

Sampling the Nation

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The Bureau of the Census is best known for the every-ten-years census that attempts to gather information on every household in America. But much of our work involves sampling. In the words of the sociologist Frederick Stephan, “All scientific observation, whether statistical or not, is based on sampling. . . . The common practice of taking a small part or portion for tasting or testing to determine the characteristics of the whole precedes recorded history.”

Throughout my career, I have focused on statistical sampling, which uses random selection of a small part of some large group to draw conclusions about the whole. At the Census Bureau, we select samples from all businesses and from all households on a monthly, quarterly, and annual basis. Many of the facts reported about the people and economy of the United States—the proportion of people unemployed, the number of new housing starts, the number of people in poverty—come from Census Bureau samples.

As amathematical statistician, I think about both practical and theoretical problems. My colleagues and I must deal with practical issues of data collection such as how to ask a question, how to get responses, what to do when some units don’t respond, how to match records in one data base with those in another, and how to protect and keep secret the responses from individual units.

These practical issues motivate theoretical problems that require mathematical skills. One of my main interests is the important and controversial issue of using samples to measure any undercounting or overcounting in the every-ten-years census. I also enjoy, almost as recreation, developing simple (but efficient) sampling methods and finding simple ways to explain wellknown statistical results. For example, choosing a random sample of size 1000 usually requires generating 1000 random numbers—I found a simple algorithm that does the job for a sample of any size with just one randomization.

The combination of mathematical challenges and practical importance makes doing statistics at the Census Bureau a fascinating career.