Swiss Epidemiology Winter School 2022

Prognostic Research: From Basics to Modelling

31 March – 02 April 2022

Faculty	**Prof. Georgia Salanti** **PD Dr. Orestis Efthimiou** **Prof. Matthias Egger** Institute of Social and Preventive Medicine (ISPM), University of Bern, Switzerland
Venue	**CH – 3823 Wengen | SWITZERLAND** Hotel Sunstar (see map at http://www.epi-winterschool.org/hotels)
Description	Prognosis is about making statements about what is likely to happen in the future. Prognostic research is fundamental to clinical decision making, healthcare policy, and discovering new approaches to patient management. In this course we describe the basic concepts and methods that can be used to develop, validate, and implement a prognostic model in clinical practice. In addition, we consider the reporting and impact of prognostic models and discuss how the quality of prognostic research might be improved so that they can be translated into clinically useful decision tools. In the statistical sessions we will guide you through the main steps of prognostic modelling. In addition to standard regression techniques, you will be introduced to penalization as a modern estimation method that can improve the predictive ability of a model. We will present methods to select prognostic variables and investigate their form, to compare and choose candidate models, and to validate the chosen model. Although we will present the statistical theory in the lectures, the emphasis will be on practical application of the statistical methods. The practicals will give you experience of selecting prognostic factors and assessing them, choosing between different models, and fitting and validating a prognostic model using R.
Objectives	By the end of this course participants will have: • An understanding of different types of prognostic research. • An understanding of how prognosis is used in clinical decision making and in discovering new approaches to managing patients. • Practical experience of analysing and assessing potential prognostic factors. • Practical experience of developing and validating a prognostic model. • An understanding of the quality of prognostic research and how it can be improved.

Outline of course	The course will run over three days and consists of a mixture of lectures and computer practicals in R software. During the extended break in the afternoon, participants review course materials, catch up on emails or go skiing.

Thursday, March 31st

- Welcome and introduction to the course.
- What is (and is not) prognostic research? Introducing the 4 themes framework: *fundamental prognosis research, prognostic factors, prognostic models, stratified and individualised medicine*
- Introduction to simple statistical methods for prediction modeling (linear regression, logistic regression, analysis of time-to-event)
- Statistical issues in prediction modelling: overfitting and optimism, dealing with missing data and modelling non-linear associations
- R practical

Friday, April 1st

- Review of Day 1
- Reporting and impact of prognostic models
- Group work: critical appraisal of the reporting of a prognostic model
- Model selection and modern estimation methods
- Evaluation of model performance and validation of prediction models
- R Practical

Saturday, April 2nd

- Review of Day 2
- Advanced methods for prediction modelling
- Evaluating the clinical impact of prognostic models
- Systematic reviews of prognostic research
- Optional presentation of prognostic research projects by participants
- R practical
  Closing remarks and course evaluation

Credits	1.0 ECTS

To bring along	Students should bring their own portable computers.

Course fee	SSPH+ students: CHF 700
	Academic: CHF 900
	Industry: CHF 2000

Registration	You can register on the Winter School website www.epi-winterschool.org.

Accomodation	Participants must book their accommodations themselves (see map and recommendations on www.epi-winterschool.org/hotels).