## ROBUST LIKELIHOOD-BASED ANALYSIS OF LONGITUDINAL DATA WITH MISSING VALUES

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One approach to the analysis of longitudinal survey data with missing values is to multiply impute the missing values using draws from their predictive distribution given the observed data (Rubin 1987; Little and Rubin 2002). An advantage of the method is that predictors that are not relevant or not available for the final analysis model can be used in the imputation model. A robust model-based multiple imputation approach is proposed based on extensions of the work of Little and An (2003 Statistica Sinica). Imputations are based on a model that models the relationship with the response propensity non-parametrically by a penalized spline, and models relationships with other variables parametrically. This approach has a form of double robustness that will be described, and simulation comparisons with other methods suggest that the method works well in a wide range of populations, with little loss of efficiency relative to parametric models when the latter are correct. Extensions to general patterns of missing data and the parameters other than unconditional means are outlined.

KEYWORDS: double robustness, incomplete data, penalized splines, regression imputation, weighting, longitudinal surveys