STAT 442, Fall 2008 Assignment 5

Assignment due date: Thursday, Nov. 27, in class

1. Refer to exercise 20 (Chapter 6, page 244).
a. Provide a table of relevant row or column percentages relevant to comparing responses between the three groups (i.e. fans and natives on and off reservations). What does the table indicate?
b. Fit a log-linear model under assumption of independence between group and response and examine the pattern of standardized residuals. What does the pattern of residuals indicate about the relation of the response to group?
c. Fit a log-linear model that takes into account the ordinal nature of the response in it's relationship to group. In addition, fit a saturated model. Perform a sequential analyis of deviance comparing the three models using likelihood ratio tests. What do you conclude?

2. Refer to exercise 14 (Chapter 7, page 301). Do parts (a) and (c).

3. A study was conducted to see how accurately wrist fractures could be diagnosed based on simple physical examination, as compared with the gold standard, X-ray. Two physicians each independently examined a series of patients presenting with suspected wrist fractures, after which all patients went on for definitive X-ray. The results were:

Phys. #1			Phys. #2		
X-Ray $\downarrow$: Phys. $\rightarrow$	Pos.	Neg.	X-Ray $\downarrow$: Phys. $\rightarrow$	Pos.	Neg.
Pos.	14	1	Pos.	15	0
Neg.	5	30	Neg.	7	28

Comparing the two physicians yielded:

Phys. #1 $\downarrow$: Phys. #2 $\rightarrow$	Pos.	Neg.
Pos.	17	2
Neg.	5	26

a. Estimate positivity rates for each physician, providing 95% confidence intervals in each case. Test for a difference in positivity rates and provide a 95% confidence interval for the difference.
b. Calculate the kappa statistic for inter-rater agreement.

4. The data below were collected in a study investigating risk factors for heart disease. Two distinct age groups were considered in the study.

34-49 Years of Age			
Hypertension $\downarrow$: CAD $\rightarrow$	Yes	No	Total
Yes	550	212	762
No	941	495	1436
Total	1491	707	2198

>65 Years of Age			
Hypertension $\downarrow$: CAD $\rightarrow$	Yes	No	Total
Yes	1102	87	1189
No	1018	109	1127
Total	2120	196	2316

a. For the 35-49 and >65 groups, separately, calculate odds ratios and corresponding relative risks describing the "effect" of hypertension on the risk of CAD. Are the odds ratios at all similar to the relative risks? Explain.

b. Calculate a pooled estimate of the odds ratio. Test it's significance and provide a 95% confidence interval. Is it reasonable to combine the information in the two tables in this way?