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Efficiency of Maximum Partial Likelihood Estimators with Nested Case Control Sampling and Comparisons to Maximum Likelihood Estimators. Preliminary report.

In making inference on the relation between failure and covariates in Cox regression models, the maximum partial likelihood estimator (MPLE) is put forward. It is always interesting to assess if the proposed estimator used the available information in the efficient manner. In a regular parametric model, the Cramer-Rao variance lower bound provides the smallest possible variance for estimating an unknown parameter. Under regularity, it is well known that the maximum likelihood estimator (MLE) achieves this lower bound and so it is asymptotically efficient.

In this project, we consider the efficiency of the MPLE for nested case-control sampling under the highly stratified situation, where the covariate values are increasingly less dependent upon the past and there is no censoring. Starting through the use of previous information about the efficiency of MLE in covariate situations, we can progress to the unknown sampling efficiency. In particular, through numerical study under the parametric distribution for the failure time, the efficiency of the MPLE is investigated and its performance is compared with the MLE when the sample size is finite. (Received September 21, 2010)