Biostatistics - Applications and Case Studies

Chair: Wendy Lou (University of Toronto)

TANJA HOEGG, University of British Columbia - Okanagan
Breast Cancer in British Columbia - Identification of High Risk Women Based on Breast Cancer Risk Modelling

Although there are many known factors associated with an increased risk of breast cancer, currently, age remains the only eligibility criterion for the Screening Mammography Program of BC. Using five year follow-up data of 220,000 SMP BC participants, we aim to identify women at high risk of breast cancer and create a personalized access criterion to earlier breast screening. We evaluated the discriminatory performance of the existing Gail et al. breast cancer risk model for the BC population. Accounting for well-established risk factors, we estimate survival probabilities as a basis for improved outcome stratification of the population.

MOHAMMAD EHSANUL KARIM, University of British Columbia
A Simulation Study of Methods Used to Reduce Variability in the Inverse Probability of Treatment Weights for Marginal Structural Cox Models

Extreme values among the inverse probability of treatment weights can unduly affect the results of marginal structural Cox models. Besides standardization, methods including truncation, trimming and normalization are suggested in the literature to reduce the variability of these weights. To compare the performance of these methods, we used simulated data that mimicked survival data in which both treatment and confounders were time-dependent. The findings from this simulation study were used to guide the weighted adjustment in an application where we investigated the impact of beta-interferon treatment in delaying disability progression in patients from the British Columbia Multiple Sclerosis database (1995-2008).

PROSANTA MONDAL, University of Saskatchewan
Predictors for Nursing Home Placement (NHP) and Mortality Among Intellectually Disabled Adults With and Without Down Syndrome (DS): Application of Competing Risks Models

Objective: To identify predictors for NHP and mortality. Methods: Cox cause-specific and sub-distribution hazards models were used. Results: Among 343 participants, 14.6% had NHP, 21% died without NHP. Interaction of DS and age, higher physical-depression had a higher hazard of NHP in cause-specific hazards model, only interaction of DS and age was significant in sub-distribution hazards model of NHP. Older age, higher physical-depression had a higher hazard of death in both cause-specific and sub-distribution hazards models. Conclusion: Sub-distribution and cause-specific hazards models gave same results for death not for NHP. Simulation will be performed to investigate applicability of the models.

YAWEN XU, York University
Multiple-Platform Data Integration Method with Application to Combined Analysis of Microarray and Proteomic Data

It's desirable in genomic studies to select biomarkers that differentiate between normal and diseased populations based on related data sets from different platforms. Most recently developed integration methods focus on correlation analyses between gene and protein expression profiles. These methods select biomarkers with concordant behavior but do not directly select differentially expressed biomarkers. Other methods combine statistical evidence in terms of ranks and p-values, but they don't account for the dependency relationships among the data across platforms. We propose an integration method to perform hypothesis testing and biomarkers selection based on multi-platform data sets observed from normal and diseased populations.

XUECHEN ZHANG, University of Alberta
Power Comparison of Discrete Data Methods with Repeated Measurement Data in Small Sample

Various analytical methods are available to analyze repeated measurement data for both continuous and discrete data. In the case of discrete data, most methods are based on asymptotic normality, requiring large sample size. Naturally, their small sample performance may not match the expectation satisfactorily. Two main methods, non-linear mixed effect model and generalized estimating equation method, are investigated for their small sample performance on repeated binary responses. Repeated binary data sets are generated with sample size of 20, 40, 60, 80 and 100. Two methods are applied to each data set and power is compared, along with their coverage probabilities.

NICHOLAS MITSAKAKIS, Toronto Health Economics and Technology Assessment Collaborative
Methodological Challenges in Mapping a Disease Specific Psychometric Instrument to a Disease Specific Utility Instrument

Regression techniques used to map disease-specific psychometric instruments to disease specific utility instruments have been proposed for the estimation of utility scores when data on the latter are not available. Here, using data from prostate cancer patients, we investigate potential improvement of the mapping when the utility scores are transformed prior to fitting the regression model. We also discuss the hypothesis that the performance of the mapping models is affected by the low correlation between the disease specific and non-specific items of the preference-based instrument and we present a couple of approaches that could be used for investigating this hypothesis.