Health Science 503
Advanced Community Health Statistics

Lecture 1
Overview of Inferential Statistics

Introduction to Course
Introduction
- S. Watson—Department of Mathematics and Statistics
- website: www.csulb.edu/~saleem
- Meet your classmates
- Sign log sheet

Course Materials
- Syllabus
- HSc 503 Overview
- Requirements for class project

Purpose of Course
- Understand common statistical procedures
- Learn to use SPSS software
Overview of Statistics

- **Types of statistics**
  - **Descriptive**: Conclusions restricted to observation studied
  - **Inferential**: Conclusions apply to population
    - Estimate population parameter from sample statistic
    - Estimate error in that estimate (or state a level of confidence in the estimate).

Diagram of Inferential Statistics

![Diagram of Inferential Statistics]

Research Methodology

- **Obtaining Data**
  - Observational
  - Surveys
  - Experiments
- **Types of studies**
  - Cross-Sectional
  - Retrospective
  - Prospective
  - Clinical Trials
  - Epidemiological
Random Samples
- Importance of randomness
- Properties of a sample
  - Sample size
  - Randomness

Obtaining a Random Sample
- Sampling
  - Simple Random
  - Convenience
  - Systematic
  - Stratified Random
  - Cluster
- Experimental Design
  - Completely Randomized
  - Randomized block
  - Matched pair

Why Is This Stuff Important?
- Decision can be made from data
- Understanding literature
- Language of academia
Types of Designs

- Correlational Designs
  - Weak claims of causality
  - Surveys, Epidemiological studies
- Experimental Designs
  - Strong claims of causality
  - Clinical trials, laboratory studies

Sampling & Inferential Statistics

![Diagram]

Types of Random Sampling

- Simple random samples
  - With replacement
  - Without replacement (Large pop. required)
- Complex sampling designs
  - Stratified
    - Fixes sizes within category
    - E.g., # of males = # of females
  - Clustering (multi-stage sampling)
    - E.g., Students within universities
Summation Notation Used To Calculate Mean

Sum Values of X
\[ \sum_{i=1}^{n} X_i \]

Mean of a population
\[ \mu = \frac{\sum_{i=1}^{N} X_i}{N} \]

Mean of a sample
\[ \bar{X} = \frac{\sum_{i=1}^{n} X_i}{n} \]