STA 570 — Spring 2012 — Dr. Charnigo

Written Assignment 1

This assignment is due on Thursday 02 February at 12 Noon. You may work in groups of two or three, submitting one copy of the assignment for the group.

[50] 1. Refer to {Sheet1} of {MedicineLDL.xls}, which contains low density lipoprotein measurements (column LDL) for 50 adults with a history of elevated cholesterol after 12 weeks on a placebo treatment (0 in column Medicine) and for 49 adults with a history of elevated cholesterol after 12 weeks on an active treatment (1 in column Medicine).

[10] a. Report the sample mean and sample standard deviation for low density lipoprotein among the adults on active treatment. Do the same for the adults on placebo treatment.

[10] b. Report the sample median and sample interquartile range for low density lipoprotein among the adults on active treatment. Do the same for the adults on placebo treatment.

[10] c. Create side-by-side box plots comparing the sample distribution of low density lipoprotein measurements among the adults on active treatment to the sample distribution of low density lipoprotein measurements among the adults on placebo treatment. Comment on the shape of each distribution. Are the two distributions visually similar with respect to central tendency and variability?

[10] d. Suppose that low density lipoprotein measurements are normally distributed in a hypothetical population of adults with a history of elevated cholesterol who are placed on active treatment. Suppose also that the population mean and population standard deviation happen to be the same as the sample mean and sample standard deviation computed for item a. Under these two suppositions, what is the population percentage with low density lipoprotein measurements between 130 and 160 (borderline high)? Above 160 (high)?

[10] e. Under the two suppositions introduced in part d, find the low density lipoprotein measurement defining the boundary between the top 20% and bottom 80% in a hypothetical population of adults with a history of elevated cholesterol who are placed on active treatment.

[50] 2. Suppose that 25% of adults smoke. Suppose, moreover, that 10% of smoking adults will experience myocardial infarction within the next 10 years versus 5% of non-smoking adults.

[10] a. What percentage of adults will experience myocardial infarctions within the next 10 years?

[10] b. What percentage of adults both are smokers and will experience myocardial infarctions within the next 10 years? What percentage of adults neither are smokers nor will experience myocardial infarctions within the next 10 years?

[10] c. Among adults who will experience myocardial infarctions within the next 10 years, what percentage are smokers?

[10] d. What is the probability that, among 10 randomly selected smoking adults, there are at least 2 who will experience myocardial infarction during the next 10 years? What is the approximate probability that, among 100 randomly selected smoking adults, there are at least 20 who will experience myocardial infarction during the next 10 years?

[10] e. Suppose that, in a certain community, there live 4000 adults. If 500 of them experienced myocardial infarctions within the next 10 years, would that be an unexpected result? Please explain your answer.