



INSTITUTE OF ENVIRONMENTAL MEDICINE

C6F3046, Causal Inference: Emulating a Target Trial to Assess Comparative Effectiveness, 1.5 credits (hec)

Kausal inferens: att efterlikna en klinisk prövning i syfte att analysera jämförande effektivitet, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2023-11-16, and was last revised on 2026-02-20. The revised course syllabus is valid from autumn semester 2026.

Responsible department

Institute of Environmental Medicine, Faculty of Medicine

Prerequisite courses, or equivalent

Courses "Epidemiology I: Introduction to epidemiology", "Epidemiology II: Design of epidemiological studies", "Biostatistics I: Introduction for epidemiologists", "Biostatistics II: Logistic regression for epidemiologists" or corresponding courses.

Purpose & Intended learning outcomes

Purpose

This course focuses on a general framework for the assessment of comparative effectiveness and safety research, which can be applied to both observational data and randomized trials.

Intended learning outcomes

After successful completion of this course, the student should 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
- Decide when g-methods are required for data analysis
- Critique observational studies and randomized trials for comparative effectiveness research

Course content

The course introduces students to a general framework for the assessment of comparative effectiveness and safety research. The framework, which can be applied to both observational data and randomized trials with imperfect adherence to the protocol, relies on the specification of a (hypothetical) target trial. The course explores key challenges for comparative effectiveness research and critically reviews methods proposed to overcome those challenges. The methods are presented in the context of several case studies for cancer, cardiovascular, renal, and infectious diseases.

Forms of teaching and learning

Lectures, group sessions and self-studies of the course literature.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

The individual examination (summative assessment).

Forms of assessment

The student must show that the learning outcomes have been achieved to pass the exam. The course grade is based on the individual written examination (summative assessment).

Students who do not obtain a passing grade in the first examination will be offered a second examination occasion within two months of the final day of the course.

Students may be granted additional examination sessions, up to six in total, subject to discussion with and approval by the examiner.

Course literature

Mandatory course literature:

Hernán MA, Robins JM (2020). Causal Inference: What If. Boca Raton: Chapman & Hall/CRC. Prior to the course days, read chapters 1-3.

The book can be downloaded (for free) from [Causal Inference: What If \(the book\) — Miguel Hernán.](#)