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# A simulation study of the performance of estimators based on estimated inclusion probabilities

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## Abstract

With the knowledge of the inclusion probabilities of the elements of a population, with a specific design, we can estimate different parameters of interest. If we know the exact inclusion probabilities, the estimators will be unbiased. In some designs we do not know the inclusion probabilities but we can, with repeated sampling, estimate the inclusion probabilities. In this essay we will do a large simulation study where we investigate the performance of estimators based on estimated inclusion probabilities. We will focus on the point estimator of the total and the estimated variance of the point estimator of the total. The procedure is to first simulate simple random sampling, where all the inclusion probabilities are known, and then to simulate Pareto  $\pi$ ps, where we only have an approximate expression for the first order inclusion probabilities and do not know the second order inclusion probabilities.

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