D210 Representation and Reporting

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# Part I: Interactive Data Dashboard

## A1: Dashboard

See attached file “WGU 210 Medical Data Dashboard.twbx” or hosted version at <https://public.tableau.com/app/profile/andrew.fagundes/viz/WGU210MedicalDataDashboard/DoesBloodPressureAffectHospitalReadmissions?publish=yes>.

The Tableau dashboard for this assessment includes a Comparison Analysis performed on medical data. This report contains a side-by-side comparison using two different data sets, four different data representations, at least two interactive controls, and at least two KPIs computed using the data from both data sets.

## A2: Data Sets for Dashboard

For this task, I used the WGU provided medical\_clean data set, and a 3rd party data set obtained via Kaggle: Healthcare Data: Dummy Data with Multi Category Classification Problem (Patil, 2024). Please see the attached CSV files of my final two datasets titled: medical\_clean.csv and healthcare\_dataset.csv for the WGU and 3rd party datasets used in this task. The WGU data set consisted of key patient demographics and services performed while admitted into a hospital. The Kaggle data set has been created to serve as a resource for data science, this data contains key patient demographics and services performed while admitted into a hospital. Data was chosen due to its similarity to the WGU-provided data.

## A3: Step-by-Step Instructions for Dashboard Installation

Installation is not required since the dashboard is provided on Tableau Public. No download or purchase is needed to use Tableau Public. Users can access the dashboard if they have an Internet connection. The dashboard is available in the link here: [Dashboard Presentation](https://public.tableau.com/app/profile/andrew.fagundes/viz/WGU210MedicalDataDashboard/DoesBloodPressureAffectHospitalReadmissions?publish=yes).

## A4: User Instructions for Dashboard Navigation

Navigating the dashboards on Tableau Public is simple. The provided link above will allow you to open the dashboards and begin navigating its interactive controls. Due to the two data sets’ similarities, the data inside the dashboards has been joined together. By doing so, users can view the same metrics between both data sets side by side with the filters working for both outputs.

The first dashboard in the story is the introduction dashboard that shows the title of presentation, my name, and WGU’s logo. Once viewed, you can then click the gray box on top that’s captioned, “Demographic and Services KPIs for Hypertension Status,” to view the next dashboard. To view the last dashboard, you click the gray box on top that is captioned, “Billing, Admission Types, and Average Age.”

In the “Demographic and Services KPIs for Hypertension Status” dashboard, you will see a heading section that shows the title, color legend, variable filters, and caption that outlines key details of the dashboard. The dashboard is an analysis of medical data regarding patients with hypertension status, which is why the title ‘Hypertensive vs. Non-Hypertensive Patient Comparison’ is used. Within this dashboard, you see an overview of the two different data sets contained, one of which is the WGU Medical Data, the other being the Kaggle data set. Next to this information, you can see the color legend for hypertension status. Lastly, you see the four filters used: gender, overweight, insurance provider, and medication. These filters have a dropdown menu that you can use to click and apply which values you want to illustrate in the dashboard.

In the “Demographic and Services KPIs for Hypertension Status” dashboard, you see a side-by-side comparison with the Kaggle data set on the left-hand side and the WGU data set on the right-hand side. The first set of charts shows text tables that compare hypertensive and non-hypertensive patients based on gender, average age, average billing amount per patient, and total number of patients. The second set of visualizations are stacked bar charts illustrating the percentage of services that hypertensive and non-hypertensive patients received. The colors are used to display the hypertension status for each sample of patients. When clicking on a specific stacked bar, it will filter the results in the table charts based on the category represented. Hovering over the cells of both dashboards will provide tool tips that will provide relevant information regarding the visualization. For the text tables, the tool tips provide information on hypertension status, gender, and average billing amount. For the vertical stacked bar charts, the tool tips provide information about hypertension status, admission type, and percentage of patients that have received admission type.

In the “Billing, Admission Types, and Average Age” dashboard, the color legends on the top left illustrate hypertension status and total billing amounts for both data sets. The color legend titled “Blood Pressure Status” is describing the colors used for the horizontal stacked bar charts. These colors describe hypertension status. The legends titled “Total Billing Amount (Kaggle)” and “Total Billing Amount (WGU)” describe the total charges patients received dependent on their hypertension status and admission type. This is demonstrated in the tree map visuals on the right-hand side. The horizontal stacked bar charts on the left-hand side demonstrates the average age through mark labels written within each stacked bar. Mark labels are also used on the tree maps on the right-hand side to describe the hypertension status, admission type, and total billing charges for the patients in each category. When clicking inside a specific stacked bar or tree map section, this will filter the data for each data set for that specific sample of patients. This makes it easier to track a specific group of patients visually. Hovering over the cells of both dashboards will provide tool tips that will provide relevant information regarding the visualization. For the horizontal stacked bar tables, the tool tips provide information on hypertension status, admission type, and average age. For the tree maps, the tool tips provide information about hypertension status, admission type, total billing amount, and total number of patients.

For the visualizations of both dashboards, colors from the Tableau color blind palette were used (cite Tableau article here). By default, all categories in the filters in the first dashboard are selected. To deselect whichever category you would like to filter out, click on the respective box and make sure the checkmark is no longer present. Once you have clicked on the box, then you can click ‘Apply’ to complete the changes.

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The video recording for this assignment includes a vocal presentation of the dashboard being used, and a discussion of the charts created within it. The video recording for this project can be found inside the Panopto drop box titled “Representation and Reporting – NAMx | D210.”. Panopto video link: <https://wgu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=cacf6279-e5e8-48f4-ad16-b2c201870882>.

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# Part III: Reflection

## C1: Purpose and Function of Dashboards

Having high blood pressure puts you at risk for heart disease and stroke, which are leading causes of death in the United States (CDC, 2025). In 2022, high blood pressure was a primary or contributing cause of 685,875 deaths in the United States (CDC, 2025). High blood pressure costs the United States about $131 billion each year, averaged over 12 years from 2003 to 2014 (CDC, 2025). By understanding which groups of people are most affected by or most likely to have hypertension, we can better plan for preventative measures that can target the most at-risk groups. For this investigation, I chose to focus on hypertension as a point of interest medical condition. The purpose and function of the executive dashboard is to showcase which demographics are most at-risk for hypertension based on the existing patient records. This will help the hospital staff and stakeholders better predict and anticipate which patient groups are most likely at risk for hypertension. From there, they can plan interventions and preventative treatments for target groups.

The dashboards have been built for the purpose of reviewing details regarding patients for this hospital chain that have identified a readmission problem.  The visuals, filters, and presented data all show relationships between data points and help tell the story throughout the presentation that leads to the insights. Outlined in the WGU-provided Data Dictionary is to identify trends and key metrics to provide actionable business insights. The dashboards included in my Tableau story compare and visualize the key metrics for me to provide insight into the data that can be used to make data-driven decisions. By comparing WGU patient information with Kaggle patient information, we can see where we are exceeding or falling short in certain areas. By understanding what a provider is doing well and what needs to be improved, data-driven decision-making can assist providers in making better decisions to improve experiences, increase profits, and reduce readmission rates.

The dashboards are designed to tackle the challenge of CMS penalties by monitoring a specific medical condition, hypertension, and seeing if it affects readmission rates. By highlighting key correlations and providing detailed analysis via filters, it allows the hospital chain to adopt a data-driven approach to reducing hypertension and seeing what variables may influence hospital readmissions. The primary purpose of the dashboards is to showcase a side-by-side analysis of the two data sets alongside key performance indicators (KPIs) and metrics correlated with hypertension status. Notable KPIs include Average Billing Amount, Average Age, and Number of Patients, which are used to describe the demographics of hypertensive patients along with how much they were billed when admitted to the hospital.

Other visualizations explore primary services during admission, patient medical conditions, patient’s demographic data such as Age and Gender, and total billing amount charged for admission. These enable users to dissect the data and identify patterns. Filters for Overweight status, Gender, Medication, and Medical Provider enhance the dashboard’s utility, allowing users to compare characteristics of hypertensive versus non-hypertensive patients and pinpoint trends.

## C2: How do the variables of the Kaggle data set enhance our insights?

The additional Kaggle data set helps enhance the insights by providing an additional line of comparison for the variables we represented here. The additional data set, titled healthcare\_dataset, is comprised of data collected from 39,876 US hospitals from the years 2019-2024. (Patil, 2024). This data set also contained 10,000 patient records and contained no null values, which made it easier to analyze with the WGU data set. It also contained variables such as medical condition, insurance provider, and billing amount, which helped me determine ways to filter the information that could help understand the influences of readmission rates. Medical condition is an important variable because I could compare both data sets based on hypertension status. Including insurance providers as a filter was important to see which providers help patients save the most money in hospital admissions. Billing amount was an important variable because it allowed us to see which group of patients was being charged the most for hospital admissions. Finally, adding medications as a variable filter was important because it allowed us to see which medications were correlated with patients with lower billing amounts.

## C3: Two Different Representations and How They Help Executives With Decision Making

The two different data representations show us which groups of patients appear to have hypertension status along with the services they received. Both tables for age and billing amount based on a patients’ hypertension status show us that patients who were admitted were more likely to be non-hypertensive. The table for the WGU data set shows that hypertensive men were older and more likely to be charged more money than women. Nonbinary patients were charged the most amongst all categories. Hypertensive patients were also older in the WGU data set than they were in the Kaggle data set. There were more women who were hypertensive than men in the WGU data set while it was the opposite in the Kaggle data set. In the horizontal stacked bar charts, WGU data set illustrates that the highest number of hypertensive patients were admitted as an emergency while Kaggle’s data set illustrates that the highest number of hypertensive patients were admitted as elective. Majority of patients were non-hypertensive in the Kaggle data set while it was close to a 50/50 split of hypertensive and non-hypertensive patients in the WGU data set. In the Kaggle data set, hypertensive patients were charged the least when using Cigna as insurance provider. Hypertensive patients were also charged the least when prescribed with the medication, Paracetamol. Finally, in the WGU data set, hypertensive men who were overweight were charged more for hospital admission than overweight hypertensive women. Overweight nonbinary patients were charged the most regardless of hypertension status. Hospital executives and stakeholders can use these to help with decision making regarding how they can lower readmission rates of patients with hypertension. Seeing which groups are the highest at risk could help hospitals plan for better initial treatments. They can also use this data to predict future patient trends and plan preventative treatment and educational measures ahead of time. Research by the CDC shows that about 1 in 5 Americans with high blood pressure don’t even know that they have it (CDC, 2025). By creating targeted educational campaigns, they can further reduce potential readmissions since at risk patients would be better informed and can be treated early or begin preventative measures. Awareness could be established for patients about available insurance providers, the cost-benefit analysis of taking medications, and best practices for weight management.

Executives could use these dashboards to make decisions based on multiple variables. For example, the tables on the KPIs dashboard could be filtered to tell them which hypertensive patients are at risk for readmission based on the insurance provider they use, the medications they are prescribed, their overweight status, and what gender they are. It would tell them which categories contain the most at-risk patients for hospital readmission. The stacked bar charts could inform executives on how they can improve the hospital’s services for hypertensive patients so that way they can receive timely and effective treatment.

## C4: Two Interactive Controls and How They Enable Modification of Dashboard

One of my dashboard’s interactive controls is the filter for the insurance provider variable. This allows the user to select or deselect any specific insurance provider for the Kaggle data set and compare hypertensive patients based on the insurance they had and whether they paid money for their hospital admission. The users can also select and deselect the medication a patient was prescribed during their hospital visit. These filters apply to the table and stacked bar charts. This allows users to see if the medication prescribed influenced how much patients were charged and what services they received.

## C5: How is the dashboard made accessible for color-blind users?

To make the dashboard accessible for individuals with colorblindness, I used colors from the Tableau Color Blind 10 palette. I avoided using reds and greens together since those can be problematic for color blind people to distinguish. For the tree maps and stacked bar charts, I applied the color-blind palette. This palette was not necessary for the text tables in the first dashboard. For the stacked bar charts, I used dark blue and orange colors form the Color Blind 10 palette since those colors are a good contrast and can be distinguished by color blind people. (Shaffer 2016). For the tree map, it needed a range of colors for the range of values and did not have a colorblind palette. To compensate for that, I chose a palette that mainly aligned with the blues and oranges from the previous dashboard along with contrasting tones of blues and reds. The tree map uses box size and color to convey its values. There are also borders and text values on each visualization to help ensure this is understandable even without the colors being fully present (Shaffer 2016). There are also tool tips that users can view by hovering over a particular dashboard, which allows them to see the relevant information in a visualization. I also made a point to use the same palette to maintain consistency and readability throughout the story.

## C6: Two Data Representations That Help Explain the Story Told

The bulk of the story is told through the text tables and stacked bar charts. The text tables visually represent the average age, average billing amounts, genders, and total number of patients depending on hypertension status. This data highlights key demographic trends, such as which age groups account for the highest patient volume and associated charges. The story emphasizes understanding demographics and financial drivers in healthcare. These bar graphs help communicate which groups of patients received certain admission types along with whether they were hypertensive or not. These visuals also helped communicate which groups of patients are the primary users of healthcare services and where the most significant costs are incurred. This representation also aligns with the narrative that healthcare organizations must allocate resources effectively based on demographic patterns. For example, in the WGU data set, hypertensive patients were older on average. This may signal a need for additional geriatric care resources or preventative measures to reduce costs. By focusing on certain demographic trends, the story becomes relatable to executive leaders, emphasizing operational priorities (for the Senior VP of Hospital Operations) and research opportunities (for the VP of Research). It provides actionable insights into how specific age groups or genders impact the organization’s operations and finances. These visualizations simplify complex data into digestible insights, helping the audience quickly identify key trends. They support the story by reinforcing the need for strategic initiatives, such as improving emergency response efficiency or tailoring services to hypertension-specific trends. These data representations were carefully chosen to enhance the narrative by visually highlighting the most critical aspects of patient demographics, healthcare costs, and care delivery relative to hypertension status. They support the story by making the data both engaging and actionable, aligning perfectly with the goals of the audience. For now, we can at least look at the patients that did have high blood pressure and see how we can improve their treatment and services received by the hospital. With the filters of overweight status, insurance provider, and medication, we can find ways to implement best practices and awareness on improving a patient’s weight, their insurance status so they can save money, and determining which medications work best for hypertensive patients.

## C7: Audience Analysis for Presentation

The audience is a mixed group of executives and peer analysts. The dashboard has been designed to give a quick high-level review briefly, with further details if needed on options like tool tips. The expectation is the executives can digest the information quickly without extra details but can dig in and find more if needed. The added details will provide the other analysts with these extra details and the presentation will include a deeper dive into how the data was brought together since the executives will not be attending. With the data dictionary in mind, I tailored my presentation to what I believed the audience, hospital executives, would be interested in – learning more about the patients to improve processes, become more efficient, and eventually reduce costs/increase profits. I focused on the patient as it is the main unknown a provider faces. A provider can control the caliber of doctors and staff they employ, purchase the most high-tech equipment, and always have plenty of hospital beds available, but what they cannot control is what kind of patient walks in their door. Thus, I tailored my presentation to hospital executives to provide insights into past patients and how we can use that data moving forward to improve hospital processes.

## C8: How Was Universal Access Provided for Users?

My presentation was intentionally designed to be universally accessible by all audiences and not just people in the medical field. The Tableau dashboard was made public and accessible for anyone with internet access to view for free. The dashboard was designed to be simple to understand and does not rely on medical terminology. The colors for the visualizations were chosen so that even people with color blindness would be able to understand and distinguish the visuals. The dashboards are grouped together with visualizations that are related, and all filter selections update the others as needed. There are keys and instructions for how to utilize the filters along with explanations for some of the visualizations that needed clarification. The dashboard also was designed by using clear fonts, adequate spacing, and concise labeling to enhance readability and comprehension for users of all abilities. Lastly, side-by-side views make it easier for audiences to identify trends and discrepancies without needing advanced analytical skills.

## C9:  Two Elements of Effective Storytelling

To tell a story with the data, I first engaged with the audience by introducing myself and setting a narrative they could relate to. Good story telling begins with capturing your audience’s attention, and this can be achieved by peaking their interests and invoking an emotional reaction. (Knaflic 2015). By bringing up how 1 in 5 Americans have high blood pressure and don’t even know it, as well as mentioning my own personal experience with high blood pressure and how it affected my dad, I hoped to invoke an emotional response for my audience and capture their attention right before presenting. Many people are familiar with hypertension and many people have a loved one or someone they know with this condition. While my intent isn’t to scare or alarm people, perhaps individuals who view my presentation and realize that they fall within the most likely groups of people to hypertension can schedule doctor visits and determine their risk factors as well. Showing how common high blood pressure is helps to further contextualize to the audience the need to understand who is most likely impacted. Showcasing the interactive charts of the dashboards helped better contextualize patients at-risk for hypertension by providing adaptive visuals for the audience. They can specifically focus on certain variables such as gender, overweight status, insurance provider used, and medication prescribed using the filters and see for themselves how likely these patients were hypertensive.

In presenting the dashboard to my peers, I aimed to maintain a clear structure in my storytelling. A compelling story follows a clear plot: a beginning, middle, and end (Rose, 2025). After my introduction, the beginning focused on outlining the problem of hospital readmissions and the motivation behind the dashboard and analysis. The middle highlighted the findings and provided an explanation of the dashboard. Finally, the ending emphasized key takeaways and actionable steps based on the results. This structured approach is designed to give the audience a logical flow, making the information easier to follow and understand. Using advice from the LinkedIn learning course from Doug Rose, I also used a variation of overcoming the monster plot-type to frame the story and personal anecdotes in presenting the conflict to gain the audience’s interest (Rose 2025).

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