.

*Coverage:* The NVSS collects and presents U.S. resident data for the aggregate of 50 States, New York City, and the District of Columbia, as well as for each individual State and the District of Columbia. Vital events occurring in the United States to non-U.S. residents and vital events occurring abroad to U.S. residents are excluded.

*Methodology:* NCHS's Division of Vital Statistics obtains information on births and deaths from the registration offices of each of the 50 States, New York City, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and Northern Mariana Islands. Until 1972 microfilm copies of all death certificates and a 50-percent sample of birth certificates were received from all registration areas and processed by NCHS. In 1972, some States began sending their data to NCHS through the Cooperative Health Statistics System (CHSS). States that participated in the CHSS program processed 100 percent of their death and birth records and sent the entire data file to NCHS on computer tapes. Currently, data are sent to NCHS through the Vital Statistics Cooperative Program (VSCP), following the same procedures as CHSS. The number of participating States grew from 6 in 1972 to 46 in 1984. Starting in 1985 all 50 States and the District of Columbia participated in VSCP.

*U.S. Standard Certificates*—U.S. Standard Live Birth and Death Certificates and Fetal Death Reports are revised periodically, allowing evaluation and addition, modification, and deletion of items. Beginning with 1989 revised standard certificates replaced the 1978 versions. The 1989 revision of the birth certificate included items to identify the Hispanic parentage of newborns and to expand information about maternal and infant health characteristics. The 1989 revision of the death certificate included items on educational attainment and Hispanic origin of decedents, as well as changes to improve the medical certification of cause of death. Standard certificates recommended by NCHS are modified in each registration area to serve the area's needs.



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However, most certificates conform closely in content and arrangement to the standard certificate, and all certificates contain a minimum data set specified by NCHS. Following 1989, the next revisions of vital records went into effect in some States beginning in 2003, but full implementation in all States will be phased in over several years.

### Birth File

*Overview:* Vital statistics natality data are a fundamental source of demographic, geographic, and medical and health information on all births occurring in the United States. This is one of the few sources of comparable health-related data for small geographic areas over an extended time period. The data are used to present the characteristics of babies and their mothers, track trends such as birth rates for teenagers, and compare natality trends with other countries.

*Selected Content:* The natality file includes characteristics about the baby such as sex, birthweight, weeks of gestation; demographic information about the parents such as age, race, Hispanic origin, parity, educational attainment, marital status, and State of residence; medical and health information such as prenatal care based on hospital records; and behavioral risk factors for the birth such as mother's tobacco use during pregnancy.

*Data Years:* The birth registration area began in 1915 with 10 States and the District of Columbia.

*Methodology:* In the United States, State laws require birth certificates to be completed for all births. The registration of births is the responsibility of the professional attendant at birth, generally a physician or midwife. The birth certificate must be filed with the local registrar of the district in which the birth occurs. Each birth must be reported promptly—the reporting requirements vary from State to State, ranging from 24 hours after the birth to as much as 10 days.

Federal law mandates national collection and publication of birth and other vital statistics data. The National Vital Statistics System is the result of cooperation between NCHS and the States to provide access to statistical information from birth certificates. Standard forms for the collection of the data and model procedures for the uniform registration of the events are developed and recommended for State use through cooperative activities of the States and NCHS. NCHS shares the costs incurred by the States in providing vital statistics data for national use.

*Issues Affecting Interpretation:* In 2003, two States, Pennsylvania and Washington, implemented the 2003 revision of the U.S. Standard Certificate of Live Birth (revised). Data on mother's educational attainment, tobacco use during pregnancy, and prenatal care based on the 2003 revision are not comparable with data based on the 1989 revision of the U.S. Standard Certificate of Live Birth (revised), and are excluded from *Health, United States* statistics. Prior to 2003, the number of States reporting information on maternal education, Hispanic origin, marital status, and tobacco use during pregnancy increased over the years. Interpretation of trend data should take into consideration expansion of reporting areas and immigration. See Appendix II for methodological and reporting area changes for the following birth certificate items: *Age* (maternal age); *Education* (maternal education); *Hispanic origin; Marital status; Prenatal care; Race;* and *Tobacco use.*

*Reference:*

National Center for Health Statistics, Vital Statistics of the United States 2000, Vol. I Natality, Technical Appendix, found at http://www.cdc.gov/nchs/data/techap00.pdf.

*For More Information:* See the Birth Data Web site at www.cdc.gov/nchs/births.htm.

### Mortality File

*Overview:* Vital statistics mortality data are a fundamental source of demographic, geographic, and cause-of-death information. This is one of the few sources of comparable health-related data for small geographic areas over an extended time period. The data are used to present the characteristics of those dying in the United States, to determine life expectancy, and to compare mortality trends with other countries.

*Selected Content:* The mortality file includes demographic information on age, sex, race, Hispanic origin, State of residence, and educational attainment, and medical information on cause of death.

*Data Years:* The death registration area began in 1900 with 10 States and the District of Columbia.

*Methodology:* By law, the registration of deaths is the responsibility of the funeral director. The funeral director obtains demographic data for the death certificate from an informant. The physician in attendance at the death is



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required to certify the cause of death. Where death is from other than natural causes, a coroner or medical examiner may be required to examine the body and certify the cause of death. Data for the entire United States refer to events occurring within the United States; data for geographic areas are by place of residence. See Appendix II for methodological and reporting area changes for the following death certificate items: *Education; Hispanic origin;* and *Race.*

*Issues Affecting Interpretation: International Classification of Diseases* (ICD), by which cause of death is coded and classified, is revised approximately every 10 to 15 years. Revisions of the ICD may cause discontinuities in trend data by cause of death. Comparing death rates by cause of death across ICD revisions should be conducted with caution and with reference to the comparability ratio. (See Appendix II, *Comparability ratio.*) The death certificate has been revised periodically. A revised U.S. Standard Certificate of Death was recommended for State use beginning on January 1, 1989. Among the changes were the addition of a new item on educational attainment and Hispanic origin of decedent and changes to improve the medical certification of cause of death.

*References:*

Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940–60. Washington: Government Printing Office. 1968.

National Center for Health Statistics, Vital Statistics of the United States, Vol II Mortality part A, Technical Appendix, available at www.cdc.gov/nchs/datawh/statab/pubd/ta.htm.

*For More Information:* See the Mortality Data Web site at www.cdc.gov/nchs/about/major/dvs/mortdata.htm.

### Multiple Cause-of-Death File

*Overview:* Multiple cause-of-death data reflect all medical information reported on death certificates and complement traditional underlying cause-of-death data. Multiple cause data give information on diseases that are a factor in death whether or not they are the underlying cause of death, on associations among diseases, and on injuries leading to death.

*Selected Content:* In addition to the same demographic variables listed for the mortality file, the multiple cause-of-death file includes record axis and entity axis cause-of-death data (see *Methodology* section).

*Data Years:* Multiple cause-of-death data files are available for every data year since 1968.

*Methodology:* NCHS is responsible for compiling and publishing annual national statistics on causes of death. In carrying out this responsibility, NCHS adheres to the World Health Organization Nomenclature Regulations. These Regulations require that (1) cause of death be coded in accordance with the applicable revision of the *International Classification of Diseases* (ICD) (see Appendix II, table IV and *ICD*); and (2) underlying cause of death be selected in accordance with international rules. Traditionally, national mortality statistics have been based on a count of deaths, with one underlying cause assigned for each death.

Starting with data year 1968, electronic files exist with multiple cause-of-death information. These files contain codes for all diagnostic terms and related codable information recorded on the death certificate. These codes make up the entity axis and are the input for a software program called TRANSAX. The TRANSAX program eliminates redundant entity axis codes and combines other entity axis codes to create the best set of ICD codes for a record. The output of the TRANSAX program is the record axis. Record axis data are generally used for research and analysis of multiple or nonunderlying cause of death. Because the function of the TRANSAX program is not to select a single underlying cause of death, record axis data may or may not include the underlying cause. Tabulations of underlying and nonunderlying cause of death in table 48 (selected occupational diseases) are compiled by searching both underlying cause of death and record axis data.

*Reference:* Multiple Causes of Death in the United States. Monthly vital statistics report; vol 32 no 10, supp 2. Hyattsville, MD: National Center for Health Statistics. February 17, 1984.

*For More Information:* See the mortality multiple cause-of-death data file page at www.cdc.gov/nchs/products/elec_prods/subject/mortmod.htm.

### Linked Birth/Infant Death Data Set

*Overview:* National linked files of live births and infant deaths are used for research on infant mortality.



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*Selected Content:* The linked birth/infant death data set includes all variables on the natality file, including racial and ethnic information, as well as variables on the mortality file, including cause of death and age at death.

*Data Years:* National linked files of live births and infant deaths were first produced for the 1983 birth cohort. Birth cohort linked file data are available for 1983–91 and period linked file data starting with 1995. National linked files do not exist for 1992–94.

*Methodology:* To create the linked data files, death certificates are linked with corresponding birth certificates for infants who die in the United States before their first birthday. About 97–99 percent of files can be linked. The linkage makes available extensive information about the pregnancy, maternal risk factors, infant characteristics, and health items at birth that can be used in analyses of infant mortality.

Starting with data year 1995, more timely linked file data are produced in a period data format preceding the release of the corresponding birth cohort format. Other changes to the data set starting with 1995 data include addition of record weights to correct for the 1.0–1.4 percent in 2000–2002 (2.1–2.5 percent in 1995–99) of records that could not be linked and for the addition of an imputation for not stated birthweight. The 1995–2001 weighted mortality rates are from less than 1 percent to 4.1 percent higher than unweighted rates for the same period. The 1995–2001 weighted mortality rates with imputed birthweight are less than 1 percent to 6.3 percent higher than unweighted rates with imputed birthweight for the same period.

*Issues Affecting Interpretation:* Period linked file data starting with 1995 are not strictly comparable with birth cohort data for 1983–91. While birth cohort linked files have methodological advantages, their production incurs substantial delays in data availability, since it is necessary to wait until the close of a second data year to include all infant deaths to the birth cohort.

*Reference:*

Mathews TJ, Menacker F, MacDorman MF. Infant mortality statistics from the 2002 period linked birth/infant death data set. National vital statistics report; vol 53 no 10. Hyattsville, Maryland: National Center for Health Statistics. 2004.

*For More Information:* See the NCHS Linked Birth and Infant Death Data Web site at www.cdc.gov/nchs/linked.htm.

### Compressed Mortality File

*Overview:* The Compressed Mortality File (CMF) is a county-level national mortality and population database.

*Selected Content:* The compressed mortality database contains mortality data derived from the detailed mortality files of the National Vital Statistics System and from the U.S. Census Bureau estimates of U.S. national, State, and county resident populations. Number of deaths, crude death rates, and age-adjusted death rates can be obtained by place of residence (total U.S., State, and county), age group, race (white, black, and other), sex, year of death, and underlying cause of death.

*Data Years:* The CMF spans the years 1968–2002. On CDC WONDER, data are available starting with 1979.

*Methodology:* In *Health, United States*, the CMF is used to compute death rates by urbanization level of decedent's county of residence. Counties are categorized according to level of urbanization based on an NCHS-modified version of the 1993 rural-urban continuum codes for metropolitan and nonmetropolitan counties developed by the Economic Research Service, U.S. Department of Agriculture. See Appendix II, *Urbanization*.

*For More Information:* See the Compressed Mortality File Web site at: http://www.cdc.gov/nchs/products/elec_prods/subject/mcompres.htm; or see the CDC Wonder Web site at http://wonder.cdc.gov/mortSQL.html.

## Online Survey Certification and Reporting Database (OSCAR)

### Centers for Medicare & Medicaid Services

*Overview:* The Online Survey Certification and Reporting (OSCAR) is an administrative database containing detailed information on all Medicare and Medicaid certified institutional health care providers, including all currently and previously certified Medicare and Medicaid nursing homes in the United States and Territories. (Data for the Territories are not shown in *(Health, United States)*. The purpose of the nursing home survey certification process is to ensure that nursing facilities meet the current Centers for Medicare & Medicaid Services



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(CMS) care requirements and thus can be reimbursed for services furnished to Medicare and Medicaid beneficiaries.

*Selected Content:* OSCAR contains information on facility and patient characteristics and health deficiencies issued by the government during State surveys.

*Data Years:* OSCAR has been maintained by CMS, formerly the Health Care Financing Administration (HCFA), since 1992. OSCAR is an updated version of the Medicare and Medicaid Automated Certification System that had been in existence since 1972.

*Coverage:* All nursing homes in the United States that receive Medicare or Medicaid payments are included. Nursing homes that are intermediate care facilities for the mentally retarded and Department of Veterans Affairs nursing homes are excluded.

*Methodology:* Information on the number of beds and other facility characteristics comes from HCFA form 671, and information on residents and resident characteristics is collected on HCFA form 672. A nursing home representative fills out the forms, and they are submitted to CMS. The information provided on HCFA forms 671 and 672 can be audited at any time.

All certified nursing homes are inspected by representatives of the State survey agency (generally the department of health) at least once every 15 months. Therefore, a complete census must be based on a 15-month reporting cycle rather than a 12-month cycle. Some nursing homes are inspected twice or more often during any given reporting cycle. To avoid overcounting, the data must be edited and duplicates removed. Data editing and compilation were performed by Cowles Research Group and published in the group's *Nursing Home Statistical Yearbook* series.

*References:*

Cowles CM. 1995; 1996; 1997 Nursing home statistical yearbook. Anacortes, WA: Cowles Research Group (CRG). 1995; 1997; 1998.

Cowles CM, 1998; 1999; 2000; 2001 Nursing home statistical yearbook. Washington: American Association of Homes and Services for the Aging (AAHSA). 1999; 2000; 2001; 2002.

*For More Information:* See the CRG Web site at www.longtermcareinfo.com/org or the AAHSA Web site at www.aahsa.org.

## Population Census and Population Estimates

### Bureau of the Census

### Decennial Census

The census of population (decennial census) has been held in the United States every 10 years since 1790. The decennial census has enumerated the resident population as of April 1 of the census year ever since 1930. Data on sex, race, age, and marital status are collected from 100 percent of the enumerated population. More detailed information, such as income, education, housing, occupation, and industry, are collected from a representative sample of the population.

### Race Data on the 1990 Census

The question on race on the 1990 census was based on the Office of Management and Budget's (OMB) "1977 Statistical Policy Directive 15, Race and Ethnicity Standards for Federal Statistics and Administrative Reporting." This document specified rules for the collection, tabulation, and reporting of race and ethnicity data within the Federal statistical system. The 1977 standards required Federal agencies to report race-specific tabulations using four single-race categories: American Indian or Alaska Native, Asian or Pacific Islander, black, and white. Under the 1977 standards, race and ethnicity were considered to be two separate and distinct concepts. Thus, persons of Hispanic origin may be of any race.

### Race Data on the 2000 Census

The question on race on the 2000 census was based on OMB's 1997 "Revisions of the Standards for the Classification of Federal Data on Race and Ethnicity" (see Appendix II, *Race*). The 1997 Standards incorporated two major changes in the collection, tabulation, and presentation of race data. First, the 1997 standards increased from four to five the minimum set of categories to be used by Federal agencies for identification of race: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and white. Second, the 1997 standards included the requirement that Federal data collection programs allow respondents to select one or more race categories when responding to a query on their racial identity.



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This provision means that there are potentially 31 race groups, depending on whether an individual selects one, two, three, four, or all five of the race categories. The 1997 standards continue to call for use, when possible, of a separate question on Hispanic or Latino ethnicity and specify that the ethnicity question should appear before the question on race. Thus, under the 1997 standards, as under the 1977 standards, Hispanics may be of any race.

### Modified Decennial Census Files

For several decades, the Census Bureau has produced modified decennial census files. These modified files incorporate adjustments to the 100 percent April 1 count data for 1) errors in the census data discovered subsequent to publication, 2) misreported age data, and 3) nonspecified race.

For the 1990 census, the Census Bureau modified the age, race, and sex data on the census and produced the Modified Age Race Sex (MARS) file. The differences between the population counts on the original census file and the MARS file are primarily due to modification of the race data. Of the 248.7 million persons enumerated in 1990, 9.8 million persons did not specify their race (over 95 percent were of Hispanic origin). For the 1990 MARS file, these persons were assigned the race reported by a nearby person with an identical response to the Hispanic origin question.

For the 2000 census, the Census Bureau modified the race data on the census and produced the Modified Race Data Summary File. For this file, persons who reported "Some other race" as part of their race response were assigned to one of the 31 race groups, which are the single- and multiple-race combinations of the five race categories specified in the 1997 race and ethnicity standards. Persons who did not specify their race were assigned to one of the 31 race groups using imputation. Of the 18.5 million persons who reported "Some other race" as part of their race response, or who did not specify their race, 16.8 million (90.4 percent) were of Hispanic origin.

### Bridged-Race Population Estimates for Census 2000

Race data on the 2000 census are not comparable with race data on other data systems that are continuing to collect data using the 1977 standards on race and ethnicity during the transition to full implementation of the 1997 standards. For example, most of the States in the Vital Statistics Cooperative Program will revise their birth and death certificates to conform to the 1997 standards after 2000. Thus, population estimates for 2000 and beyond with race categories comparable to the 1977 categories are needed so that race-specific birth and death rates can be calculated. To meet this need, NCHS, in collaboration with the U.S. Census Bureau, developed methodology to bridge the 31 race groups in census 2000 to the four single-race categories specified under the 1977 standards.

The bridging methodology was developed using information from the 1997–2000 National Health Interview Survey (NHIS) The NHIS provides a unique opportunity to investigate multiple-race groups because, since 1982, the NHIS has allowed respondents to choose more than one race but has also asked respondents reporting multiple races to choose a "primary" race. The bridging methodology developed by NCHS involved the application of regression models relating person-level and county-level covariates to the selection of a particular primary race by the multiple-race respondents. Bridging proportions derived from these models were applied by the U.S. Census Bureau to the Census 2000 Modified Race Data Summary File. This application resulted in bridged counts of the April 1, 2000, resident single-race populations for four racial groups, American Indian or Alaska Native, Asian or Pacific Islander, black, and white.

*For More Information* about bridged-race population estimates, see Ingram DD, Parker JD, Schenker N, et al. United States Census 2000 population with bridged race categories. National Center for Health Statistics. Vital Health Stat 2(135). 2003; and the NCHS Web site for U.S. Census Populations with Bridged Race Categories www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

### Postcensal Population Estimates

Postcensal population estimates are estimates made for the years following a census, before the next census has been taken. National postcensal population estimates are derived by updating the resident population enumerated in the decennial census using a components of population change approach. The following formula is used to update the decennial census counts:

(1) decennial census enumerated resident population
(2) + births to U.S. resident women,
(3) – deaths to U.S. residents,
(4) + net international migration,



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(5) + net movement of U.S. Armed Forces and U.S. civilian citizens

State postcensal estimates are based on similar data and on a variety of other data series, including school statistics from State departments of education and parochial school systems. The postcensal estimates are consistent with official decennial census figures and do not reflect estimated decennial census underenumeration.

The Census Bureau has produced a postcensal series of estimates of the July 1 resident population of the United States based on census 2000 by applying the components of change methodology to the Modified Race Data Summary File. These postcensal estimates have race data for 31 race groups, in accordance with the 1997 race and ethnicity standards. So that the race data for the 2000-based postcensal estimates would be comparable with race data on vital records, the Census Bureau applied the NHIS bridging methodology to the 31-race group postcensal population estimates to obtain postcensal estimates for the four single-race categories (American Indian or Alaska Native, Asian or Pacific Islander, black, and white). Bridged-race postcensal population estimates are available at www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

Note that before the bridged-race April 1, 2000, population counts and the bridged-race 2000-based postcensal estimates were available, the Census Bureau extended their postcensal series of estimates based on the 1990 census (with the four single-race categories needed to compute vital rates) to July 1, 2001. NCHS initially calculated vital rates for 2000 using 1990-based July 1, 2000, postcensal population estimates and vital rates for 2001 using 1990-based July 1, 2001, postcensal estimates. Vital rates for 2000 have been revised using the bridged-race April 1, 2000, population counts, and vital rates for 2001 have been revised using the 2000-based bridged-race July 1, 2001, postcensal population estimates.

### Intercensal Population Estimates

The further from the census year on which the postcensal estimates are based, the less accurate are the postcensal estimates. With the completion of the decennial census at the end of the decade, intercensal estimates for the preceding decade were prepared to replace the less accurate postcensal estimates. Intercensal population estimates take into account the census of population at the beginning and end of the decade. Thus intercensal estimates are more accurate than postcensal estimates because they correct for the "error of closure" or difference between the estimated population at the end of the decade and the census count for that date. The "error of closure" at the national level was quite small for the 1960s (379,000). However, for the 1970s, it amounted to almost 5 million; for the 1980s, 1.5 million; for the 1990s, about 6 million. The error of closure differentially affects age, race, sex, and Hispanic origin subgroup populations as well as the rates based on these populations. Vital rates that were calculated using postcensal population estimates are routinely revised when intercensal estimates become available because the intercensal estimates correct for the error of closure.

Intercensal estimates for the 1990s with race data comparable to the 1977 standards have been derived so that vital rates for the 1990s could be revised to reflect census 2000. Calculation of the intercensal population estimates for the 1990s was complicated by the incomparability of the race data on the 1990 and 2000 censuses. The Census Bureau, in collaboration with National Cancer Institute and NCHS, derived race-specific intercensal population estimates for the 1990s using the 1990 MARS file as the beginning population base and the bridged-race population estimates for April 1, 2000, as the ending population base. Bridged-race intercensal population estimates are available at www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

### Special Population Estimates

Special population estimates are prepared for the education reporting area for mortality statistics because educational attainment of decedent is not reported by all 50 States. The Housing and Household Economics Statistics Division of the U.S. Bureau of the Census currently produces unpublished estimates of populations by age, race, sex, and educational attainment for NCHS. These population estimates are based on the Current Population Survey, adjusted to resident population controls. The control totals used for July 1, 1994–96 are 1990-based population estimates for 45 reporting States and the District of Columbia (DC); for July 1, 1997–2000, 1990-based postcensal population estimates for 46 reporting States and DC; and for July 1, 2001–02, 2000-based postcensal population estimates for 47 reporting States and DC. See Appendix II, *Education*.

*For More Information:* See the U.S. Census Bureau Web site at www.census.gov/.



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## Sexually Transmitted Disease (STD) Surveillance

### Centers for Disease Control and Prevention

### National Center of HIV, STD, and TB Prevention

*Overview:* Surveillance information on incidence and prevalence of sexually transmitted diseases (STDs) is used to inform public and private health efforts to control these diseases.

*Selected Content:* Case reporting data are available for nationally notifiable chanchroid, chlamydia, gonorrhea, and syphilis; surveillance of other STDs, such as genital herpes simplex virus (HSV), genital warts or other human papillomavirus infections, and trichomoniasis, are based on estimates of office visits in physicians' office practices provided by the National Disease and Therapeutic Index (NDTI).

*Data Years:* STD national surveillance data have been collected since 1941.

*Coverage:* Case reports of STDs are reported to CDC by STD surveillance systems operated by State and local STD control programs and health departments in 50 States, the District of Columbia, selected cities, 3,139 U.S. counties, and outlying areas comprised of U.S. dependencies, possessions, and independent nations in free association with the United States. Data from outlying areas are not included in *Health, United States.*

*Methodology:* Information is obtained from the following sources of data: (1) case reports from STD project areas; (2) prevalence data from the Regional Infertility Prevention Program, the National Job Training Program (formerly the Job Corps), the Jail STD Prevalence Monitoring Projects, the adolescent Women Reproductive Health Monitoring Project, the Men Who Have Sex With Men (MSM) Prevalence Monitoring Project, and the Indian Health Service; (3) sentinel surveillance of gonococcal antimicrobial resistance from the Gonococcal Isolate Surveillance Project (GISP); and (4) national sample surveys implemented by Federal and private organizations. STD data are submitted to CDC on a variety of hard-copy summary reporting forms (monthly, quarterly, and annually) and in electronic summary or individual case-specific (line-listed) formats via the National Electronic Telecommunications System for Surveillance (NETSS).

*Issues Affecting Interpretation:* Because of incomplete diagnosis and reporting, the number of STD cases reported to CDC undercounts the actual number of cases occurring among the U.S. population. Reference: Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2002. Atlanta, GA: Department of Health and Human Services. 2003.

*For More Information:* See the STD Surveillance Report Web site at http://www.cdc.gov/std/stats/ or the STD Prevention Web site at: http://www.cdc.gov/std/default.htm.

## Surveillance, Epidemiology, and End Results (SEER) Program

### National Cancer Institute

*Overview:* The Surveillance, Epidemiology, and End Results (SEER) program tracks incidence of persons diagnosed with cancer during the year as well as follow-up information on all previously diagnosed patients until death.

*Selected Content:* SEER registries routinely collect data on patient demographics, primary tumor site, morphology, stage at diagnosis, first course of treatment, and follow-up for vital status.

*Data Years:* Case ascertainment for SEER began on January 1, 1973, and has continued for more than 30 years.

*Coverage:* SEER cancer registries were initiated in 1973 in Connecticut, Iowa, New Mexico, Utah, Hawaii, Detroit, and San Francisco-Oakland. Registries were added as follows: in 1974–75, Atlanta and Seattle-Puget Sound; in 1978, 10 predominantly black rural counties in Georgia; in 1980, American Indians in Arizona; New Orleans, Louisiana (1974–77, rejoined 2001); New Jersey (1979–89, rejoined 2001); and Puerto Rico (1973–89); in 1992, Alaska Native populations in Alaska and Hispanics in Los Angeles County and San Jose-Monterey; in 2001, Kentucky, Greater California, New Jersey, and Louisiana. The SEER Program currently collects and publishes cancer incidence and survival data from 14 population-based cancer registries and three supplemental registries covering approximately 26 percent of the U.S. population.



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The following combination of SEER registries are commonly used for statistical analyses and are used for analysis of cancer survival rates in *Health, United States*: the SEER 9 registries of Atlanta, Connecticut, Detroit, Hawaii, Iowa, New Mexico, San Francisco-Oakland, Seattle-Puget Sound, and Utah. Analysis of cancer incidence covers residents in the following SEER 12 registries: the SEER 9 registries plus Los Angeles, San Jose-Monterey, and the Alaska Native Tumor Registry.

*Methodology:* A cancer registry (or tumor registry) collects and stores data on cancers diagnosed in a specific hospital or medical facility (hospital-based registry) or in a defined geographic area (population-based registry). A population-based registry is generally composed of a number of hospital-based registries. In SEER registry areas, trained coders abstract medical records using the *International Classification of Diseases for Oncology, Third Edition* (ICD–O–3), which provides a coding system for onset and stage of specific cancers. The third edition, implemented in 2001, is the first complete review and revision of the text and guidelines since its original publication in 1988.

Population estimates used to calculate incidence rates are obtained from the U.S. Census Bureau. NCI uses estimation procedures as needed to obtain estimates for years and races not included in data provided by the U.S. Census Bureau. Life tables used to determine normal life expectancy when calculating relative survival rates were obtained from NCHS and in-house calculations. Separate life tables are used for each race-sex-specific group included in the SEER Program.

*Issues Affecting Interpretation:* Because of the addition of registries over time, analysis of long-term incidence and survival trends is limited to those registries that have been in SEER for similar lengths of time. Analysis of Hispanic, American Indian and Alaska Native data is limited to shorter trends. Rates presented in this report may differ somewhat from previous reports due to revised population estimates and the addition and deletion of small numbers of incidence cases.

*Reference:*

Ries LAG, Eisner MP, Kosary CL, et al. (eds). SEER Cancer Statistics Review 1975–2001. Bethesda, MD: National Cancer Institute. 2004, available at http://seer.cancer.gov/csr/1975_2001.

*For More Information:* See the SEER Web site at www.seer.cancer.gov.

## Survey of Mental Health Organizations (SMHO)

### Substance Abuse and Mental Health Services Administration (SAMHSA)

*Overview:* The Survey of Mental Health Organizations and General Hospital Mental Health Services (SMHO/GHMHS) collects data on number and characteristics of specialty mental health organizations in the United States.

*Selected Content:* The inventory collects basic information, such as types of mental health organizations, ownership, number of additions and residents, and number of beds. The sample survey is a more detailed questionnaire that covers types of services provided, revenues and expenditures, staffing, and many items addressed to managed behavioral health care.

*Data Years:* The Inventory of Mental Health Organizations (IMHO/GHMHS) was conducted biannually from 1986 until 1994. The SMHO replaced the IMHO/GHMHS in 1998. The SMHO and the inventory used as its sampling frame have been conducted biannually starting in 1998.

*Coverage:* Organizations included are State and county mental hospitals, private psychiatric hospitals, non-Federal general hospitals with separate psychiatric services, Department of Veterans Affairs medical centers, residential treatment centers for emotionally disturbed children, freestanding outpatient psychiatric clinics, partial care organizations, freestanding day-night organizations, and multiservice mental health organizations not elsewhere classified.

*Methodology:* The IMHO was an inventory of all mental health organizations. Its core questionnaire included versions designed for specialty mental health organizations and another for non-Federal general hospitals with separate psychiatric services. The data system was based on questionnaires mailed every other year to mental health organizations in the United States. In 1998, the IMHO was replaced by the SMHO. The SMHO is made up of two parts. A complete inventory is done by postcard gathering a limited amount of information. The inventory is used as a sampling frame for the SMHO, which contains most of the information



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from the IMHO core questionnaire as well as new items about managed behavioral health care.

Sample Size and Response Rate: Phase I, all organizations were inventoried by postcard (about 10,000). A complete enumeration was needed to define the sampling frame for the sample survey. In Phase II, general hospitals without separate mental health units, community residential organizations, and managed behavioral health care organizations are dropped from the sampling frame. From this number, approximately between 1,600 and 2,200 organizations are drawn for the sample survey and sent a questionnaire with a response rate of approximately 90 percent.

*Issues Affecting Interpretation:* Revisions to definitions of providers include phasing out Community Mental Health Centers as a category after 1981–82; increasing the number of multiservice mental health organizations from 1981 to 1986; increasing the number of psychiatric outpatient clinics in 1981–82, but decreasing the number in 1983–84, 1986, 1990, and 1992; and increasing the number of partial care services in 1983–84. These changes should be noted when interyear comparisons for the affected organizations and service types are made. The increase in the number of general hospitals with separate psychiatric services was partially due to a more concerted effort to identify these organizations. Forms had been sent only to those hospitals previously identified as having a separate psychiatric service. Beginning in 1980–81, a screener form was sent to general hospitals not previously identified as providing a separate psychiatric service to determine whether they had such a service.

*Reference:*

Center for Mental Health Services. Mental Health, United States, 2002. Manderscheid R, Henderson MJ, eds. DHHS pub no (SMA) SMA04–3938. Washington: Department of Health and Human Services. 2004, available at http:/ www.mentalhealth.samhsa.gov/publications/allpubs/SMA04–3938.

*For More Information:* See the Center for Mental Health Services Web site at www.samhsa.gov/centers/cmhs/cmhs.html.

## Survey of Occupational Injuries and Illnesses (SOII)

### Bureau of Labor Statistics

*Overview:* The Survey of Occupational Injuries and Illnesses (SOII) is a Federal/State program that collects statistics used to identify problems with workplace safety and develop programs to improve workplace safety.

*Selected Content:* Data include the number of injuries and illnesses by industry. The case and demographic data provide additional details on workers injured, the nature of the disabling condition, and the event and source producing that condition for those cases that involve one or more days away from work.

*Data Years:* The Bureau of Labor Statistics (BLS) has conducted an annual survey since 1971.

*Coverage:* The data represent persons employed in private industry establishments in the United States. The survey excludes the self-employed, farms with fewer than 11 employees, private households, Federal Government agencies, and State and local government agencies.

*Methodology:* Survey estimates of occupational injuries and illnesses are based on a scientifically selected probability sample of establishments rather than a census of all establishments. An independent sample is selected for each State and the District of Columbia that represents industries in that jurisdiction. BLS includes all the State samples in the national sample.

Establishments included in the survey are instructed in a mailed questionnaire to provide summary totals of all entries for the previous calendar year to its Log and Summary of Occupational Injuries and Illnesses (OSHA No. 200 form). In addition, from the selected establishments, approximately 550,000 injuries and illnesses with days away from work are sampled to obtain demographic and detailed case characteristic information. An occupational injury is any injury such as a cut, fracture, sprain, or amputation that results from a work-related event or from a single instantaneous exposure in the work environment. An occupational illness is any abnormal condition or disorder other than one resulting from an occupational injury, caused by exposure to factors associated with employment. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact. Prior to 2002, injury



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and illness cases involved days away from work, days of restricted work activity, or both (lost workday cases). Starting in 2002, injury and illness cases may involve days away from work, job transfer, or restricted work activity. Restriction may involve shortened hours, a temporary job change, or temporary restrictions on certain duties (for example, no heavy lifting) of a worker's regular job.

*Sample Size and Response Rates:* Employer reports were collected from about 183,700 private industry establishments in 2003. Survey response rates have typically exceeded 90 percent.

*Issues Affecting Interpretation:* The number of injuries and illnesses reported in any given year can be influenced by the level of economic activity, working conditions and work practices, worker experience and training, and number of hours worked. Long-term latent illnesses caused by exposure to carcinogens are believed to be understated in the survey's illness measures. In contrast, new illnesses, such as contact dermatitis and carpal tunnel syndrome, are easier to relate directly to workplace activity.

Effective January 1, 2002, the Occupational Safety and Health Administration (OSHA) revised its requirement for recording occupational injuries and illnesses. Because of the revised recordkeeping rule, the estimates from the 2002 survey are not comparable with those from previous years. See www.osha-slc.gov/recordkeeping/index.html for details about the revised recordkeeping requirements.

Data for the mining industry and for railroad activities are provided by Department of Labor's Mine Safety and Health Administration and Department of Transportation's Federal Railroad Administration. Neither of these agencies adopted the revised OSHA recordkeeping requirements for 2002. Therefore, estimates for these industries for 2002 are not comparable with estimates for other industries but are comparable with estimates for prior years. Excluded from the survey are self-employed individuals, farmers with fewer than 11 employees, private households, Federal Government agencies, and employees in State and local government agencies.

Beginning with the 2003 data year, SOII began using the 2002 North American Industry Classification System (NAICS) to classify industries. Prior to 2003, the program used the Standard Industrial Classification (SIC) system and the Bureau of the Census occupational classification system. Although some titles in SIC and NAICS are similar, there is limited compatibility because industry groupings are defined differently between the two systems. See Appendix II, *Industry of employment*.

*Reference:*

Bureau of Labor Statistics. Workplace Injuries and Illnesses in 2003. Washington: Department of Labor. December 2004.

*For More Information:* See the BLS occupational safety and health Web site at www.bls.gov/iif/home.htm.

## Youth Risk Behavior Survey (YRBS)

### Centers for Disease Control and Prevention

### National Center for Chronic Disease Prevention and Health Promotion

*Overview:* The national Youth Risk Behavior Survey (YRBS) monitors health risk behaviors among students in grades 5–12 that contribute to morbidity and mortality in both adolescence and adulthood.

*Selected Content:* Data are collected on tobacco use, dietary behaviors, physical activity, alcohol and other drug use, sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases including HIV infection, and behaviors that contribute to unintentional injuries and violence.

*Data Years:* The national YRBS of high school students was conducted in 1990, 1991, 1993, 1995, 1997, 1999, 2001, and 2003.

*Coverage:* Data are representative of high school students in public and private schools in the United States.

*Methodology:* The national YRBS school-based surveys employ a three-stage cluster sample design to produce a nationally representative sample of students in grades 5–12 attending public and private high schools. The first-stage sampling frame contains primary sampling units (PSUs) consisting of large counties or groups of smaller, adjacent counties. The PSUs are then stratified based on degree of urbanization and relative percentage of black and Hispanic students in the PSU. The PSUs are selected from these strata with probability proportional to school enrollment size. At the second sampling stage, schools are selected with probability proportional to school enrollment size. To enable



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separate analysis of data for black and Hispanic students, schools with substantial numbers of black and Hispanic students are sampled at higher rates than all other schools. The third stage of sampling consists of randomly selecting one or two intact classes of a required subject from grades 5–12 at each chosen school. All students in the selected classes are eligible to participate in the survey. A weighting factor is applied to each student record to adjust for nonresponse and for the varying probabilities of selection, including those resulting from the oversampling of black and Hispanic students.

*Sample Size and Response Rate:* The sample size for the 2003 YRBS was 15,240 students in 158 schools. The school response rate was 81 percent and the student response rate was 83 percent, for an overall response rate of 67 percent.

*Issues Affecting Interpretation:* National YRBS data are subject to at least two limitations. First, these data apply only to adolescents who attend regular high school. These students may not be representative of all persons in this age group because those who have dropped out of high school or attend an alternative high school are not surveyed. Second, the extent of underreporting or overreporting cannot be determined, although the survey questions demonstrate good test-retest reliability.

Estimates of substance use for youths based on the YRBS differ from the National Survey on Drug Use & Health (NSDUH) and Monitoring the Future (MTF). Rates are not directly comparable across these surveys because of differences in populations covered, sample design, questionnaires, interview setting, and statistical approaches to make the survey estimates generalizable to the entire population. The NSDUH survey collects data in homes, whereas the MTF and YRBS collect data in school classrooms. The NSDUH estimates are tabulated by age, while the MTF and YRBS estimates are tabulated by grade, representing different ages as well as different populations.

*References:*

Grunbaum JA, Kann L, Kinchen S, et al. Youth risk behavior surveillance—United States, 2003. In: Surveillance Summaries May 21, 2004. Morbidity & Mortality Weekly Report 53(SS-2):1–29. 2004.

Cowan CD. Coverage, sample design, and weighting in three Federal surveys. Journal of Drug Issues; 1(3):595–614. 2004.

*For More Information:* See the Division of Adolescent and School Health Web site at www.cdc.gov/nccdphp/dash/.

## Private and Global Sources

### Alan Guttmacher Institute (AGI) Abortion Provider Survey

The Alan Guttmacher Institute (AGI), a not-for-profit organization focused on reproductive health research, policy analysis, and public education, conducts periodic surveys of abortion providers to provide nationally representative statistics on abortion incidence.

Number of induced abortions; number, types, and locations of providers; and types of procedures performed, are presented by State and region. *Health, United States* presents the total for each data year. Thirteen provider surveys have been conducted for selected data years 1973 to midyear 2001. Data were collected from clinics, physicians, and hospitals identified as potential providers of abortion services. Mailed questionnaires were sent to all potential providers, with two additional mailings and telephone follow-up for nonresponse. No surveys were conducted in 1983, 1986, 1989, 1990, 1993, 1994, 1997, or 1998. For 1999–2000, a version of the survey questionnaire was created for each of the three major categories of providers, modeled on the survey questionnaire used for AGI's data collection in 1997. All surveys asked the number of induced abortions performed at the provider's location. State health statistics agencies were contacted, requesting all available data reported by providers to each State health agency on the number of abortions performed in the survey year. For States that provided data to AGI, the health agency figures were used for providers who did not respond to the survey. Estimates of the number of abortions performed by some providers were ascertained from knowledgeable sources in the community.

Of the 2,442 potential providers surveyed for 1999–2000, 1,931 performed abortions between January 1999 and June 2001. Of abortions reported for data year 2000, 77 percent were reported by providers, 10 percent came from health department data, 11 percent were estimated by knowledgeable sources, and 2 percent were projections or other estimates.

To estimate the number of abortions performed in 2001 and 2002, AGI first estimated the change in the number of



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abortions between 2000 and 2001, beginning with the number of abortions occurring in each State, as reported by the CDC, in each of those 2 years. The three States without reporting systems were excluded. AGI also eliminated the States with very incomplete or inconsistent reporting (Arizona, Maryland, and Nevada, as well as the District of Columbia). AGI summed the number of abortions that took place in the 44 remaining States for each year. The percentage change between 2000 and 2001 was then applied to AGI's more complete nationwide count of 1,312,990 abortions in 2000 to arrive at the national estimate for 2001. The same procedure was used to estimate the change in the number of abortions between 2001 and 2002, except that the data for both years were collected directly from State health departments because the CDC abortion surveillance report for 2002 was not yet available. For 2002, no data were available for Wyoming (in addition to the States with no reporting systems), and AGI eliminated Arizona, Colorado, the District of Columbia, and Maryland because of inconsistent reporting. AGI used the remaining 43 States for the calculations.

The number of abortions estimated by AGI through the mid- to late-1980s was about 20 percent higher than the number reported to the CDC. Between 1989 and 1997, the AGI estimates were about 12 percent higher than those reported by CDC. Beginning in 1998, health departments of four States did not report abortion data to CDC. The four reporting areas (the largest of which is California) that did not report abortions to CDC in 1998 accounted for 18 percent of all abortions tallied by AGI's 1995–96 survey. FDA approval of Mifepristone (medical abortion) in September of 2000 accounted for a small proportion (approx 6 percent) of abortions performed in nonhospital facilities during the first half of 2001.

*References:*

Finer LB, Henshaw SK. Abortion incidence and services in the United States in 2000. Perspect Sex Reprod Health; 35(1):6–15. 2003.

Finer LB, Henshaw SK. Estimates of U.S. Abortion Incidence in 2001 and 2002. The Alan Guttmacher Institute. May 2005. found at http://www.guttmacher.org/pubs/2005/05/18/ab_incidence.pdf.

*For More Information:* See the AGI Web site at http://www.guttmacher.org or write to The Alan Guttmacher Institute, 120 Wall Street, New York, NY 10005.

## American Association of Colleges of Pharmacy

The American Association of Colleges of Pharmacy (AACP) compiles data on the Colleges of Pharmacy, including information on student enrollment and types of degrees conferred. Data are collected through an annual survey; the response rate is 100 percent.

*For More Information:* See *Profile of Pharmacy Students.* The American Association of Colleges of Pharmacy, 1426 Prince Street, Alexandria, VA; or the AACP Web site at www.aacp.org.

## American Association of Colleges of Podiatric Medicine

The American Association of Colleges of Podiatric Medicine (AACPM) compiles data on the Colleges of Podiatric Medicine, including information on the schools and enrollment. Data are collected annually through written questionnaires. The response rate is 100 percent.

*For More Information:* Write to The American Association of Colleges of Podiatric Medicine, 15850 Crabbs Branch Way, Suite 320, Rockville, MD 20855; or see the AACPM Web site at www.aacpm.org.

## American Dental Association

The Division of Educational Measurement of the American Dental Association (ADA) conducts annual surveys of predoctoral dental educational institutions. The questionnaire, mailed to all dental schools, collects information on student characteristics, financial management, and curricula.

*For More Information:* See the American Dental Association, *2002–03 Survey of Predoctoral Dental Education, vol.1, Academic Programs, Enrollments, and Graduates, Chicago. 2004* or the ADA Web site at www.ada.org.

## American Hospital Association Annual Survey of Hospitals

Data from the American Hospital Association (AHA) annual survey are based on questionnaires sent to all AHA-registered and nonregistered hospitals in the United States and its



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associated areas. U.S. Government hospitals located outside the United States are excluded. Overall, the average response rate over the past 5 years has been approximately 83 percent. For nonreporting hospitals and for the survey questionnaires of reporting hospitals on which some information was missing, estimates are made for all data, except those on beds, bassinets, and facilities. Data for beds and bassinets of nonreporting hospitals are based on the most recent information available from those hospitals. Data for facilities and services are based only on reporting hospitals.

Estimates of other types of missing data are based on data reported the previous year, if available. When unavailable, estimates are based on data furnished by reporting hospitals similar in size, control, major service provided, length of stay, and geographic and demographic characteristics.

*For More Information:* Write to the AHA Annual Survey of Hospitals, Health Forum, LLC, an American Hospital Association Company, One North Franklin Street, Chicago, IL 60606; or see the AHA Web site at www.aha.org.

## American Medical Association Physician Masterfile

A masterfile of physicians has been maintained by the American Medical Association (AMA) since 1906. The Physician Masterfile contains data on all physicians in the United States, both members and nonmembers of the AMA, and on those graduates of American medical schools temporarily practicing overseas. The file also includes international medical graduates (IMGs) who are graduates of foreign medical schools residing in the United States and who meet education standards for primary recognition as physicians.

A file is initiated on each individual upon entry into medical school or, in the case of IMGs, upon entry into the United States. Between 1965 and 1985, a mail questionnaire survey was conducted every 4 years to update the file information on professional activities, self-designated area of specialization, and present employment status. Since 1985, approximately one-third of all physicians are surveyed each year.

*For More Information:* See Division of Survey and Data Resources, American Medical Association, *Physician Characteristics and Distribution in the U.S., 2005* ed. Chicago, IL. 2004; or the AMA Web site at http://www.ama-assn.org/.

## Association of American Medical Colleges

The Association of American Medical Colleges (AAMC) collects information on student enrollment in medical schools through the annual Liaison Committee on Medical Education questionnaire, the fall enrollment questionnaire, and the American Medical College Application Service (AMCAS) data system. Other data sources are the institutional profile system, the premedical students questionnaire, the minority student opportunities in medicine questionnaire, the faculty roster system, data from the Medical College Admission Test, and one-time surveys developed for special projects.

*For More Information:* See the Association of American Medical Colleges, *Statistical Information Related to Medical Schools and Teaching Hospitals*, Washington, DC. 2004; or the AAMC Web site at www.aamc.org.

## Association of Schools and Colleges of Optometry

The Association of Schools and Colleges of Optometry (ASCO) compiles data on various aspects of optometric education including data on schools and enrollment. Questionnaires are sent annually to all schools and colleges of optometry. The response rate is 100 percent.

*For More Information:* Write to the Annual Survey of Optometric Educational Institutions, Association of Schools and Colleges of Optometry, 6110 Executive Blvd., Suite 510, Rockville, MD 20852; or see the ASCO Web site at www.opted.org.

## Association of Schools of Public Health

The Association of Schools of Public Health (ASPH) compiles data on schools of public health in the United States and Puerto Rico. Questionnaires are sent annually to all member schools. The response rate is 100 percent.

Unlike health professional schools that emphasize specific clinical occupations, schools of public health offer study in specialty areas such as biostatistics, epidemiology, environmental health, occupational health, health administration, health planning, nutrition, maternal and child



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health, social and behavioral sciences, and other population-based sciences.

*For More Information:* Write to the Association of Schools of Public Health, 1101 15th Street, NW, Suite 910, Washington, DC 20005; or see the ASPH Web site at www.asph.org.

## European Health for All Database

### World Health Organization Regional Office for Europe

The WHO Regional Office for Europe (WHO/Europe) provides country-specific and topic-specific health information via the Internet for people who influence health policy in the WHO European Region and the media.

WHO/Europe collects statistics on health and makes them widely available through

- The European health for all database (HFA-DB), which contains data on about 600 health indicators collected from national counterparts in 51 European countries, and data from other WHO technical programs and some international organizations.
- Highlights on health in countries in the WHO European Region that give an overview of the health situation in each country in comparison with other countries. Highlights complement the public health reports produced by a number of member States in the region.
- Health status overview for countries of central and eastern Europe that are candidates for accession to the European Union (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia).

WHO/Europe helps countries strengthen their national health information systems, particularly by supporting

- the development of national health indicator databases
- the exchange of experience on national public health reports between countries; a database of public health reports is maintained and available for consultation and networking
- implementation of international classifications and definitions in countries
- regional networks of health information professionals

*For More Information:* See the European health for all database at http://hfadb.who.dk/hfa/.

## InterStudy National Health Maintenance Organization Census

From 1976 to 1980, the Office of Health Maintenance Organizations conducted a census of health maintenance organizations (HMOs). Since 1981, InterStudy has conducted the census. A questionnaire is sent to all HMOs in the United States asking for updated enrollment, profit status, and Federal qualification status. New HMOs, are also asked to provide information on model type. When necessary, information is obtained, supplemented, or clarified by telephone. For nonresponding HMOs State-supplied information or the most current available data are used.

In 1985, a large increase in the number of HMOs and enrollment was partly attributable to a change in the categories of HMOs included in the census: Medicaid-only and Medicare-only HMOs have been added. Component HMOs, which have their own discrete management, can be listed separately, whereas previously, the oldest HMO reported for all of its component or expansion sites, even when the components had different operational dates or were different model types.

*For More Information:* See *Rebecca L. Waller RL, Lauer TM, Greenberger MA, et al. The InterStudy Competitive Edge, Fall 2004 Part II: Managed Care Industry Report. St. Paul, MN: Decision Resources, Inc., 2004* or the InterStudy Web site at www.hmodata.com.

## National League for Nursing

The division of research of the National League for Nursing (NLN) conducts The Annual Survey of Schools of Nursing in October of each year. Questionnaires are sent to all graduate nursing programs (master's and doctoral), baccalaureate programs designed exclusively for registered nurses, basic registered nursing programs (baccalaureate, associate degree, and diploma), and licensed practical nursing programs. Data on enrollments, first-time admissions, and graduates are completed for all nursing education programs. Response rates of approximately 80 percent are achieved for other areas of inquiry.

*For More Information:* See the NLN Web site at www.nln.org.



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## Organization for Economic Cooperation and Development Health Data

The Organization for Economic Cooperation and Development (OECD) provides annual data on statistical indicators on health and economic policies collected from 30 member countries since the 1960s. The international comparability of health expenditure estimates depends on the quality of national health accounts in OECD member countries. In recent years, the OECD health accounts have become an informal standard for reporting on health care systems. Additional limitations in international comparisons include differing boundaries between health care and other social care, particularly for the disabled and elderly, and underestimation of private expenditures on health.

The OECD was established in 1961 with a mandate to promote policies to achieve the highest sustainable economic growth and a rising standard of living among member countries. The Organization now comprises 30 member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, The Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

As part of its mission, the OECD has developed a number of activities in relation to health and health care systems. The main aim of OECD work on health policy is to conduct cross-national studies of the performance of OECD health systems and to facilitate exchanges between member countries of their experiences of financing, delivering, and managing health services. To support this work, each year the OECD compiles cross-country data in OECD Health Data, one of the most comprehensive sources of comparable health-related statistics. OECD Health Data is an essential tool to carry out comparative analyses and to draw lessons from international comparisons of diverse health care systems. This international database now incorporates the first results arising from the implementation of the OECD manual, A System of Health Accounts (2000), which provide a standard framework for producing a set of comprehensive, consistent, and internationally comparable data on health spending. The OECD collaborates with other international organizations such as the WHO.

*For More Information:* See the OECD Web site at www.oecd.org/health.

## United Nations Demographic Yearbook

The Statistical Office of the United Nations prepares the *Demographic Yearbook*, a comprehensive collection of international demographic statistics.

Questionnaires are sent annually and monthly to more than 220 national statistical services and other appropriate government offices. Data forwarded on these questionnaires are supplemented, to the extent possible, by data taken from official national publications and by correspondence with the national statistical services. To ensure comparability, rates, ratios, and percents have been calculated in the statistical office of the United Nations.

Lack of international comparability among estimates arises from differences in concepts, definitions, and time of data collection. The comparability of population data is affected by several factors, including (a) definitions of the total population, (b) definitions used to classify the population into its urban and rural components, (c) difficulties relating to age reporting, (d) extent of over- or under-enumeration, and (e) quality of population estimates. The completeness and accuracy of vital statistics data also vary from one country to another. Differences in statistical definitions of vital events may also influence comparability.

International demographic trend data are available on a CD-ROM entitled United Nations, 2000. Demographic Yearbook---Historical Supplement 1948--97. CD-ROM Special Issue. United Nations publication sales number E/F.99.XIII.12.

*For More Information:* See the United Nations, Statistics Division Web site at http://unstats.un.org/unsd/demographic/products/dyb/dyb2.htm.

## World Health Statistics Annual

### World Health Organization

The World Health Organization (WHO) prepares the *World Health Statistics Annual*, an annual volume of information on vital statistics and causes of death designed for use by the medical and public health professions. Each volume is the result of a joint effort by the national health and statistical administrations of many countries, the United Nations, and



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WHO. United Nations estimates of vital rates and population size and composition, where available, are reprinted directly in the *Statistics Annual*. For those countries for which the United Nations does not prepare demographic estimates, primarily smaller populations, the latest available data reported to the United Nations and based on reasonably complete coverage of events are used.

Information published on infant mortality is based entirely on official national data either reported directly or made available to WHO.

Selected life table functions are calculated from the application of a uniform methodology to national mortality data provided to WHO, to enhance their value for international comparisons. The life table procedure used by WHO may often lead to discrepancies with national figures published by countries, because of differences in methodology or degree of age detail maintained in calculations.

The international comparability of estimates published in the *World Health Statistics Annual* is affected by the same problems as is the United Nations *Demographic Yearbook*. Cross-national differences in statistical definitions of vital events, in the completeness and accuracy of vital statistics data, and in the comparability of population data are the primary factors affecting comparability.

*For More Information:* See the World Health Organization, *World Health Statistics Annual 2005* at http://www3.who.int/statistics/ or the WHO Web site at www.who.int.



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# Appendix II

# Definitions and Methods

Appendix II is an alphabetical listing of terms used in *Health, United States*. It includes cross-references to related terms and synonyms. It also describes the methods used for calculating age-adjusted rates, average annual rates of change, relative standard errors, birth rates, death rates, and years of potential life lost. Appendix II includes standard populations used for age adjustment (tables I, II, and III); *International Classification of Diseases* (ICD) codes for cause of death from the Sixth through Tenth Revisions and the years when the Revisions were in effect (tables IV and V); comparability ratios between ICD–9 and ICD–10 for selected causes (table VI); ICD–9–CM codes for external cause of injury, diagnostic, and procedure categories (tables VII, IX, and X); classification of generic analgesic drugs (table XI); and industry codes from the North American Industry Classification System (NAICS) that has replaced the Standard Industrial Classification (SIC) system (table VIII). Standards for presenting Federal data on race and ethnicity are described under *Race*, and sample tabulations of National Health Interview Survey (NHIS) data comparing the 1977 and 1997 Standards for Federal data on race and Hispanic origin are presented in tables XII and XIII.

**Acquired immunodeficiency syndrome (AIDS)**—Human immunodeficiency virus (HIV) disease is the pathogen that causes AIDS and encompasses all the condition's stages, from infection to the deterioration of the immune system and the onset of opportunistic diseases. However, AIDS is still the name that most people use to refer to the immune deficiency caused by HIV. An AIDS diagnosis (indicating that the person has reached the late stages of the disease) is given to people with HIV who have counts below 200 CD4+ cells/$mm^3$ (also known as T cells or T4 cells, which are the main target of HIV) or when they become diagnosed with at least one of a set of opportunistic diseases. All 50 States and the District of Columbia report AIDS cases to CDC using a uniform surveillance case definition and case report form. The case reporting definitions were expanded in 1985 *(MMWR* 1985; 34:373–5); 1987 *(MMWR* 1987; 36(No. SS-1):1S–15S); 1993 for adults and adolescents *(MMWR* 1992; 41(no. RR-17): 1–19); and 1994 for pediatric cases *(MMWR* 1994; 43(no. RR-12):1–19). The revisions incorporated a broader range of AIDS-indicator diseases and conditions and used HIV diagnostic tests to improve the sensitivity and specificity of the definition. The 1993 expansion of the case definition caused a temporary distortion of AIDS incidence trends. In 1995, new treatments (protease inhibitors) for HIV and AIDS were approved. These therapies have prevented or delayed the onset of AIDS and premature death among many HIV-infected persons, which should be considered when interpreting trend data. AIDS surveillance data are published annually by CDC in the HIV/AIDS Surveillance Report at www.cdc.gov/hiv/stats/hasrlink.htm. See related *Human immunodeficiency virus (HIV) disease.*

**Active physician**—See *Physician.*

**Activities of daily living (ADL)**—Activities of daily living are activities related to personal care and include bathing or showering, dressing, getting in or out of bed or a chair, using the toilet, and eating. In the National Health Interview Survey, respondents were asked whether they or family members 3 years of age and over need the help of another person with personal care because of a physical, mental, or emotional problem. Persons are considered to have an ADL limitation if any condition(s) causing the respondent to need help with the specific activities was chronic.

In the Medicare Current Beneficiary Survey (table 141), if a sample person had any difficulty performing an activity by him or herself and without special equipment or did not perform the activity at all because of health problems, the person was categorized as having a limitation in that activity. The limitation may have been temporary or chronic at the time of the interview. Sample persons who were administered a community interview answered health status and functioning questions themselves, if able to do so. A proxy such as a nurse answered questions about the sample person's health status and functioning for those in a long-term care facility. Beginning in 1997, interview questions for persons in long-term care facilities were changed slightly from those administered to persons in the community to differentiate residents who were independent from those who received supervision or assistance with transferring, locomotion on unit, dressing, eating, toilet use, and bathing. See related *Condition; Instrumental activities of daily living (IADL); Limitation of activity.*

**Addition**—An addition to a mental health organization is defined by the Substance Abuse and Mental Health Services



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Administration's Center for Mental Health Services as a new admission, a readmission, a return from long-term leave, or a transfer from another service of the same organization or another organization. See related *Mental health organization; Mental health service type.*

**Admission**—The American Hospital Association defines admissions as persons, excluding newborns, accepted for inpatient services during the survey reporting period. See related *Days of care; Discharge; Inpatient.*

**Age**—Age is reported as age at last birthday, that is, age in completed years, often calculated by subtracting date of birth from the reference date, with the reference date being the date of the examination, interview, or other contact with an individual.

Mother's (maternal) age is reported on the birth certificate by all States. Birth statistics are presented for mothers age 10–49 years through 1996 and 10–54 years starting in 1997, based on mother's date of birth or age as reported on the birth certificate. The age of mother is edited for upper and lower limits. When the age of the mother is computed to be under 10 years or 55 years or over (50 years or over in 1964–96), it is considered not stated and imputed according to the age of the mother from the previous birth record of the same race and total birth order (total of fetal deaths and live births). Before 1963 not stated ages were distributed in proportion to the known ages for each racial group. Beginning in 1997 the birth rate for the maternal age group 45–49 years includes data for mothers age 50–54 years in the numerator and is based on the population of women 45–49 years in the denominator.

**Age adjustment**—Age adjustment is used to compare risks of two or more populations at one point in time or one population at two or more points in time. Age-adjusted rates are computed by the direct method by applying age-specific rates in a population of interest to a standardized age distribution, to eliminate differences in observed rates that result from age differences in population composition. Age-adjusted rates should be viewed as relative indexes rather than actual measures of risk.

Age-adjusted rates are calculated by the direct method as follows:

$$\sum_{i=1}^{n} r_i \times (p_i / P)$$

**Table I. United States standard population and proportion distribution by age for age adjusting death rates**

| Age | Population | Proportion distribution (weights) | Standard million |
|---|---|---|---|
| Total | 274,634,000 | 1.000000 | 1,000,000 |
| Under 1 year | 3,795,000 | 0.013818 | 13,818 |
| 1–4 years | 15,192,000 | 0.055317 | 55,317 |
| 5–14 years | 39,977,000 | 0.145565 | 145,565 |
| 15–24 years | 38,077,000 | 0.138646 | 138,646 |
| 25–34 years | 37,233,000 | 0.135573 | 135,573 |
| 35–44 years | 44,659,000 | 0.162613 | 162,613 |
| 45–54 years | 37,030,000 | 0.134834 | 134,834 |
| 55–64 years | 23,961,000 | 0.087247 | 87,247 |
| 65–74 years | 18,136,000 | 0.066037 | 66,037 |
| 75–84 years | 12,315,000 | *0.044842 | 44,842 |
| 85 years and over | 4,259,000 | 0.015508 | 15,508 |

*Figure is rounded up instead of down to force total to 1.0.

SOURCE: Anderson RN, Rosenberg HM. Age Standardization of Death Rates: Implementation of the Year 2000 Standard. National vital statistics reports; vol 47 no 3. Hyattsville, Maryland: National Center for Health Statistics. 1998.

**Table II. Numbers of live births and mother's age groups used to adjust maternal mortality rates to live births in the United States in 1970**

| Mother's age | Number |
|---|---|
| All ages | 3,731,386 |
| Under 20 years | 656,460 |
| 20–24 years | 1,418,674 |
| 25–29 years | 994,904 |
| 30–34 years | 427,806 |
| 35 years and over | 233,342 |

SOURCE: U.S. Bureau of the Census: Population estimates and projections. *Current Population Reports.* Series P-25, No. 499. Washington, D.C.: U.S. Government Printing Office, May 1973.

where $r_i$ = rate in age group $i$ in the population of interest

$p_i$ = standard population in age group $i$

$$P = \sum_{i=1}^{n} p_i$$

$n$ = total number of age groups over the age range of the age-adjusted rate

Age adjustment by the direct method requires use of a standard age distribution. The standard for age adjusting death rates and estimates from surveys in *Health, United States* is the projected year 2000 U.S. resident population. Starting with *Health, United States, 2001*, the year 2000 U.S. standard population replaces the 1940 U.S. population for



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age adjusting mortality statistics. The U.S. standard population also replaces the 1970 civilian noninstitutionalized population and 1980 U.S. resident population, which previously had been used as standard age distributions for age adjusting estimates from NCHS surveys.

Changing the standard population has implications for racial and ethnic differentials in mortality. For example, the mortality ratio for the black to white populations is reduced from 1.6 using the 1940 standard to 1.4 using the 2000 standard, reflecting the greater weight that the 2000 standard gives to the older population where race differentials in mortality are smaller.

Age-adjusted estimates from any data source presented in *Health, United States* may differ from age-adjusted estimates based on the same data presented in other reports if different age groups are used in the adjustment procedure.

For more information on implementing the 2000 population standard for age adjusting death rates, see Anderson RN, Rosenberg HM. Age Standardization of Death Rates: Implementation of the Year 2000 Standard. National vital statistics reports; vol 47 no 3. Hyattsville, MD: National Center for Health Statistics. 1998. For more information on the derivation of age-adjustment weights for use with NCHS survey data, see Klein RJ, Schoenborn CA. Age Adjustment Using the 2000 Projected U.S. Population. Healthy People Statistical Notes no. 20. Hyattsville, MD: National Center for Health Statistics. 2001. Both reports are available through the NCHS home page at www.cdc.gov/nchs. The U.S. standard population is available through the Census Bureau's home page at www.census.gov/prod/1/pop/p25-1130/.

*Mortality data*—Death rates are age adjusted to the year 2000 U.S. standard population (table I). Age-adjusted rates are calculated using age-specific death rates per 100,000 population rounded to one decimal place. Adjustment is based on 11 age groups with two exceptions. First, age-adjusted death rates for black males and black females in 1950 are based on nine age groups, with under 1 year and 1–4 years of age combined as one group and 75–84 years and 85 years of age combined as one group. Second, age-adjusted death rates by educational attainment for the age group 25–64 years are based on four 10-year age groups (25–34 years, 35–44 years, 45–54 years, and 55–64 years).

Age-adjusted rates for years of potential life lost before age 75 years also use the year 2000 standard population and are based on eight age groups (under 1 year, 1–14 years, 15–24 years, and 10-year age groups through 65–74 years).

Maternal mortality rates for pregnancy, childbirth, and the puerperium are calculated as the number of deaths per 100,000 live births. These rates are age adjusted to the 1970 distribution of live births by mother's age in the United States as shown in table II. See related *Rate: Death and related rates; Years of potential life lost.*

*National Health and Nutrition Examination Survey (NHANES)*—Estimates based on the National Health Examination Survey (NHES) and NHANES are age adjusted to the year 2000 U.S. standard population generally using five age groups: 20–34 years, 35–44 years, 45–54 years, 55–64 years, and 65–74 years or 65 years and over (see table III). Prior to *Health, United States, 2000,* these estimates were age adjusted to the 1980 U.S. resident population.

*National Health Care Surveys*—Estimates based on the National Hospital Discharge Survey, the National Ambulatory Medical Care Survey, the National Hospital Ambulatory Medical Care Survey, the National Nursing Home Survey, and the National Home and Hospice Care Survey are age adjusted to the year 2000 U.S. standard population (table III). Information on the age groups used in the age-adjustment procedure is contained in the footnotes to the relevant tables.

*National Health Interview Survey (NHIS)*—Estimates based on the NHIS are age adjusted to the year 2000 U.S. standard population (table III). Prior to the 2000 edition of *Health, United States,* National Health Interview Survey estimates were age adjusted to the 1970 civilian noninstitutionalized population. Information on the age groups used in the age-adjustment procedure is contained in the footnotes to the relevant tables.

**AIDS**—See *Acquired immunodeficiency syndrome.*

**Alcohol consumption**—Alcohol consumption is measured differently in various data systems.

*Monitoring the Future Study*—This school-based survey of secondary school students collects information on alcohol use using self-completed questionnaires.



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Information on consumption of alcoholic beverages, defined as beer, wine, wine coolers, and liquor, is based on the following question: "On how many occasions (if any) have you had alcohol to drink—more than just a few sips—in the last 30 days?" Students responding affirmatively are then asked "How many times have you had five or more drinks in a row in the last 2 weeks?" For this question, a "drink" means a 12-ounce can or bottle of beer, a 4-ounce glass of wine, a 12-ounce bottle or can of wine cooler, or a mixed drink or shot of liquor.

*National Health Interview Survey (NHIS)*—Starting with the 1997 NHIS, information on alcohol consumption is collected in the sample adult questionnaire. Adult respondents are asked two screening questions about their lifetime alcohol consumption: "In any one year, have you had at least 12 drinks of any type of alcoholic beverage? In your entire life, have you had at least 12 drinks of any type of alcoholic beverage?" Persons who report at least 12 drinks in a lifetime are then asked a series of questions about alcohol consumption during the past year: "In the past year, how often did you drink any type of alcoholic beverage? In the past year, on those days that you drank alcoholic beverages, on the average, how many drinks did you have? In the past year, on how many days did you have 5 or more drinks of any alcoholic beverage?"

*National Survey on Drug Use and Health (NSDUH)*—Starting in 1999, NSDUH information about the frequency of the consumption of alcoholic beverages during the past 30 days has been obtained for all persons surveyed who are 12 years of age and over. An extensive list of examples of the kinds of beverages covered was given to respondents prior to the question administration. A "drink" is defined as a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor, or a mixed drink with liquor in it. Those times when the respondent had only a sip or two from a drink are not considered consumption. Alcohol use is based on the following questions: "During the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?" "On the days that you drank during the past 30 days, how many drinks did you usually have?" And "During the past 30 days, on how many days did you have 5 or more drinks on the same occasion?"

**Table III. United States standard population and age groups used to age adjust survey data**

| *Survey and age* | *Number in thousands* |
|---|---|
| NHIS, NAMCS, NHAMCS, NHHCS, NNHS, and NHDS | |
| All ages | 274,634 |
| 18 years and over | 203,851 |
| 25 years and over | 117,593 |
| 40 years and over | 118,180 |
| 65 years and over | 34,710 |
| Under 18 years | 70,783 |
| 2–17 years | 63,229 |
| 18–44 years | 108,150 |
| 18–24 years | 26,258 |
| 25–34 years | 37,233 |
| 35–44 years | 44,659 |
| 45–64 years | 60,991 |
| 45–54 years | 37,030 |
| 55–64 years | 23,961 |
| 65–74 years | 18,136 |
| 75 years and over | 16,574 |
| 18–49 years | 127,956 |
| 40–64 years: | |
| 40–49 years | 42,285 |
| 50–64 years | 41,185 |
| NHES and NHANES | |
| 20 years and over | 195,850 |
| 20–74 years | 179,276 |
| 20–34 years | 55,490 |
| 35–44 years | 44,659 |
| 45–54 years | 37,030 |
| 55–64 years | 23,961 |
| 65–74 years | 18,136 |
| or | |
| 65 years and over | 34,710 |
| NHANES (Tables 55 and 71 only) | |
| 20–39 years | 77,670 |
| 40–59 years | 72,816 |
| 60–74 years | 28,790 |
| or | |
| 60 years and over | 45,364 |
| NHANES (Table 91 only) | |
| Under 18 years | 70,783 |
| 18–44 years | 108,150 |
| 45–64 years | 60,991 |
| 65 years and over | 34,710 |

SOURCE: U.S. Census Bureau: Current Population Reports. P25–1130. Population Projections of the United States by Age, Sex, Race, and Hispanic Origin, table 2. U.S. Government Printing Office, Washington: 1996.



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**Any-listed diagnosis**—See *Diagnosis.*

**Average annual rate of change (percent change)**—In *Health, United States* average annual rates of change or growth rates are calculated as follows:

$$[(P_n / P_o)^{1/N} - 1] \times 100$$

where $P_n$ = later time period

$P_o$ = earlier time period

$N$ = number of years in interval.

This geometric rate of change assumes that a variable increases or decreases at the same rate during each year between the two time periods.

**Average length of stay**—In the National Health Interview Survey, average length of stay per discharged inpatient is computed by dividing the total number of hospital days for a specified group by the total number of discharges for that group. Similarly, in the National Hospital Discharge Survey, average length of stay is computed by dividing the total number of days of care, counting the date of admission but not the date of discharge, by the number of patients discharged. The American Hospital Association computes average length of stay by dividing the number of inpatient days by the number of admissions. See related *Days of care; Discharge; Inpatient.*

**Bed**—The American Hospital Association defines the bed count as the number of beds, cribs, and pediatric bassinets that are set up and staffed for use by inpatients on the last day of the reporting period. In the Center for Medicare & Medicaid Service's Online Survey Certification and Reporting (OSCAR) database, all beds in certified facilities are counted on the day of certification inspection. The World Health Organization defines a hospital bed as one regularly maintained and staffed for the accommodation and full-time care of a succession of inpatients and situated in a part of the hospital where continuous medical care for inpatients is provided. The Center for Mental Health Services counts the number of beds set up and staffed for use in inpatient and residential treatment services on the last day of the survey reporting period. See related *Hospital; Mental health organization; Mental health service type; Occupancy rate.*

**Birth cohort**—A birth cohort consists of all persons born within a given period of time, such as a calendar year.

**Birth rate**—See *Rate: Birth and related rates.*

**Birthweight**—Birthweight is the first weight of the newborn obtained after birth. Low birthweight is defined as less than 2,500 grams or 5 pounds 8 ounces. Very low birthweight is defined as less than 1,500 grams or 3 pounds 4 ounces. Before 1979, low birthweight was defined as 2,500 grams or less and very low birthweight as 1,500 grams or less.

**Body mass index (BMI)**—BMI is a measure that adjusts bodyweight for height. It is calculated as weight in kilograms divided by height in meters squared. Overweight for children and adolescents is defined as BMI at or above the sex- and age-specific 95th percentile BMI cut points from the 2000 CDC Growth Charts (www.cdc.gov/growthcharts/). Healthy weight for adults is defined as a BMI of 18.5 to less than 25; overweight, as greater than or equal to a BMI of 25; and obesity, as greater than or equal to a BMI of 30. BMI cut points are defined in the Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2000. U.S. Department of Agriculture, Agricultural Research Service, Dietary Guidelines Advisory Committee, p. 23, or on the Internet at www.health.gov/dietaryguidelines/dgac/; NHLBI Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report. *Obes Res* 1998. 6:51S-209S or on the Internet at www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.htm; and in U.S. Department of Health and Human Services. *Tracking Healthy People 2010.* Washington, DC: U.S. Government Printing Office, November 2000. Objectives 19.1, 19.2, and 19.3, or on the Internet at www.health.gov/healthypeople/document/html/volume2/19nutrition.htm.

**Cause of death**—For the purpose of national mortality statistics, every death is attributed to one underlying condition, based on information reported on the death certificate and using the international rules for selecting the underlying cause of death from the conditions stated on the death certificate. The underlying cause is defined by the World Health Organization (WHO) as the disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence that produced the fatal injury. Generally more medical information is reported on death certificates than is directly reflected in the underlying cause of death. The conditions that are not selected as



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**Table IV. Revision of the *International Classification of Diseases (ICD)* according to year of conference by which adopted and years in use in the United States**

| *Revision of the International Classification of Diseases* | *Year of conference by which adopted* | *Years in use in United States* |
|---|---|---|
| First | 1900 | 1900–1909 |
| Second | 1909 | 1910–1920 |
| Third | 1920 | 1921–1929 |
| Fourth | 1929 | 1930–1938 |
| Fifth | 1938 | 1939–1948 |
| Sixth | 1948 | 1949–1957 |
| Seventh | 1955 | 1958–1967 |
| Eighth | 1965 | 1968–1978 |
| Ninth | 1975 | 1979–1998 |
| Tenth | 1992 | 1999– |

underlying cause of death constitute the nonunderlying causes of death, also known as multiple cause of death.

Cause of death is coded according to the appropriate revision of the *International Classification of Diseases* (ICD) (see table IV). Effective with deaths occurring in 1999, the United States began using the Tenth Revision of the ICD (ICD–10); during the period 1979–98, causes of death were coded and classified according to the Ninth Revision (ICD–9). Table V lists ICD codes for the Sixth through Tenth Revisions for causes of death shown in *Health, United States*.

Each of these revisions has produced discontinuities in cause-of-death trends. These discontinuities are measured using comparability ratios. These measures of discontinuity are essential to the interpretation of mortality trends. For further discussion, see the Mortality Technical Appendix available on the NCHS Web site at www.cdc.gov/nchs/about/major/dvs/mortdata.htm. See related *Comparability ratio; International Classification of Diseases (ICD); Appendix I, National Vital Statistics System, Multiple Cause-of-Death File*.

**Cause-of-death ranking**—Selected causes of death of public health and medical importance comprise tabulation lists and are ranked according to the number of deaths assigned to these causes. The top-ranking causes determine the leading causes of death. Certain causes on the tabulation lists are not ranked if, for example, the category title represents a group title (such as Major cardiovascular diseases and Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified); or the category title begins with the words "Other" and "All other." In addition when one of the titles that represents a subtotal (such as Malignant neoplasms) is ranked, its component parts are not ranked. The tabulation lists used for ranking in the *Tenth Revision of the International Classification of Diseases* (ICD) include the List of 113 Selected Causes of Death, which replaces the ICD–9 List of 72 Selected Causes, HIV infection and Alzheimer's disease; and the ICD–10 List of 130 Selected Causes of Infant Death, which replaces the ICD–9 List of 60 Selected Causes of Infant Death and HIV infection. Causes that are tied receive the same rank; the next cause is assigned the rank it would have received had the lower-ranked causes not been tied, that is, skip a rank. See related *International Classification of Diseases (ICD)*.

**Chronic condition**—See *Condition*.

**Cigarette smoking**—Cigarette smoking and related tobacco use are measured in several different data systems.

*Birth File*—Information on cigarette smoking by the mother during pregnancy is based on Yes/No responses to the birth certificate item "Other risk factors for this pregnancy: Tobacco use during pregnancy" and the average number of cigarettes per day with no specificity on timing during pregnancy. This information became available for the first time in 1989 with revision of the U.S. Standard Certificate of Live Birth. In 1989, 43 States and the District of Columbia collected data on tobacco use. The following States did not require the reporting of tobacco use in the standard format on the birth certificate: California, Indiana, Louisiana, Nebraska, New York, Oklahoma, and South Dakota. In 1990, information on tobacco use became available from Louisiana and Nebraska, increasing the number of reporting States to 45 and the District of Columbia. In 1991–93, with the addition of Oklahoma to the reporting area, information on tobacco use was available for 46 States and the District of Columbia; in 1994–98, 46 States, the District of Columbia, and New York City reported tobacco use; in 1999 information on tobacco use became available from Indiana and New York, increasing the number of reporting States to 48 and the District of Columbia; starting in 2000, with the addition of South Dakota, the reporting area includes 49 States and the District of Columbia. During 1989–2002, California did not require the reporting of tobacco use. The areas reporting tobacco use comprised 87 percent of U.S. births in 1999–2002. In 2003, data on smoking during pregnancy was included for all States except California,



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**Table V. Cause-of-death codes, according to applicable revision of *International Classification of Diseases (ICD)***

| Cause of death (Tenth Revision titles) | Sixth and Seventh Revisions | Eighth Revision | Ninth Revision | Tenth Revision |
|---|---|---|---|---|
| Communicable diseases | ... | ... | 001–139, 460–466, 480–487, 771.3 | A00–B99, J00–J22 |
| Chronic and noncommunicable diseases | ... | ... | 140–459, 470–478, 490–799 | C00–I99, J30–R99 |
| Injuries[1] | ... | ... | E800–E869, E880–E929, E950–E999 | *U01–*U03, V01–Y36, Y85–Y87, Y89 |
| Meningococcal infection | ... | ... | 036 | A39 |
| Septicemia | ... | ... | 038 | A40–A41 |
| Human immunodeficiency virus (HIV) disease[2] | ... | ... | *042–*044 | B20–B24 |
| Malignant neoplasms | 140–205 | 140–209 | 140–208 | C00–C97 |
| Colon, rectum, and anus | 153–154 | 153–154 | 153, 154 | C18–C21 |
| Trachea, bronchus, and lung | 162–163 | 162 | 162 | C33–C34 |
| Breast | 170 | 174 | 174–175 | C50 |
| Prostate | 177 | 185 | 185 | C61 |
| In situ neoplasms and benign neoplasms | ... | ... | 210–239 | D00–D48 |
| Diabetes mellitus | 260 | 250 | 250 | E10–E14 |
| Anemias | ... | ... | 280–285 | D50–D64 |
| Meningitis | ... | ... | 320–322 | G00, G03 |
| Alzheimer's disease | ... | ... | 331.0 | G30 |
| Diseases of heart | 6th: 410–443<br>7th: 400–402, 410–443 | 390–398, 402, 404, 410–429 | 390–398, 402, 404, 410–429 | I00–I09, I11, I13, I20–I51 |
| Ischemic heart disease | ... | ... | 410–414, 429.2 | I20–I25 |
| Cerebrovascular diseases | 330–334 | 430–438 | 430–434, 436–438 | I60–I69 |
| Atherosclerosis | ... | ... | 440 | I70 |
| Influenza and pneumonia | 480–483, 490–493 | 470–474, 480–486 | 480–487 | J10–J18 |
| Chronic lower respiratory diseases | 241, 501, 502, 527.1 | 490–493, 519.3 | 490–494, 496 | J40–J47 |
| Chronic liver disease and cirrhosis | 581 | 571 | 571 | K70, K73–K74 |
| Nephritis, nephrotic syndrome, and nephrosis | ... | ... | 580–589 | N00–N07, N17–N19, N25–N27 |
| Pregnancy, childbirth, and the puerperium | 640–689 | 630–676 | 630–676 | A34, O00–O95, O98–O99 |
| Congenital malformations, deformations, and chromosomal abnormalities | ... | ... | 740–759 | Q00–Q99 |
| Certain conditions originating in the perinatal period | ... | ... | 760–779 | P00–P96 |
| Newborn affected by maternal complications of pregnancy | ... | ... | 761 | P01 |
| Newborn affected by complications of placenta, cord, and membranes | ... | ... | 762 | P02 |
| Disorders related to short gestation and low birthweight, not elsewhere classified | ... | ... | 765 | P07 |
| Birth trauma | ... | ... | 767 | P10–P15 |
| Intrauterine hypoxia and birth asphyxia | ... | ... | 768 | P20–P21 |
| Respiratory distress of newborn | ... | ... | 769 | P22 |
| Sudden infant death syndrome | ... | ... | 798.0 | R95 |
| Unintentional injuries[3] | E800–E936, E960–E965 | E800–E929, E940–E946 | E800–E869, E880–E929 | V01–X59, Y85–Y86 |
| Motor vehicle-related injuries[3] | E810–E835 | E810–E823 | E810–E825 | V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0, V89.2 |
| Suicide[1] | E963, E970–E979 | E950–E959 | E950–E959 | *U03, X60–X84, Y87.0 |
| Homicide[1] | E964, E980–E983 | E960–E969 | E960–E969 | *U01–*U02, X85–Y09, Y87.1 |
| Injury by firearms | ... | E922, E955, E965, E970, E985 | E922, E955.0–E955.4, E965.0–E965.4, E970, E985.0–E985.4 | *U01.4, W32–W34, X72–X74, X93–X95, Y22–Y24, Y35.0 |

... Cause-of-death code numbers are not provided for causes not shown in *Health, United States*.

[1]Beginning with 2001 data, NCHS introduced categories *U01–*U03 for classifying and coding deaths due to acts of terrorism. The * indicates codes are not part of the Tenth Revision.

[2]Categories for coding human immunodeficiency virus infection were introduced in 1987. The * indicates codes are not part of the Ninth Revision.

[3]In the public health community, the term "unintentional injuries" is preferred to "accidents" and "motor vehicle-related injuries" to "motor vehicle accidents."



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Pennsylvania, and Washington, and comprised 81 percent of births. California did not report this information. Pennsylvania and Washington implemented the 2003 revision of the U.S. Standard Certificate of Live Birth, which asked for the number of cigarettes smoked at different intervals before and during pregnancy. Data from the 2003 revision of the birth certificate are not comparable with data from the 1989 revision used by other reporting areas.

*Monitoring the Future Survey*—Information on current cigarette smoking is obtained for high school seniors (starting in 1975) and 8th and 10th graders (starting in 1991) based on the following question: "How frequently have you smoked cigarettes during the past 30 days?"

*National Health Interview Survey (NHIS)*—Information about cigarette smoking is obtained for adults 18 years of age and over. Starting in 1993, current smokers are identified by asking the following two questions: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" Persons who smoked 100 cigarettes and who now smoke every day or some days are defined as current smokers. Before 1992, current smokers were identified based on positive responses to the following two questions: "Have you smoked 100 cigarettes in your entire life?" and "Do you smoke now?" (traditional definition). In 1992, the definition of current smoker in the NHIS was modified to specifically include persons who smoked on "some days" (revised definition). In 1992 cigarette smoking data were collected for a half sample with half the respondents (one-quarter sample) using the traditional smoking questions and the other half of the respondents (one-quarter sample) using the revised smoking question ("Do you smoke every day, some days, or not at all?"). An unpublished analysis of the 1992 traditional smoking measure revealed that the crude percentage of current smokers 18 years of age and over remained the same as for 1991. The statistics for 1992 combine data collected using the traditional and the revised questions.

In 1993–95 estimates of cigarette smoking prevalence were based on a half sample. Smoking data were not collected in 1996. Starting in 1997 smoking data were collected in the sample adult questionnaire. For further information on survey methodology and sample sizes pertaining to the NHIS cigarette smoking data for data years 1965–92 and other sources of cigarette smoking data available from the National Center for Health Statistics, see National Center for Health Statistics. *Bibliographies and Data Sources, Smoking Data Guide,* no 1, DHHS pub no (PHS) 91–1308-1, Public Health Service. Washington: U.S. Government Printing Office. 1991.

*National Survey on Drug Use & Health (NSDUH)*—Information on current cigarette smoking is obtained for all persons surveyed who are 12 years of age and over based on the following question: "During the past 30 days, have you smoked part or all of a cigarette?"

*Youth Risk Behavior Survey*—Information on current cigarette smoking is obtained from high school students (starting in 1991) based on the following question: "During the past 30 days, on how many days did you smoke cigarettes?"

**Civilian noninstitutionalized population; Civilian population**—See *Population.*

**Cohort fertility**—Cohort fertility refers to the fertility of the same women at successive ages. Women born during a 12-month period constitute a birth cohort. Cohort fertility for birth cohorts of women is measured by central birth rates, which represent the number of births occurring to women of an exact age divided by the number of women of that exact age. Cumulative birth rates by a given exact age represent the total childbearing experience of women in a cohort up to that age. Cumulative birth rates are sums of central birth rates for specified cohorts and show the number of children ever born up to the indicated age. For example, the cumulative birth rate for women exactly 30 years of age as of January 1, 1960, is the sum of the central birth rates for the 1930 birth cohort for the years 1944 (when its members were age 14) through 1959 (when they were age 29). Cumulative birth rates are also calculated for specific birth orders at each exact age of woman. The percentage of women who have not had at least one live birth by a certain age is found by subtracting the cumulative first birth rate for women of that age from 1,000 and dividing by 10. For method of calculation, see Heuser RL. *Fertility tables for birth cohorts by color: United States, 1917–73.* Rockville, MD: NCHS. 1976. See related *Rate: Birth and related rates.*

**Community hospitals**—See *Hospital.*



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**Comparability ratio**—About every 10–20 years, the *International Classification of Diseases* (ICD) is revised to stay abreast of advances in medical science and changes in medical terminology. Each of these revisions produces breaks in the continuity of cause-of-death statistics. Discontinuities across revisions are due to changes in classification and rules for selecting underlying cause of death. Classification and rule changes affect cause-of-death trend data by shifting deaths away from some cause-of-death categories and into others. Comparability ratios measure the effect of changes in classification and coding rules. For causes shown in table VI, comparability ratios range between 0.6974 and 1.1404. Influenza and pneumonia had the lowest comparability ratio (0.6974), indicating that influenza and pneumonia is about 30 percent less likely to be selected as the underlying cause of death in ICD–10 than in ICD–9. Pregnancy, childbirth, and the puerperium had the highest comparability ratio (1.1404), indicating that pregnancy is more than 14 percent more likely to be selected as the underlying cause using ICD–10 coding.

For selected causes of death, the ICD–9 codes used to calculate death rates for 1980–1998 differ from the ICD–9 codes most nearly comparable with the corresponding ICD–10 cause-of-death category, which also affects the ability to compare death rates across ICD revisions. Examples of these causes are ischemic heart disease; cerebrovascular diseases; trachea, bronchus, and lung cancer; unintentional injuries; and homicide. To address this source of discontinuity, mortality trends for 1980–98 were recalculated, using ICD–9 codes that are more comparable with codes for corresponding ICD–10 categories. Table V shows the ICD–9 codes used for these causes. Although this modification may lessen the discontinuity between the Ninth and Tenth Revisions, the effect on the discontinuity between the Eighth and Ninth Revisions is not measured.

Comparability ratios shown in table VI are based on a comparability study in which the same deaths were coded by both the Ninth and Tenth Revisions. The comparability ratio was calculated by dividing the number of deaths classified by ICD–10 by the number of deaths classified by ICD–9. The resulting ratios represent the net effect of the Tenth Revision on cause-of-death statistics and can be used to adjust mortality statistics for causes of death classified by the Ninth Revision to be comparable with cause-specific mortality statistics classified by the Tenth Revision.

The application of comparability ratios to mortality statistics helps make the analysis of change between 1998 and 1999 more accurate and complete. The 1998 comparability-modified death rate is calculated by multiplying the comparability ratio by the 1998 death rate. Comparability-modified rates should be used to estimate mortality change between 1998 and 1999.

Caution should be taken when applying the comparability ratios presented in table VI to age-, race-, and sex-specific mortality data. Demographic subgroups may sometimes differ with regard to their cause-of-death distribution, and this would result in demographic variation in cause-specific comparability ratios.

For more information, see Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates; Kochanek KD, Smith BL, Anderson RN. Deaths: Preliminary data for 1999. National vital statistics reports. Vol. 49 no. 2 and vol. 49 no. 3. Hyattsville, MD: National Center for Health Statistics. 2001; and Final and preliminary comparability ratios for 113

**Table VI. Comparability of selected causes of death between the Ninth and Tenth Revisions of the *International Classification of Diseases (ICD)***

| *Cause of death*[1] | *Final comparability ratio*[2] |
|---|---|
| Human immunodeficiency virus (HIV) disease | 1.0821 |
| Malignant neoplasms | 1.0093 |
| Colon, rectum, and anus | 0.9988 |
| Trachea, bronchus, and lung | 0.9844 |
| Breast | 1.0073 |
| Prostate | 1.0144 |
| Diabetes mellitus | 1.0193 |
| Diseases of heart | 0.9852 |
| Ischemic heart diseases | 1.0006 |
| Cerebrovascular diseases | 1.0502 |
| Influenza and pneumonia | 0.6974 |
| Chronic lower respiratory diseases | 1.0411 |
| Chronic liver disease and cirrhosis | 1.0321 |
| Pregnancy, childbirth, and the puerperium | 1.1404 |
| Unintentional injuries | 1.0251 |
| Motor vehicle-related injuries | 0.9527 |
| Suicide | 1.0022 |
| Homicide | 1.0020 |
| Injury by firearms | 1.0012 |
| Chronic and noncommunicable diseases | 1.0100 |
| Injuries | 1.0159 |
| Communicable diseases | 0.8582 |
| HIV disease | 1.0821 |
| Other communicable diseases | 0.7997 |

[1]See table V for ICD–9 and ICD–10 cause-of-death codes.
[2]Ratio of number of deaths classified by ICD–10 to number of deaths classified by ICD–9.

SOURCE: Final and preliminary comparability ratios for 113 selected causes of death at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/Comparability/icd9_icd10.



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selected causes of death at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/Comparability/icd9_icd10/. See related *Cause of death; International Classification of Diseases (ICD); tables IV, V, and VI.*

**Compensation**—See *Employer costs for employee compensation.*

**Condition**—A health condition is a departure from a state of physical or mental well-being. In the National Health Interview Survey, each condition reported as a cause of an individual's activity limitation has been classified as "chronic," "not chronic," or "unknown if chronic," based on the nature and duration of the condition. Conditions that are not cured once acquired (such as heart disease, diabetes, and birth defects in the original response categories, and amputee and old age in the ad hoc categories) are considered chronic, whereas conditions related to pregnancy are always considered not chronic. In addition, other conditions must have been present 3 months or longer to be considered chronic. An exception is made for children less than 1 year of age who have had a condition "since birth," as these conditions are always considered chronic. The National Nursing Home Survey uses a specific list of chronic conditions, disregarding time of onset.

**Consumer Price Index (CPI)**—The CPI is prepared by the U.S. Bureau of Labor Statistics. It is a monthly measure of the average change in the prices paid by urban consumers for a fixed market basket of goods and services. The medical care component of CPI shows trends in medical care prices based on specific indicators of hospital, medical, dental, and drug prices. A revision of the definition of CPI has been in use since January 1988. See related *Gross domestic product (GDP); Health expenditures, national; Appendix I, Consumer Price Index.*

**Contraception**—The National Survey of Family Growth collects information on contraceptive use as reported by women 15–44 years of age, during heterosexual vaginal intercourse. For current contraceptive use, women were asked about contraceptive use during the month of interview. Women were classified by whether they reported using each of 19 methods of contraception at any time in the month of interview. Data show up to four methods used in the month of interview. Contraceptive methods listed as other methods include the following: for 2002, the female condom, foam, cervical cap, Today Sponge®, suppository or insert, jelly or cream, or other method; for 1995, the female condom or vaginal pouch, foam, cervical cap, Today Sponge®, suppository or insert, jelly or cream, or other method; for 1988, foam, douche, Today Sponge®, suppository or insert, jelly or cream, or other method; and for 1982, foam, douche, suppository or insert, or other method.

**Crude birth rate; Crude death rate**—See *Rate: Birth and related rates; Rate: Death and related rates.*

**Days of care**—Days of care is defined similarly in different data systems. See related *Admission; Average length of stay; Discharge; Hospital; Hospital utilization; Inpatient.*

*American Hospital Association*—Days, hospital days, or inpatient days are the number of adult and pediatric days of care rendered during the entire reporting period. Days of care for newborns are excluded.

*National Health Interview Survey (NHIS)*—Hospital days during the year refer to the total number of hospital days occurring in the 12-month period before the interview week. A hospital day is a night spent in the hospital for persons admitted as inpatients. Starting in 1997 hospitalization data from NHIS are for all inpatient stays, whereas estimates for prior years published in *Health, United States* excluded hospitalizations for deliveries and newborns.

*National Hospital Discharge Survey*—Days of care refers to the total number of patient days accumulated by inpatients at the time of discharge from non-Federal short-stay hospitals during a reporting period. All days from and including the date of admission but not including the date of discharge are counted.

**Death rate**—See *Rate: Death and related rates.*

**Dental caries**—Dental caries is evidence of dental decay on any surface of a tooth. Dental caries was determined by an oral examination conducted by a trained dentist as part of the National Health and Nutrition Examination Survey. Study participants 2 years of age and over were eligible for the examination, as long as they did not meet other exclusion criteria. Both permanent and primary (or baby) teeth were evaluated.

**Dental visit**—Starting in 1997, National Health Interview Survey respondents were asked "About how long has it been since you last saw or talked to a dentist? Include all types of



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dentists, such as orthodontists, oral surgeons, and all other dental specialists as well as hygienists." Starting in 2001, the question was modified slightly to ask respondents how long it had been since they last saw a dentist. Questions about dental visits were not asked for children under 2 years of age for years 1997–99 and under 1 year of age for 2000 and beyond. Starting with data year 1997 estimates are presented for persons with a dental visit in the past year. Prior to 1997, dental visit estimates were based on a 2-week recall period.

**Diagnosis**—Diagnosis is the act or process of identifying or determining the nature and cause of a disease or injury through evaluation of patient history, examination, and review of laboratory data. Diagnoses in the National Hospital Discharge Survey, the National Ambulatory Medical Care Survey, the National Hospital Ambulatory Medical Care Survey, the National Nursing Home Survey, and the National Home and Hospice Care Survey are abstracted from medical records and coded to the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD–9–CM).* For a given medical care encounter, the first-listed diagnosis can be used to categorize the visit, or if more than one diagnosis is recorded on the survey abstraction form, the visit can be categorized based on all diagnoses recorded. Analyzing first-listed diagnoses avoids double-counting events such as visits or hospitalizations; the first-listed diagnosis is often, but not always, considered the most important or dominant condition among all comorbid conditions. For example, a hospital discharge would be considered a first-listed stroke discharge if the ICD–9–CM diagnosis code for stroke was recorded in the first diagnosis field on the survey form. An any listed stroke discharge would classify all diagnoses of stroke recorded on the survey abstraction form regardless of order. Any-listed diagnoses double count events such as visits or hospitalizations with more than one recorded diagnosis but provide information on the burden a specific diagnosis presents to the health care system. See related *External cause of injury; Injury; Injury-related visit.*

**Diagnostic and other nonsurgical procedures**—See *Procedure.*

**Discharge**—The National Health Interview Survey defines a hospital discharge as the completion of any continuous period of stay of 1 night or more in a hospital as an inpatient. According to the National Hospital Discharge Survey, a discharge is a completed inpatient hospitalization. A hospitalization may be completed by death or by releasing the patient to the customary place of residence, a nursing home, another hospital, or other locations. See related *Admission; Average length of stay; Days of care; Inpatient.*

**Domiciliary care homes**—See *Long-term care facility; Nursing home.*

**Drug abuse**—See *illicit drug use.*

**Drug class, major**—Major drug class is a general therapeutic or pharmacological classification scheme for drug products reported to the Food and Drug Administration under the provisions of the Drug Listing Act. The classification scheme used was based on the AMA DRUG EVALUATIONS SUBSCRIPTION and generally follows the organization of material in that publication. The drug class for each product was determined by the labeled indication(s). See related *National Drug Code (NDC) Directory therapeutic class.*

**Drugs**—Drugs are pharmaceutical agents—by any route of administration—for prevention, diagnosis, or treatment of medical conditions or diseases. Data on specific drug use are collected in three NCHS surveys.

*National Ambulatory Medical Care Survey (NAMCS)* and *National Hospital Ambulatory Medical Care Survey (NHAMCS)*—Data collection in the NAMCS and NHAMCS outpatient department component is from the medical record of an inperson physician office or hospital outpatient department visit, rather than from the patient. Generic or brand name drugs are abstracted from the medical record, including prescription and over-the-counter drugs, immunizations, allergy shots, and anesthetics that were prescribed, ordered, supplied, administered, or continued during the visit. Prior to 1995, up to five drugs per visit could be reported on the Patient Record Form; in data years 1995 and beyond, up to six drugs could be reported. Beginning with data year 2003, eight drugs could be reported, as well as a count of the total number of drugs prescribed, ordered, supplied, administered, or continued during the visit. For more information on drugs collected by the NAMCS and NHAMCS, see the NAMCS drug database at www.cdc.gov/nchs/about/major/ahcd/ambulatory.htm, or ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc01.pdf.
For more information on how drugs are classified into therapeutic use categories, see *National Drug Code (NDC) Directory therapeutic class.* See related *Appendix*



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*I. National Ambulatory Medical Care Survey* and *National Hospital Ambulatory Medical Care Survey.*

*National Health and Nutrition Examination Survey (NHANES)*—Drug information from NHANES III and 1999–2002 NHANES was collected during an inperson interview conducted in the participant's home. Participants were asked whether they had taken a medication in the past month for which they needed a prescription. Those who answered "Yes" were asked to produce the prescription medication containers for the interviewer. For each medication reported, the interviewer entered the product's complete name from the container. If no container was available, the interviewer asked the participant to verbally report the name of the medication. In addition, participants were asked how long they had been taking the medication and the main reason for use.

All reported medication names were converted to their standard generic ingredient name. For multi-ingredient products, the ingredients were listed in alphabetical order and counted as one drug (e.g., Tylenol #3 was listed as Acetaminophen; Codeine). No trade or proprietary names are provided on the data file.

Drug data from NHANES provide a snapshot of all prescribed drugs reported by a sample of the civilian noninstitutionalized population for a 1-month period. Drugs taken on an irregular basis, such as every other day, once per week, or for a 10-day period, etc., were captured in the 1-month recall period. Data shown in *Health, United States* for the percent of the population reporting three or more prescription drugs during the past month include a range of drug utilization patterns—for example, persons who took three or more drugs on a daily basis during the past month or persons who took a different drug three separate times—as long as at least three different drugs were taken during the past month.

For more information on prescription drug data collection and coding in the NHANES 1999–2000, see www.cdc.gov/nchs/data/nhanes/frequency/rxq_rxdoc.pdf. For more information on NHANES III prescription drug data collection and coding, see www.cdc.gov/nchs/data/nhanes/nhanes3/PUPREMED-acc.pdf. See related *Appendix I, National Health and Nutrition Examination Survey.*

**Education**—Several approaches to defining educational categories are used in this report. In survey data, educational categories are based on information about educational credentials, such as diplomas and degrees. In vital statistics, educational attainment is based on years of school completed.

*Birth File*—Information on educational attainment of mother is based on number of years of school completed, as reported by the mother on the birth certificate. Between 1970 and 1992, the reporting area for maternal education expanded.

Mother's education was reported on the birth certificate by 38 States in 1970. Data were not available from Alabama, Arkansas, California, Connecticut, Delaware, District of Columbia, Georgia, Idaho, Maryland, New Mexico, Pennsylvania, Texas, and Washington. In 1975, these data became available from Connecticut, Delaware, Georgia, Maryland, and the District of Columbia, increasing the number of States reporting mother's education to 42 and the District of Columbia. Between 1980 and 1988, only three States, California, Texas, and Washington, did not report mother's education. In 1988, mother's education was also missing from New York State outside New York City. In 1989–91, mother's education was missing only from Washington and New York State outside New York City. During 1992–2002, mother's education was reported by all 50 States and the District of Columbia. In 2003, data on mother's education is included for all States except Pennsylvania and Washington, both of which implemented the 2003 revision of the U.S. Standard Certificate of Live Birth. The education item on the 2003 revision asks for the highest degree or level of school completed whereas the education item on the 1989 revision asks for highest grade completed. Data from the 1989 and 2003 certificate items on educational attainment are too dissimilar to be reliably combined.

*Mortality File*—Information on educational attainment of decedent became available for the first time in 1989 because of a revision of the U.S. Standard Certificate of Death. Decedent's educational attainment is reported on the death certificate by the funeral director based on information provided by an informant such as next of kin. Mortality data by educational attainment for 1989 were based on data from 20 States and by 1994–96,



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increased to 45 States and the District of Columbia (DC). In 1994–96, either the following States did not report educational attainment on the death certificate or the information was more than 20 percent incomplete: Georgia, Kentucky, Oklahoma, Rhode Island, and South Dakota. In 1997–2000, information on decedent's education was available from Oklahoma, increasing the reporting area to 46 States and the DC. With the addition of Kentucky, the reporting area increased to 47 States and DC in 2001 and 2002.

Calculation of unbiased death rates by educational attainment based on the National Vital Statistics System requires that the reporting of education on the death certificate be complete and consistent with the reporting of education on the Current Population Survey (CPS), the source of population estimates for denominators for death rates. Death records that are missing information about decedent's education are not included in the calculation of rates. Therefore the levels of death rates by educational attainment shown in this report are underestimated by approximately the percentage with not stated education, which ranges from 3 to 9 percent.

The validity of information about the decedent's education was evaluated by comparing self-reported education obtained in the CPS with education on the death certificate for decedents in the National Longitudinal Mortality Survey (NLMS). (Sorlie PD, Johnson NJ. Validity of education information on the death certificate. *Epidemiology* 7(4):437–9), 1996. Another analysis compared self-reported education collected in the first National Health and Nutrition Examination Survey (NHANES I) with education on the death certificate for decedents in the NHANES I Epidemiologic Followup Study. (Makuc DM, Feldman JJ, Mussolino ME. Validity of education and age as reported on death certificates. American Statistical Association. *1996 Proceedings of the Social Statistics Section 102–6).* Results of both studies indicated that there is a tendency for some people who did not graduate from high school to be reported as high school graduates on the death certificate. This tendency results in overstating the death rate for high school graduates and understating the death rate for the group with less than 12 years of education. The bias was greater among older than younger decedents and somewhat greater among black than white decedents.

In addition, educational gradients in death rates based on the National Vital Statistics System were compared with those based on the NLMS, a prospective study of persons in the CPS. Results of these comparisons indicate that educational gradients in death rates based on the National Vital Statistics System were reasonably similar to those based on NLMS for white persons 25–64 years of age and black persons 25–44 years of age. The number of deaths for persons of Hispanic origin in NLMS was too small to permit comparison for this ethnic group. For further information on measurement of education, see Kominski R and Siegel PM. Measuring education in the Current Population Survey. *Monthly Labor Review*, 34–8. September 1993.

*National Health Interview Survey (NHIS)*—Beginning in 1997, the NHIS questionnaire was changed to ask "What is the highest level of school ____ has completed or the highest degree received?" Responses were used to categorize adults according to educational credentials (e.g., no high school diploma or general educational development (GED) high school equivalency diploma; high school diploma or GED; some college, no bachelor's degree; bachelor's degree or higher).

Prior to 1997, the education variable in NHIS was measured by asking, "What is the highest grade or year of regular school ___ has ever attended?" and "Did ___ finish the grade/year?" Responses were used to categorize adults according to years of education completed (e.g., less than 12 years, 12 years, 13–15 years, and 16 or more years).

Data from the 1996 and 1997 NHIS were used to compare distributions of educational attainment for adults 25 years of age and over using categories based on educational credentials (1997) with categories based on years of education completed (1996). A larger percentage of persons reported "some college" than "13–15 years" of education and a correspondingly smaller percentage reported "high school diploma or GED" than "12 years of education." In 1997, 19 percent of adults reported no high school diploma, 31 percent a high school diploma or GED, 26 percent some college, and 24 percent a bachelor's degree or higher. In 1996, 18 percent of adults reported less than 12 years of education, 37 percent 12 years of education, 20 percent 13–15 years, and 25 percent 16 or more years of education.



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**Figure I. Census Bureau: Four Geographic Regions and 9 Divisions of the United States**




**Emergency department**—According to the National Hospital Ambulatory Medical Care Survey, an emergency department is a hospital facility that provides unscheduled outpatient services to patients whose conditions require immediate care and is staffed 24 hours a day. Off-site emergency departments open less than 24 hours are included if staffed by the hospital's emergency department. See related *Emergency department or emergency room visit; Outpatient department.*

**Table VII. Codes for first-listed external causes of injury from the *International Classification of Diseases, Ninth Revision, Clinical Modification***

| *External cause of injury category* | *E-Code numbers* |
|---|---|
| Unintentional | E800–E869, E880–E929 |
| Motor vehicle traffic | E810–E819 |
| Falls | E880–E886, E888 |
| Struck by or against objects or persons | E916–E917 |
| Caused by cutting and piercing instruments or objects | E920 |
| Intentional (suicide and homicide) | E950–E969 |

**Emergency department or emergency room visit**—Starting with the 1997 National Health Interview Survey, respondents to the sample adult and sample child questionnaires (generally the parent) were asked about the number of visits to hospital emergency rooms during the past 12 months, including visits that resulted in hospitalization. In the National Hospital Ambulatory Medical Care Survey, an emergency department visit is a direct personal exchange between a patient and a physician or other health care providers working under the physician's supervision for the purpose of seeking care and receiving personal health services. See related *Emergency department; Injury-related visit.*

**Employer costs for employee compensation**—This is a measure of the average cost per employee hour worked to employers for wages and salaries and benefits. Wages and salaries are defined as the hourly straight-time wage rate or, for workers not paid on an hourly basis, straight-time earnings divided by the corresponding hours. Straight-time wage and salary rates are total earnings before payroll deductions, excluding premium pay for overtime and for work on



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**Figure II. Bureau of Economic Analysis: Eight Geographic Regions of the United States**




weekends and holidays, shift differentials, nonproduction bonuses, and lump-sum payments provided in lieu of wage increases. Production bonuses, incentive earnings, commission payments, and cost-of-living adjustments are included in straight-time wage and salary rates. Benefits covered are paid leave—paid vacations, holidays, sick leave, and other leave; supplemental pay—premium pay for overtime and work on weekends and holidays, shift differentials, nonproduction bonuses, and lump-sum payments provided in lieu of wage increases; insurance benefits—life, health, and sickness and accident insurance; retirement and savings benefits—pension and other retirement plans and savings and thrift plans; legally required benefits—Social Security, railroad retirement and supplemental retirement, railroad unemployment insurance, Federal and State unemployment insurance, workers' compensation, and other benefits required by law, such as State temporary disability insurance; and other benefits—severance pay and supplemental unemployment plans. See related *Appendix I, National Compensation Survey.*

**Ethnicity**—See *Hispanic origin.*

**Exercise**—See *Physical activity, leisure-time.*

**Expenditures**—See *Health expenditures, national; Appendix I, National Health Accounts.*

**External cause of injury**—The ICD–9 External Cause Matrix is a two-dimensional array describing both the mechanism or external cause of the injury (e.g., fall, motor vehicle traffic) and the manner or intent of the injury (e.g., self-inflicted or assault). Although this matrix was originally developed for mortality, it has been adapted for use with the ICD–9–CM. For more information, see *http://www.cdc.gov/nchs/about/otheract/injury/tools.htm.*

**Family income**—For purposes of the National Health Interview Survey and National Health and Nutrition Examination Survey, all people within a household related to each other by blood, marriage, or adoption constitute a family. Each member of a family is classified according to the total



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income of the family. Unrelated individuals are classified according to their own income.

*National Health Interview Survey (NHIS)*—In the NHIS (prior to 1997), family income was the total income received by members of a family (or by an unrelated individual) during the 12 months before the interview. Starting in 1997, the NHIS collected family income data for the calendar year prior to the interview (e.g., 2003 family income data were based on calendar year 2002 information). Family income includes wages, salaries, rents from property, interest, dividends, profits and fees from their own businesses, pensions, and help from relatives. Family income data are used in the computation of poverty level. Starting with *Health, United States, 2004*, a new methodology for imputing family income data for NHIS data was implemented for data years 1997 and beyond. Multiple imputations were performed for survey years 1997 and beyond with five sets of imputed values created to allow for the assessment of variability caused by imputation. Family income was missing for 24–29 percent of persons in 1997–98 and 31–33 percent in 1999–2003. A detailed description of the multiple imputation procedure, as well as data files for 1997 and beyond, are available from NCHS on the NHIS Web site (www.cdc.gov/nchs/nhis.htm), via the Imputed Income Files link under that year. For data years 1990–96, about 16–18 percent of persons had missing data on poverty level. In those years, missing values were imputed for family income using a sequential hot deck within matrix cells imputation approach. A detailed description of the imputation procedure, as well as data files with imputed annual family income for 1990–96, is available from NCHS on CD-ROM, NHIS Imputed Annual Family Income 1990–96, series 10, no 9A.

*National Health and Nutrition Examination Survey (NHANES)*—In the NHANES 1999 and onward, family income is asked in a series of questions about possible sources of income, including wages, salaries, interest and dividends, Federal programs, child support, rents, royalties, and other possible sources of income. After the information about sources of income was obtained in the Family Interview Income section of the questionnaire, the respondent was asked to report total combined family income for themselves and the other members of their family, in dollars. If the respondent did not provide an answer or did not know the total combined family income, they were asked if the total family income was less than $20,000 or more than $20,000. If the respondent answered, a followup question asked the respondent to select an income range from a list on a printed hand card. The midpoint of the income range was then used as the total family income value. Family income values were used to calculate the Poverty Income ratio. NHANES III did not ask the detailed components of income questions but asked respondents to identify their income based on a set of ranges provided on a flashcard, whereas NHANES II did include questions on components of income. Family income was not imputed for individuals or families with no reported income information in any of the NHANES survey years. See related *Poverty level*.

**Federal hospitals**—See *Hospital*.

**Fee-for-service health insurance**—This is private (commercial) health insurance that reimburses health care providers on the basis of a fee for each health service provided to the insured person. It is also known as indemnity health insurance. Medicare Parts A and B are sometimes referred to as "Medicare fee-for-service." See related *Health insurance coverage; Medicare*.

**Fertility rate**—See *Rate: Birth and related rates*.

**General hospitals**—See *Hospital*.

**General hospitals providing separate psychiatric services**—See *Mental health organization*.

**Geographic region and division**—The U.S. Census Bureau groups the 50 States and the District of Columbia for statistical purposes into four geographic regions—Northeast, Midwest, South, and West—and nine divisions, based on geographic proximity. See figure I.

The Department of Commerce's Bureau of Economic Analysis (BEA) groups States into eight regions based on their homogeneity with respect to income characteristics, industrial composition of the employed labor force, and such noneconomic factors as demographic, social, and cultural characteristics. See figure II.

Three Census Bureau divisions—West North Central, East North Central, and New England—and three BEA regions—Plains, Great Lakes, and New England—are composed of the same States. The States composing the



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remaining Census Bureau divisions differ from those composing the corresponding BEA regions.

**Gestation**—For the National Vital Statistics System and the Centers for Disease Control and Prevention's Abortion Surveillance, the period of gestation is defined as beginning with the first day of the last normal menstrual period and ending with the day of birth or day of termination of pregnancy.

**Gross domestic product (GDP)**—GDP is the market value of the goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the suppliers (i.e., the workers and, for property, the owners) may be U.S. residents or residents of other countries. See related *Consumer Price Index (CPI); Health expenditures, national.*

**Health care contact**—Starting in 1997, the National Health Interview Survey has been collecting information on health care contacts with doctors and other health care professionals using the following questions: "During the past 12 months, how many times have you gone to a hospital emergency room about your own health?" "During the past 12 months, did you receive care at home from a nurse or other health care professional? What was the total number of home visits received?" "During the past 12 months, how many times have you seen a doctor or other health care professional about your own health at a doctor's office, a clinic, or some other place? Do not include times you were hospitalized overnight, visits to hospital emergency rooms, home visits, or telephone calls." Beginning in 2000 this question was amended to exclude dental visits also. For each question respondents were shown a flashcard with response categories of 0, 1, 2–3, 4–9, 10–12, or 13 or more visits in 1997–99. Starting in 2000, response categories were expanded to 0, 1, 2–3, 4–5, 6–7, 8–9, 10–12, 13–15, or 16 or more. Analyses of the percentage of persons with health care visits were tabulated as follows: For tabulation of the 1997–99 data, responses of 2–3 were recoded to 2, and responses of 4–9 were recoded to 6. Starting in 2000, tabulation of responses of 2–3 were recoded to 2, and other responses were recoded to the midpoint of the range. A summary measure of health care visits was constructed by adding recoded responses for these questions and categorizing the sum as none, 1–3, 4–9, or 10 or more health care visits during the past 12 months.

Analyses of the percent of children without a health care visit are based on the following question: "During the past 12 months, how many times has ___ seen a doctor or other health care professional about (his/her) health at a doctor's office, a clinic, or some other place? Do not include times _____ was hospitalized overnight, visits to hospital emergency rooms, home visits, or telephone calls." See related *Emergency department or emergency room visit; Home visit.*

**Health expenditures, national**—National Health Expenditures are estimated by the Centers for Medicare & Medicaid Services (CMS) and measure spending for health care in the United States by type of service delivered (e.g., hospital care, physician services, nursing home care) and source of funding for those services (e.g., private health insurance, Medicare, Medicaid, out-of-pocket spending). CMS produces both historical and projected estimates of health expenditures by category. See related *Consumer price index (CPI); Gross domestic product (GDP).*

*Health services and supplies expenditures*—These are outlays for goods and services relating directly to patient care plus expenses for administering health insurance programs and government public health activities. This category is equivalent to total national health expenditures minus expenditures for research and construction.

*National health expenditures*—This measure estimates the amount spent for all health services and supplies and health-related research and construction activities consumed in the United States during the calendar year. Detailed estimates are available by source of expenditures (e.g., out-of-pocket payments, private health insurance, and government programs) and by type of expenditures (e.g., hospital care, physician services, and drugs) and are in current dollars for the year of report. Data are compiled from a variety of sources.

*Nursing home expenditures*—These cover care rendered in establishments primarily engaged in providing inpatient nursing and rehabilitative services and continuous personal care services to persons requiring nursing care (skilled nursing and intermediate care facilities, including those for the mentally retarded) and continuing care retirement communities with on-site nursing care facilities. The costs of long-term care provided by hospitals are excluded.



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*Personal health care expenditures*—These are outlays for goods and services relating directly to patient care. The expenditures in this category are total national health expenditures minus expenditures for research and construction, health insurance program administration, and government public health activities.

*Private expenditures*—These are outlays for services provided or paid for by nongovernmental sources—consumers, insurance companies, private industry, and philanthropic and other nonpatient care sources.

*Public expenditures*—These are outlays for services provided or paid for by Federal, State, and local government agencies or expenditures required by governmental mandate (such as worker's compensation insurance payments).

**Health insurance coverage**—Health insurance is broadly defined to include both public and private payors who cover medical expenditures incurred by a defined population in a variety of settings.

*National Health Interview Survey (NHIS)*—NHIS respondents were asked about their health insurance coverage in the previous month in 1993–96 and at the time of the interview in other years. Questions on health insurance coverage were expanded starting in 1993 compared with previous years. In 1997, the entire questionnaire was redesigned and data were collected using a computer-assisted personal interview (CAPI).

Respondents are covered by private health insurance if they indicate private health insurance or if they are covered by a single-service hospital plan, except in 1997 and 1998, when no information on single-service plans was obtained. Private health insurance includes managed care such as health maintenance organizations (HMOs).

Until 1996, persons were defined as having Medicaid or other public assistance coverage if they indicated that they had either Medicaid or other public assistance or if they reported receiving Aid to Families with Dependent Children (AFDC) or Supplemental Security Income (SSI). After welfare reform in late 1996, Medicaid was delinked from AFDC and SSI. Starting in 1997, persons are considered to be covered by Medicaid if they report Medicaid or a State-sponsored health program. Starting in 1998, persons are considered to be covered by Medicaid if they report being covered by the State Children's Health Insurance Program (SCHIP). Medicare or military health plan coverage is also determined in the interview, and starting in 1997 other government-sponsored program coverage is determined as well.

If respondents do not report coverage under one of the above types of plans and they have unknown coverage under either private health insurance or Medicaid, they are considered to have unknown coverage.

The remaining respondents are considered uninsured. The uninsured are persons who do not have coverage under private health insurance, Medicare, Medicaid, public assistance, a State-sponsored health plan, other government-sponsored programs, or a military health plan. Persons with only Indian Health Service coverage are considered uninsured. Estimates of the percentage of persons who are uninsured based on the NHIS may differ slightly from those based on the March Current Population Survey (CPS) because of differences in survey questions, recall period, and other aspects of survey methodology.

In the NHIS, less than 2 percent of persons age 65 years and over reported no current health insurance coverage, but the small sample size precludes the presentation of separate estimates for this population. Therefore, the term "uninsured" refers only to the population under age 65.

In the NHIS, the category "Medicare HMO" is defined as persons age 65 years or over who responded "Yes" when asked whether they were under a Medicare managed care arrangement such as an HMO. This is a subset of Medicare Part C. Respondents who stated they had Medicare coverage but did not answer "Yes" to the "managed care arrangement such as an HMO" are included in the Medicare fee-for-service category. Medicare fee-for-service is defined as Medicare Part A or Part B. The majority of these people had coverage from another source, primarily employer-sponsored retiree health insurance. Some tables in *Health, United States* further classify persons 65 years of age and over with "Medicare fee-for service" into "Medicare fee-for-service only" and Private (including Medicare fee-for-service) coverage.

See related *Fee-for-service health insurance; Health maintenance organization (HMO); Managed care; Medicaid;*



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*Medicare; State Children's Health Insurance Program (SCHIP); Uninsured.*

**Health maintenance organization (HMO)**—An HMO is a health care system that assumes or shares both the financial risks and the delivery risks associated with providing comprehensive medical services to a voluntarily enrolled population in a particular geographic area, usually in return for a fixed, prepaid fee. Pure HMO enrollees use only the prepaid capitated health services of the HMO panel of medical care providers. Open-ended HMO enrollees use the prepaid HMO health services but, in addition, may receive medical care from providers who are not part of the HMO panel. There is usually a substantial deductible, copayment, or coinsurance associated with use of nonpanel providers.

HMO model types are these:

*Group model HMO*—A group model HMO is an HMO that contracts with a single multispecialty medical group to provide care to the HMO's membership. The group practice may work exclusively with the HMO, or it may provide services to non-HMO patients as well. The HMO pays the medical group a negotiated per capita rate, which the group distributes among its physicians, usually on a salaried basis.

*Staff model HMO*—A staff model HMO is a closed-panel HMO (where patients can receive services only through a limited number of providers) in which physicians are HMO employees. The providers see members in the HMO's own facilities.

*Network model HMO*—A network model HMO is an HMO that contracts with multiple physician groups to provide services to HMO members and may include single or multispecialty groups.

*Individual practice association (IPA)*— An individual practice association is a healthcare provider organization composed of a group of independent practicing physicians who maintain their own offices and band together for the purpose of contracting their services to HMOs, preferred provider organizations (PPOs), and insurance companies. An IPA may contract with and provide services to both HMO and non-HMO plan participants.

*Mixed model HMO*—A mixed model HMO combines features of more than one HMO model.

See related *Managed care; Point-of-service (POS) plan; Preferred provider organization (PPO).*

**Health services and supplies expenditures**—See *Health expenditures, national.*

**Health status, respondent-assessed**—Health status was measured in the National Health Interview Survey by asking the family respondent about his or her health or the health of a family member: "Would you say _____'s health is excellent, very good, good, fair, or poor?"

**Hispanic origin**—Hispanic or Latino origin includes persons of Mexican, Puerto Rican, Cuban, Central and South American, and other or unknown Latin American or Spanish origins. Persons of Hispanic origin may be of any race.

*National Health Interview Survey (NHIS)* and *National Health and Nutrition Examination Survey (NHANES)*— Questions on Hispanic origin are self-reported in the NHANES III and subsequent years and all years of the NHIS and precede questions on race. The NHANES sample was designed to provide estimates specifically for persons of Mexican origin and not for all Hispanic-origin persons in the United States. Persons of Hispanic origin other than Mexicans were entered into the sample with different selection probabilities that are not nationally representative of the total U.S. Hispanic population.

*Birth File*—The reporting area for an Hispanic-origin item on the birth certificate expanded between 1980 and 1993. Trend data on births of Hispanic and non-Hispanic parentage in this report are affected by expansion of the reporting area and by immigration. These two factors affect numbers of events, composition of the Hispanic population, and maternal and infant health characteristics.

In 1980 and 1981, information on births of Hispanic parentage was reported on the birth certificate by the following 22 States: Arizona, Arkansas, California, Colorado, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Maine, Mississippi, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Ohio, Texas, Utah, and Wyoming. In 1982, Tennessee, and in 1983, the District of Columbia, began reporting this



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