Intro to Surveys and Sampling

Week 1

Stat 260, St. Clair

Content:

- Examples of surveys
- Terminology

What is a survey?

- Study designed to get a **snapshot of a population at a particular period of time**.
- Examples:
  - Does the public support voting by mail?
  - What are US demographics between census years?
  - How many moose are in northern MN?

Sampling Terminology

- **Observation unit/measurement unit/element** An object on which a measurement is taken.
- **Population** A collection of all observation units at a particular period of time.

Survey Monkey

Obs. unit = person (adult, ?) in US

Moose

Obs. unit = moose in region of interest

Sampling Terminology

- **target population**: who we want to study
- **sampled population**: who we actually sampled from

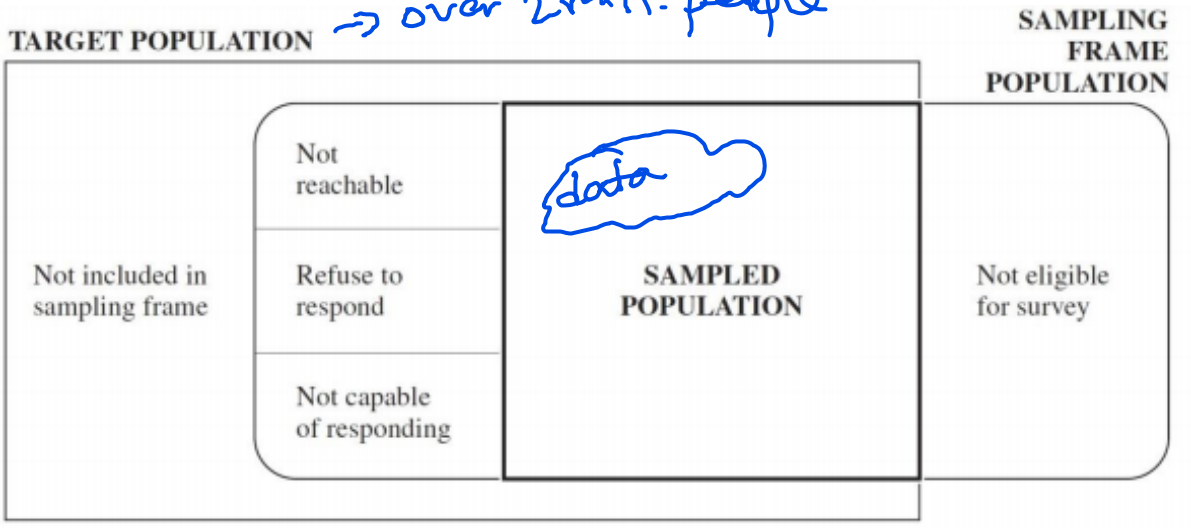

Figure 1: Target population and sampling frame (Lohr, 2010, p. 4)

Sampling Terminology

- **Sampling Unit** An element, or group of elements, which we actually sample. Sampling units are nonoverlapping and must cover the entire population.
- **Sampling Frame** A list of sampling units in a population (sampled population).

S.M.

Frame = list of 2 mill. email addresses

Samp. Unit = person (same as obs. unit)

Moose

obs. unit = moose

Sampling unit = grid cell (plot

frame = map of all plots

Sampling Terminology

- **Sample** A collection of units drawn from a sampling frame.
- **Sampling Design** A plan for selecting sampling units

S.M

Design:
Simple Random Sample (SRS)

Moose

Design:
Stratified random sample

Sampling Terminology

- **Parameter** A particular population characteristic, usually a number, that we want to estimate in a survey.

S.M.

lots possible

parameter: (adult) % of pop. who trust mail in ballots

Moose

parameter =

- total # moose in region
- % of pop. that is female

Sampling Terminology

- **Statistic** A number computed from a sample.
- **Sampling Error** Sample-to-sample variation in a statistic
    - Sampling error is quantifiable if a probability sampling design is used.
    - The **standard error** of a statistic is one way to measure sampling error.

Sampling Terminology

- When a **probability sampling design** is used, statisticians can
  - study how to **form estimates** of parameters from statistics given a particular **sampling design**
  - study how to quantify **sampling error** given a particular **sampling design**
  - **compare** competing sampling designs to determine which is "better"