Abstract Template

Project title

Approaching Trial Design from a Bayesian Perspective

Institution

Trinity College Dublin

Project details (max 250 words)

The predominant statistical approach to designing and analysing clinical trials has been the frequentist approach. In this paradigm, the probability of observing the data or more extreme data, assuming a hypothesis is true, is determined. But increasingly, more and more attention has been given to Bayesian approaches. In the Bayesian approach, which utilises Bayes rule, it is possible to directly calculate the probability that a hypothesis is true, given the available data/evidence as well as predictive probabilities. The Bayesian paradigm allows for more flexibility, for example, facilitating adaptation to the information that becomes available during the trial (see Berry, 2006).

Before a trial is conducted where a frequentist analysis is planned, power calculations are carried out to determine the required sample size. Rather than having fixed sample sizes for a trial, a Bayesian approach is to consider rules for stopping a trial based on the results that become available during the course of the trial. This can potentially reduce costs and ultimately provide better treatments for individuals, often more quickly. The availability of programs for calculating sample size for frequentist analyses and the limited familiarity with Bayesian approaches, are some reasons as to why frequentist analyses are often the only approach considered when designing trials. Through simulation studies, this project will focus on ways of introducing the advantages of the Bayesian approach for some straightforward trial designs, taking into account all relevant considerations.

Bayesian clinical trials, Donald A. Berry, Nature Reviews Drug Discovery 5, 27-36, 2006 doi:10.1038/nrd1927

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