Langara College

Department of Mathematics and Statistics

DANA 4820

Activity 1

Fall 2023

**Last Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**First Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student #:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_**

**Question 1** – The dataset “Analgesic” is based on a study of 100 women suffering from excessive menstrual bleeding, which considers whether a new analgesic provides greater relief than the standard analgesic. Use all the methods explained in chapter 1 and explain whether you meet the condition(s).

1. [5] Test the hypothesis that the probability of greater relief with the standard analgesic is the same as the probability of greater relief with the new analgesic. Report and interpret the P-value.
2. [2] Construct and interpret a 95% confidence interval for the probability of greater relief with the new analgesic.
3. [2] Use the binomial distribution directly for part (a) and compare your conclusion with the results concluded in part (a).

**Question 2** – The University of Michigan Health and Retirement (HRS) surveys more than 22,000 American over the age of 50 every two years. A subsample of the HRS participated in 2009 Internet-based survey that collected information on a number of topical areas, including health (physical and mental health behaviors), psychosocial items, economics (income, assets, expectations, and consumption), and retirement. Two of the questions asked were, “Would you say your health is excellent, very good, fair, or poor?” and “Do you smoke cigarettes now?” The two-way table summarizes the answers on these two questions.

|  |  |  |  |
| --- | --- | --- | --- |
| Health |  | Current Smoker | |
| Yes | No |
| Excellent | 25 | 484 |
| Very good | 115 | 1557 |
| Good | 145 | 1309 |
| Fair | 90 | 545 |
| Poor | 29 | 11 |

1. [2] Create a two-way table using RStudio.
2. [4] Does the data give you sufficient evidence that self-evaluation of health is associated with smoking status? (
3. [7] Can a linear trend be detected in this two-way table? If yes, detect a linear and a positive linear (separately) trend between the variables?
4. [3] Compare the odds of being a current smoker within the two groups: those who say their health is excellent and those who say their health is poor, using odds ratio and interpret the value.

Good Luck!