

BERLIN SCHOOL OF PUBLIC HEALTH

Intensive Short Course
Advanced Epidemiologic Methods
20–24 August 2018 | 9am – 5pm

**Causal research
and
prediction modeling**

Instructors



Prof. Rolf Groenwold
(Leiden University Medical Center) is interested in the development and improvement of methods for causal research, in particular methods to assess the effects of medical interventions. He has been awarded several prestigious personal research grants, including funding to develop the statistical methodology required for epidemiologic research using routinely collected healthcare data. He is currently an associate professor at Leiden University Medical Center in the Netherlands.



Dr. Maarten van Smeden
(Leiden University Medical Center) is a senior researcher primarily interested in prediction research and causal inference using observational data. In particular, Dr. Smeden uses advanced statistical modeling to analyze observational healthcare data and is an expert in diagnostic research.



The intensive short courses at BSPH are organized by the Institute of Public Health.

Institute of Public Health

Prof. Tobias Kurth, MD ScD, Director

Venue

Charité – Universitätsmedizin Berlin
Campus Virchow-Klinikum
Forum 3, Kursraum 3 (2nd floor)

Course Information

Course language: English
ECTS points: 3
Course fees: 510€ for students
750€ for other participants

Registration Information

Tanja Te Gude
Tel. +49 30 450 570 812
tanja.te-gude@charite.de

<https://iph.charite.de/en>
<https://bsph.charite.de>



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Alice Salomon Hochschule Berlin
University of Applied Sciences





Course description

The intent of this intensive short course is to strengthen the methodological skills of the research community. Upon successful completion of the course, participants will have a deeper understanding of methods in causal and prediction research and increased confidence in how to apply these tools in their everyday research practice.

Audience

The course is designed for researchers, public health professionals, epidemiologists, and clinicians with a solid knowledge of epidemiologic principles and a familiarity with multivariable modeling.

Course prerequisites

- Basic knowledge of epidemiology
- Basic familiarity with R statistical software (for a short introduction, see <https://www.r-tutorial.nl>)

Course materials

- Please bring your own laptop with statistical software R pre-installed. (<https://www.r-project.org>)
- Lecture slides and course handouts will be posted on the Blackboard e-learning platform.

Course outline

This course will cover topics in causal research (confounding, missing data, time-varying variables, and measurement error), as well as prediction modeling (basics, overfitting, missing data, and misclassification).

Throughout the week, lectures will be alternated with computer exercises.

Learning objectives

By the end of this week, participants should be able to:

- Critically assess the results of epidemiological studies on causal relationships and prediction models.
- Correctly define exposures and learn how to best represent them in models.
- Understand the difference between various sources of bias (confounding, measurement error and missing data) and the way these biases may differentially affect studies on causal relationships and prediction models.
- Describe key assumptions of methods used to control for (time-varying) confounding.
- Describe key assumptions of methods used to handle missing observations.
- Understand the reasons for and consequences of overfitting prediction models.
- Describe recent developments in the fields of causal research and prediction modelling.

Program

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Monday, 20 August

am Causality
Time-varying exposures
pm Confounding

Tuesday, 21 August

am Missing data and measurement error
pm Observational studies in EHR databases

Wednesday, 22 August

am Introduction to mediation analysis
Time-varying confounding
pm The future of causal research

Thursday, 23 August

am Prediction research
Basics of prediction modelling
pm The curse of “overfitting”
How to avoid overfitting

Friday, 24 August

am Missing data and misclassification
The future of prediction research
pm Time to work on the take home exam.
The exam must be successfully completed to receive ECTS credits.