Statistics 659 - Assignment 4
(due Wednesday, February 17, 2016, 11:59pm)

Instructions:

- The textbook exercises are in the book by Alan Agresti. This assignment covers material from Lectures 9–12.

- Whether you write out the solutions by hand or in a text document, be sure that they are *neat, legible and in order* (even if you choose to solve them in a different order).

- **Type** your name, email address, course number, section number and assignment number at the top of the first page (or cover page).

- Either scan or print your solutions to a **PDF** file under 15MB in size. It must be in a *single* file, not separate files for separate pages. Name the file using your name (for example, I could use twehrly659hw01.pdf) to avoid confusion with other students and/or assignments. *Do not* take a photo of each page and then paste them into a document – this will make your file too big and the results will generally not be very readable anyway.

- Login to your WebAssign account to upload your file. You must do this by **11:59 pm U.S. Central time**, *according to the WebAssign server*, on the due date. We highly recommend that you start the upload at least 15 minutes earlier. You can make multiple submissions but *only the last submission will be graded*.

2.29, 2.30, 2.31

2.33, 2.35, 2.37

3.2, 3.3, 3.4, 3.5

Additional Problems:

A. Analyze the data in Table 7.23, p. 237, using the methods for 2x2xK tables in Chapter 2 to test the hypothesis that admissions decisions are independent of gender, controlling for the potential differences due to graduate department.

(a) Report the conditional odds ratios for each department and their 95% confidence intervals.

(b) Report the marginal odds ratio and determine whether Simpson's paradox is present.

(c) Perform the Cochran-Mantel-Haenszel and Breslow-Day tests. Write down their null and alternative hypotheses and interpret the results.

(d) If you delete the data for Department 1, do you think a common odds ratio is reasonable? If so, report an estimate for the common odds ratio using computer output and report a 90% confidence interval for this quantity.

B. Analyze the data in Table 4.12, p. 127, using the methods for 2x2xK tables in Chapter 2 to test the hypothesis that merit pay is independent of race, controlling for the potential differences due to district.

(a) Report the conditional odds ratios and their 95

(b) Report the marginal odds ratio and determine whether Simpson's paradox is present.

(c) Perform the Cochran-Mantel-Haenszel and Breslow-Day tests. Write down their null and alternative hypotheses and interpret the results.

C. (Only for students having taken STAT 414, 610 or STAT 630)

For a 2x2x2 table, show that homogeneous association is a symmetric property, by showing equal XY conditional odds ratios is equivalent to equal YZ conditional odds ratios.