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Design-based conformal prediction for survey sampling

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Conformal prediction is an assumption-lean approach to generating distribution-free prediction intervals or sets, for nearly arbitrary predictive models, with guaranteed finite-sample coverage. Conformal methods are an active research topic in statistics and machine learning, but only recently have they been extended to non-exchangeable data. We show how conformal prediction can be applied to data from several common complex sample survey designs, under a framework of design-based inference for a finite population. Using real-data examples and R code, we demonstrate how conformal prediction can be applied to complex sample survey data in practice. Finally, we invite survey methodologists to apply their expertise towards extending the applicability of conformal methods.