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A General Statistical Framework for Multistage Designs

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Abstract

The efficiency of observational studies may be increased by applying multistage sampling designs. It is however not always transparent how to construct such a design in order to obtain increased efficiency. We here present a general statistical framework for describing and constructing multistage designs. We also provide tools for efficiency and cost-efficiency comparisons, to facilitate the choice of sampling scheme. The comparisons are based on Fisher information matrices and the results are suggested being presented in graphs, where either efficiency or cost adjusted efficiency is plotted against a normalized measure of cost. The former curve resides in the unit square and is analogous to the receiver operating characteristic curve used for testing.

KEY WORDS: Hierarchical multistage model, Multistage sampling, Efficient design, Cost-efficiency, Fisher information