Best practices in calculating probability of success in drug development- Enhancing decision-making from a pharmacometric and statistical viewpoint

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Description
Enhancing the decision-making process in drug discovery and development is a critical component for the success of R&D organizations. Quantitative methods, including rigorous definition and application of the "probability of success" (PoS) concept, can provide an invaluable mean to reduce the risk of poor decisions. However, there is no broad agreement as to how these important variables should be calculated, or which data should be used. In this context, pharmacometric and statistical disciplines offer slightly different approaches to calculate the probability of success in different contexts (i.e., clinical trial design and analysis, translational pharmacology, clinical trial simulation to inform the next study, model-based meta-analysis to benchmark a new asset to competitors). The objective of this symposium/tutorial is to provide some clarification of the different definitions of key concepts surrounding PoS, list and highlight best practices, and illustrate with examples the potential benefit of integrating these quantitative approaches in drug research, to enhance model-informed drug discovery and development. There was a session on a closely related topic during ACoP7 in 2016, "Knowing the Odds: Translational Pharmacology, Pharmacometrics and Probability of Success in Drug Development" (http://www.acop7.org/acop7-program). This symposium will build on that excellent material by providing practical examples and (ideally) computer code to perform the key calculations.

Learning Objectives

- Set the stage for a diverse audience about decision making in drug R&D and the key steps leading to it, including preclinical and translational evidence, clinical trial design and execution and pipeline probability of success (ideally considered by therapeutic area)
- Clarify the definition of some widely-used terms and how they are calculated: probability of success (PoS), probability of technical success (PTS), probability of technical and regulatory success (PTRS), etc
- Provide real examples and case studies (including data and code e.g. in R) as to how these considerations have supported a wide variety of drug development decisions.
Session Speakers and Presentations

Stephen Ruberg - Quantitative and Qualitative Assessments of Probability of Study Success

Stefano Zamuner - Probability of Success based on Pharmacological Principles (including Use of Priors)

Matt Zierhut - Estimating Probability of Technical (and Trial) Success with External Data: Applications of Model-Based Meta-Analyses (MBMA)

Brian P. Smith - The Interplay of Decision Criteria, Operating Characteristics, Design, and Analysis in Proof of Concept and Beyond

Jose Pinheiro - Program-level simulation-based evaluation of PoS and expected NPV: a case study in neuropathic pain