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Expanding Propensity Scores: Polychotomous Outcomes, Sample Selection, and Incorrect Model Specification

There is difficulty in evaluating differences in an outcome for treated vs. untreated patients in observational (non-randomly assigned) studies. The propensity score (the probability that a person will be treated conditional on measured covariates) has been used in various ways over the past two decades to address problems that arise with such data. Numerous recent publications have used these methods, and research in this area is growing rapidly.

I will review some issues that arise in analyzing observational studies and do an overview of propensity score methods. I will also discuss three current areas of research. First, I examine extensions to a polychotomous treatment via a dataset that examines discharge of homeless patients from a hospital. Theoretical discussion of propensity scores with polychotomous treatments has appeared recently, but implementation of these methods have not been fully explored. Using pairwise logistic regressions and cluster analysis, I employ a polychotomous propensity score analysis. Selection of a sub-sample of data is the second step of a propensity score analysis. Through the same example, I examine an alternative method of weighted regression and discuss the advantages of such a choice. Lastly, it has been claimed that propensity scores are more robust to incorrect model specification than typical regression. I examine what goes wrong when models are incorrectly specified via simulations. Bias from varying propensity models and exposure-outcome models are calculated and compared.