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Data Dashboard and Storytelling

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Part 3: Reflection Paper - Medical Data Mining

This reflection paper demonstrates the purpose and meaning of the data analysis lifecycle of information gathered from the medical industry. I have learned growing deeper insights about the data I began with two months ago during this process. I will demonstrate through the following that though the raw data points and numerous dimensions were complex, even with such a relatively small dataset, the descriptive statistics and build visualizations serve to bring order and business intelligence. I also provide suggestions for potential ways to reduce the readmission rate.

The purpose and function of the executive dashboard are to demonstrate who is at high risk of readmission, how many patients are readmitted and which states have higher numbers of patients readmitted, the average of Initial days by State and the hospital rate over the year 2016-2020. "The study also found that 34 percent of patients are readmitted within 90 days while 56 percent of patients are readmitted within one year." (Melissa Attias, 2009). The dashboard and presentation begin with the hospital's readmission rate of 36.69%. Following this rate is the presentation of general key performance indicators for readmission patients. Finally, a national map allows executives and data analytics and compare metrics across states.

The additional dataset enhances the insights for optimism and prediction in decision making. The US Hospital Customer Satisfaction dataset gives us information on the quality of care hospitals provide to their patients. The health plans are rated on a scale of 1-5, of which 5 is

the highest. In 2020, we had 407 facilities is rated at 5, 1083 at 4, 1106 at 3, 702 at 2, and 225 facilities is rated at 1. "Differences between hospitals in readmissions may be due to who is treated rather than how they're treated," (Dr. Carl Walraven. The Hospitalist, 2015)

We can select the category menu to visualize and discover the relationships between different readmission and non-readmission groups, as well as gender and income groups. Interactive controls are as follows:

- Select State from the dropdown and click apply to view the specified State in all dashboards from the State dropdown menu.
- View male elements from the Gender checklist by selecting the "male" gender icon in the gender menu; view numbers of female accounts by choosing the "female" gender icon in the gender menu.
- We can also select the group of Gender click on the checklist.
- View the tooltip information; move the mouse to the area you want to view.

Next, a national heatmap of initial days by State gives the business the ability to see which regions have the most average initial days. This may guide executives on how to allocate camping funds to regional. Interactive controls are as follows:

- From the "Initial days by State" heatmap, click on a state to view specified state information in all other charts.
- We can also select the group of States to click on the dropdown list or Ctrl-click on the heatmap.

Now, look at the color palette for the national heatmap – the Initial days by State. The colors range from dark brown to light brown and light blue to dark blue. The State has a high

average initial day in the dark blue, and the State has a low average initial day in dark brown. "Colour Scale feature helps end-users to structure business data and information and highlight it according to the region they belong to." (btProvider)

Have many different options in tableau to develop and design the dashboard for all to see. I used the "Color Blind" palette in the tableau. I also used Megan's idea to create colorblind-friendly dashboards, and I did not use red and green colors.

Based on the observation, the readmission rate is 36.69%, and almost the same for the male is 1773 with average initial days is 63.75, and for the female is 1813 with average initial days is 63.98. Therefore, it might be reasonable to have the campaign/marketing or send out the postcard reminder for a health check for both genders, not just focus on one. Also, we can see that the average income is $40,490.50, and patients who earn less than $49k/year have a higher risk of being readmitted. We had 70.86% of patients readmitted with an income range of $0k-$49k and 4.17% of patients readmitted with income greater than $100k. So the individual patient characteristics might influence repeat hospitalizations. Patients with a low- income may have more difficulties paying for prescriptions or accessing transport to follow-up schedules.

To reduce the readmission rate, the hospital needs to understand patients' social determinants, such as questions about living conditions and the ability to assess resources for food and transportation. Tableau analysis suggested that the hospital need to improve the hospital service and understand a patients' social determinants. More importantly, the current system for readmission may put facilities serving lower-income communities at a distinct financial disadvantage.

On the overall layout of the dashboard, I keep the number of a graph is minimal to present no threatening access to the datasets. I suggest the critical results in quickly understanding integers, dollar amounts, and percentages. The audience can find the dashboard and the dataset source, which I provided by clicking on the link below.

- Dashboard: Executive Dashboard link
- CMS Hospital Patient Satisfaction: U.S. Hospital Customer Satisfaction 2016-2020 | Kaggle

"Tableau helps turn insight into action, cut down analysis time, and change behaviors that help everyone be more data-driven across the business." (Tableau, n.d) Tableau is the quick interactive visualizations tool that helps data research make analysis more accessible, faster, and intuitive. The selection menu is easy to approach and friendly to users. The users click on the checkbox or dropdown functions to select what they would like to see. The users can also view the dashboard and see how it operates on several devices not limited to the laptop. "Tableau automatically understands the device that you're viewing the report on and makes adjustments accordingly." (Dewan, 2019)

References

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