Regression Analysis of Case-cohort Studies in the Presence of Dependent Interval Censoring

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Abstract: The case-cohort design is widely used as a means of reducing the cost in large cohort studies, especially when the disease rate is low and covariate measure ments may be expensive, and has been discussed by many authors. In this paper, we discuss regression analysis of case-cohort studies that produce interval-censored fail ure time with dependent censoring, a situation for which there does not seem to exist an established approach. For inference, a sieve inverse probability weighting estima tion procedure is developed with the use of Bernstein polynomials to approximate the unknown baseline cumulative hazard functions. The proposed estimators are shown to be consistent and the asymptotic normality of the resulting regression parameter estimators are established. A simulation study is conducted to assess the finite sam ple properties of the proposed approach and indicates that it works well in practical situations. The proposed method is applied to an HIV/AIDS case-cohort study that motivated this investigation.