

**Department of Biostatistics  
College of Public Health and Health Professions  
College of Medicine**

***Fall 2012 Seminar  
Tuesday, November 20, 2012  
10:00 a.m.-11:00 a.m.  
Room 121 Keene-Flint Hall***

## **Power and Sample Size for the Most Common Hypotheses in Mixed Models**

**Keith E. Muller  
Professor  
Department of Health Outcomes and Policy  
kmuller@ufl.edu**

Mixed models have become the standard approach for handling correlated observations and accommodating missing data. We present power analyses for scientists who use mixed models to test hypotheses about means. We show how a flow diagram can guide scientists towards a simple and valid power analysis. A series of yes-no questions guides the identification of study design, the classification of hypotheses, and the selection of a covariance model.

An important preliminary step in power analysis is the appropriate specification of the covariance model. We show that even the most complicated covariance structures can be constructed as a layering of simpler patterns. The approach enables us to formulate reasonable covariance models for designs combining longitudinal and multi-level features.

Complex covariance patterns might seem to require correspondingly complex power and sample size methods. Instead, a straightforward and valid power analysis can be conducted by considering a multivariate model equivalent in power to the mixed model of interest. We show that an inflation factor for sample size can account for missing data, when the data are missing completely at random.

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