

Causal Inference in Observational Epidemiology

January 19-21, 2015

Faculty

Prof. Miguel Hernan, MD (course co-ordinator)

Harvard School of Public Health, Harvard University, Boston, USA

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Institute of Social and Preventive Medicine (ISPM), University of Bern, Switzerland

Place

Hotel Edelweiss, Wengen (see map on <http://www.epi-winterschool.org/hotels>)

Introduction

Causal inference from observational data is a key task of epidemiology and of allied disciplines such as behavioral sciences and health services research. Commonly used statistical methods estimate association measures which cannot always be causally interpreted, even when all potential confounders are included in the analysis. In contrast, a causally explicit approach formally defines causal effects, identifies the conditions required to estimate causal effects without bias, and uses analytical methods that, under those conditions, provides estimates that can be endowed with a causal interpretation. This course presents such framework for causal inference from observational data and recent methodological developments, with a special emphasis on complex longitudinal data. The application of these methods will be illustrated using data from a synthetic HIV cohort study. The course is aimed at epidemiologists, statisticians, and other researchers who work with longitudinal observational data.

Course objectives

By the end of this short course participants will have

- An in-depth understanding of confounding and selection bias
- An understanding of the role and potential of different methodological approaches to overcome these problems, including inverse probability weighting, marginal structural models and nested structural models
- Practical data analysis experience using STATA software.

What you have to bring

Students will bring their own portable computers. A course license of Stata® will be available if required, to be installed by University of Bern IT staff on arrival.

Outline of course

The course will run over three days and consists of lectures in the morning and computer practicals during the evening. During the extended break in the afternoon, participants review course materials, catch up on emails or go skiing.

Monday, January 19th (8:30 – 12:00 | 17:00 – 19:00)

- Introduction to causal diagrams
- Confounding
- Selection bias and time-dependent confounding
- Group work
- Review of day 1

Tuesday, January 20th (8:30 – 12:00 | 17:00 – 19:00)

- Inverse probability weighting of marginal structural models
- Applications of marginal structural models
- STATA practical: Marginal structural models
- Review of day 2

Wednesday, January 21st (8:30 – 12:00 | 17:00 – 19:00)

- G-estimation of nested structural models
- Applications of G-estimation of nested structural models
- STATA practical: Nested structural models
- Review of day 3 and course evaluation

Credit

1.5 ECTS

Maximum number of participants

The maximum number of participants on this course will be 22.

Course fee

Academic: CHF 900

Industry: CHF 1800

Registration

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

Course hotels

The participants have to book their accommodation themselves (see map and recommendation on www.epi-winterschool.org/hotels).