# A model-free Bayesian analysis of regression in clustered and stratified survey data.

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Early work by Hartley and Rao 1968, Royall 1968 and Ericson 1969 established that a full Bayesian analysis of finite population survey data is possible without any approximating population or superpopulation model, using the multinomial likelihood and Dirichlet prior.

This early analytic work was limited in scope, but the modern computing environment allows straightforward posterior distribution computation for even complex parametric functions defined over the finite population.

For practical application to large-scale surveys the SRS formulation of this approach needs to be extended to allow for clustering, stratification and regression. This talk gives details of these extensions, with examples. A feature of interest is that the Bayes posterior simulation analysis can often be expressed as weighted maximum likelihood analyses with simulated Dirichlet probabilities as weights, which can be carried out in many standard ML packages.