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Population Pharmacokinetics (PopPK), a crucial approach in drug development

For several years now, popPK has taken an essential place in the drug development program and can be applied at all phases of drug development, adapting each time to clinical constraints. The agencies encourage more and more the use of popPK modelling to inform drug development and use. Indeed, The US Food and Drug Administration (FDA) released new draft guidance on Population Pharmacokinetics (popPK) in July of 2019.

To present and explain this practice we interviewed Sarah Lezzar, Pharmacometrician and Biostatistician at PhinC Development. Sarah is responsible for QT/QTc analysis, PK and PD modeling and statistical analysis related to the clinical development.
Population pharmacokinetics (popPK) modelling is a part of the major expertise activities at PhinC Development and consists of describing the behavior of a drug not at the individual level but in the overall population and allows to quantify the variability that may exist between individuals in the same population or from one population to another and to identify the source of this variability.

In concrete terms, what does it consist of?

PopPK is a compartmental method dividing the body into well-stirred hypothetical areas (compartments) for a drug, and considering different sources of variability, using the appropriate mathematical equations. When developing popPK models, the pharmacometrician identifies statistical relationships between some PK parameters and physiological, biological, or other variables collected from a population such as weight, age, renal function, or co-medications, in order to reduce the part of the unexplained variability.

PopPK models can be applied to select a dosing regimen for future design, optimize sample size and PK sampling times, design pediatric studies, to document a drug-drug interaction and exposure-response analysis.

What are the advantages of popPK analysis?

The greatest advantage of this approach is allowing us to estimate the average values of the PK parameters, their variability in the population, and identify covariates that influence these parameters. Furthermore, such a model can be built from spare or imbalance data, after a single dose or at a steady-state, from healthy subjects or patient population, with rich or sparse sampling.

Can you tell us about your personal experience at PhinC Development?

As a pharmacometrician at PhinC Development, we had the opportunity to support several sponsors throughout their drug development program at various phases. One of our last collaborations was with DNDi for fexinidazole treatment which had a positive scientific opinion delivered by the European Medicines Agency (EMA) in November 2018, the first all-oral treatment that has been shown to be efficacious for sleeping sickness. Indeed, our contribution was from the very beginning of the drug program, as a popPK model was developed in healthy volunteers receiving single and multiple dose of fexinidazole, the popPK modelling has enabled to select the therapeutic dose, optimize the PK sampling and characterize popPK parameters and their variability for both patient and pediatric populations.

CONTACT

Let's talk about how we can help you in your drug development research.

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