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Quantitative Decision Making: How Frameworks Could Help You

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Gustaf Rydevik
Please provide a brief biography for the Presenting author(s)
Gustaf Rydevik is a statistician with 15+ years of experience across the public, academic, and private sectors. He is originally from Sweden, where he started his career at the Swedish Institute of Infectious Disease control, working on outbreak investigations, surveillance of influenza using web queries, and vaccine epidemiology. He then moved to Edinburgh, Scotland (where he's still based) to pursue a PhD on a Bayesian model combining antigen and antibody data to hindcast epidemic trends, and a postdoc providing research and advice to the Scottish Government on animal disease epidemiology. Since leaving academia, he's worked on Network meta analysis (NMA), non-proportional hazards survival analysis, and late phase trial support. He's currently working as a statistics director for early clinical projects at UCB, where he's supporting clinical projects, and is involved in trial design, quantitative decision making including target setting, probability of success and pre-posteriors,
and the wide range of novel statistical challenges that come up in the early phase.

Nima Shariati
Please provide a brief biography for the Presenting author(s)
Nima Shariati, PhD, is a Data Science Team Lead and Project Lead Statistician at Hoffmann-La Roche in Switzerland, with over a decade of experience in clinical drug development within the pharmaceutical industry and academia. Nima is part of the European Quantitative Decision Making Special Interest Group (E-SIG) within PSI, and has been a member of the Estimand Subject Matter Expert (SME) network within Roche, where he has been actively instructing and advocating for the use of the estimand framework in clinical trial design. His primary research focuses on the innovative application of adaptive design in drug development, particularly on quantitative decision making to enhance the performance of clinical trials as well as the portfolio. Prior to Roche, Nima worked as a senior statistician at AstraZeneca and obtained his PhD from the University of Lund in Sweden.

Single topic, multi-speaker session, Workshop or Single presentation submission

A single topic, mutli-speaker session/workshop

Single topic session or workshop abstracts

Quantitative decision making at a study level has become commonplace within the pharmaceutical industry in recent years, however it is not always performed consistently or most effectively. Frameworks can be utilised to help standardise decision making, this session presents two such frameworks.

Implementation of a Qualitative and Quantitative Decision Framework to Facilitate Clinical Development

Since 2022, UCB has been developing Clinical Stage Gates (CSG), a framework for supporting and standardising evaluation, scenario planning, and decision-making across the clinical development process.

CSG consists of four parts that bring together the critical aspects of the program to predict product viability and success:

1. Program review – A structured set of questions to identify key operational risks and scientific gaps
2. Scenario planning – Mapping out clinical development options to resolve the identified risks and gaps
3. Target definition – Define key domains and the corresponding target values to support continuing the clinical development program
4. Decision framework – Map out tradeoffs of different scenarios in terms of speed, cost, and evidence/risk with recommendations on the optimal scenario

Targets are defined in terms of a true “reference value” for each quantity, tied to compound viability, paired with a threshold confidence of exceeding the reference. The reference values can come from a meta-analysis, from discussions with subject-matter experts, or from a structured elicitation. The confidence reflects the (feasible) level of certainty of a viable compound desired by the team to progress to the next stage. Possible study outcomes can be framed in terms of which quantities may reach confidence thresholds and how the program may be affected by different combinations.

Most recent projects in the early pipeline have used CSG, and all new program discussions with governance will use the CSG framework. We have found that in governance discussions, the framework provides clarity on communication, planning, and rapid decision-making following readouts.

Financially Calibrated Risk-Scale: A Proposed Futility Design Framework to Enhance Portfolio-Level Profitability and Performance

Futility analysis is an effective, adaptive design that enables trials to be potentially terminated at a predetermined interim stage. For pharmaceutical companies and clinical trial sponsors, balancing the risk of prematurely stopping a trial for a potentially successful drug, against the risk of continuing a trial when collected interim data suggests the drug is ineffective, is a complex challenge. The distinct nature, significance, and financial implications of these risks make them too intricate to be easily aggregated for decision-making purposes. Furthermore, the inclusion, timing, and strictness of futility designs have a considerable spillover effect on the entire portfolio. The opportunity cost of making no (or suboptimal) interim futility gating decisions, which could free up financial and human resources for reinvestment in other opportunities in the pipeline, exemplifies a portfolio-wide overflow effect. This is in addition to the other risk mitigation benefits of futilities in derisking, ungating, or acceleration of other programs in the pipeline. This work aims to introduce a refined framework to identify optimal futility designs for individual trials, but viewed from a portfolio-level perspective. The framework seeks to balance the errors of falsely continuing and falsely stopping trials by weighing them according to their financial impact, both at the trial level and, more importantly, at the portfolio level. Consequently, this framework quantitatively determines the extent of leniency and prudence in risk-taking based on the total portfolio-level financial impact of interim decisions, while considering the mutual interconnectivity among various trials within the portfolio. Considering the unique financial characteristics of each trial, the proposed framework also evaluates the alternative uses of freed-up resources within the portfolio by assessing what could have been done if some trials had been prematurely stopped. This scheme can subsequently suggest suitable futility designs for each trial whilst ensuring overall portfolio-level optimization.