# Swiss Epidemiology Winter School 2019

## Parametric Competing Risks and Multi-state models
January 24th – 26th, 2019

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| **Faculty** | **Prof. Paul Lambert**<br>Department of Health Sciences, University of Leicester, United Kingdom<br>Department of Epidemiology and Biostatistics, Karolinska Institutet Stockholm, Sweden<br><br>**Dr. Michael Crowther**<br>Department of Health Sciences, University of Leicester, United Kingdom |
| **Venue** | **CH – 3823 Wengen \| SWITZERLAND**<br>Bühlstube  (see map on http://www.epi-winterschool.org/hotels) |
| **Description** | This course will focus on the use of parametric survival models when analysing data with competing risks and then extending to multi-state models. 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 an improved understanding of patients prognosis and how risk factors impact over the whole disease pathway. 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 use an efficient and generalizable simulation method to obtain clinically useful and directly interpretable predictions, which are particularly useful for more complex models, but also explain when analytical approaches can be used.  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 package. |
| **Objectives** | By the end of this course participants will have:<br><ul><li>An understanding of how to fit and interpret flexible parametric survival models, including Royston-Parmar models.</li><li>An understanding of fitting and interpreting time-dependent effects.</li><li>An understanding of competing risks models and how to estimate cumulative incidence functions using parametric models.</li><li>An understanding of how to construct, analyse and interpret a multi-state model.</li><li>An understanding of the variety of useful measures that can be obtained from multistate models.</li><li>Practical experience of fitting the models using Stata®.</li></ul> |

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| **Target audience** | Course participants should be familiar with standard survival models, such as the Cox model and/or parametric survival models (e.g. Weibull) and be interested in extending their knowledge to the more complex issues of competing risks and multistate models.<br><br>The course will discuss the theory but emphasis will be placed on applying and interpreting the methods. |
| **Outline** | The course will run over three days and consist of lectures, group work and computer practical sessions. We start early in the morning with a review of the previous day. During the extended break in the afternoon participants review course materials, catch up on emails or go skiing. We reconvene at 4:30 pm for the computer sessions.<br><br>*Thursday, January 24th (8:00 – 12:00 \| 16:30 – 18:30)*<br>• Brief Review of time-to-event data including the Cox model<br>• Flexible Parametric Survival Models<br>• Modelling competing risks<br>• Estimating cumulative incidence functions<br><br>*Friday, January 25th (8:00 – 12:00 \| 16:30 – 18:30)*<br>• Introduction to multistate models<br>• The illness death model<br>• The Markov assumption<br>• Stacked versus separate models<br>• Extending the simulation approach for multistate models<br>• Performing contrasts between groups<br><br>*Saturday, January 26th (8:00 – 12:00 \| 16:30 – 18:30)*<br>• Expected length of stay in different states<br>• Resetting the clock and semi-Markov models<br>• Shared covariate effects between transitions<br>• Standardisation in multistate models |
| **Credits** | 1.0 ECTS |
| **To bring along** | Students should bring their own portable computers. A course license for Stata® will be available, to be installed before arrival. University of Bern IT staff onsite can provide help upon request per e-mail (it@ispm.unibe.ch) |
| **Course fee** | SSPH+ students:     CHF     0 *)<br>Academic:           CHF   900<br>Industry:            CHF 2000<br>*) except students from University of Geneva (cohort 4) and Lucerne |
| **Registration** | You can register on the Winter School website www.epi-winterschool.org. |
| **Accomodation** | Participants must book their accommodations themselves. Please see our recommendations on www.epi-winterschool.org/hotels for special prices. |