

Semiparametric Marginalized Model for Longitudinal Data with Nonignorable Dropout

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Longitudinal studies commonly encounter data attrition due to subject dropout before the designated end of the study. Both the statistical analysis and practical interpretation of longitudinal data can be complicated by dropouts. In this research, we study longitudinal data subject to nonignorable dropouts when the scientific interest is on the marginal association between longitudinal responses and covariates. We propose a semiparametric marginalized model which consists of three components: a generalized linear model for longitudinal outcomes, a semiparametric transformation model for dropout times, and a conditional mean model that specifies the dependency between longitudinal outcomes and dropout times. We develop a simple estimation procedure based on a series of asymptotically unbiased estimating equations. The resulting estimator for the marginal longitudinal parameters is consistent and asymptotically normal with a sandwich-type variance-covariance matrix that can be easily estimated by the usual plug-in rule. Moreover, we show that the proposed approach can accommodate various specifications on the dependency between longitudinal data and nonignorable dropouts and is amenable to sensitivity analysis. The performance of our approach is evaluated through simulations and illustrated with a renal disease data application.