

STA 6934 – Fall 2003 – Exam 3

Print Name: _____ UFID: _____

1) A study was conducted to compare the effects of a test drug developed to reduce cholesterol levels to a placebo, in terms of reducing coronary heart disease and death. A sample of 2000 adult males at risk are identified, with 1000 being randomized to the test drug, the remaining 1000 receiving placebo. Of those receiving the test drug, 40 suffered heart related event; among the placebo group 80 suffered a heart related event.

- a) Compute the estimated probability of a heart related event among subjects receiving the test drug.
- b) Compute the estimated probability of a heart related event among subjects receiving the placebo.
- c) Compute the estimated relative risk of a heart related event for the test drug relative to the placebo.
- d) Suppose the 95% confidence interval for the population relative risk for test drug relative to placebo is: (0.40,0.60). Which statement best describes the results at the $\alpha = 0.05$ significance level?
 - i) Conclude that the risk of heart related event is higher for test drug since entire interval is above 0.
 - ii) Conclude that the risk of heart related event is higher for test drug since entire interval is below 1.
 - iii) Conclude that the risk of heart related event is lower for test drug since entire interval is above 0.
 - iv) Conclude that the risk of heart related event is lower for test drug since entire interval is below 1.
 - v) Cannot conclude that the risk of heart related event differs for the test drug and placebo.

2) A new drug is being compared with a standard drug in terms of long term cost of care. Parallel samples of 100 patients are obtained from each drug, and the total cost of care for each patient is obtained over a two-year period. The following summary statistics are computed:

Statistic	New ($i = 1$)	Standard ($i = 2$)
\bar{Y}_i	2000	1900
S_i	400	600
n_i	100	100

a) Note that $\sqrt{\frac{(400)^2}{100} + \frac{(600)^2}{100}} = 72.1$. Obtain a 95% confidence interval between the true population mean costs of care for the two drugs. Recall that $z_{.025} = 1.96$.

- b) What do you conclude about the true mean costs of care at the $\alpha = 0.05$ significance level?

3) Researchers in India wished to determine whether there is an association between level of disclosure (full or partial) regarding a clinical trial, and whether or not a patient will consent to participate. The following contingency table gives their results, based on individuals with poor reading skills:

Disclosure	Consent?		Total
	Yes	No	
Full	29	73	102
Partial	15	35	50
Total	44	108	152

a) Give the expected cell counts under the hypothesis that consent outcome is independent of the level of disclosure for the population under study (namely, individuals with poor reading skills in India).

b) The chi-square statistic is: $X_{obs}^2 = .0362$. What do you conclude at the $\alpha = 0.05$ significance level? Why?

- i) Conclude that consent outcome differs between the Full and Partial disclosure groups since $.0362 < .05$
- ii) Conclude that consent outcome does not differ between the Full and Partial disclosure groups since $.0362 < 3.84$
- iii) Conclude that consent outcome does not differ between the Full and Partial disclosure groups since $.0362 < .05$
- iv) Conclude that consent outcome differs between the Full and Partial disclosure groups since $.0362 < 3.84$

4) Fisher's exact test is most often applied when:

- a) We wish to adjust for an extraneous factor when we obtain odds ratios between two categorical variables.
- b) When we wish to determine whether there is a positive or negative association between two ordinal variables.
- c) When we have a 2×2 table with small sample sizes.
- d) When we wish to measure the level of agreement between two raters.

5) A case-control study is conducted to determine whether incidence of stroke in young women is associated with use of oral contraceptive. Young women who have had a stroke are identified (cases) as well as a similar group of women based on age and other characteristics, who have not (controls). It is determined whether each woman had previously used oral contraceptives. The following table is based on the ischemic infarction cases.

Oral Conc	Stroke?		Total
	Yes	No	
Any Use	96	314	410
No Use	28	64	92
Total	124	378	502

a) Based on the preceding table, what is the odds a woman who had an ischemic infarction had any use of oral contraceptives?

b) Based on the preceding table, what is the odds a woman who in the control group had any use of oral contraceptives?

c) Give the odds ratio, for the case group relative to the control group.

d) The square root of the variance of the log odds ratio is: $\sqrt{v} = 0.25$. Give a 95% confidence interval for the population odds ratio.

e) Based on the interval in part d), is there evidence of an increase in the risk of stroke for women using oral contraceptives?

6) A study to determine whether there is an association between nationality and presence/absence of a rare disease is based on 4 nations. The null hypothesis is that the probability that a person has the disease is the same for all four nations. The researchers report a chi-square statistic of $X_{obs}^2 = 25.0$.

a) Give the rejection region, and conclusion for a test with $\alpha = 0.05$.

b) Is the P-value **larger** or **smaller** than 0.05?