**MODULE 7: HOMEWORK ASSIGNMENT**

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**DATA SET:**

* Download the dataset “MOCK\_HealthDATA” from the canvas course module.

**DATA CLEANING:**

* Before Cleaning the dataset, initially analyze the given dataset whether it contains any Null values or not.
* Apply Filter to each variable column in the excel.
* Check whether there are any null values or not, and the data types.
* After a deep Analysis, I found that there are no Null values, and all data types of variables are correct. So, this dataset does not require any data cleaning and I can use this dataset for further analysis.

**REASONS FOR SELECTION OF CHARTS:**

1. **Average cost per day by hospital and department**

* **Chart Summary:** The graph represents the average daily costs for different hospital departments.
* **Type of Chart:** Bar Chart
* Using the bar chart, it is simple to identify and compare the daily costs across different hospital departments.
* Each department was coded with different colors such as, Blue represents the Cardiology department, Orange represents the ER department, Red represents the Neurology department, Light teal represents the Orothopedics department and Green represents the Surgery department.
* **Parameters:** Top N Hospitals
* The user may alter the range between 1 to 100 from the Top N Hospitals to view the statistics for the top hospitals based on the range they have chosen.
* **Calculation Field:** Cost Per Day
* Using the calculation field for this chart, the total cost per day was calculated by using the formula below.

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Description automatically generatedCost per day = [Cost of Stay]/[Length of Stay]

**Figure 1:Chart 1 - Hospital & Department Cost Analysis**

* **REASONS:**
* As shown in Figure 1, this chart represents the average total expenditure for each department in selected top hospitals. Also, it provides a clear comparison of which hospital spends more on each department.
* By utilizing the "TOP N hospitals" parameter, business can easily identify the hospitals with the highest and lowest expenditures.
* This graph Figure 1 shows the hospital's overall cost expenditures by seeing the costs allocated to each department.

1. **Patients satisfaction rate based on particular year for that department.**

* **Chart Summary:** The graph Figure 2, provides the satisfaction rate information of the patients of a specific hospital department during a particular year.
* **Type of Chart:** Ganttbar Chart
* Here, I'm using a Gantt bar chart to visualize the total count of patients based on the satisfaction rate level to a specific hospital department during a particular year. This Gantt bar chart offers a clear representation of patient admission patterns over time.
* Each level was coded with different colors such as, Blue represents the Agree, Orange represents the Disagree, Red represents the Neutral, Light teal represents the Strongly Agree and Green represents the Strongly Disagree.
* **Filters:**
* Year of date admitted - This filter makes users select one or multiple years from the dropdown.
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  Description automatically generated**Departments - This filter helps users to select one or multiple departments to compare the data between them from the dropdown.

**Figure 2: Chart 2: Yearly Patients Satisfaction rate**

* **REASONS:**
* This chart 2 [Figure2], provides clear feedback for each hospital department based on the quality of doctor's treatment provided to patients during a specific year.
* From the above Figure 2, it enables easy identification of departments with positive feedback, indicated by "Strongly Agree," and those with negative feedback, represented by "Strongly Disagree."
* By choosing different years, this graph [Figure2] allows business to see how the doctor's treatment plan for a certain patient has changed each year.

1. **The Distribution of Patients and Staff and Staff-to-Patient Ratio across Hospital Departments Based on Admission Date**

* **Chart Summary:** The graph Figure 3, provides the information of total number of patients, staff, and the Staff-to-patient ratio across all the departments in the hospital based on their year of admission.
* **Type of Chart:** Bar Chart
* It is simple to see the total number of patients, staff, and their ratio counts in selected year using a bar chart.
* Here also, each year is represented with different colors. Purple represents the year 2018, Orange represents the year 2019, Red represents the year 2020, Light teal represents the year 2021 and Green represents the year 2022, Blue represents the year 2023.
* **Filters:**
* Departments - This filter helps users to select one or multiple departments to compare the data between them from the dropdown.
* **Calculation Field: Patient-Staff Ratio**
* To determine the patients-staff ratio for this chart, the calculation field has been employed together with the number of patients and the number of staff members. Below is the formula for Patient-Staff Ratio,

SUM([Number of Patient]) / SUM([Number of staff])

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**Figure 3: Chart 3: Hospital Department Patient-Staff Ratio**

* **REASONS:**
* Annual data on the total number of patients admitted to different hospital departments are shown in this chart 3 [Figure 3]. Additionally, it draws attention to the patterns in patient counts over the years and shows whether admissions increased or decreased over time.
* Additionally, it gives details on the number of employees working in each department as well as the rate of staff growth and decline over time.
* Provides the information about the patients and staff ratio to the business which clearly finds the insights of how many number of patients were assigned to each staff.

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**Figure 4: Dashboard: Hospital departments patient analysis**

**LOGO Reference:** <https://images.techhive.com/images/article/2014/12/healthcare-data-thinkstock-100533600-primary.idge.jpg>

**BUSINESS INSIGHTS:**

* According to Figure 1, the Neurology department for hospital code 91 had the highest average day cost, which was $16,664, and the same department had the second-highest average day cost for hospital code 24, which was $15,637. However, with an average cost per day of $91, the same department of Neurology has the lowest cost for the hospital code 95.

Below is a description of the department’s highest average prices with their hospital codes.

* Cardiology - $7,478 - Hospital code 95
* ER - $8,271 - Hospital code 64
* Neurology - $16,664 - Hospital code 91
* Orothopedics - $6,195 - Hospital code 24
* Surgery - $6,516 - Hospital code 71
* According to Figure 2, the Cardiology department received the highest number of positive feedbacks from the patients were 9,516,947 patients strongly agreeing in the year 2020, indicating excellent treatment by the department's doctors. Additionally, Cardiology consistently had the most patients strongly agreeing in each year compared to other departments.
* On the other hand, the ER department received the highest negative feedback in the year 2019, with 1,543,436 patients strongly disagreeing. In contrast, the Orthopedics department maintained more neutral feedback from patients, with 2,636,322 patients agreeing as neutral in the year 2018.
* According to Figure 3, there are 9,892,613 patients and 850 staff members at the cardiology department which is the highest number of patients visiting in 2020. From the next years on, there is a progressive decline in the number of patients, and in 2023, there are 2,599,099 patients and 263 staff members. In the year 2019, the ER department is highlighted as having the greatest patient-staff ratio with 11,875 in the year 2021 and the lowest patient-staff ratio with 8,064.
* Finally, from the figure 4, at every hospital, the number of staff members assigned to a certain department increases as the number of patients visiting that department increases, as they are both closely related.