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Statistical Methods for Modeling Time- Updated Exposures in Cohort Studies of Chronic Kidney Disease

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J. Richard Landis*, †, Harold I. Feldman*, † on behalf of the Chronic
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Abstract

When estimating the effect of an exposure on a time-to-event type of outcome, one can focus on the baseline exposure or the time-updated exposures. Cox regression models can be used in both situations. When time-dependent confounding exists, the Cox model with time-updated covariates may produce biased effect estimates. Marginal structural models, estimated through inverse-probability weighting, were developed to appropriately adjust for time-dependent confounding. We review the concept of time-dependent confounding and illustrate the process of inverse-probability weighting. We fit a marginal structural model to estimate the effect of time-updated systolic BP on the time to renal events such as ESRD in the Chronic Renal Insufficiency Cohort. We compare the Cox regression model and the marginal structural model on several attributes (effects estimated, result interpretation, and assumptions) and give recommendations for when to use each method.

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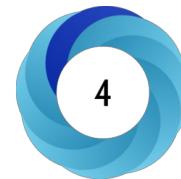
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