"Strategies for dealing with covariate measurement error for propensity scores"

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Traditional propensity score methods for estimating causal effects in non-experimental settings assume that the covariates are measured without error, and are measured consistently in the treatment and comparison groups. However, in reality the covariates are often measured with error. For example, test scores may not reflect an individual's true achievement. This measurement error is a particular problem if the treatment assignment mechanism depends on the true, underlying variables rather than the observed values measured with error. Additional complications may occur if the treatment and comparison groups come from different data sources with potentially different amounts of measurement error, where, for example, depression is measured using one scale in the treatment group and another scale in the comparison group. This talk will discuss two potential methods for estimating propensity scores in settings with covariate measurement error. The first is based on a latent variable framework, with the goal of estimating the true, latent factor and then using that true score in the propensity score model. The second is based on a multiple imputation framework, which obtains multiple draws (imputations) of the underlying true values. Both methods require external information on the relationship between the observed and true variables, for example, a validation sample with both measures available or a model of the measurement error. Results from a simulation study assessing the new approaches will be discussed, as well as recommendations for future research.