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A Censored Regression Method to Adjust for Medication Effects in Genetic Analysis of a Quantitative Trait When the Treatment Received Depends on the Trait

In some observational studies, receiving a treatment or not is response-dependent. For example, the use of antihypertensive medication to lower blood pressure (BP) depends on the individual's pre-treatment BP measure. In genetic association analysis of BP, adjusting BP for the effect of medication is crucial when the objective is to identify genes associated with high or low BP. A naive analysis based on modeling BP with the treatment as a covariate leads to biased estimates of genetic effects. We propose a new method based on censored regression, assuming that a treated individual's true underlying BP is higher than the observed.