Efficient Simulation and Comparison of Adaptive Clinical Trial Designs

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Abstract

The decision about the design of a clinical trial is usually made within a relatively short period of a few weeks or months. Consideration of adaptive designs however requires extensive simulation, which may limit the number of possible designs to a few options. We have therefore set out to develop a software tool, which would offer efficient simulation and comparison of adaptive clinical trial designs. We have created a package in Julia programming language, which calculates the operating characteristics directly rather than by simulation and is thus able to provide more accurate results notably faster than a simulation to an acceptable precision. We will illustrate the use of the package for a comparison of a number of standard adaptive clinical trial designs. This package is being developed by the Group on Optimal Adaptive Learning (G.O.A.L.) at Lancaster University, UK (see http://www.lancaster.ac.uk/staff/jacko/goal/).