**Group Assignment**

Q1.A study was undertaken to evaluate the effect of percutaneous transluminal coronary angioplasty (PTCA) in patients with one-vessel coronary artery disease. A random sample of one hundred and seven patients with coronary artery disease were given PTCA. Patients were given exercise tests at baseline and after 6 months of follow-up. Exercise tests were performed up to maximal effort until symptoms (such as angina) were present. The “change” in the duration of exercise was calculated. “Change” is defined as the 6 month test minus the baseline test. The mean change was 2.1 minutes and the standard deviation of the changes was 3.1.

(a) What statistical test can be performed to see if there has been a statistically significant change in duration of exercise for this group of patients given PTCA?

(b) Compute a 95% confidence interval for the mean change in exercise duration.

(c) Can we conclude from this study that PTCA is effective in increasing exercise duration? Are there any limitations or weaknesses in this study for answering that question?

**Q2.**A researcher wishes to determine if vitamin E supplements could increase cognitive ability among elderly women. In 1999 the researcher recruits a sample of elderly women age 75-80. At the time of the enrollment into the study, the women were randomized to either take Vitamin E, or a placebo for six months. At the end of the six month period, the women were given a cognition test. Higher scores on this test indicate better cognition. The mean and standard deviation of the test scores of 81 women who took vitamin E supplements was 27 and 6.9 respectively. The mean and standard deviation of the test scores of the 90 women who took placebo supplements was 24 and 6.2, respectively.

1. Compute a 95% confidence interval for the mean difference in cognition test scores between Vitamin E and placebo groups.

2. What statistical test would you perform to compare the mean scores?

3. Are there limitations to this study for drawing conclusions about whether vitamin E can enhance cognitive ability in elderly women?

4. What would you conclude from these study results?

**Q.3** Measurements on babies of mothers who used marijuana during pregnancy were compared to measurements on babies of mothers who did not. The sample mean head circumference was larger in the group who were not exposed to marijuana and the 95% confidence interval for the difference in mean circumference between the 2 groups was .61 to 1.19 cm. What can be said about the (2- sided) p value for testing the hypothesis of equal means?

(a) The p value is greater than .05

(b) The p value is equal to .05

(c) The p value is less than .05

(d) The p value is 0

(e) Cannot be determined from the information given.

**Q.4** A study of 100 patients is performed to determine if cholesterol levels are lowered after 3 months of taking a new drug. Cholesterol levels are measured on each individual at the beginning of the study and 3 months later. The cholesterol change is calculated which is the value at 3 months minus the value at the beginning of the study. On average the cholesterol levels among these 100 patients decreased by 15.0 and the standard deviation of the changes in cholesterol was 40. What can be said about the 2 sided p-value for testing the null hypothesis of no change in cholesterol levels?

(a) The p value is less than. 05

(b) The p value is greater than .05

(c) The p value is equal to .05

(d) Cannot be determined from the information given

**Q.5** An article in the Journal of the American Medical Association1 documents the results of a randomized clinical trial designed to evaluate whether the influenza vaccine is effective in reducing the occurrence of acute otitis media (AOM) in young children. Acute otitis media is an infection that causes inflammation of the middle ear canal. In the study, children were randomized to receive either the influenza vaccine or a placebo. (randomization was done in a 2 to 1 ratio, meaning that two times as many children were randomized to the vaccine treatment as were randomized to the placebo group). The children were followed for one year after randomization, and monitored for AOM during this period. 262 children were randomized to the vaccine group, and 150 of these children experienced at least one incident of AOM during the follow-up period. 134 children were randomized to the placebo group, and 83 of these children experience at least one incident of AOM during the follow-up period. Note that the standard error of the differences in the proportions in the two groups is 0.0519.

(a) Estimate a 95% confidence interval for the proportion of children experiencing at least one incident of AOM during the follow-up period in each of the randomization groups. How do these 95% CI’s compare? (similar range of values? Overlap?)

(b) Estimate the 95% confidence interval for the difference in the two proportions.

(c) State the null and alternative hypotheses associated with testing for an association between the influenza vaccine and AOM. Is the p-value for testing these hypotheses significant at the 0.05 level?

(d) Is this a randomized study? What does this suggest when translating the observed difference in proportions?