STA 580 — Fall 2008 — Dr. Charnigo

Written Assignment 4

This assignment is due on Thursday 06 November at 5:20 p.m. You may work in self-selected groups of two or three, in which case you may hand in one copy of the assignment for the group.

[20] 1. Refer to "Renal Disease" on page 451. Let p_1 denote the probability of death (any cause) within 19 years for a 30- to 49-year-old woman who takes phenacetin-containing analgesics and p_2 the probability of death (any cause) within 19 years for a 30- to 49-year-old woman who does not.

[10] a. Test $H_0 : p_1 = p_2$ against $H_1 : p_1 \neq p_2$ at level $\alpha = 0.05$ by calculating a z statistic based on the difference in sample proportions.

[10] b. Test $H_0 : p_1 = p_2$ against $H_1 : p_1 \neq p_2$ at level $\alpha = 0.05$ by calculating a χ^2 statistic based on the disparities between expected and observed values in a two-by-two contingency table.

[40] 2. Refer to "Health Services Administration" and Table 9.8 on page 380. Use $\alpha = 0.05$ for all hypothesis tests.

[10] a. Create boxplots of the length-of-stay measurements in the two hospitals, one boxplot for each hospital. Would you be comfortable applying the procedure in Section 8.4 to the length-of-stay measurements? Why or why not?

[10] b. Apply the rank sum test to assess whether median length of stay differs between the two hospitals.

[10] c. Take the natural logarithms of the length-of-stay measurements in the two hospitals. [Check figure: $\log(21) = 3.045$.] Apply the procedure in Section 8.4 to the log-transformed length-of-stay measurements. Do you conclude that mean log-transformed length of stay differs between the two hospitals?

[10] d. Find the equal sample sizes of patients from the two hospitals for which you would have 90% power to conclude that mean log-transformed length of stay differs between the two hospitals.

[40] 3. Refer to "Dentistry" and Table 9.7 on page 379. Use $\alpha = 0.05$ for all hypothesis tests.

[10] a. Apply the sign test to assess whether there is a nonzero median change in periodontal status six months after implementation of the dental education program.

[10] b. Apply the signed rank test to assess whether there is a nonzero median change in periodontal status six months after implementation of the dental education program.

[10] c. Proceeding as if the change scores were normally distributed, apply the paired t-test to assess whether there is a nonzero mean change in periodontal status six months after implementation of the dental education program.

[10] d. Comment on the agreements/disagreements of the results from the three testing procedures. Which of the procedures do you think is most appropriate for this data set?