VICTORIAN CENTRE FOR BIOSTATISTICS ViCBiostat

Victorian Centre for Biostatistics

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Thursday 16th August 2018
9.30am to 10.30am

Monash University, Dept of Epidemiology and Preventive Medicine
Conference Room 1, Ground Floor, 553 St Kilda Rd, Melbourne

Parametric multi-state survival analysis: New developments

A/Prof Michael Crowther
University of Leicester

Multi-state models are increasingly being used to model complex disease profiles. By modelling transitions between disease states, accounting for competing events at each transition, we can gain a much richer understanding of patient trajectories and how risk factors impact over the entire disease pathway. In this talk, I'll describe some new developments building on our previous work [1], with a focus on providing interpretable measures of risk and disease burden, regardless of the underlying transition models. The transition models can be as simple or complex as required for each transition (anything from an exponential to a spline-based approach), and yet through a generalizable simulation algorithm we can calculate easily understood predictions to describe results to patients, clinicians, and decision makers, alike. Such predictions include transition probabilities, length of stay in each state, the probability of ever visiting each state, the population attributable fraction, and more. The approach accommodates any form of transition matrix (cyclic or acyclic), allows transition-specific timescales (e.g. time since diagnosis for some transitions, and attained age for others, as appropriate), and each prediction can be standardised over the observed covariate distribution, to bring a causal framework to parametric multi-state models [2]. Differences and ratios of predictions across specified covariate patterns can be calculated to illustrate the impact of covariates. User-friendly software is provided and illustrated through application to a breast cancer example.

A/Prof Michael Crowther is a highly regarded biostatistician at the University of Leicester, UK. He graduated from the university with a Masters in Medical Statistics and completed his PhD in 2014. He has made major contributions in the area of survival analysis including work on joint modelling of continuous biomarkers and a time to event outcome and also multistate models. He contributes extensively to Stata program development to facilitate the uptake of new survival methods. This includes contributions of commands for joint modelling, complex survival data simulation, general and multilevel parametric survival models, and multistate modelling.

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