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Bias reduction using surrogate endpoints as auxiliary variables

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Abstract Recently, it is becoming more active to apply appropriate statistical methods dealing with missing data in clinical trials. Under not missing at random missingness, MLE based on direct-likelihood, or observed likelihood, possibly has a serious bias. A solution to the bias problem is to add auxiliary variables such as surrogate endpoints to the model for the purpose of reducing the bias. We theoretically studied the impact of an auxiliary variable on MLE and evaluated the bias reduction or inflation in the case of several typical correlation structures.

Keywords Auxiliary variables · Surrogate endpoints · Direct-likelihood · Not missing at random missingness data

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