Exam 1 Preparation

- **Logistical details**
  - Mon Jan 26
  - 65 minutes
  - Open-book, open-notes
  - Calculator needed

- **Coverage**
  - Handouts 1 – 7
  - Quizzes 1 – 7
  - HW 1 – 2
    - Sections 1.1 – 1.3, 8.1 – 8.5, 20.1 – 20.5, 21 – 2.5, 3.1 – 3.9

- **Resources available online**
  - This preparation sheet
  - Handouts
  - Quizzes and solutions
  - HW assignments and solutions
  - Practice exam and solutions

- **Types of questions to expect**
  - Short answer (e.g., observational study or experiment, identify observational units and variables)
  - Calculations (e.g., determine five-number summary, check for outliers)
  - Interpretations and explanations
  - Similar to examples, quizzes, HWs

- **Advice for preparing**
  - Prepare and organize your notes carefully
  - Don’t study less because it’s open-notes/book
  - Plan not to rely on your notes/book too much
  - Re-read, work through handouts
  - Focus on understanding, not memorization
  - Review and make sure that you can answer example, quiz, HW questions
  - Ask questions during class, office hours

- **Advice during the exam**
  - Show up on time!
  - Be cognizant of time constraint
  - Read carefully
  - Relate conclusions to context
  - Write and explain clearly
  - Show details of calculations
  - Do not elaborate excessively
Outline (of most important topics)

- **Fundamental terms**
  - Observational unit, variable
    - Categorical vs. quantitative
    - Explanatory vs. response
  - Population, sample
  - Parameter, statistic

- **Two key questions**
  - To what population can results be generalized?
    - Depends on how data were collected (e.g., random sample?)
  - Can a cause/effect conclusion be drawn?
    - Depends on how subjects got into groups (e.g., random assignment?)

- **Sampling**
  - Bias
  - Random sampling
  - Effect of sample size

- **Types of studies**
  - Observational studies vs. controlled experiments
    - How to distinguish
    - Scope of conclusions
      - Confounding
      - Causation
  - Designing experiments
    - Comparison
      - Control group
      - Placebo effect
      - Blindness
    - Randomization

- **Two-way tables**
  - Segmented bar graph
  - 2x2 tables
    - Marginal distributions
    - Conditional proportions
    - Relative risk

- **Graphical displays**
  - Dotplot, histogram, stemplot, boxplot
  - Features: shape, center, variability, outliers
    - Symmetry, skewness

- **Numerical summaries**
  - Mean, median (center)
  - Standard deviation, IQR (variability)
  - Properties, including resistance
  - Five-number summary
  - Outlier check