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Semi-parametric efficiency bounds for regression models under response-selective sampling: the profile likelihood approach

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Abstract We obtain an information bound for estimates of parameters in general regression models where data are collected under a variety of response-selective sampling schemes, together with a simple formula for the asymptotic variance of the semi-parametric maximum likelihood estimate. This is compared to the bound and the estimate is found to be fully efficient in a variety of settings. A small simulation study is reported to illustrate the small-sample efficiency of the semi-parametric estimator.

Keywords Semi-parametric efficiency · Outcome-dependent sampling · Case-control study · Profile likelihood · Tangent space · Influence function · Efficient score · Information bound