

Longitudinal variable selection in causal inference with collaborative targeted minimum loss-based estimation

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Causal inference methods have been developed for longitudinal observational study designs where confounding is thought to occur over time. In such a context, potential confounding variables are generally identified using domain-specific knowledge. However, this may leave an analyst with a large set of potential confounders that may hinder estimation and variable reduction may be desirable. Previous approaches to data-adaptive variable selection for marginal structural models were limited to the single time-point setting. We develop a longitudinal extension of collaborative targeted minimum loss-based estimation (C-TMLE) for the estimation of the expectation of the potential outcome that can be applied to perform variable selection in propensity score models. We demonstrate the properties of this estimator through a simulation study and apply the method to investigate the safety of trimester-specific exposure to inhaled corticosteroids during pregnancy in women with mild asthma.

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