Seminari Internazionali
Dottorato di Ricerca In Statistica
Dipartimento di Statistica

Avviso di Seminario

20 dicembre (13.30-17.30) **— 21 dicembre** (9.30-13.30)

Prof. Els Goetghebeur — Prof. Stijn Vansteelandt
Department of Applied Mathematics and Computer Science, Gent University (BE)

Topics in causal inference for the health sciences

Recent developments in causal inference within the statistical and artificial intelligence literature have led to important new insights on how to address problems of confounding and selection bias in a wide variety of settings. The aim of this course is to review some of these developments and to provide state -of-the-art statistical solutions for dealing with these problems, motivated by substantive problems from medicine and public health.

The first half day of the course will introduce the framework of potential outcomes as a tool that helps articulate causal questions and model data to seek their answers. It will consider the two basic classes of assumptions that allow to make progress based on observed data 1) the no unmeasured (time-varying) confounders assumption and 2) the instrumental variables assumption with reference to Mendelian randomization. For each class structural mean or distribution models will be developed that allow to analyze continuous, discrete or right censored survival type outcomes. Their application in well chosen observational and experimental clinical studies will be presented. Due attention will be given to interpretation and justification of the approach and its conclusions in the clinical context. Participants will be offered a lead into the statistical software available for implementation.

The second half day of the course will focus on causal diagrams to express causal background knowledge including: (i) ways for reading off such graphs whether a given data situation suffers problems of confounding and selection bias (ii) and whether/how this can be accommodated, for instance via inverse probability weighting. The usefulness of such diagrams will be illustrated in the context of complex problems of time-varying confounding, such as arise when estimating the effect of hospital-acquired pneumonia on mortality. It will be shown that standard approaches based on regression-adjustment for confounding by disease severity are fallible, and that progress can be made using inverse probability weighting under so-called marginal structural models.

Per ulteriori informazioni contattare: dottorato.statistica@unimib.it tel. 02/64485826

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