



# BERLIN SCHOOL OF PUBLIC HEALTH

Intensive Short Course

**Causal Inference -  
Learning what works**

19 - 20 February 2020 | 9am - 5pm

## Instructors

**Miguel Hernán** conducts research to learn what works to improve human health. Together with his collaborators, he designs analyses of health-care databases, epidemiologic studies, and randomized trials. Miguel teaches clinical data science at the Harvard Medical School, clinical epidemiology at the Harvard-MIT Division of Health Sciences and Technology, and causal inference methodology at the Harvard T.H. Chan School of Public Health, where he is the Kolutronos Professor of Biostatistics and Epidemiology. His edX course Causal Diagrams and his book Causal Inference, co-authored with James Robins, are freely available online and widely used for the training of researchers. Miguel is an elected Fellow of the American Association for the Advancement of Science and of the American Statistical Association, an Editor of Epidemiology, and past Associate Editor of Biometrics, American Journal of Epidemiology, and the Journal of the American Statistical Association.

**Katalin Gémes** is a postdoctoral researcher at the Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden. She defended her PhD work in the field of Public Health Epidemiology. She currently works with combining data from observational studies and routinely collected administrative information to compare the effectiveness of different hypothetical interventions on diet and alcohol consumption on the risk of cardiovascular diseases.

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 Charité Mitte, Philippstraße 11  
Hertwig-Hörsaal, Oskar Hertwig-Haus

### Course Information

Course language: English  
ECTS points: 1,25  
Course fees: 212,50 € for enrolled students  
(proof required)  
312,50 € for other participants

### Registration Information

Please use our online registration form on our website:  
[https://bsph.charite.de/en/academic\\_programs/intensive\\_short\\_courses/](https://bsph.charite.de/en/academic_programs/intensive_short_courses/)

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



Design: CV, Zentrale Medienstleistungen der Charité | BSPH, VersA, 1. Jan 2020  
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Alice Salomon Hochschule Berlin  
University of Applied Sciences





## Course description

The course introduces students to a general framework for the assessment of comparative effectiveness and safety, with an emphasis of the use of routinely collected data in healthcare settings. The framework relies on the specification and emulation of a hypothetical randomized trial: the target trial. The course explores key challenges for causal inference and critically reviews methods proposed to overcome those challenges. The methods are presented in the context of several case studies for cancer, cardiovascular, and renal diseases.

### Course objectives

To learn how to determine “what works” using data from observational and randomized studies.

### Audience

The course is designed for students and 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

## Learning objectives

After successful completion of this course, students will be able to:

- Formulate sufficiently well-defined causal questions for comparative effectiveness research
- Specify the protocol of the target trial
- Design analyses of observational data that emulate the protocol of the target trial
- Identify key assumptions for a correct emulation of the target trial

### Pre-course reading

Chapters 1–3 of the book Hernán MA, Robins JM (2020). Causal Inference: What If. Boca Raton: Chapman & Hall/CRC, forthcoming. The book can be downloaded (for free) from

<http://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/>

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## Program

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### Wednesday, 19 February

9:00 Introduction: Asking causal questions  
10:30 Break  
11:00 Emulating the target trial  
12:30 Break  
13:30 Choosing time zero  
15:00 Break  
15:30 Individual and group exercises  
17:00 End

### Thursday, 20 February

9:00 Confounding adjustment: emulating randomization  
10:30 Break  
11:00 Treatment strategies  
12:30 Break  
13:30 Individual and group exercises  
15:00 Break  
15:30 Individual and group exercises  
17:00 End