EPI 5346G Applied Longitudinal and Clustered Data Analysis (1.5 cr.)
Winter 2010
Health Sciences Building, 451 Smyth Rd., Room 3001
Thursdays, 9 a.m. – 12 noon
Dr. Monica Taljaard

This course will begin on March 4, 2010.

LECTURE 1:
INTRODUCTION, BACKGROUND & REVIEW

- ☐ Understand differences between longitudinal and cross-sectional data
- ☐ Appreciate the advantages of longitudinal study designs
- ☐ Explain the consequences of ignoring correlation in responses
- ☐ Review of linear regression models, concepts of covariance and correlation

EXPLORATORY DATA ANALYSIS

- ☐ Know how to prepare longitudinal data for analysis in SAS
- ☐ Conduct exploratory data analysis of longitudinal data in SAS using graphs and descriptive statistics

LECTURE 2:
HISTORICAL APPROACHES TO REPEATED MEASURES ANALYSIS

- ☐ Review historical approaches to repeated measures analysis (including multivariate and univariate repeated measures ANOVA, and approaches based on summary measures)
- ☐ Understand the disadvantages of historical approaches

ANALYSIS OF CONTINUOUS OUTCOMES USING COVARIANCE PATTERN MODELS: Response profile analysis

- ☐ Know the four-step procedure for mixed model analyses
- ☐ Analyze response profiles of repeated measures data using covariance patterns models

LECTURE 3:
ANALYSIS OF CONTINUOUS OUTCOMES USING COVARIANCE PATTERN MODELS: Parametric and semi-parametric curves

- ☐ Understand advantages and disadvantages of response profile analysis
- ☐ Analyze repeated measures data using parametric and semi-parametric curves in the linear mixed regression approach

ANALYSIS OF CONTINUOUS OUTCOMES USING LINEAR MIXED MODELS: Random Coefficient Models

- ☐ Understand disadvantages of covariance pattern models
- ☐ Understand advantages of mixed models
- ☐ Analyze repeated measures data using random coefficient models in the linear mixed regression approach

LECTURE 4
ANALYSIS OF CONTINUOUS OUTCOMES USING LINEAR MIXED MODELS (ctd): EBLUPs and Case studies

- ☐ Compute and interpret Empirical Best Linear Unbiased Predictions
- ☐ Fit mixed-effects regression models including multiple time-varying and time-invariant predictors

MODEL ASSESSMENT

- ☐ Plot residuals by predicted values and by each explanatory variable
- ☐ Create a histogram of the residuals
- ☐ Investigate violations of assumptions about the random effects
- ☐ Identify subjects that are potential outliers

LECTURE 5:
ANALYSIS OF LONGITUDINAL DICHOTOMOUS OUTCOMES: MARGINAL MODELS

- ☐ Explain the difference between generalized linear mixed models and models using Generalized Estimating Equations (GEE)
- ☐ Analyze longitudinal dichotomous outcomes using GEE
- ☐ Understand the advantages and disadvantages of robust and model-based standard error estimates

ANALYSIS OF DICHOTOMOUS LONGITUDINAL DATA: Case studies

- ☐ Fit GEE models using PROC GENMOD

LECTURE 6:
ANALYSIS OF LONGITUDINAL DICHOTOMOUS OUTCOMES: SUBJECT-SPECIFIC MODELS

- ☐ Understand differences in interpretation of regression parameters in marginal and generalized linear mixed-effects models
- ☐ Fit generalized linear mixed-effects models using PROC GLIMMIX
- ☐ Miscellaneous topics or course review

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