

EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

New Perspectives on Tests for Co-Primary and Secondary Endpoints

ABSTRACT—Diseases typically have multiple symptoms, and drug approvals accordingly require evaluations of treatment effects on multiple endpoints. Standard testing procedures for multiple endpoints, designed to guarantee that Type I familywise error rates do not exceed some level, tend to yield lower Type I error rates than nominal, leading to a sacrifice in power and pharmaceutical productivity. More powerful procedures that maintain the desired significance level are developed through consideration of randomization tests. Randomization tests for co-primary endpoints that are more powerful than the standard intersection-union test, and step-down tests for secondary endpoints that maintain strong control of Type I familywise error rates, are given and illustrated for a multiple sclerosis case study. These tests are extended to the case of principal strata, arising from rescue treatments, by means of posterior predictive checks. This study sheds a new light on powerful Bayesian multiple comparison procedures that satisfy frequentist criteria for clinical trials, and can help the pharmaceutical industry increase the number and quality of novel treatments for serious diseases.



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SPEAKER BIO — *Dr. Arman Sabbaghi is an Assistant Professor in the Department of Statistics at Purdue University. He received his PhD in Statistics in 2014 from Harvard University. Dr. Sabbaghi's primary research interests include causal inference, Bayesian statistics, experimental design, and quality control.*

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3:30PM – 4:50PM

USC ANDRUS GERONTOLOGY CENTER (GER), ROOM 206