Exploratory Data Analysis – D207

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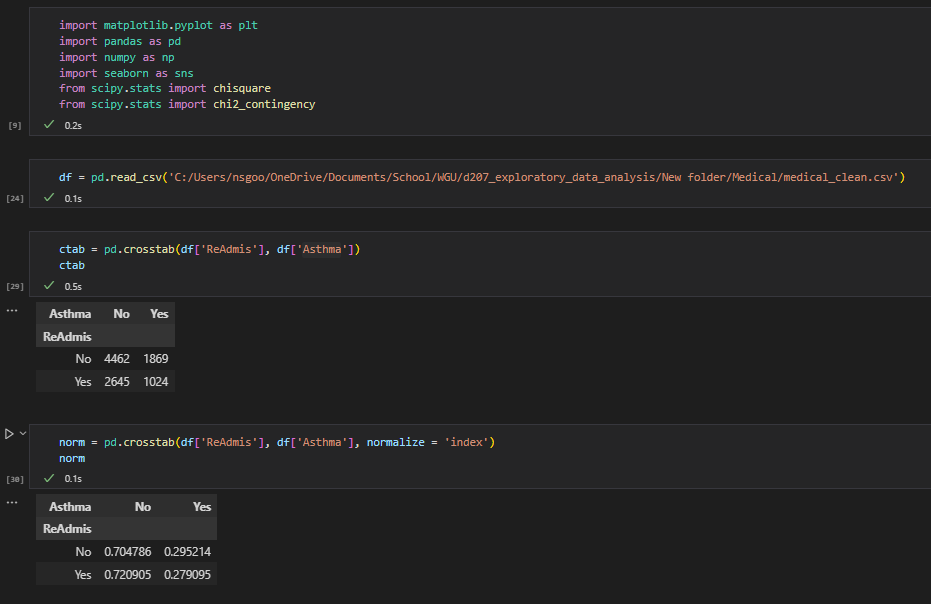
This analysis will explore the medical data of a potentially real-world organization. In creating this analysis, I will present an evaluation using one of the allowed measurement techniques, to identify key performance indicators to answer a specific question.

## **A. Describe an organizational situation/issue that the data will address:**

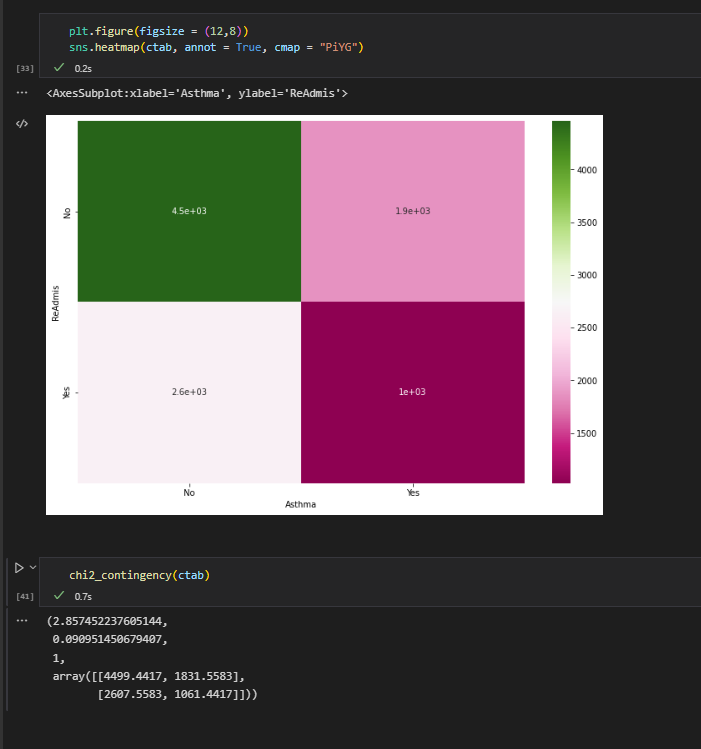
1. Research Question
   1. Does having asthma have an association with readmission likelihood?
2. Organizational Benefits
   1. In 2018, the cost of readmissions cost hospitals more than $41B (LaPoint, 2018). Identifying whether patients with asthma consistently contribute to readmissions will allow stakeholders to take action to mitigate cost.
3. Relevant Data from Set
   1. The most relevant variable to our analysis is “Readmis,” which serves as our statis variable for analysis. “Asthma” is another categorical variable that I will be exploring in order to satisfy my initial research question.

## **B. Data Analysis**

1. Code for Technique
   1. When comparing two categorical variables, the chi-square test makes the most sense. To run this test, I first used the *pd.crosstab* command from *pandas* to convert the data into a contingency table with the number of frequencies for each answer of Yes and No.
   2. Next, I normalized the data into a second contingency table.

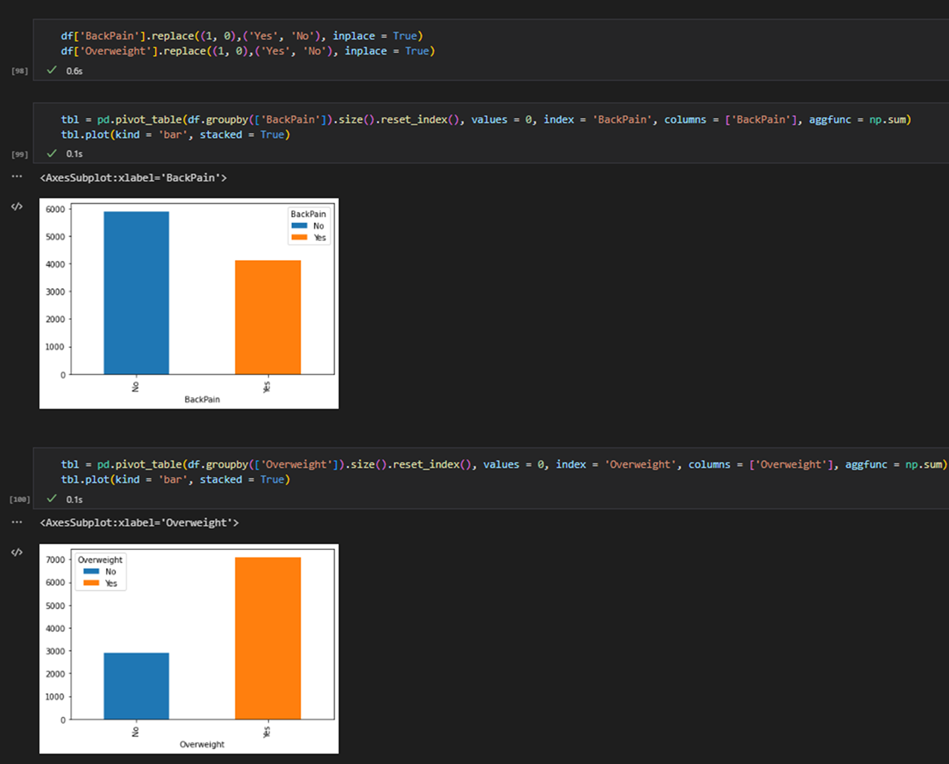
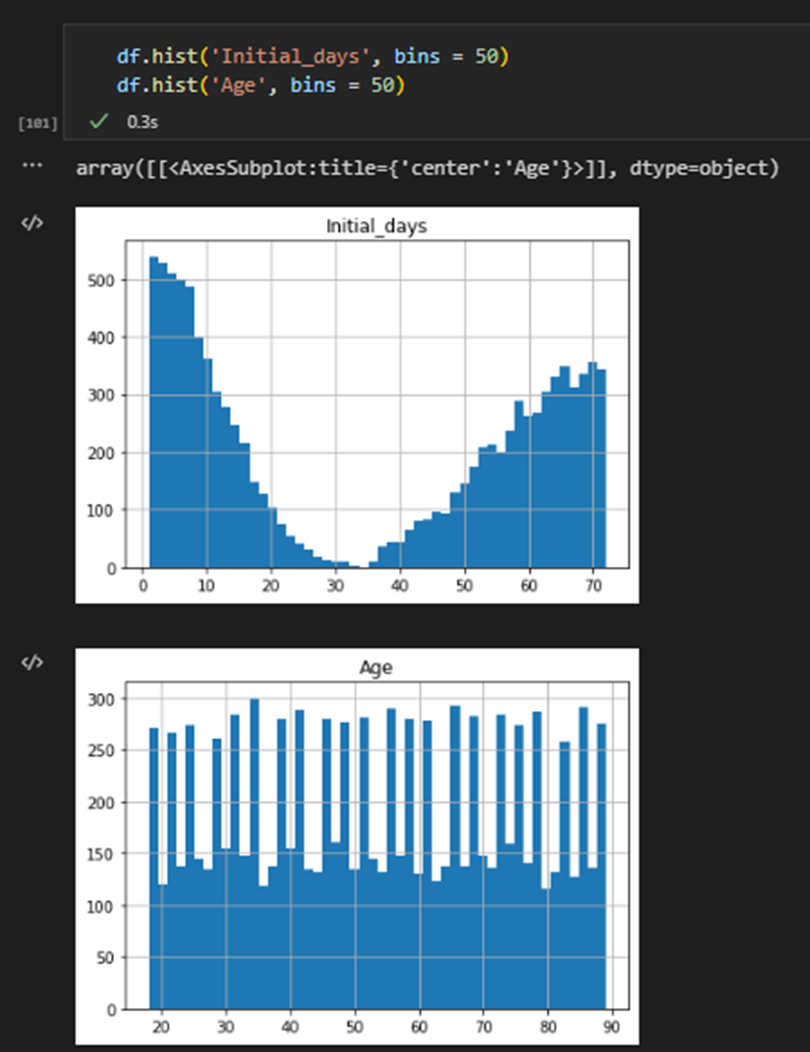


1. Output and Results
   1. In order to better understand what the contingency table was telling me, I visualized the output with a heatmap.
   2. I used the chi-square test of independence, *chi2\_contigency* to call the test statistic and p-value. The p-value is .09 and much lower than the statistic, which means I can reject the null hypothesis—“Readmis” and “Asthma” are correlated.

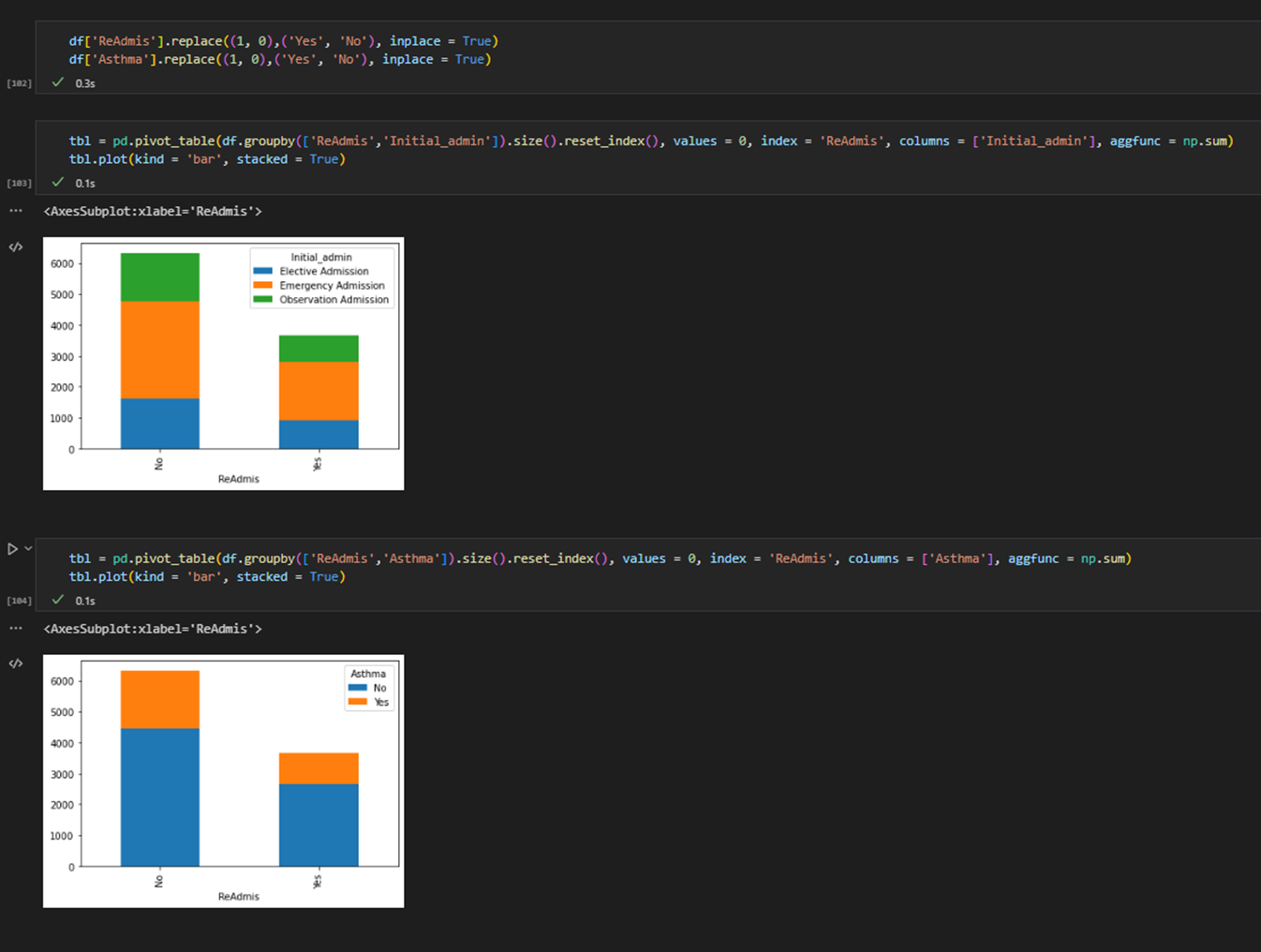
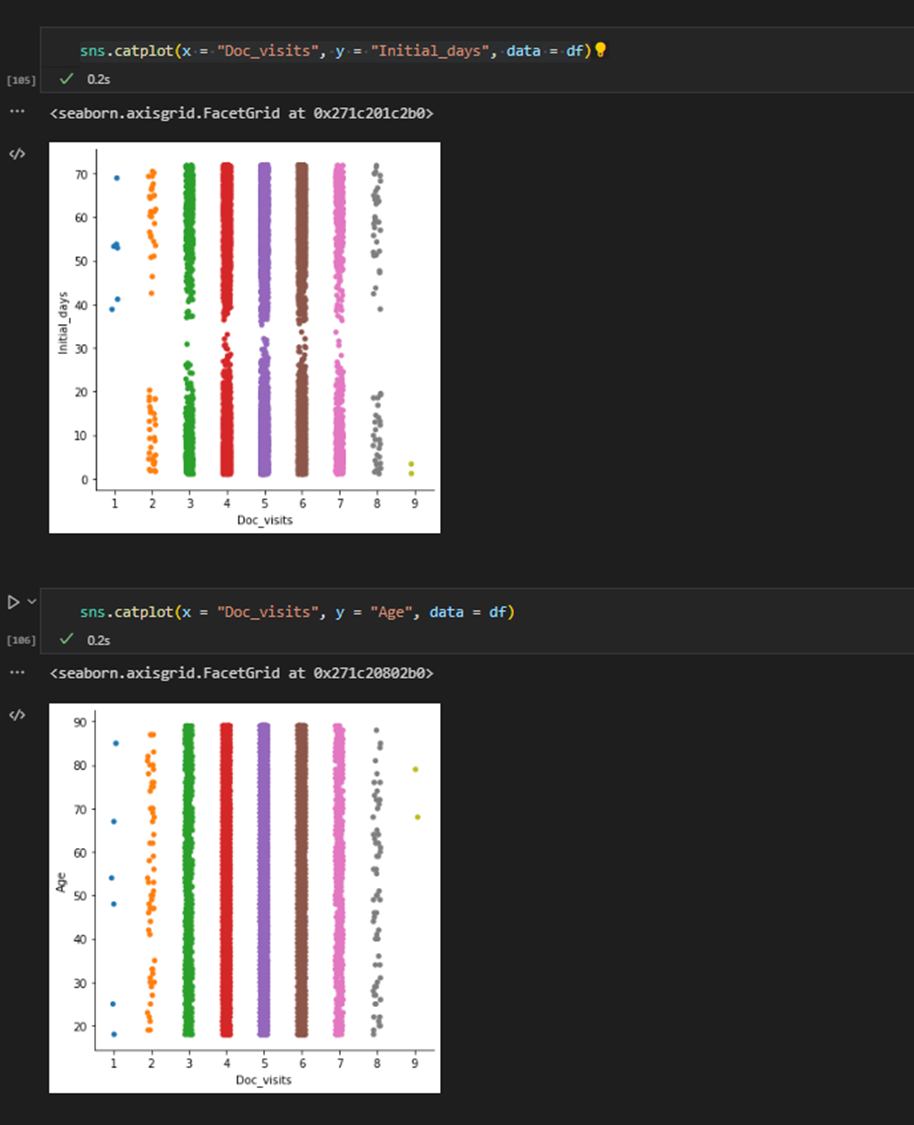


1. Justification
   1. “Readmis” and “Asthma” are both categorical variables and I wanted to test whether or not they were related to one another. As such, the chi-square test was the most appropriate option.

## **C. Univariate Statistics**

1. Categorical Variables
   1. BackPain, Overweight
   2. BackPain showed the potential for readmission correlation. Being overweight is a hot-button issue in the medical community. I wanted to check this column to see if there was merit for that concern.
   3. 
2. Continuous Variables
   1. Initial\_days and Age
   2. Initial\_days, and Age showed the potential for readmission correlation.
   3. 

## **D. Bivariate Statistics**

1. Categorical Variables
   1. Initial\_admin, Asthma
   2. Initial\_admin and Asthma showed the potential for readmission correlation. In order to get an accurate view of these variables, I needed to look at them broken down further.
   3. 
2. Continuous Variables
   1. Initial\_days, Age
   2. Initial\_days and Age showed the potential for readmission correlation. I used Doc\_visits as a comp because the spread for the secondary variable was easy to categorize visually.
   3. 
   4. Chart, histogram

      Description automatically generated

## **E. Implication Summary**

1. **Results:** The chi-square test identified the “Asthma” variable as having a significant association with “Readmis.”
   1. A correlation between having asthma and being readmitted was found.
   2. In addition, duration of Initial\_days and age were also found to have correlation with readmission.
2. **Limitations:** There are a number of limitations presented by the data as it is and the test I used:
   1. Data evaluated is from a single industry source, with set resources and may not apply to all medical institutions.
   2. In order to use the chi-square test, we have to first test for frequencies in order to make sure the sample size is sufficiently large. In this case, we were able to utilize the test, but we would not be able to segment further if we wanted reliable results.
   3. We would also not be able to use the chi-test on non-categorical variables, should the scope of our test expand.
3. **Recommendations:** Because asthmatic patients, as well as older patient, were found to be readmitted at a significant rate, this medical center should take action to mitigate that rate.
   1. Spend additional resources on patients over a certain threshold of age in order to decrease the likelihood for readmittance—reporting and observing this trend may be vital to avoiding lawsuits.
   2. Lastly, reduce number of days patients are held after being initially admitted to the hospital.

## **F. Panopto**

## **G. Third-party Code References**

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## **H. In-text Citations**

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