Kurland, Brenda F.; **Heagerty, Patrick J.**

Directly parameterized regression conditioning on being alive: analysis of longitudinal data truncated by deaths. (English) Zbl 1071.62106

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Summary: For observational longitudinal studies of geriatric populations, outcomes such as disability or cognitive functioning are often censored by death. Statistical analysis of such data may explicitly condition on either vital status or survival time when summarizing the longitudinal response. For example, a pattern-mixture model characterizes the mean response at time t conditional on death at time $S = s$ (for $s > t$), and thus uses future status as a predictor for the time t response. As an alternative, we define regression conditioning on being alive as a regression model that conditions on survival status, rather than a specific survival time. Such models may be referred to as partly conditional since the mean at time t is specified conditional on being alive ($S > t$), rather than using finer stratification ($S = s$ for $s > t$).

We show that naive use of standard likelihood-based longitudinal methods and generalized estimating equations with non-independence weights may lead to biased estimation of the partly conditional mean model. We develop a taxonomy for accommodation of both dropout and death, and describe estimation for binary longitudinal data that applies selection weights to estimating equations with independence working correlation. Simulation studies and an analysis of monthly disability status illustrate potential bias in regression methods that do not explicitly condition on survival.

MSC:

62P10	Applications of statistics to biology and medical sciences; meta analysis	Cited in **11** Documents
62N02	Estimation in survival analysis and censored data	
62M10	Time series, auto-correlation, regression, etc. in statistics (GARCH)	
62N01	Censored data models	

Keywords:

missing data; dropout; binary longitudinal data

Full Text: DOI