**HOMEWORK 10**

*Contingency Tables and Chi-square Tests for Independence*

Reading: This assignment focuses on content from your textbook, *STAT2: Building Models for a World of Data*, the second portion of Chapter 11.4 labeled as Review: Two-sample z-test and Chi-square Test for a Two-way Table. Read this section of your textbook.

Notes:

* For questions requiring you to use JMP, you must provide a copy of your output at the end of your assignment or embedded within your assignment. No credit will be given if you do not include your output, even if your answer is correct.
* Recall that you can download JMP to your personal computer for free. See the JMP information posted on Canvas. Problems due to not getting JMP working will not allow you to submit your assignment late. Please plan to work ahead and email your instructor questions if needed.
* You must use your own words to answer all homework questions. You cannot copy information from the book or other sources.
* Round all numbers to 2 decimal places unless otherwise specified.
* For all questions requiring calculations, show your work to receive credit.

11.29 – Intensive care unit. Some parts from the book plus additional questions.

* 1. Compute the proportions described in Part A in the book and describe what they tell us about a possible relationship.

Young: 0.915 (=54/59), Middle: 0.779 (=60/77), Old: 0.719 (=46/64)

The proportion of patients who survived decreases as age group increases, with the youngest age group having the highest proportion of survivors (0.915), followed by the middle age group (0.779), and the oldest age group (0.719). This suggests that there is a possible relationship between AgeGroup and Survive, with older patients being less likely to survive in the ICU. But further statistical analysis would be needed to confirm this relationship and rule out other factors that may be influencing survival rates.

Table

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* 1. Show all steps of the chi-square test, including checking conditions, described in Part F in the book. You do not have to compare the results to a logistic model. If you find any conditions to not be met, conduct the test anyways and discuss the implications in your conclusion.

Table

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Ho: The number of people survived and the age group are independent

Ha: The number of people survived and the age group are dependent

Conditions: Random sample not met. Large sample size met. All expected counts: 11.8, 47.2, 15.4, 61.6, 12.8, 51.2 are all ≥ 5

X^2=7.747

p-value=0.0208

There is strong evidence to say the number of people survived and the age group are dependent.

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* 1. Consider the mosaic plot for survival and age groups. Based on the plot, is there evidence that the variables are dependent? Explain.

Chart, bar chart, treemap chart

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The mosaic plot shows the condition properties of each age group are visibly differing from each other. So, AgeGroup and Survive are dependent.

* 1. Compute the following odds. Show your computations.
     1. What are the odds of surviving?

0.8 / (1 – 0.8) = 4

* + 1. For patients under 50 years old (age group 1), what are the odds of surviving?

0.9153 / (1 – 0.9153) = 10.81

* + 1. For patients in their 50s or 60s (age group 2), what are the odds of surviving?

0.7792 / (1 – 0.7792) = 3.53

* + 1. For patients 70 years or older (age group 3), what are the odds of surviving?

0.7188 / (1 – 0.7188) = 2.56