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A Simulation-Extrapolation Method for Bivariate Survival Data with Covariates Subject to Measurement Error

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Abstract

In recent years, using frailty models to analyze bivariate survival data has attracted considerable interest. The validity of standard inference methods in this setting relies on the assumption that explanatory variables are precisely measured. In the presence of measurement error in one or more covariates, the resulting estimates of model parameters may be biased. In this paper we describe a simulation-extrapolation method of analyzing bivariate survival data when some covariates are subject to measurement error. Through simulation studies we evaluate the performance of the proposed method, as well as the impact of ignoring measurement error in covariates. The proposed method is illustrated by analyzing a data set arising from the Busselton Health Study (Knuiman et al. 1994).

Keywords: Accelerated life regression model, bivariate time-to-event data, measurement error, simulation-extrapolation.

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