Stratified semiparametric regression analysis of partly interval censored failure time data with missing and mis-measured longitudinal covariates

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Abstract

Partly interval censored failure time data are common in clinical and epidemiological studies, where the failure time of interest is either exactly observed or known to lie within a specific interval. Additionally, two-phase sampling designs are often employed to measure covariates for a subset of participants, reducing study costs. This paper addresses regression analysis of partly interval-censored failure time data under stratified semiparametric transformation models, incorporating time-dependent covariates subject to: (i) missingness due to two-phase sampling and (ii) measurement errors during observation. We propose a maximum weighted likelihood estimation method and develop an EM algorithm for implementation. A weighted bootstrap approach is introduced for variance estimation, and the asymptotic properties of the proposed estimator are established. Extensive simulation studies demonstrate the method's satisfactory finite-sample performance, and its practical utility is illustrated through an application to data from the HIV prevention trials HVTN-703/HVTN-704

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