Prof. Don Rubin, Universität Harvard

"Causal Inference Through Potential Outcomes: Application to Quality of Life Studies with "Censoring" Due to Death and to Studies of the Effect of Job-training Programs on Wages “

Abstract:

Causal inference is best understood using potential outcomes, which include all post treatment quantities. The use of potential outcomes to define causal effects is particularly important in more complex settings, i.e., observational studies or randomized experiments with complications such as noncompliance. Here we deal with the issue of estimating the casual effect of a treatment on a primary outcome that is “censored” by an intermediate outcome, for example, the effect of a drug treatment on Quality of Life (QOL) in a randomized experiment where some of the patients die before their QOL can be assessed. Because both QOL and death are post-randomization quantities, they both should be considered potential outcomes, and the effect of treatment versus control on QOL is only well-defined for the subset of patients who would live under either treatment or control. The resulting analysis uses the framework of Principal Stratification (Frangakis and Rubin, 2002). Another application is to an educational program designed to increase final test scores, which are not defined for those who drop out of school before taking the test. A further application is to studies of the effect of job-training programs on wages, where wages are only defined for those who are employed, and thus the effect of the job-training program on wages is only well-defined for the subset of individuals who would be employed whether or not they were trained. Some empirical results are presented from Zhang, Rubin and Mealli (2004), which indicate that this framework can lead to new insights because the analysis is not predicated on traditional econometric assumptions.