

Population PK/PD Modeling and Simulation Optimization Tools



Shaping the Future

A paper published by the FDA* revealed that of 31 New Drug Applications (NDAs) submitted over a 15-month period, a pharmacometric component (i.e., population PK/PD modeling and simulation) was ranked as important in the decision-making process for over 85%.

Not only did 20 of the 31 NDAs gain FDA approval as a result of analysis of their population PK/PD modeling and simulation, but also decisions on labeling (both pivotal and supportive) were influenced in 17 of the 31 cases.

Of the reviews that shaped labeling decisions, 75% contributed to statements on dosage or administration, 53% to precautions or warnings and 70% to clinical pharmacology labeling.

FDA Support

Population pharmacokinetic/pharmacodynamic (PK/PD) modeling and simulation, available from Quintiles, is now endorsed by the FDA as often being instrumental in drug approval and labeling.

The use of population PK/PD modeling and simulation is recommended in all stages of drug development by the FDA, and has been for some time. Quintiles has capabilities to consult on the design of the study, create the analysis data sets, develop and validate nonlinear mixed-effects PK/PD models, and write and publish the modeling report.

* Results reported by Bhattaram et al (Clinical Pharmacology and Therapeutics. 2007;81:213-221)

In addition, we are actively engaged in clinical trial simulation (CTS) and have used this technology to optimize the dosage regimens of Phase II/III safety and efficacy trials. Quintiles' expertise in the expanding field of population PK/PD includes:

- > Addressing specific questions from regulatory agencies using the results of our analyses
- > Designing future trials
- > Supporting drug product labeling

How PK/PD Modeling and Simulation Works and Why it Matters

Population PK/PD modeling is capable of handling sparse and unbalanced data often seen in early drug development and Phase II/III studies and evaluates the relationship between efficacy and/or safety endpoints.

Modeling of drug exposure and/or response at the population level is used to quantify individual variability and identify important demographics that explain the variability often observed.

Improving Safety and Effectiveness

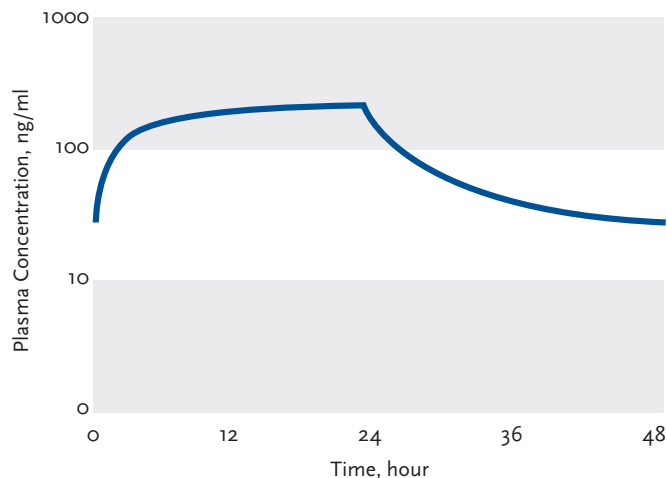
Identification of subgroups of the populations that require altered dosing, such as elderly patients or patients with renal or hepatic impairment, can aid development of more effective and safer dosing strategies. Population PK/PD modeling can also be used to predict the outcome of untested doses and dosing regimen via simulation; thus it is a powerful tool that can streamline drug development when used early.

Population PK/PD analyses offer more educated drug development and regulatory decision making. By utilizing population PK/PD modeling and simulation techniques during the earlier phases of development, the overall process can be optimized, providing more informative results with each clinical trial. Better understanding of the concentration response relationship allows for improved dose selection and population targeting in follow-on phase II/III studies. This type of drug development approach has proven to decrease late stage development failures.

A Wealth of Experience

Quintiles has a wealth of experience in population PK/PD modeling and simulation. Over the past 10 years, our team of scientists has worked on over 60 population PK/PD modeling projects involving 45 compounds across 13 different therapeutic areas, resulting in 20 NDA submissions. Quintiles experts have also used these analyses to address specific questions from regulatory agencies, help design future trials and support drug labeling.

Contact us to learn more about how we can help you optimize your clinical trials and development programs with Population PK/PD Modeling and Simulation.



This graph shows the mean time course of dose-normalized drug plasma concentrations collected during and after cessation of a 24-hour infusion in patients.

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