

LAB SESSION 1 – SAMPLING

Analytics Primer

POPULATIONS & SAMPLES

Example

- The United States Department of Transportation wants to estimate the number of all flights that arrived on-time to their destination over the last week. All large airlines have to report complete reports of daily flights to the DOT. Smaller airlines do not have to report the detail of information. The DOT estimated that 82% of all flights arrived on time.

Example

- What is the population of interest? **ALL FLIGHTS**
- What is the sample? **ALL FLIGHTS FROM LARGER AIRLINES**
- What is the parameter? **% ARRIVED ON TIME**
- What is the statistic? **82%**

Example

- Are there any sampling concerns? YES! THERE IS A SELECTION BIAS (OR MORE SPECIFICALLY, UNDERCOVERAGE – WILL NOT HAVE ALL INFORMATION ON THE SMALLER AIRLINES)

SAMPLING TECHNIQUES

Sampling Technique Used?

- An airline manufacturer tests the quality of every hundredth engine off the line. **SYSTEMATIC**
- Audit a random sample from each of six tax-brackets determined by the Internal Revenue Service.
STRATIFIED
- Calculated the average age of employees at a company from sampling a company database. **SRS**

Sampling Technique Used?

- Manager evaluates a new company policy by asking the morning shift employees the next morning.

CONVENIENCE

- Survey company collected information about family income by mailing a survey and see who responds.

VOLUNTEER

- Trying to estimate daily sales of a product from stores nationwide. Randomly selected 5 states - FL, AZ, NC, TX, ME and obtained estimates of daily sales from all stores in these states. **CLUSTER**

DATA TYPES

Quantitative vs. Qualitative

- Sales Region. **QUALITATIVE (NOMINAL)**
- Blood pressure of patients after taking an experimental drug. **QUANTITATIVE**
- Size of engine in car measured as 4 cylinder, 6 cylinder, or 8 cylinder. **QUALITATIVE (ORDINAL)**

Quantitative vs. Qualitative

- Stock price for Microsoft. **QUANTITATIVE**
- Revenues by software company. **QUANTITATIVE**
- Breed of dog. **QUALITATIVE (NOMINAL)**
- ZIP code of customer. **QUALITATIVE (NOMINAL)**