Appendix 4

The Phases of Clinical Trials

While preclinical research that is done in a lab can provide foundation information about how a drug may work and its safety, it is not a substitute for studies that show how the drug will interact with the human body.

The term "clinical trials," or "clinical research," refers to studies that are conducted in people. Researchers design clinical trials to answer specific research questions related to a drug candidate.

Clinical trials follow a rigorous series from early, small-scale, Phase 1 studies to late-stage, large scale, Phase 3 studies. If a treatment is successful in one phase, it moves on to the next phase.

A successful clinical trial process continues until the developer files a marketing application with the U.S. Food and Drug Administration (FDA) or a regulatory agency in another country for the medication to be approved for doctors to prescribe to patients.

Though the phases and design of clinical trials may be different for certain diseases and specialized medicines, such as cancer drugs or gene therapies, here is a general overview of each phase of a clinical trial for most medications:

Phase 1	During Phase 1 studies, researchers generally test a new drug candidate in healthy volunteers (healthy people). In most cases, 20 to 80 healthy volunteers participate in Phase 1. The primary purpose of a Phase 1 study is to evaluate the safety of a new drug candidate before it proceeds to further clinical studies. In addition to safety, researchers can answer other questions in a Phase 1 trial related to how much drug is measured in the blood after administration, how the drug works in the body, and the side effects associated with increased dosage.
Phase 2	In Phase 2 studies, researchers administer the drug to a larger group of patients (typically up to a few hundred) with the disease or condition for which the drug is being developed to initially assess its effectiveness and to further study its safety. A key focus of Phase 2 studies is determining the optimal dose or doses of a drug candidate, in order to determine how best to administer the drug to maximize possible benefits while minimizing risks.
Phase 3	For diseases affecting many patients, Phase 3 studies typically involve 300 to 3,000 participants from patient populations for which the medicine is eventually intended to be used. Participants are assigned to receive either the medication being evaluated or a control group that receives either the current standard of care treatment or a placebo (a substance that has no therapeutic effect). Researchers design Phase 3 studies—among other things—to demonstrate whether or not a drug candidate offers a treatment benefit to a specific population, provide more detailed safety data, and serve as the basis for product labeling. When one or more Phase 3 trials are completed, the researchers examine the results and decide whether the drug has demonstrated effectiveness and an acceptable safety profile in treating a disease. If so, the company can submit a New Drug Application (NDA), which contains all of the data and information gathered at every stage of the process through the results of the Phase 3 clinical trial(s), as well as other information required by the applicable regulatory authority. The NDA is submitted to the FDA (or analogous applications may be submitted to other regulatory agencies outside the U.S.) for consideration for marketing approval. Because Phase 3 trial results often provide the basis for approval, Phase 3 trials are sometimes also called "pivotal trials." If the drug is approved, doctors can prescribe the medication for their patients.

Source: Concert Pharmaceuticals, Inc., concertpharma.com: "Understanding Clinical Trial Terminology: What's a Phase 1, 2 or 3 Clinical Trial?"