

A simple sensitivity assessment on the impact of missing data in longitudinal studies with Gaussian outcomes

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We consider longitudinal studies with Gaussian outcomes in which some portion of study subjects are lost to follow-up due to processes that may be related to their unobservable outcomes. Assessing the sensitivity of estimated effects to informative missingness depends on developing interpretable models for postulated associations between the probability of dropout and the distribution of the missing information. Using a pattern mixture approach, we quantify dropout outcome dependence using straightforward functions relating the expected mean change in outcomes across successive time periods for dropouts, and the variance of that change, to similar patterns among those who remain in the study. Ranges of values for the parameters of these functions are used to assess the sensitivity of results to various levels of dropout outcome association. Sampling variability is incorporated into the assessment via bootstrap resampling at each value of the missingness parameters. In addition, by postulating prior distributions for the parameters, Bayesian methods are employed to develop posterior distributions of study effects that reflect uncertainty regarding the missingness process. We illustrate the approach using a longitudinal study comparing the effectiveness of two folic acid dosing schemes among female Honduran factory workers.