

Monday 22 July 2024

13:30-15:00 Invited Session 2 (Main Room)

Recent advances in survival analysis with complex data structures (Chair: Giorgos Bakoyannis)

Semiparametric estimation of misclassified semi-competing risks data under gamma-frailty conditional Markov model

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The semi-competing risks data model has become increasingly popular in studying the association between time to disease progression and death and allows us to better understand how an intermediate event impacts the terminal event. However, in many applications, event ascertainment is incomplete, resulting in event misclassification that complicates the statistical inference based on semi-competing risk data models. In this work, we consider a Gamma frailty conditional Markov model to study the misclassified semi-competing risk data and propose a two-stage semiparametric maximum pseudo-likelihood estimation approach equipped with a pseudo-EM algorithm to make unbiased statistical inference, in which the probability of event misclassification is estimated via a nonparametric regression splines estimation procedure in the first stage. Extensive simulation studies show the proposed method is numerically stable and performs well even under a large amount of event misclassification. The method is applied to a multi-center HIV cohort study in East Africa to develop a metric that can predict the individual risk of interruption of lifelong antiretroviral therapy (ART) on HIV mortality. This metric will have a profound implication for HIV care management in the East African region.