
Analysis of Longitudinal Data

Chair: Paramjit Gill (University of British Columbia, Okanagan)

HYUN (JUNE) LIM, University of Saskatchewan

Joint Modelling of Repeated CD4+ Count Measurements and Survival Time in HIV Study

In many clinical studies, data have two types of outcome, longitudinal biomarker measurements and survival time. These two outcomes are often separately analyzed using a mixed effects model and survival model. However, separate models are overly simplified by ignoring the association between two components. Joint modelling is sophisticated, complex approach but enables the longitudinal measurements and survival time to be modelled whilst accounting for association between them. Using a HIV dataset with repeated CD4+ count measurements and survival time, we combine a random effects sub-model and Cox or Weibull sub-models through their shared dependence on latent variable.

TASNEEM ZAIHRA, Concordia University

Evaluating Predictive Validity of Patient Reported Asthma Control, Belief about Medications and Self-Efficacy

The purpose of this study is to develop statistical models to evaluate the predictors of long-term asthma control. A cohort of 1437 patients with asthma were followed over a one-year period and completed the Asthma Control Test (ACT), mini-asthma quality of life questionnaire (AQLQ), asthma self-efficacy (opinion, knowledge about asthma) scale and beliefs about medication. Long-term asthma control was evaluated by assessing overuse of rescue medication and emergency department (ED) visits. Even a 15% reduction in asthma-related ED visits and hospitalization based on efficient predictive models could result in an important reduction in health-care costs.

ABDERAZZAK MOUIHA, Centre de Recherche de l'Institut Universitaire de Santé Mentale de Québec

The Dynamic of Alzheimer's Disease: a Longitudinal Study of Patients Progressing From MCI to AD

Numerous studies suggest that medial temporal lobe atrophy, tracked via hippocampal (HC) volumes and longitudinal rates of change, predicts Alzheimer's disease (AD) in patients with amnesic mild cognitive impairment (aMCI). It should relate to neuropsychological assessment. To determine the shape of this relationship and take into account within-individual changes in HC over time, we used a general mixed model. The control group is used to transform scores. From the ADNI (Alzheimer's Disease Neuroimaging Initiative) study, 48 females and 86 males, who progressed from MCI to AD over time, were included. Results confirm the hypothesis proposed by Jack et al. 2010.

NARGES NAZERI RAD, University of Waterloo

Multi-state Models for Viral Load Patterns

In many cohorts of individuals infected with the human immune deficiency virus (HIV), viral load is measured at intermittent visit times. Multi-state models with states defined by viral load levels provide a simplistic but useful approach for examining viral load dynamics, and phenomena such as viral blips or viral rebound. In this talk we consider the effect of the gap time between viral load measurements on the estimation of process parameters. Insights gained also apply to other longitudinal studies where biomarker measurements are taken at intermittent visits.

DEPENG JIANG, University of Manitoba

Latent Class Growth Model for National Longitudinal Data

This study will discuss statistical assumptions, strengths, limitations, and areas of interpretational confusion for using latent class growth model (LCGM) to analyze longitudinal data. We use data from the National Longitudinal Survey of children and

Youth (Statistics Canada and Human Resources Development Canada, 1994-2011) to illustrate how latent class growth model are commonly used in longitudinal research, and what one should take into consideration. We explain how the integration of the latent class growth model and conventional growth model can lead to a more complete understanding of the processes and patterns of human development.

CHENGLIN YE, McMaster University

Comparison of Methods to Model Diastolic and Systolic Blood Pressure Measurements over Time

The pathology behind high blood pressure is still unclear. Most analyses of data from interventional studies treat systolic blood pressure (SBP) and diastolic blood pressure (DBP) separately, ignoring the plausible correlation between them. Such analyses assumed that the two measures were independent of each other. We use data from the Cardiovascular Health Awareness Program (CHAP, see www.CHAPprogram.ca) study to compare the results of the longitudinal analyses of DBP and SBP using univariate (i.e. separately) and multivariate (i.e. jointly) approaches as functions of several baseline risk factors.