

Censored Longitudinal Data and Causality

Course No: PUBLIC HEALTH 246A

Instructors: Mark van der Laan and Alan Hubbard

Lecture Time and Place: Tu-Th 2-3:30 in Tolman 2312

Lab Time and Place: M 4-5 in Tolman 2304

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Class Websites: www.stat.berkeley.edu/~laan/class/
ehs.sph.berkeley.edu/hubbard/causal

Relevant Text/Websites

Unified Methods for Censored and Longitudinal Data and Causality. 2003. Mark van der Laan and James Robins. Springer.

www.bepress.com

Jamie Robins Research Website (link at Alan's class website)

Andrea Rotnitzsky's notes (link at Alan's class website)

Semiparametric Theory and Missing Data. 2006. Anastasios A. Tsiatis. Springer Series in Statistics

Course Description

Lecture. The course will cover both the basic issues regarding the estimation of causal effects using observational data and also specific, recently developed models designed to estimate such effects. Topics to be discussed include confounding, counterfactuals, statistical and graphical models, direct and indirect effects, the G-computation algorithm and marginal structural models for both point treatment and time-dependent treatment studies. We will also discuss more general topics like the contrast between techniques based on maximum likelihood estimation and more general estimation function approaches, including “targeted” maximum likelihood estimation.

Lab. The lab will review the material discussed during the week as well as devoted to

computer labs implementing the techniques learned in class. All assignments will be done in statistical programming software R.

List of Topics

Introduction and overview of class

Statistical and causal graphs and associated causal inference

Longitudinal data, counterfactuals, sequential randomization and likelihood-based inference (G-computational formula).

Individualized treatment rules

Direct and indirect causal effects

Maximum likelihood estimation versus general estimation function approaches

Marginal Structural Models (MSM) for point treatment studies

MSM's for time-dependent treatments studies

History-adjusted MSM's for time-dependent treatments

Causal Effects for Individualized Treatment Rules Instrumental variables (unmeasured confounding)