STATS 111/202

Lecture 6: MH and BD tests continued (clarifications, examples)

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Three-way tables (cont’d)

2.7

Review from last week

- If we think we may have a confounding variable, try testing for any association between W and X as well as W and Y
- If we think the relationship between X and Y may be changing across levels of W (effect modifier), can observe whether odds ratios are changing across levels of W
- A measure to merge across levels of W, is the MH common odds ratio. It calculates the odds ratio while accounting/controlling for W
- We can formally test for an association between X and Y while controlling for W through the MH test ($H_0: OR_{MH} = 1$)
- The estimate $\widehat{OR}_{MH}$ combines odds ratio estimates across different levels of W, so to formally test whether or not the odds ratios across different levels of W are significantly different we can use the BD test (Breslow-Day)

MH and BD Test Example

Odds ratio interpretation reminder

- If OR=1, then X=1 and X=0 have the same odds for Y=1 (X not associated with Y)
  - X does not determine how likely (odds) that Y will equal 1

- If OR is not 1, say 1.5, then X=1 and X=0 do not have the same odds for Y=1
  - Evidence that X is associated with Y
  - Value of X may determine/influence how likely (odds) Y will equal 1
  - X=1 more likely to result in Y=1 compared to X=0. Or X=1 has 1.5 times the odds, 50% higher odds, than compared to X=0

- If OR is not 1, say 0.30, then X=1 and X=0 do not have the same odds for Y=1
  - Evidence that X is associated with Y
  - Value of X may determine/influence how likely (odds) Y will equal 1
  - X=1 more less likely to result in Y=1 compared to X=0. Or X=1 has 0.3 times the odds, 70% lower odds compared to X=0

Regression!

What we've covered

- Now working with categorical variables
  - Discrete, may have no ordering, usually finite number of values
- Can convert continuous variables to categorical, but will lose information
  - Household income placed in low-income, middle, high
- Different measures of association needed for categorical data
  - Risk difference, risk ratio, odds ratio
- 1-way tables -> 2-sample proportion test (equivalent to chi-square test for independence)
- 2-way tables
  - Chi-square test for independence
  - CI based on normal distribution for RD, log(RR), log(OR)
  - If ordering present, trend test
- 3-way tables
  - MH test for independence (accounting for a confounder)
  - BD test for heterogeneity of the odds ratio's across levels of confounder

Announcements

- HW #2 due this Sunday at 11:59pm PT
  - Extra practice from textbook: 2.23, 2.27 part a and c, 2.33, 2.37, and 2.39