Chapter 6

Coverage and Sampling

Sharon L. Lohr
Arizona State University

Sample surveys may be used to study characteristics of a population of interest without having to measure every unit in the population. A good survey design attempts to minimize the total survey error, which is the difference between an estimate from the survey and the unknown value of a corresponding population characteristic. This chapter discusses two important aspects of survey design: obtaining accurate coverage of the population and designing a probability sample.

Accurate coverage of the population is essential for a high-quality survey. Undercoverage, which occurs when segments of the population are missing from the sampling frame, can lead to misleading estimates. Accurate coverage can be attained through careful consideration of the mode of survey administration, by using multiple frame surveys, or by using special methods that have been developed to sample rare populations.

Probability sampling is the most widely accepted method for selecting which units in the sampling frame should appear in the sample; the randomness induced by the probability design reduces investigator discretion in selecting units, and allows the investigator to make probabilistic statements about the size of the sampling error. Knowledge about the structure of the population may be used when designing the survey to improve efficiency: commonly used survey designs include simple random sampling, stratified sampling, cluster sampling, unequal probability sampling, systematic sampling, and stratified multistage sampling.

GLOSSARY OF KEY CONCEPTS

Cluster sample. A sample in which the sampling units are groups (clusters) of population units.

Coverage. The percentage of the population of interest that is included in the sampling frame.

Multiple frame survey. A survey in which samples are selected separately from two or more sampling frames.

Probability sampling. Probability sampling methods give a known probability of selection for all possible samples from the sampling frame. They thus provide protection against selection bias, and give a means of quantifying sampling error.

Rare population. A subpopulation that does not constitute a large proportion of the overall population, and is often widely dispersed in that population.

Sampling error. Error in estimation due to taking a sample instead of measuring every unit in the sampling frame.

Sampling frame. A list, map, or other specification of units in the population from which a sample may be selected. Examples include a list of all university students, or a telephone directory.

Stratified sample. A sample in which the population is divided into groups called strata, and independent probability samples are taken separately in every stratum.