

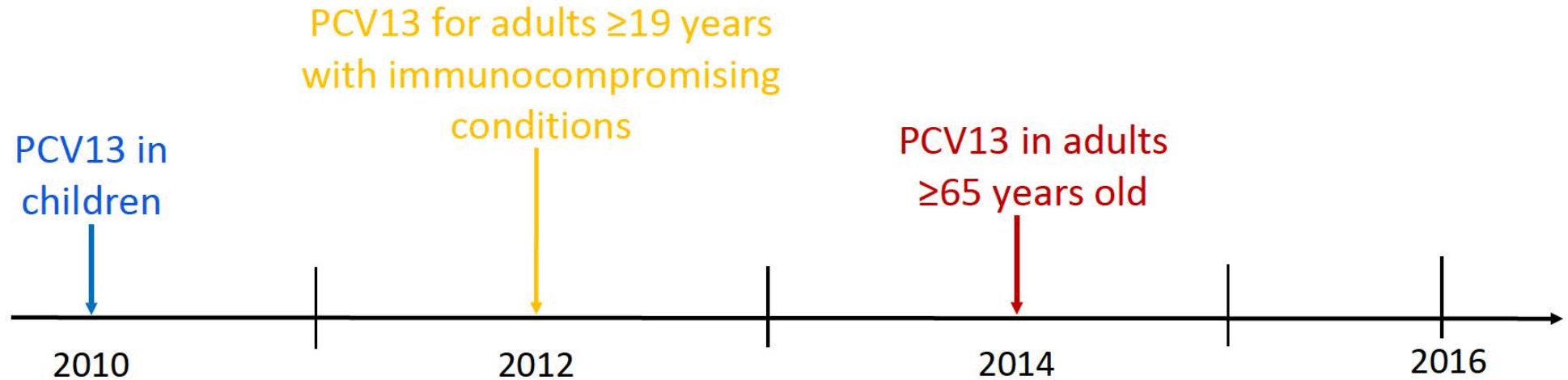


Invasive Pneumococcal Disease in the U.S.—2008–2016

Almea Matanock, MD

October 26, 2017

Background and Aims

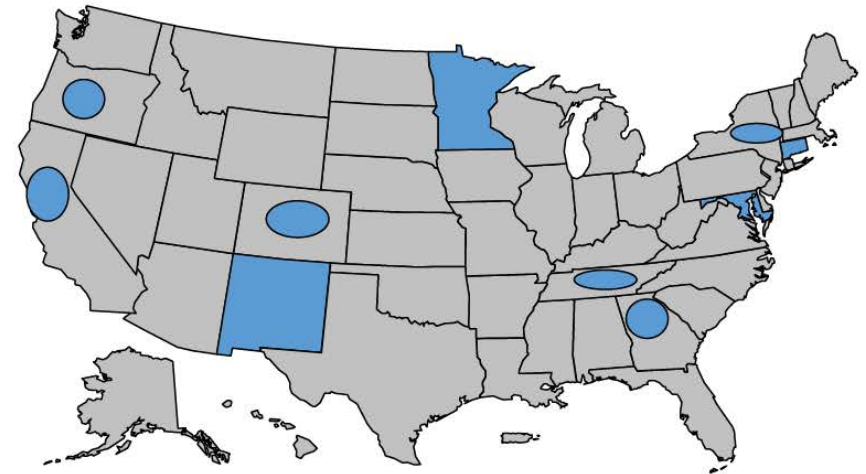


- Aim: Evaluate the direct and indirect impact of PCV13 on invasive pneumococcal disease (IPD) in the general population of children and adults and among adults with HIV

Methods

- **Active Bacterial Core Surveillance (ABCs):**

- Active laboratory and population-based surveillance, 10 sites
- Pneumococcus isolated from sterile site



- **US Census Bureau:**

- Race-bridged post-census population estimates as denominators

- **National HIV surveillance:**

- People diagnosed with HIV in the ABCs catchment areas

- **Overall and serotype-specific IPD incidence rates (cases per 100,000)**

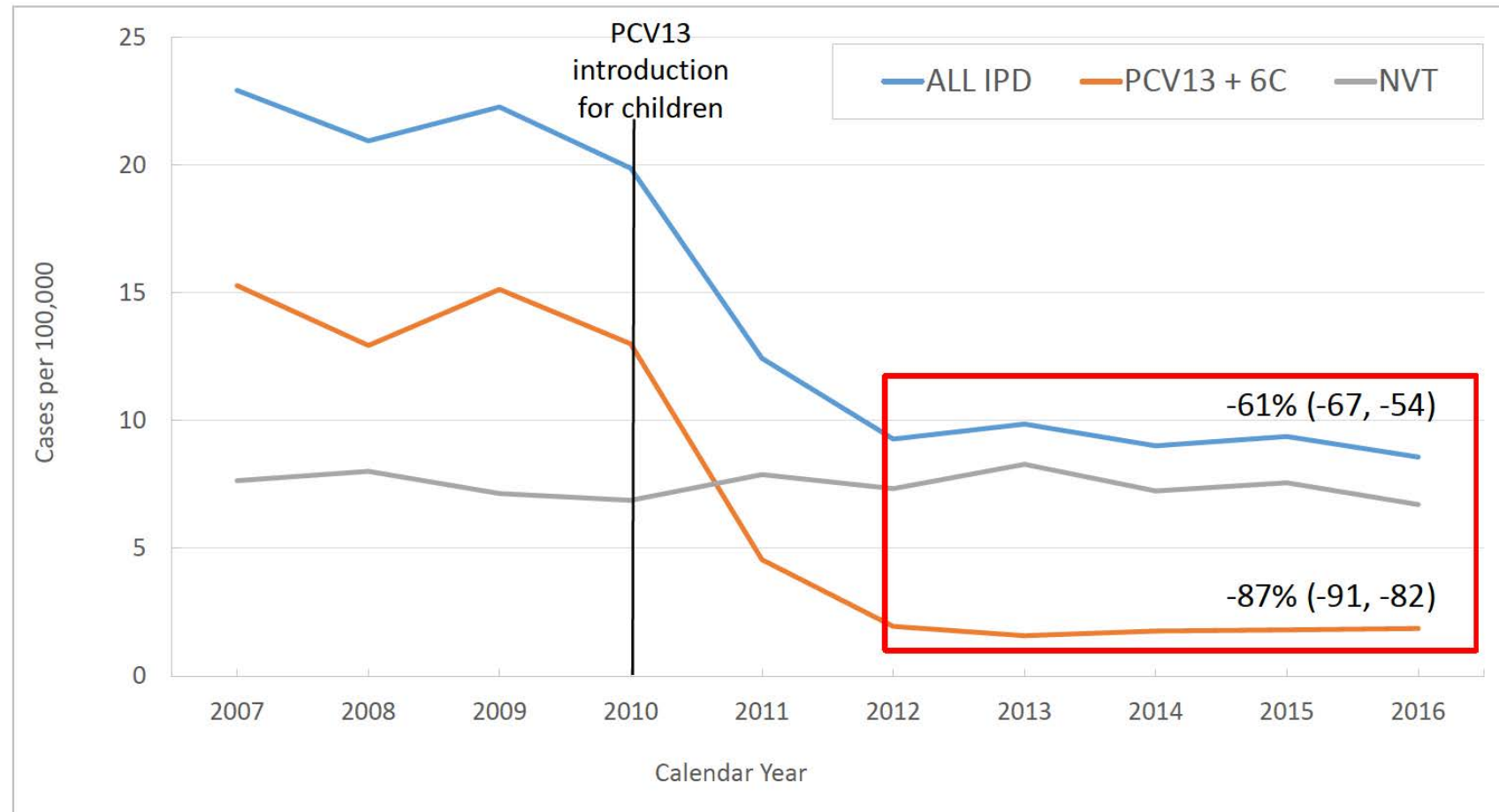
Methods

- Isolates serotyped by Quellung or PCR at reference labs and grouped for analysis:
 - **PCV13 serotypes**¹: 13 serotypes in PCV13 plus 6C due to cross-protection²
 - **PPV11 serotypes**³: 11 serotypes unique to PPSV23
 - **Non-vaccine types (NVT)**: all other pneumococcal serotypes
- Compared overall and serotype-specific IPD incidence (cases/100,000 population) pre and post pediatric PCV13 introduction
 - HIV denominator only available 2008–2014
 - Percent reduction in disease incidence (1-RR)

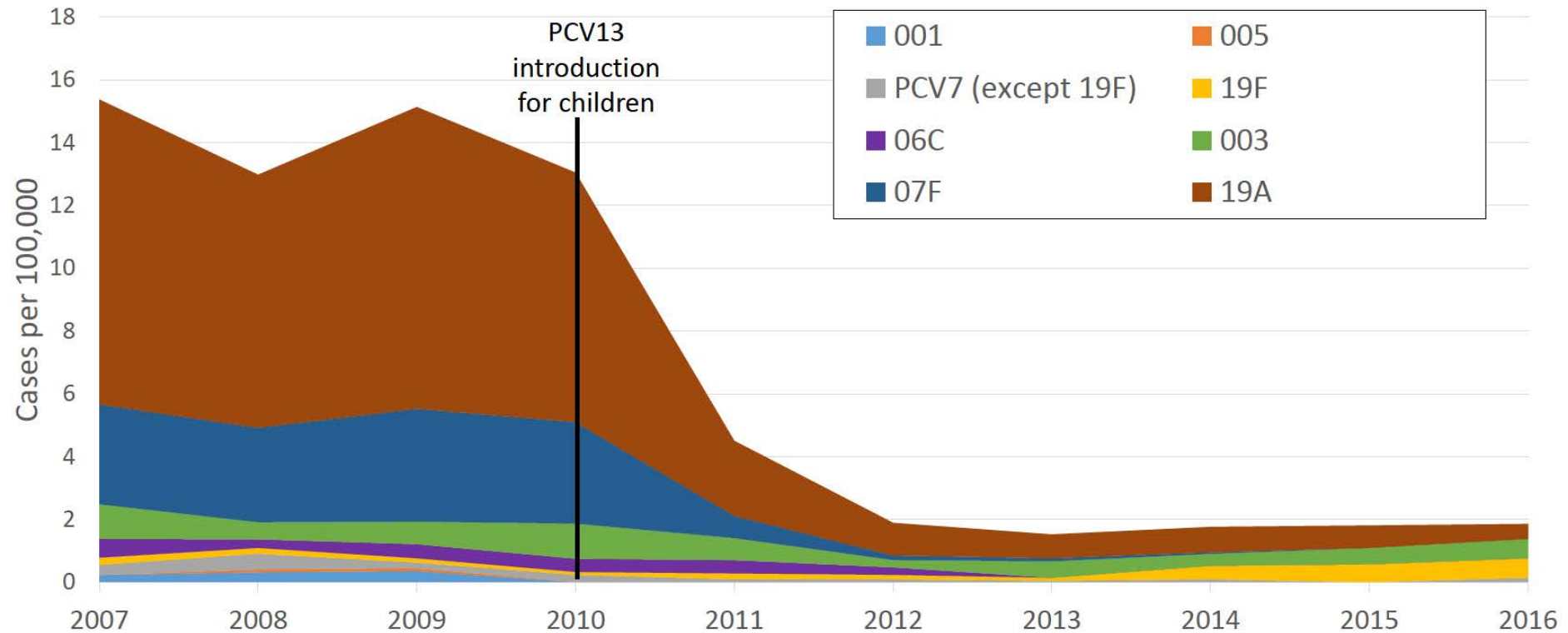
1. Serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F 2. Cooper et al. 2011

3. Serotypes 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, 33F

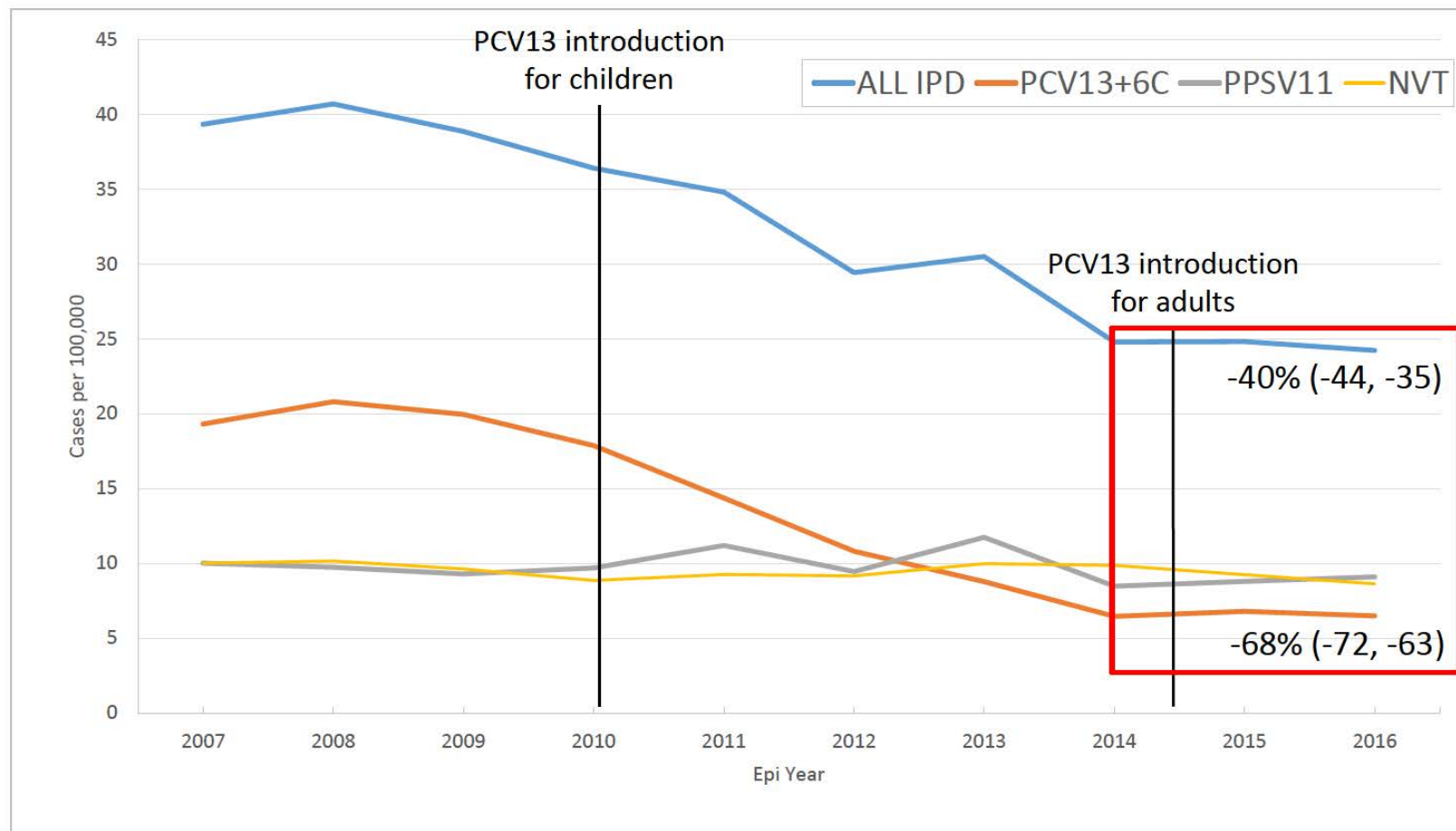
IPD rates among children < 5 years old, 2007–2016



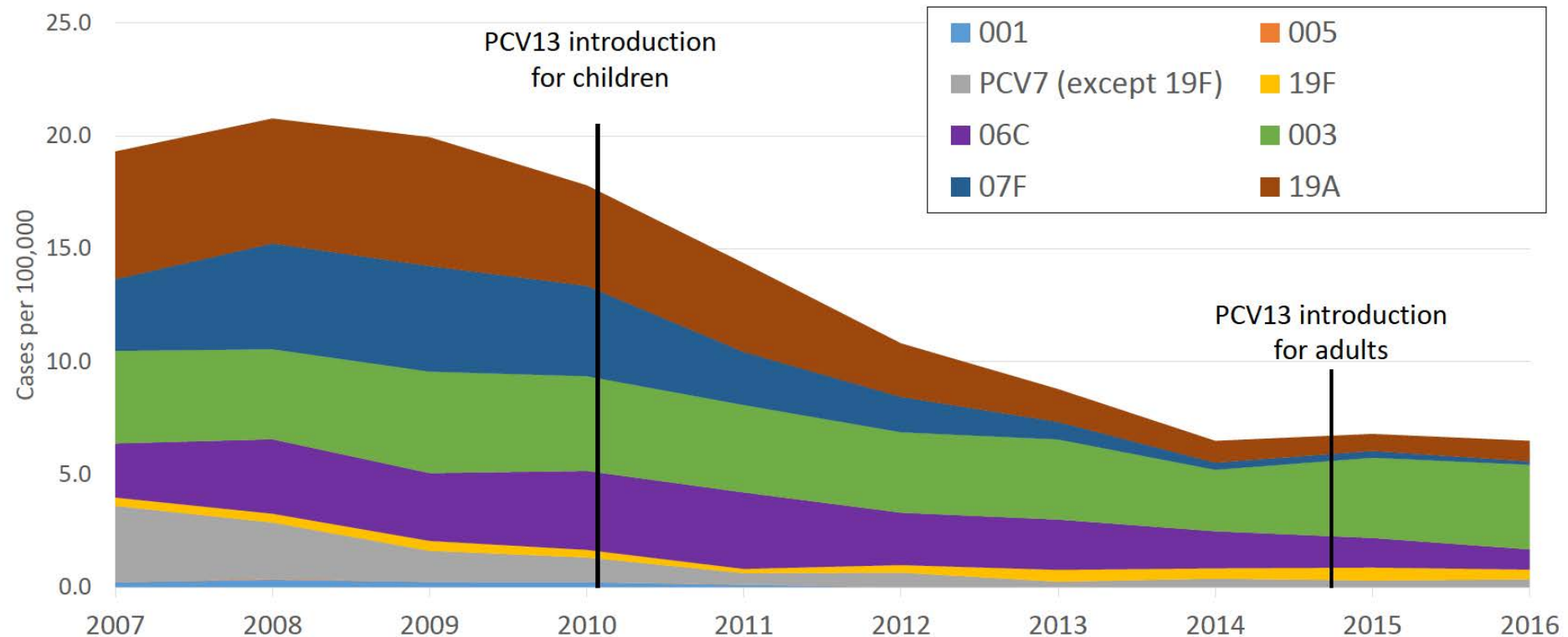
IPD rates among children < 5 years old by PCV13 plus 6C serotypes, 2007–2016



IPD rates among adults ≥ 65 years, 2007–2016



IPD rates among adults ≥ 65 years by PCV13 plus 6C serotypes, 2007–2016



Rank order of non-PCV13 serotypes causing IPD, 2015-2016

Children < 5 years

TYPE	Cases/100,000
23B	0.62
22F	0.62
33F	0.57
15C	0.52
15A	0.48
35B	0.43
10A	0.33
12F	0.29
15B	0.29
38	0.19
other	1.67

Adults ≥ 65 years

TYPE	Cases/100,000
22F	2.57
23A	1.33
35B	1.31
15A	1.16
33F	0.97
16F	0.88
11A	0.82
9N	0.72
23B	0.67
12F	0.61
other	4.66

Green denotes serotypes common to both age groups

Changes in pneumococcal meningitis incidence by age and serotype group, 2007-2008 vs. 2016

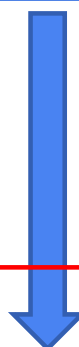
Age (years)	Serotype group	2016 % change (95%CI)
<5	PCV13+6C	-81.9 (-93.7, -47.7)*
	Non-PCV13	27.1 (-31.8, 137)
	ALL IPD	-34 (-59.6, 7.8)
≥65	PCV13+6C	-76.1 (-90.6, -39.5)*
	PPSV11	-5.3 (-57.9, 113.2)
	NVT	-32.4 (-66.9, 38.3)
	ALL IPD	-43.6 (-64, -11.7)*

* statistically significant decrease

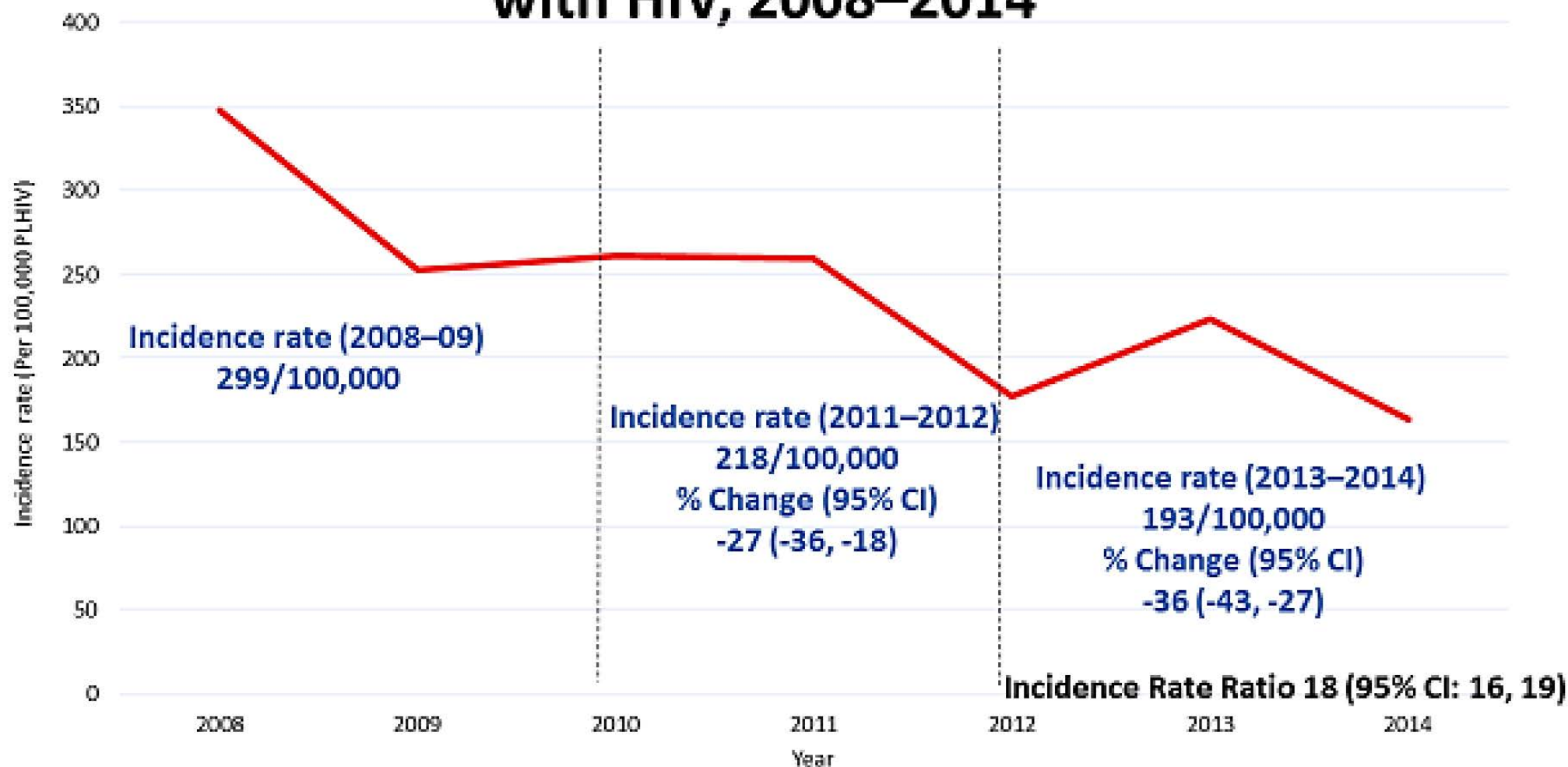
Characteristics of IPD cases among adults ≥19 years with and without HIV, 2008–2014

- IPD cases with HIV more likely to be:
 - **Younger** (median age: 47yrs [19–88] vs. 61yrs [19–104])
 - **Male** (60.8% vs 50.9%)
 - **Black race** (69.6% vs 16.9%)

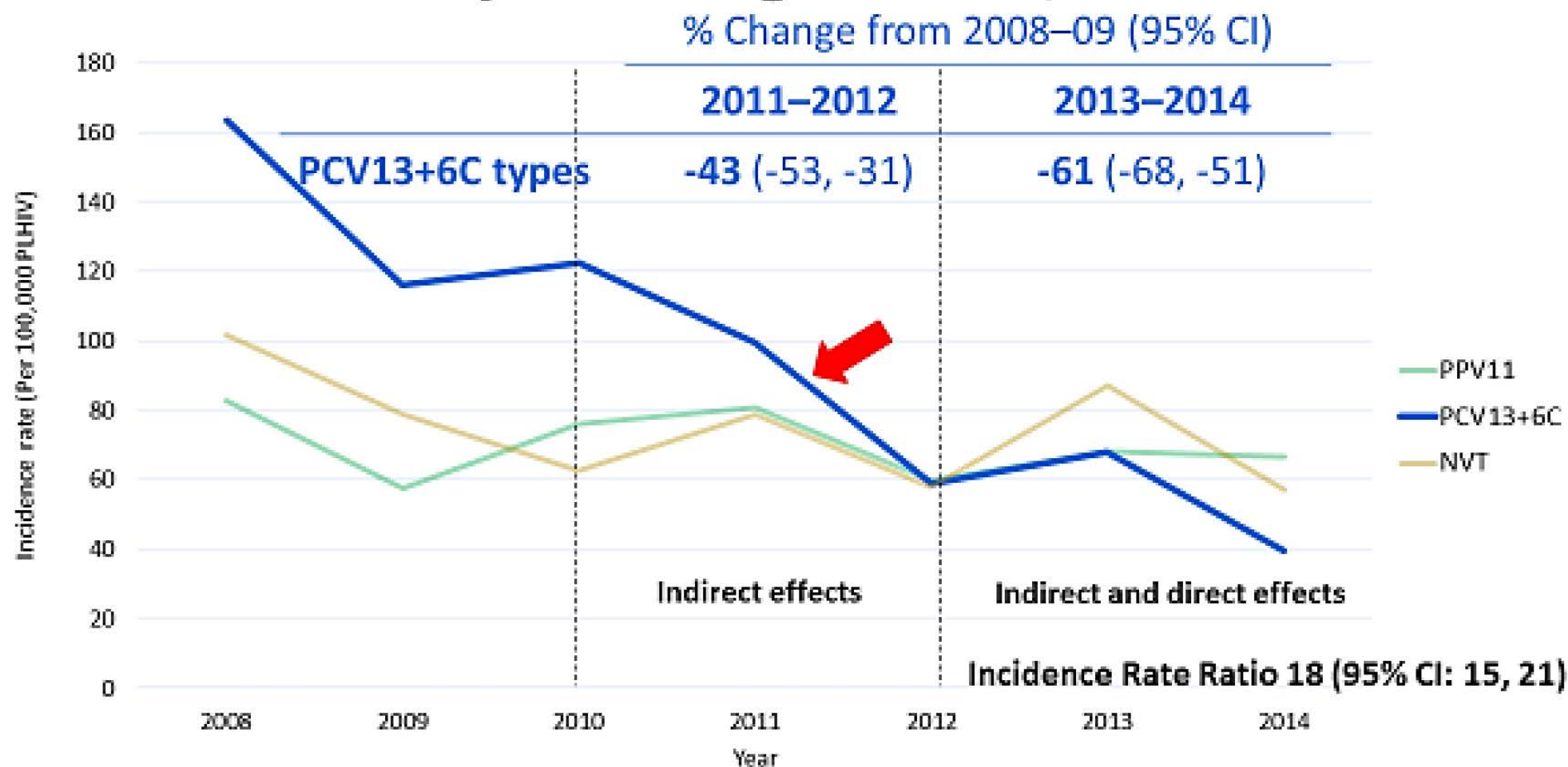
Age groups	Case fatality (%)	
	PLHIV (n=1,662)	Non-PLHIV (n=18,071)
19–34 years	3.7	4.5
35–49 years	5.7	8.4
50–64 years	9.2	10.7
≥65 years	17.0	15.3



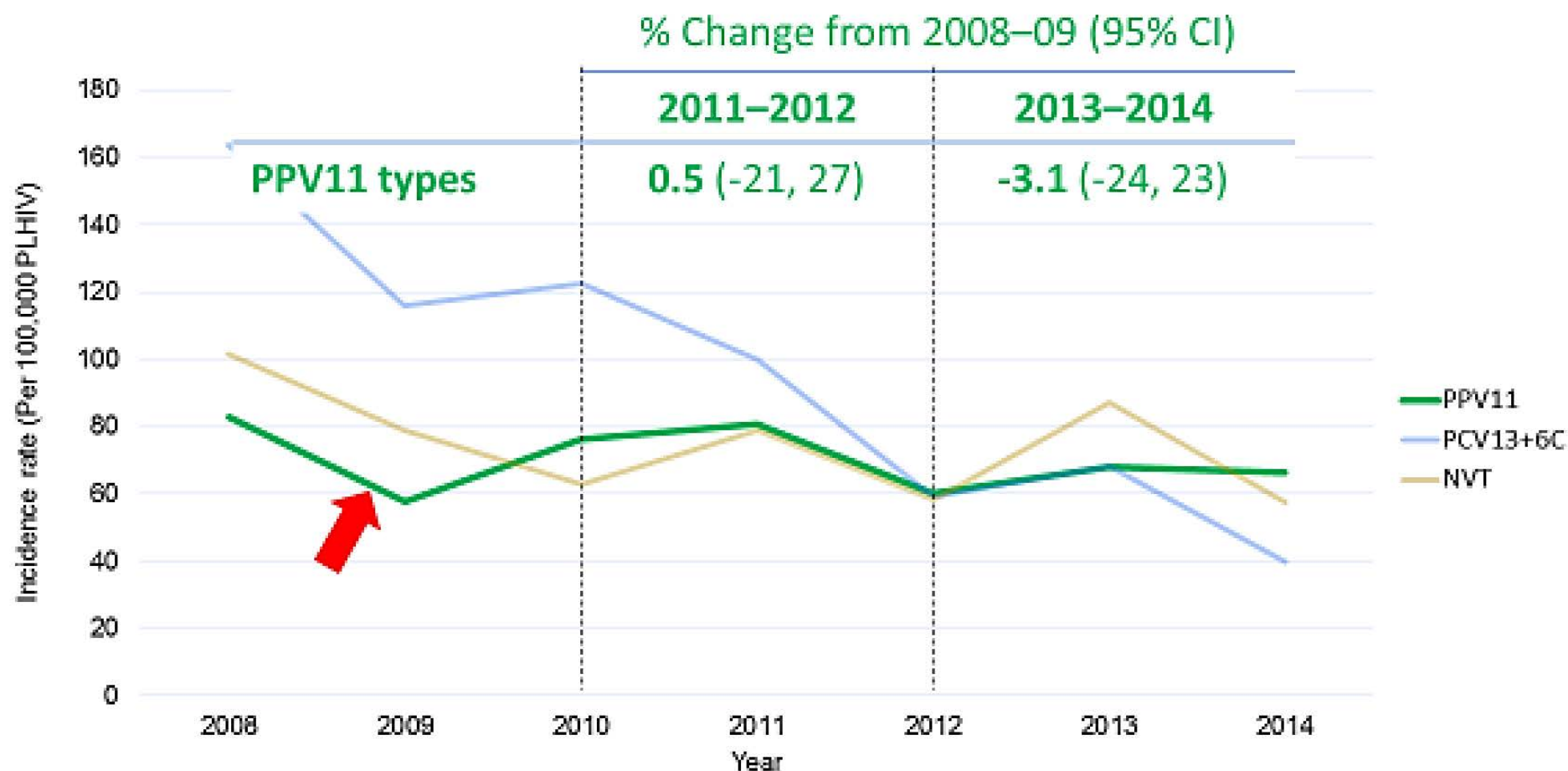
Changes in IPD incidence rate in adults ≥ 19 years living with HIV, 2008–2014



Changes in IPD incidence rate by serotype group in adults ≥19 years living with HIV, 2008–2014



Changes in IPD incidence rate by serotype group in adults ≥ 19 years living with HIV, 2008–2014



Summary

- Significant reductions in overall and PCV13 serotype IPD among children and adults since PCV13 introduction
 - Reductions driven by types 19A and 7F
 - Rates plateaued in 2014–2016
 - No further reductions in PCV13 serotype IPD among adults ≥ 65 years since 2014 adult PCV13 recommendations
 - Despite reductions, IPD rates including PCV13 serotypes, remained high in adults with HIV compared to those without HIV
- No large increases in any non-PCV13 serotype among children or adults, including those living with HIV
- Similar trends observed for pneumococcal meningitis

Conclusions

- In the 6 years post-PCV13 introduction, sustained benefits in overall IPD and IPD caused by the PCV13 serotypes in children and adults
- No evidence of serotype replacement in children or general population of adults
- Continue monitoring changes in disease and serotype distribution to inform new vaccine policy

Acknowledgments

Center for Disease Control and Prevention National Center for Immunizations and Respiratory Diseases

Ryan Gierke
Miwako Kobayashi
Tamara Pilishvili
Tracy Pondo

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

William Adih
Jianmin Li

Active Bacterial Core Surveillance Sites

James Watt
Nisha Alden
Susan Petit
Monica Farley
Lee H. Harrison
Ruth Lynfield
Joan Baumbach
Ann Thomas
William Schaffner

Acknowledgments

- California EIP
 - Art Reingold
 - Duc Vugia
 - James Watt
 - Gretchen Rothrock
 - Pam Daily
 - Joelle Nadle
 - Mirasol Apostol
 - Katie Wymore
 - Lauren Pasutti
 - Erin Garcia
 - Erin Parker
 - Mariah Hamilton
 - Nick Czap
- Colorado EIP
 - Ken Gershman
 - Deborah Aragon
 - Jen Sadlowski
 - Ben White
 - Wendy Bamberg
- Connecticut EIP
 - Matt Carter
 - Terry Rabatsky-Ehr
 - Heather Altier
 - Susan Petit
 - Carmen Marquez
 - Michelle Wilson
- Georgia EIP
 - Monica Farley
 - Wendy Baughman
 - Janine Ladson
 - Amy Holst
 - Stepy Thomas
 - Sasha Harb
 - Suzanne Segler
 - Lauren Lorentzson
 - Matt Crist
 - Jessica Reno
 - Lewis Perry
- Maryland EIP
 - Lee Harrison
 - David Blythe
 - Patricia Ryan
 - Rosemary Hollick
 - Joanne Benton
 - Teresa Carter
 - Kim Holmes
 - Kathleen Shutt
 - Lindsay Saxman
 - Andrea Riner
 - Mary Messenger
 - Helen Yoon
 - Carolyn Kreiner
- Minnesota EIP
 - Richard Danila
 - Ruth Lynfield
 - Catherine Lexau
 - Lori Triden
 - Brenda Jewell
 - Corinne Holtzmann
 - Christine Lees
 - Billie Juni
- New Mexico EIP
 - Joan Baumbach
 - Megin Nichols
 - Joseph Bareta
 - Sarah Khalnlian
 - Robert Mansmann
 - Lisa Butler
 - Kathy Angeles
 - Gabriela Keener
- New York EIP
 - Gus Birkhead
 - Nancy Bennett
 - Deb Blog
 - Shelley Zansky
 - Nancy Spina
 - Glenda Smith
 - Jillian Karr
 - Suzanne Solghan
 - Kari Burzlaff
 - Salvatore Currenti
 - Greg Giambrore
 - Nellie Dumas
 - Kimberlee Musser
 - Ghinwa Dumyati
 - Anita Gellert
 - Gary Hollick
- Oregon EIP
 - Paul Cieslak
 - Ann Thomas
 - Heather Jamieson
 - Tasha Poissant
- Tennessee EIP
 - William Schaffner
 - Mary Lou Lindegren
 - Tim Jones
 - Brenda Barnes
 - Melinda Eady
 - Terri McMinn
 - Katie Gore
 - Lynne Fenner
 - Sandra Gray
 - Lura McKnight
 - Wendi Welch
 - Karen Leib
 - Henrietta Hardin
- CDC ABCs Team
 - Melissa Arvay
 - Olivia Almendares
 - Gayle Fischer Langley
 - Chris Van Beneden
 - Ryan Gierke
 - Cyndy Whitney
 - Stephanie Schrag
 - Tracy Pondo
 - Bernie Beall
 - Lesley McGee
 - Sopio Chochua
 - Dee Jackson

Thank you

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

