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# Inference about ATE from Observational Studies with Continuous Outcome and Unmeasured Confounding

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For settings with a binary treatment and a binary outcome, instrumental variables can be used to construct bounds on a causal treatment effect. With continuous outcomes, meaningful bounds are more difficult to obtain because the domain of the outcome is typically unrestricted. In this paper, we combine an instrumental variable and subjective assumptions in the context of an observational cohort study of HIV-infected women to construct meaningful bounds on the initial-stage causal effect of antiretroviral therapy on CD4 count. The subjective assumptions are encoded in terms of the potential outcomes that are identified by observed data as well as a sensitivity parameter that captures the impact of unmeasured confounding. Measured confounding is adjusted using the method of inverse probability weighting (IPW). With extra information from an IV, we quantify both the causal treatment effect and the degree of the unmeasured confounding. We demonstrate our method by analyzing data from the HIV Epidemiology Research Study.

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