An Introduction to the Clinical Trial Process

A clinical trial is a research study that is performed in humans to determine if a new drug or therapy is both safe and effective for treating a disease or condition. All clinical trials are based on a set of rules called a protocol. A protocol describes what type of people may participate in the trial; the schedule of tests, procedures, medications, and dosages; and the length of the study.

Clinical trials are carried out in steps called phases. Patients may be eligible for studies in different phases, depending on their general condition, the type and stage of their disease, and what therapy, if any, they have already had. Trial participants are seen regularly by research staff to monitor their health and to determine the safety and effectiveness of their treatment.

On average, it takes 12 years for a drug to travel through the clinical testing phases to reach the patient population. Approximately one in five drugs that enter clinical testing are ultimately approved for patient use. The following is a description of what makes up each stage in the U.S. clinical trial process:

Pre-Clinical Testing

Before a drug can be tested in humans, pre-clinical testing is required. Laboratory studies are conducted to demonstrate safety in humans and the drugs' ability to fight against a targeted disease. Once the drug has been determined to have strong potential, it begins to be prepared for human delivery. Pre-clinical testing takes approximately three to four years.

Investigational New Drug Application (IND)

After completing pre-clinical testing, an IND must be filled with the regulatory agency, the U.S. Food and Drug Administration (FDA). The IND outlines the results of pre-clinical testing and clearly defines how future studies will be conducted. The FDA has thirty days to review the IND. If they do not disapprove the IND within that time period, the drug can move on to a phase 1 trial where it can be tested in humans.

Phase 1

In a phase 1 clinical trial, the primary goal is to assess the drug's safety. For the first time, the drug is introduced to humans, with tests occurring in a small number of healthy volunteers (20-100). The study is designed to determine how the human body reacts to the drug and, specifically, what side effects occur as dosage levels are increased. This initial phase of testing typically takes severa months to a year. About 70 percent of experimental drugs pass this initial phase.

Phase 2

Once a drug has been shown to be safe, it must be tested for effectiveness. Most phase 2 studies are randomized trials. This means, one group of patients will receive the experimental drug, while a second "control" group will receive a standard treatment or placebo. Often these studies are "blinded"--neither the patient nor the researchers know who is getting the experimental drug. In this manner, the study can provide the pharmaceutical or biotechnology company and the regulatory agency comparative information about the relative safety and effectiveness of this new drug. This second phase of testing may last from several months to two years, and involve up to several hundred patients. Only about 30 percent of experimental drugs successfully complete both phase 1 and phase 2 studies.

Phase 3

In a phase 3 study, a drug is tested in several hundred to several thousand patients. This large-scale testing provides the pharmaceutical or biotechnology company and the regulatory agency with a more through understanding of the drug's effectiveness, benefits, and the range of possible adverse reactions. Moat phase 3 studies are randomized and blinded trials.

Phase 3 studies typically last several years. Seventy to 90 percent of drugs that enter phase 3 studies successfully complete testing. Once a phase 3 study is successfully completed, a company can request marketing approval for the drug from the U.S. Food and Drug Administration.

New Drug Application (NDA) / Biologics License Application (BLA)

Once all three clinical trial phases are complete and if the data demonstrates that the drug is safe and effective, an NDA/BLA is filed with the U.S. Food and Drug Administration (FDA). This NDA/BLA must contain all of the scientific information compiled over the course of the trials. The FDA is allowed atleast six months to review the NDA/BLA. However, this review process can sometimes take up to two years depending on the procedures set forth by a specific country.

Approval

Once the U.S. Food and Drug Administration approves the NDA/BLA, the drug becomes available for physicians to prescribe. Although the product is approved, it must continue to comply with regulatory requirements over time. For example,

all cases of adverse events caused by the drug must be reported and quality control standards must be met. In some cases, the regulatory agency will also require post-marketing studies to evaluate the long-term effects of the drug.

Post Marketing Studies

Post Marketing studies, also called phase 4 studies, often have several objectives. One, these studies are often performed in special patient populations not previously studied (for example, pediatric or geriatric). Two, the studies are often designed to monitor a drug's long-term effectiveness and impact on a patient's quality of life. And, three, many studies are designed to determine the cost-effectiveness of a drug therapy relative to other traditional and new therapies.