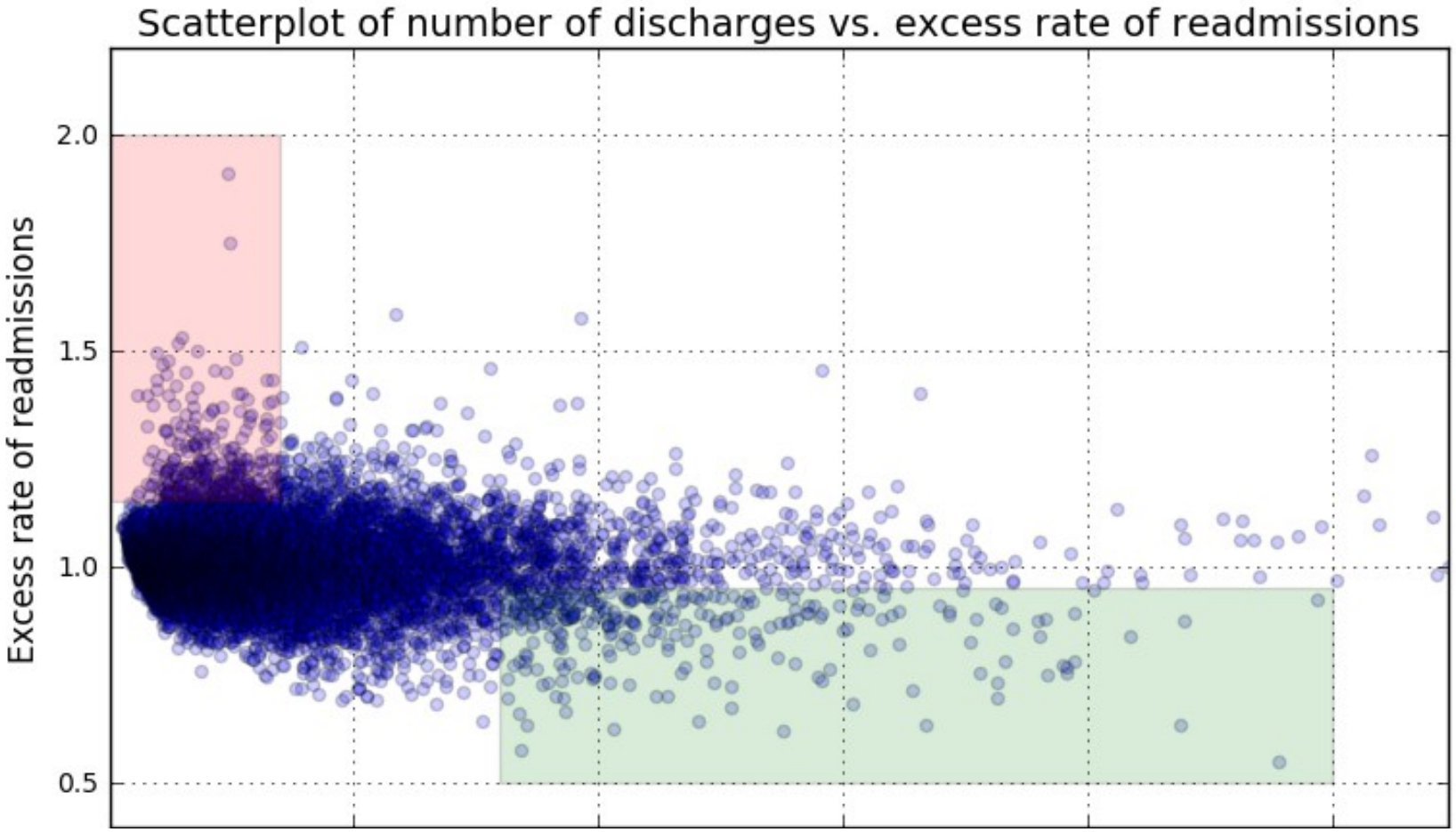
Hospital Readmissions Data Analysis and Recommendations for Reduction - part of Capstone project for Coursera-IBM

In October 2016, the US government's Center for Medicare and Medicaid Services (CMS) began reducing Medicare payments for Inpatient Prospective Payment System hospitals with excess readmissions. Excess readmissions are measured by a ratio, by dividing a hospital’s number of “predicted” 30-day readmissions for heart attack, heart failure, and pneumonia by the number that would be “expected,” based on an average hospital with similar patients. A ratio greater than 1 indicates excess readmissions.

In this exercise, we:
+ critique a preliminary analysis of readmissions data and recommendations (provided below) for reducing the readmissions rate. Based on public studies we proceeded with solid conclusions and based on the learnings of this course
+ construct a statistically sound analysis and make recommendations of my own (author of this study: Antonio Pesqueira

More instructions provided below. I will also include all the work and data **in this notebook and submit in my Github account**.

scatterplot for number of discharges vs. excess rate of readmissions



Distribution of customers per city

Preliminary Report

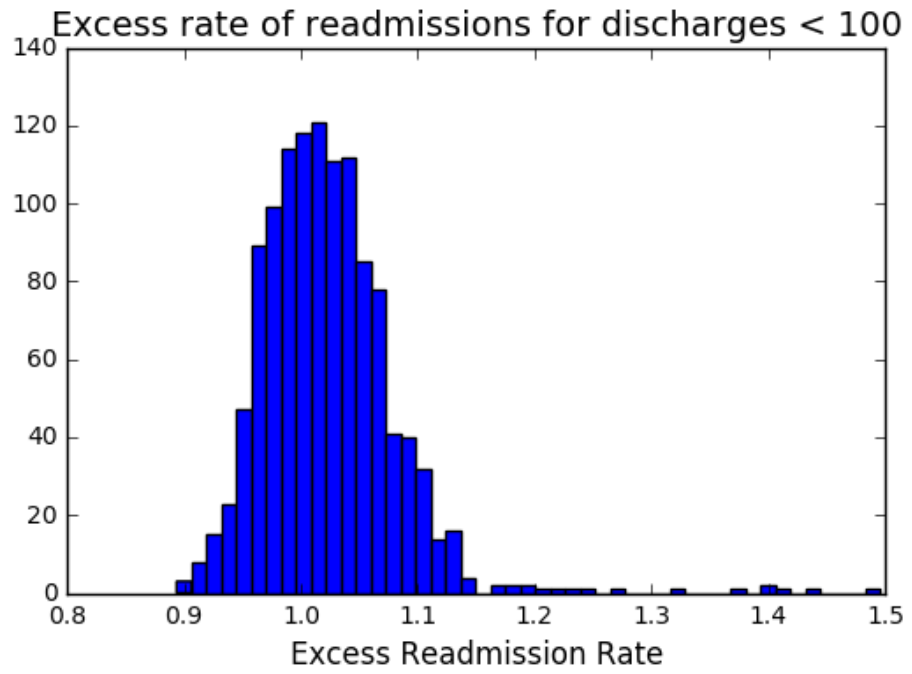
A. Initial observations based on the plot above**
+ Overall, rate of readmissions is trending down with increasing number of discharges
+ With lower number of discharges, there is a greater incidence of excess rate of readmissions (area shaded red)
+ With higher number of discharges, there is a greater incidence of lower rates of readmissions (area shaded green)

B. Statistics**
+ In hospitals/facilities with number of discharges < 100, mean excess readmission rate is 1.023 and 63% have excess readmission rate greater than 1
+ In hospitals/facilities with number of discharges > 1000, mean excess readmission rate is 0.978 and 44% have excess readmission rate greater than 1

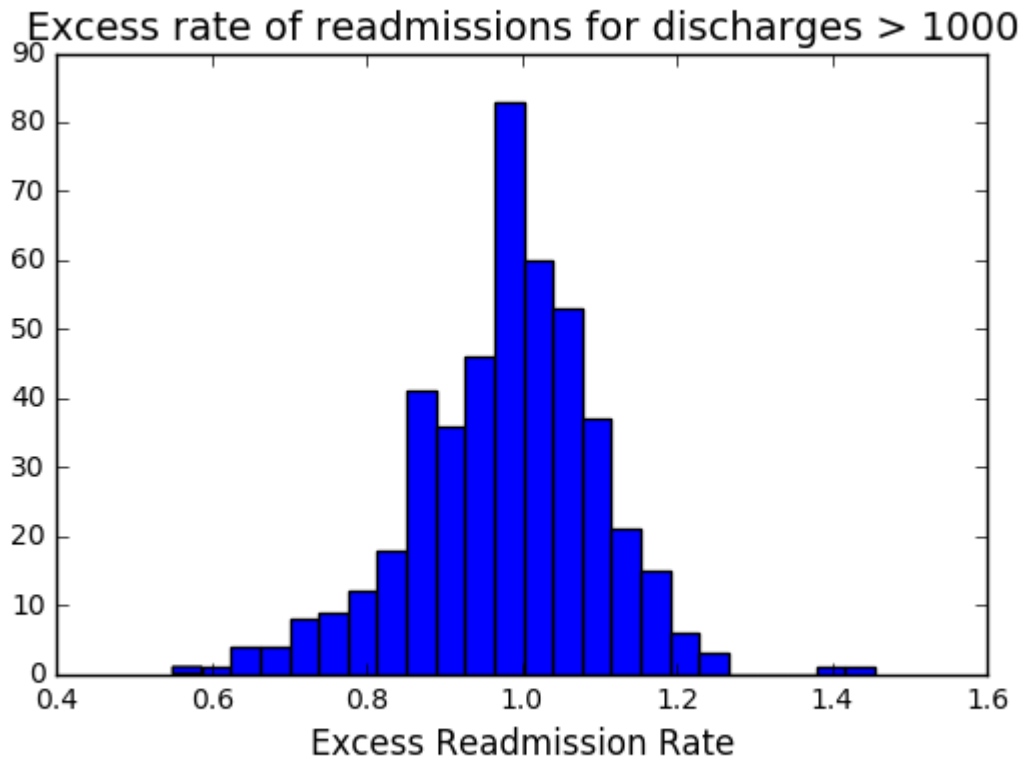
C. Conclusions**
+ There is a significant correlation between hospital capacity (number of discharges) and readmission rates.
+ Smaller hospitals/facilities may be lacking necessary resources to ensure quality care and prevent complications that lead to readmissions.

D. Regulatory policy recommendations**
+ Hospitals/facilties with small capacity (< 300) should be required to demonstrate upgraded resource allocation for quality care to continue operation.
+ Directives and incentives should be provided for consolidation of hospitals and facilities to have a smaller number of them with higher capacity and number of discharges.

[50]: <matplotlib.text.Text at 0xe681d30>



[51]: <matplotlib.text.Text at 0xc79f898>



One can get a better sense of the distributions among higher lower discharge rates.

Conclusions

+ There is a significant correlation between hospital capacity (number of discharges) and readmission rates.
+ Smaller hospitals/facilities may be lacking necessary resources to ensure quality care and prevent complications that lead to readmissions.

Regulatory policy recommendations

+ Hospitals/facilties with small capacity (< 300) should be required to demonstrate upgraded resource allocation for quality care to continue operation.
+ Directives and incentives should be provided for consolidation of hospitals and facilities to have a smaller number of them with higher capacity and number of discharges.