

STAT 301 Exam 2 Preparation Winter 2011

Logistics:

- Mon Feb 28
- You are welcome to show up at 11:10 rather than 10:10
- Open-book, open-notes, open-handouts and anything else that I've provided
- Bring calculator
- No computer use
- Material from Mon Jan 31 – Tues Feb 22, Chapter 2, HW9-14, Quizzes 8-10

Overview:

We have primarily analyzed studies that involve two (binary) categorical variables, for which the results can be organized in a 2×2 table. We have studied how to conduct inferences depending on whether the data were collected from:

- Independent random samples
- One random sample with two variables
- Randomized experiment
- Observational study

We have also considered how the scope of conclusions to be drawn depends on how the data were collected. More specifically:

- Random assignment allows for the possibility of drawing cause/effect conclusions.
- Random sampling allows for generalizing to a larger population.

We have learned three ways to conduct statistical inference in this situation:

- Simulation
 - Binomial sampling model (for independent random sampling)
 - Randomization model (for randomized experiment)
- Fisher's exact test (hypergeometric probability distribution)
- Normal approximation
 - When conditions are satisfied

We have examined confidence intervals for three different parameters:

- Difference in success proportions
- Relative risk
- Odds ratio

Outline:

- Two-way table, conditional proportions, segmented bar graph
- Binomial simulation analysis for comparing two proportions
- Normal approximation for comparing two proportions, standard error
- Two-sample z -test, two-sample z -interval
- Effect of sample size, effect of order of subtraction
- Explanatory and response variables
- Simulating randomization test for assessing statistical significance with 2×2 tables

- Hypergeometric probabilities, Fisher's exact test
- Ratio of conditional proportions, relative risk
- Sampling distribution of sample relative risk, confidence interval for population relative risk
- Observational studies, confounding variables
- Randomized comparative experiment, placebo effect, blindness, double blindness
- Case-control, cohort, and cross-classified studies
- Odds ratio, sampling distribution for odds ratio, confidence interval for population odds ratio

Advice:

- Organize notes for efficient retrieval of information/formulas
- Don't plan to use text, notes too much
 - Prepare as if exam were closed book/notes
 - Focus on understanding, not memorization
 - Be cognizant of time constraint
- Expect similar questions to what we answer in class every day, in quizzes, on HW
- Be prepared to think/explain/interpret
 - Not just plug into formulas
 - Be ready to explain process of how you would do calculations
 - E.g., $p\text{-value} = \Pr(X \leq k)$, where $X \sim \text{Hypergeometric}(N, M, n)$
- Be ready to interpret computer output
 - Possibly exclude irrelevant output
- Read carefully
 - Be sure to answer the question asked
- Take advantage of information provided
 - Perhaps including computer output
- Relate conclusions to context
- Prepare as thoroughly as you would for a closed-book exam
 - Re-work in-class investigations
 - Re-work HW questions
 - Work through examples
 - Re-read summary sections
 - Bring questions to office hours (extra office hours on Fri 9:30-10:30 and Mon 8:30-9:30)
- Show up on time!
 - Be cognizant of time constraint
 - Make attempt at all questions