

Title: Hybrid BRR and Parametric-Model Variance Estimates for Small Domains in Large Surveys

Abstract: Following its justification in widely cited papers (McCarthy 1969, Krewski and Rao 1981, Fay 1984, 1989), Balanced Repeated Replication (BRR) has become a standard method for variance estimation in large complex surveys, especially in the US. However, it is also known that BRR variance estimates for very small domains are very noisy and may be biased. Survey point estimates for small domains are often based on empirical-Bayes small area estimation models (Rao and Molina 2015), with variances estimated through parametric-bootstrap methods. This talk describes a hybrid method of variance estimation, in which variances are estimated via parametric-bootstrap replications or linearized parametric-model variance formulas, nested within BRR weight-replications. The method is presented first in general settings where categories are modeled within larger (but sometimes still small) domains. Then the results are specialized to the Dirichlet-multinomial hierarchical model describing small outcome proportions developed in the recent estimation from 2010-2014 American Community Survey data of language-minority and English proficiency characteristics in support of alternate-language ballot assistance determinations under ***Section 203(b) of the Voting Rights Act of 1965***.