

BIOS 7250 Principles of Sampling - Uses of Sample Surveys.

- I. Sample Survey - A study of a subset (sample) of the population which has the primary objective of estimating population parameters.
 - a. Reduce cost and save time of observing the entire population.
 - b. Summary statistics from the sample are extrapolated to the population - as opposed to a census where the entire population is studied.

- II. Designing Sample Surveys: Four Major Components of Sample Survey Design are: Sample Design, Survey Measurements, Survey Operations, Statistical Analysis and Report Writing.
 - a. Sample Design - the major statistical component.
 - i. Sampling Plan: Methodology for choosing the sample from the population.
 - ii. Types of Designs:
 1. Simple Random Sampling - Most basic design. A sample of n elements is selected from a population in such a way that each sample of size n has the same chance of being selected.
 2. Systematic Sampling - Randomly select one element from the first k elements in a list and every kth element thereafter.
 3. Stratified Random Sampling - Divide the population elements into 2 or more non overlapping subgroups (strata) based on categories defined by other variables, and select a simple random sample from each strata.
 4. Cluster Sampling - Divide the population into clusters and randomly select clusters. Obtain information on all elements (all elementary units) in the selected clusters.
 5. Multi-Stage Cluster Sampling - Divide the population into clusters and randomly select clusters. Obtain random samples from each selected cluster.
 - iii. Estimation Procedures: Formulas for obtaining
 1. Estimates of population parameters
 2. Measures of reliability of those estimates.
 - b. Survey Measurements - Subject matter and measurement experts.
 - i. Method of Measurement: Decide on
 1. Personal Interviews
 - a. advantages - people respond when confronted in person - interviewer can eliminate misunderstandings.
 - b. disadvantages - cost - interviewer can introduce bias.
 2. Telephone Interviews
 - a. advantages - less expensive
 - b. disadvantages - restricted frame (list of elements).

3. Self Administered Questionnaire

- a. advantages - no interviewer bias or cost - responder can take more time
- b. disadvantages - lowest rate of response - follow-up letters and phone call backs increase cost.

4. Direct Observation

- a. advantages - no responder or interviewer bias
- b. disadvantages - possible errors in observing

5. Objective Sources (hospital and employee records)

- a. advantages - no responder or interviewer bias
- b. disadvantages - possible coding errors - tedious.

ii. Measurement Instrument

- 1. Specify what measurements are to be obtained.
- 2. Design questionnaire and coding forms to minimize non response and incorrect response bias.

c. Survey Operations

- i. Pilot survey on a small sample - test the measurement instrument and survey procedures.
- ii. Collect data - control for non sampling errors by using
 - 1. callbacks
 - 2. rewards and incentives.
- iii. Data preparation and processing
 - 1. data coding
 - 2. computerization
 - 3. data editing.

d. Statistical Analysis and Report Writing - using selected estimation procedures.

III. Preliminary Planning of a Sample Survey

- a. Define the target population
- b. Specify the information to be gathered.
- c. Consider subdomains (age, sex, race groups that need to be considered).
- d. Investigate available resources (budget, personnel, time frame)