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Predicting Hospital Readmissions Summary

The purpose of the analysis was to determine if there is any evidence that can help predict whether a patient will be readmitted. Hospital readmission is a key indicator in hospital care effectiveness and quality. The outcome of the analysis indicated a correlation between the number of medications administered during the hospital stay and whether the patient was readmitted to the hospital. For each additional medication administered, the odds of the patient being readmitted increased by 1.01%. The difference of medications administered for readmitted versus non-readmitted patients in the distribution can also be observed in the Probability Mass Function (PMF) plot and the Cumulative Distribution Function (CDF) plot. Non-readmitted patients generally received slightly less medications during the hospital stay.

What could have improved the analysis is a more concise description of the response variable *readmitted*. What deemed whether the subsequent hospital visit was a readmission? Hospitals typically use a second visit within 30, 60, or 90 days from the discharge date of the initial visit for the same or related care (Healthcare.gov, 2023). The specificity in the timeframe the patient was readmitted was lacking in the dataset, or separate variables for a readmission with 30, 60, and 90 days could have improved the analysis.

The age was included in the dataset, but it was in the range of 10 years of the patient’s actual age. The patient’s real age could have improved the analysis. Also, the categorical variables could have improved the analysis, however dummy variables would have needed to be created for the logistic regression model which wasn’t covered in the course. Also, about half of the observations in the dataset were missing a value in a key categorical variable *medical\_specialty*, the specialty of the admitting physician. The primary diagnosis, *diag\_1*, could have provided excellent analysis as the variable was clean with only 4 observations missing a value.

Assuming multiple variables will be correlated to the patient being readmitted is not the best approach to an analysis. It may have caused bias in choosing which variables to keep in or out of the analysis. A better approach would be to keep an open mind as the research question may not be answered with the data provided.

A challenge faced during the analysis included the normal versus lognormal CDFs and probability plots. As the analysis indicated for the medications administered, the lognormal CDF followed the model a lot better than the normal CDF model, and the lognormal probability plot better fit the distribution from -1 to 3 standard deviations than the normal plot. Due to these aspects, it was unclear whether to use the log10 medications administered in the correlations and logistic regression analysis or the normal medications administered.

References

“Hospital Readmissions.” *Hospital Readmissions - Glossary | HealthCare.Gov*, www.healthcare.gov/glossary/hospital-readmissions/#:~:text=A%20situation%20where%20you%20were,30%2C%2060%20or%2090%20days. Accessed 3 June 2023.