Course:Censored Longitudinal Data and Causality

Course No: PUBLIC HEALTH 246A sec 1 (Lecture), PUBLIC HEALTH 298 sec. 50 (Lab)

Instructors: Mark van der Laan and Alan Hubbard

Lecture Time and Place: M-W 12-1:30 in Tolman 235

Lab Time and Place: F 3-5 in 340A Haviland

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Website: www.stat.berkeley.edu/~laan/class/class.html

Relevant Text/Websites

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

www.bepress.com

http://www.biostat.harvard.edu/~robins/research.html

Course Description

M-W 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 contrasts between techniques based on maximum likelihood estimation and more general estimation function approaches.

F Lab. In the Friday afternoon lab, the first hour will be spent reviewing the material discussed during the week; the second hour will be devoted to computer labs implementing the techniques learned in class. All assignments will be done in the open source, statisticals programming software R.

Order 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)

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

Instrumental variables (unmeasured confounding)