

## ABSTRACT

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### Randomization in Small Population Clinical Trials

Rare disease clinical trials present unique problems for the statistician designing the study. First, the trial may be small to reflect the uniquely small population of diseased in the population. Hence, the usual large sample beneficial properties of randomization (balancing on unknown covariates, distribution of standard tests, converging to a target allocation) may not apply. We describe the impact of such trials on consideration of randomization procedures, and discuss randomization as a basis for inference. We conclude that, in small trials, the randomization procedure chosen does matter, and randomization tests should be used as a matter of course due to its property of preserving the type I error rate under time trends.

William Rosenberger is University Professor and Chairman, Department of Statistics, George Mason University (GMU). He received his PhD in Mathematical Statistics from George Washington University in 1992 and was the 2nd recipient of the David Byar Award in 1995. He is a Fellow of the ASA (2005), IMS (2011), was named the Outstanding Research Faculty in the Volgenau School of Engineering, GMU (2012), and was promoted to the highest honorary rank of University Professor at GMU this year. Prof. Rosenberger has authored over 80 refereed papers and two books. He is currently working on the second edition of the first book, *Randomization in Clinical Trials: Theory and Practice*, as a Fulbright Scholar at RWTH University, Aachen, Germany.

His areas of research interest include randomization, optimal and adaptive designs, sequential analysis, and clinical trials.