Swiss Epidemiology Winter School 2023

Competing Risks and Multi-state Models
19–21 January 2023

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Venue	**CH – 3823 Wengen | SWITZERLAND** Hotel Edelweiss (map)
Course description	This course will focus on the use of parametric survival models, when analysing data with competing risks, and the general setting of multi-state models. Competing risks models play an increasingly important role for predicting absolute risks of disease and prognosis using time to event data. An overarching goal of this course is to provide a solid introduction to important concepts when performing a competing risks analysis (e.g., which quantities can be estimated and what they do represent) as well as practical aspects of estimation. Multi-state models provide an extension of competing risks models that also enable modelling of complex disease profiles. By modelling transitions between disease states, accounting for competing events at each transition, we can gain an improved understanding of a patient's prognosis and how risk factors impact over the whole disease pathway. Throughout the course we will place emphasis on the use of flexible parametric survival models that incorporate restricted cubic splines on the log hazard or log cumulative hazard scale. This will include models with time-dependent effects (non-proportional hazards). We will focus on obtaining clinically useful and directly interpretable predictions, which are particularly useful for more complex models, but also describe the challenges and various approaches to calculating them. We will also discuss assumptions of the models, including the Markov assumption and how this can be relaxed. The course will be taught using Stata making use of the multistate and merlin packages.
Course objectives	By the end of this course participants will have: - An understanding of how to fit and interpret flexible parametric survival models, including Royston-Parmar models. - An understanding of fitting and interpreting time-dependent effects.

	- An understanding of competing risks models and how to estimate cumulative incidence functions non-parametrically and using parametric models. - An understanding of how to construct, analyse and interpret a multi-state model. - An understanding of the variety of useful measures that can be obtained from multistate models. - Practical experience of fitting the models using Stata®.
Course audience	Course participants should be familiar with standard survival models, such as the Cox model and/or parametric survival models (e.g. Weibull) and interested in extending their knowledge to the more complex issues of competing risks and multistate models. The course will discuss theory but emphasis is placed on applying and interpreting the methods.
Course outline	The course runs over three days and consist of lectures and computer practical sessions. We start early in the morning by reviewing the previous day. During the extended afternoon break, participants review course materials, catch up on email, or ski. We reconvene at 4:30 pm for the computer sessions. *Thursday, 19 January 8:00 am – 12:00 pm | 4:30 pm – 6:30 pm* - Brief review of time-to-event data including the Cox model - Flexible parametric survival models - Modelling competing risks - Estimating cumulative incidence functions *Friday, 20 January 8:00 am – 12:00 pm | 4:30 pm – 6:30 pm* - Introduction to multi-state models - The illness death model - The Markov assumption - Stacked versus separate models - Estimating contrasts between groups *Saturday, 21 January 8:00 am – 12:00 pm | 1:00 pm – 3:00 pm* - Expected length of stay in different states - Resetting the clock and semi-Markov models - Standardisation in multi-state models - Reporting of competing risks and multi-state models
Credits	1.0 ECTS
Course materials	Bring a portable computer. A course license for Stata® will be available to install before arrival. Onsite University of Bern IT staff provides support upon e-mail (it@ispm.unibe.ch) request.
Course book	On the first day of the course, we provide *Flexible Parametric Survival Analysis Using Stata: Beyond the Cox Model* (2011) by P. Royston and P.C. Lambert.
Course fee	PhD Bern Students: CHF 350 PhD Students: CHF 700 Academic: CHF 900 Industry: CHF 2000
Registration	Register on the Winter School website. Pre-Registration starts 29 August 2022 at 12:00 pm (CET).
Accomodation	Book your accommodation separately. Please see recommendations for special prices