

gsDesignExplorer: An open source R package GUI for group sequential design

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gsDesignExplorer is a graphical user interface (GUI) to **gsDesign**: an R package intended to provide a flexible set of tools for designing and analyzing group sequential trials. **gsDesignExplorer** is itself an R package containing functionality to launch the GUI, which can be used by analysts to instantly create, compare, and document multiple group sequential clinical trial designs. A fundamental advantage of the GUI is that it allows users to focus on the model parameters and their statistical and clinical implications without being burdened by technical details or programming. Group sequential methods allow clinic trial design with interim analyses to evaluate efficacy while controlling Type I error and power. Interim analyses offer opportunities for early stopping of trials, if, for example, the new treatment is demonstrably better than the standard treatment or clearly inferior. This can have benefits in many areas, from improved patient outcomes to significant savings in money and time.

The **gsDesignExplorer** package is the result of a collaboration between REvolution Computing and Merck Research Laboratories. In this collaboration, Merck provided the original code base and statistical expertise while REvolution Computing developed **gsDesignExplorer** and provided validation support for the original **gsDesign** package. The core of the code is written in C++ using Qt, a popular cross-platform GUI-building toolkit, which we supplemented with new C++ classes to facilitate communication with R. The result is a free, commercial-grade, open source product that is amenable for widespread use on a variety of platforms including Windows, LINUX, and Mac OS X.

In our presentation, we will discuss the development cycle of the **gsDesignExplorer** and **gsDesign** packages, the technique for forming a communication between Qt/C++ and R, and a brief demonstration of the resulting GUI. We will conclude with comments on the advantages of the collaboration between commercial organizations in creating an open source product.

References

R-FORGE (2010). gsDesign: Group Sequential Design,
<http://r-forge.r-project.org/projects/gsdesign/>.