The FDA's Drug Review Process: Ensuring Drugs Are Safe and Effective

Topics on this Page

- Drug Approval Process Infographic (/drugs/information-consumers-drugs/fdas-drug-review-process-continued)
- Drug Review Steps Simplified (/drugs/information-consumers-drugs/fdas-drug-review-process-continued)
- Reviewing Applications (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#review)
- Accelerated Approvals (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#accelerated)
- Bumps in the Road (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#bumps)
- The Role of User Fees (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#role)
- The Quality of Clinical Trials (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#quality)

The path a drug travels from a lab to your medicine cabinet is usually long, and every drug takes a unique route. Often, a drug is developed to treat a specific disease. An important use of a drug may also be discovered by accident.

For example, Retrovir (zidovudine, also known as AZT) was first studied as an anti-cancer drug in the 1960s with disappointing results. Twenty years later, researchers discovered the drug could treat AIDS, and Food and Drug Administration approved the drug, manufactured by GlaxoSmithKline, for that purpose in 1987.

Most drugs that undergo preclinical (animal) testing never even make it to human testing and review by the FDA. The drugs that do must undergo the agency's rigorous evaluation process, which scrutinizes everything about the drug--from the design of clinical trials to the severity of side effects to the conditions under which the drug is manufactured.

Stages of Drug Development and Review

Investigational New Drug Application (IND)--The pharmaceutical industry sometimes seeks advice from the FDA prior to submission of an IND.

Sponsors--companies, research institutions, and other organizations that take responsibility for developing a drug. They must show the FDA results of preclinical testing in laboratory animals and what they propose to do for human testing. At this stage, the FDA decides whether it is reasonably safe for the company to move forward with testing the drug in humans.

Clinical Trials--Drug studies in humans can begin only after an IND is reviewed by the FDA and a local institutional review board (IRB). The board is a panel of scientists and non-scientists in hospitals and research institutions that oversees clinical research.

IRBs approve the clinical trial protocols, which describe the type of people who may participate in the clinical trial, the schedule of tests and procedures, the medications and dosages to be studied, the length of the study, the study's objectives, and other details. IRBs make sure the study is acceptable, that participants have given consent and are fully informed of their risks, and that researchers take appropriate steps to protect patients from harm.

Phase 1 studies are usually conducted in healthy volunteers. The goal here is to determine what the drug's most frequent side effects are and, often, how the drug is metabolized and excreted. The number of subjects typically ranges from 20 to 80.

Phase 2 studies begin if Phase 1 studies don't reveal unacceptable toxicity. While the emphasis in Phase 1 is on safety, the emphasis in Phase 2 is on effectiveness. This phase aims to obtain preliminary data on whether the drug works in people who have a certain disease or condition. For controlled trials, patients receiving the drug are compared with similar patients receiving a different treatment--usually an inactive substance (placebo), or a different drug. Safety continues to be evaluated, and short-term side effects are studied. Typically, the number of subjects in Phase 2 studies ranges from a few dozen to about 300.

At the end of Phase 2, the FDA and sponsors try to come to an agreement on how large-scale studies in Phase 3 should be done. How often the FDA meets with a sponsor varies, but this is one of two most common meeting points prior to submission of a new drug application. The other most common time is pre-NDA--right before a new drug application is submitted.

Phase 3 studies begin if evidence of effectiveness is shown in Phase 2. These studies gather more information about safety and effectiveness, studying different populations and different dosages and using the drug in combination with other drugs. The number of subjects usually ranges from several hundred to about 3,000 people.

Postmarket requirement and commitment studies are required of or agreed to by a sponsor, and are conducted after the FDA has approved a product for marketing. The FDA uses postmarket requirement and commitment studies to gather additional information about a product's safety, efficacy, or optimal use.

New Drug Application (NDA)--This is the formal step a drug sponsor takes to ask that the FDA consider approving a new drug for marketing in the United States. An NDA includes all animal and human data and analyses of the data, as well as information about how the drug behaves in the body and how it is manufactured.

When an NDA comes in, the FDA has 60 days to decide whether to file it so that it can be reviewed. The FDA can refuse to file an application that is incomplete. For example, some required studies may be missing. In accordance with the Prescription Drug User Fee Act (PDUFA), the FDA's Center for Drug Evaluation and Research (CDER) expects to review and act on at least 90 percent of NDAs for standard drugs no later than 10 months after the applications are received. The review goal is six months for priority drugs. (See "The Role of User Fees (/drugs/information-consumers-drugs/fdas-drug-review-process-continued#role).")

"It's the clinical trials that take so long--usually several years," says Sandra Kweder, M.D., deputy director of the Office of New Drugs in the CDER. "The emphasis on speed for FDA mostly relates to review time and timelines of being able to meet with sponsors during a drug's development," she says.

DRUG REVIEW PROCESS CONTINUED > (/drugs/information-consumers-drugs/fdas-drug-review-process-continued)

Related Information

- Video Series - Overview of Our Role Regulating and Approving Drugs (/drugs/information-consumers-and-patients-drugs/overview-our-role-regulating-and-approving-drugs-video-series)
- How Drugs are Developed and Approved (/drugs/development-approval-process-drugs/how-drugs-are-developed-and-approved)
- Frequently Asked Questions about the FDA Drug Approval Process (/drugs/special-features/frequently-asked-questions-about-fda-drug-approval-process)

Resources

- FDA Drug Approval Process Infographic (Horizontal) (/drugs/information-consumers-drugs/fda-drug-approval-process-infographic-horizontal)
- FDA Drug Approval Process Infographic (Vertical) (/drugs/information-consumers-drugs/fda-drug-approval-process-infographic-vertical)