Healthcare Data Analysis:

Uncovering Insights from Patient Records

Submitted by:

Gurpreet Singh (ID: 0283945)

Bhavinkumar J Patel (ID:0285763)

Md Sahid Parvez (ID:0276904)

Randeep Kaur (ID: 0283916)

Presented by:

Group Winter

Course: Data Visualization

Submitted to:

Dr. Shervin Espahbod

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Introduction

- *Like many industries, healthcare is in a state of continuous improvement. We are looking for better ways of treating patients and achieving better outcomes.*

- *The presentation focuses to analyse data of healthcare, which includes patient details as well as medical features and condition. This analysis also helps to understand treatment patterns, medication regimes, and outcomes by using data visualization*

- *The importance of analysing health data helps as a tool to enhance patient care and it also helps to optimise the resource allocation along with informed decision making with in healthcare management. It analyses the data set containing patient details, medical features , treatment and billing amounts, healthcare management can identify patterns and areas for their improvement.*

- *It helps to make more effective healthcare decisions and improve the professionals for better results to meet required needs of different patients. So, these datasets improve health outcomes and increase the process and quality of patient care.*

Data Description

- *The dataset contains extensive patient records, covering demographic information such as Name, Age, and Gender, along with medical details like Blood Type and Medical Condition. It also includes treatment specifics such as Doctor and Medication, as well as healthcare facility data like Hospital and Room Number. Key admission and discharge information such as Date of Admission, Admission Type, and Discharge Date are also included.*

- *The data contains 10000 rows and 15 columns There is no null and duplicate values in the data. We created two columns namely, 'Age Group' and 'Days in Hospital'.*

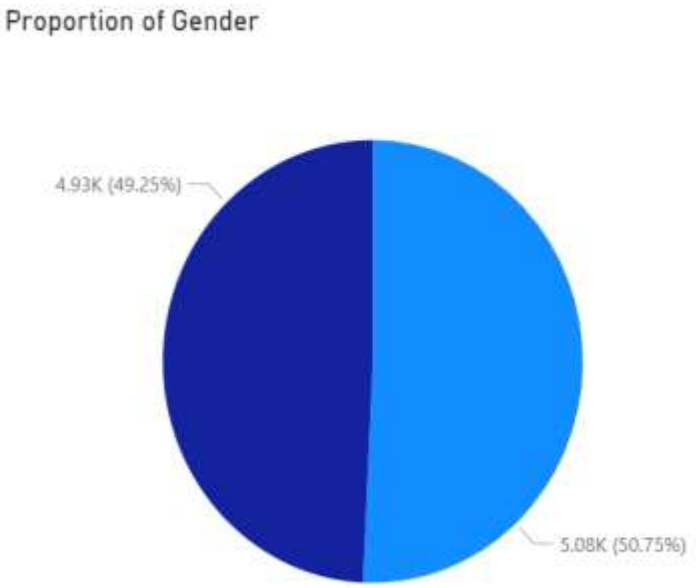
	A	B	C	D	E	F	G	H	I	J	
1	Name	Age	Gender	Blood Type	Medical Condition	Date of Admission	Doctor	Hospital	Insurance Provider	Billing Amount	Room N
2	Tiffany Ramirez	81	Female	O-	Diabetes	2022-11-17	Patrick Parker	Wallace-Hamilton	Medicare	37490.98336	
3	Ruben Burns	35	Male	O+	Asthma	2023-06-01	Diane Jackson	Burke, Griffin and Cooper	UnitedHealthcare	47304.06485	
4	Chad Byrd	61	Male	B-	Obesity	2019-01-09	Paul Baker	Walton LLC	Medicare	36874.897	
5	Antonio Frederick	49	Male	B-	Asthma	2020-05-02	Brian Chandler	Garcia Ltd	Medicare	23303.32209	
6	Mrs. Brandy Flowers	51	Male	O-	Arthritis	2021-07-09	Dustin Griffin	Jones, Brown and Murray	UnitedHealthcare	18086.34418	
7	Patrick Parker	41	Male	AB+	Arthritis	2020-08-20	Robin Green	Boyd PLC	Aetna	22522.36338	
8	Charles Horton	82	Male	AB+	Hypertension	2021-03-22	Patricia Bishop	Wheeler, Bryant and Johns	Cigna	39593.43576	
9	Patty Norman	55	Female	O-	Arthritis	2019-05-16	Brian Kennedy	Brown Inc	Blue Cross	13546.81725	
10	Ryan Hayes	33	Male	A+	Diabetes	2020-12-17	Kristin Dunn	Smith, Edwards and Obrien	Aetna	24903.03727	
11	Sharon Perez	39	Female	O-	Asthma	2022-12-15	Jessica Bailey	Brown-Golden	Blue Cross	22788.23603	
12	Amy Roberts	45	Male	B-	Cancer	2021-04-13	Anthony Roberts	Little-Spencer	Aetna	40325.07139	
13	Mrs. Caroline Farrell	23	Female	O-	Hypertension	2019-06-09	William Miller	Rose Inc	Medicare	6185.90353	
14	Christina Williams	85	Female	A+	Diabetes	2021-11-29	Laura Roberts	Malone, Thompson and Mejia	Aetna	4835.94565	
15	William Page	72	Female	A+	Diabetes	2021-07-29	James Carney	Richardson-Powell	Cigna	13669.37774	
16	Michael Bradshaw	65	Female	AB+	Cancer	2021-06-05	Katherine Lowe	Castaneda-Hardy	Cigna	10342.83612	
17	Brian Dorsey	32	Female	O+	Arthritis	2021-08-07	Curtis Smith	Burch-White	Aetna	27174.94291	
18	Olivia Gonzalez	64	Male	AB-	Diabetes	2019-11-15	Clayton Mcknight	Cunningham and Sons	Aetna	17394.99426	
19	Teresa Caldwell	23	Male	A+	Arthritis	2022-03-08	Debra Meyers	Bell, Mcknight and Willis	Medicare	45213.53763	
20	Desiree Williams MD	66	Male	O+	Obesity	2022-06-19	Megan Sanders	Pugh-Rogers	UnitedHealthcare	4262.911578	

Data Analysis Storytelling

1. Patient Demographics
2. Medical Conditions
3. Hospitals and Doctors Trend
4. Healthcare Utilization
5. Insurance Coverage

1. Patient Demographics

Pie Chart showing the Distribution of Patients by Gender and a Table showing the percentage of patients with each blood type.

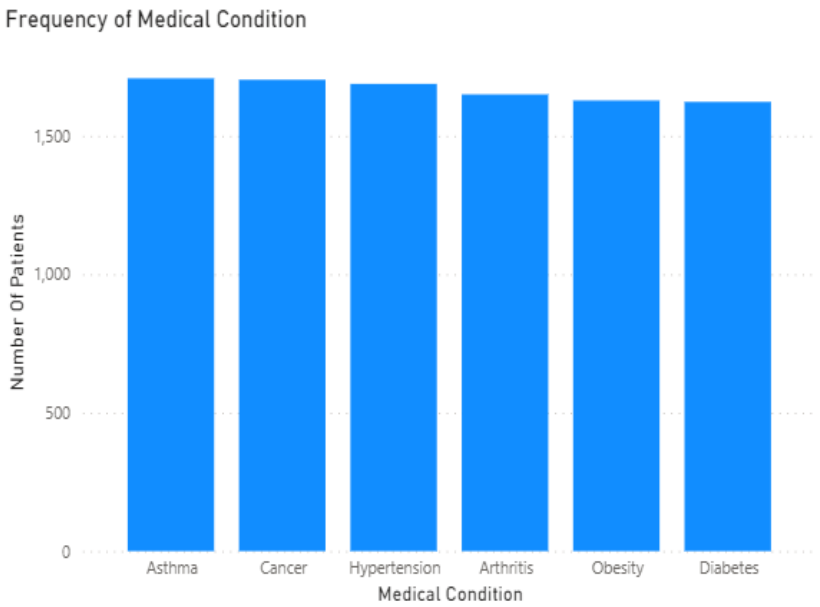


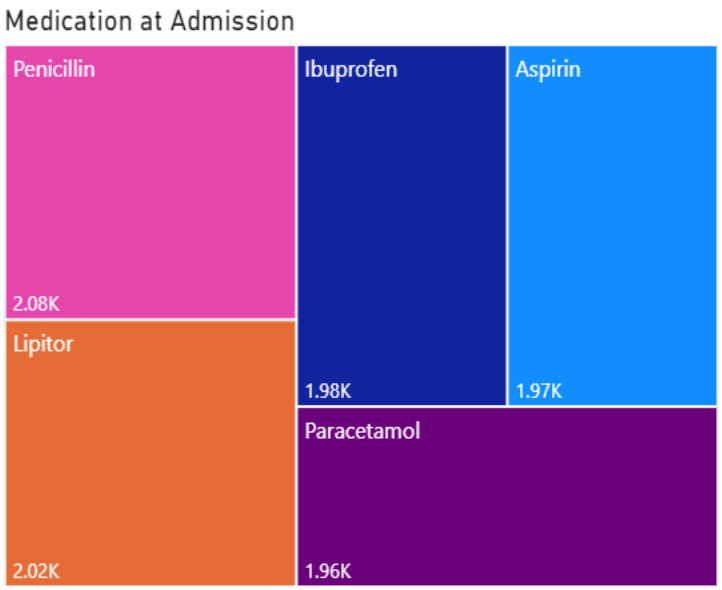
Blood Type	Percentage
AB-	12.75%
AB+	12.58%
B-	12.52%
O+	12.48%
B+	12.44%
O-	12.44%
A+	12.41%
A-	12.38%
Total	**100.00%**

Interpretation: The female gender dominates in the dataset and AB- is the leading blood group in the dataset, followed by AB+.

2. Medical Conditions

Bar graph to illustrate the prevalence of different medical conditions among the patients and a Treemap to show the frequency of each Medication at Admission

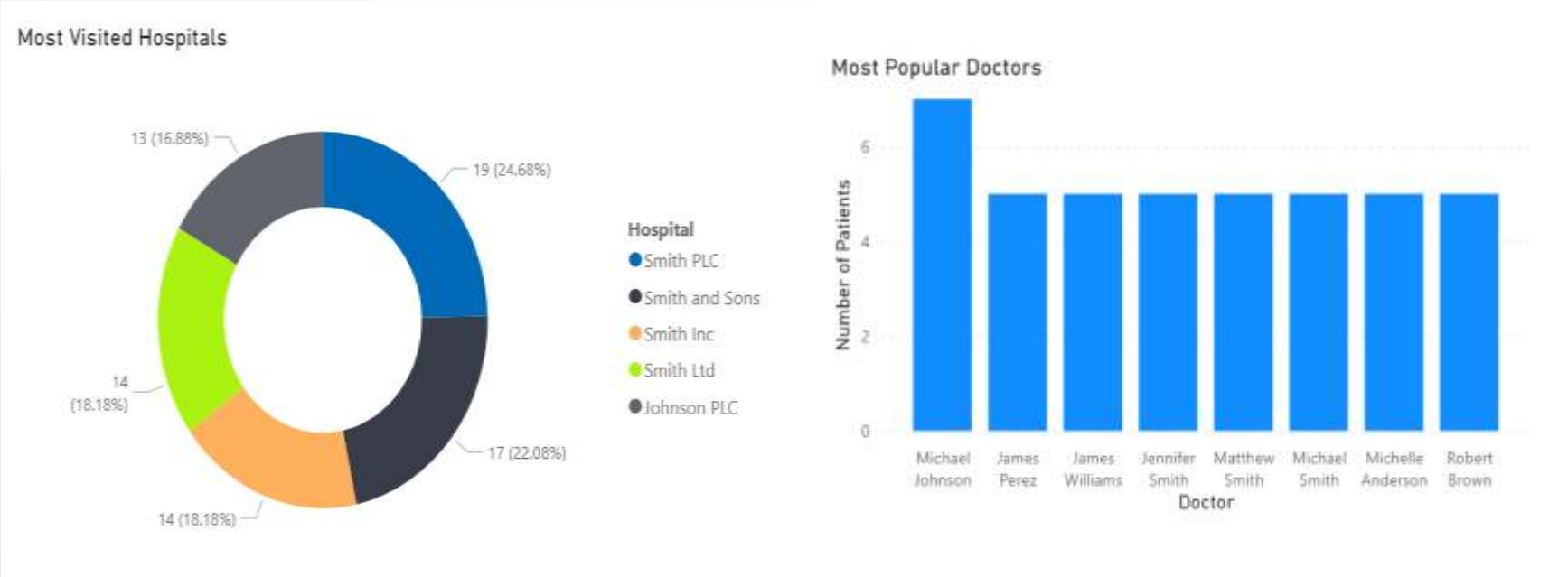




Interpretation: Asthma and Cancer are the top two primary medical condition and Penicillin is the most prescribed drugs at Admission followed by Lipitor.

3. Hospitals and Doctors Trend

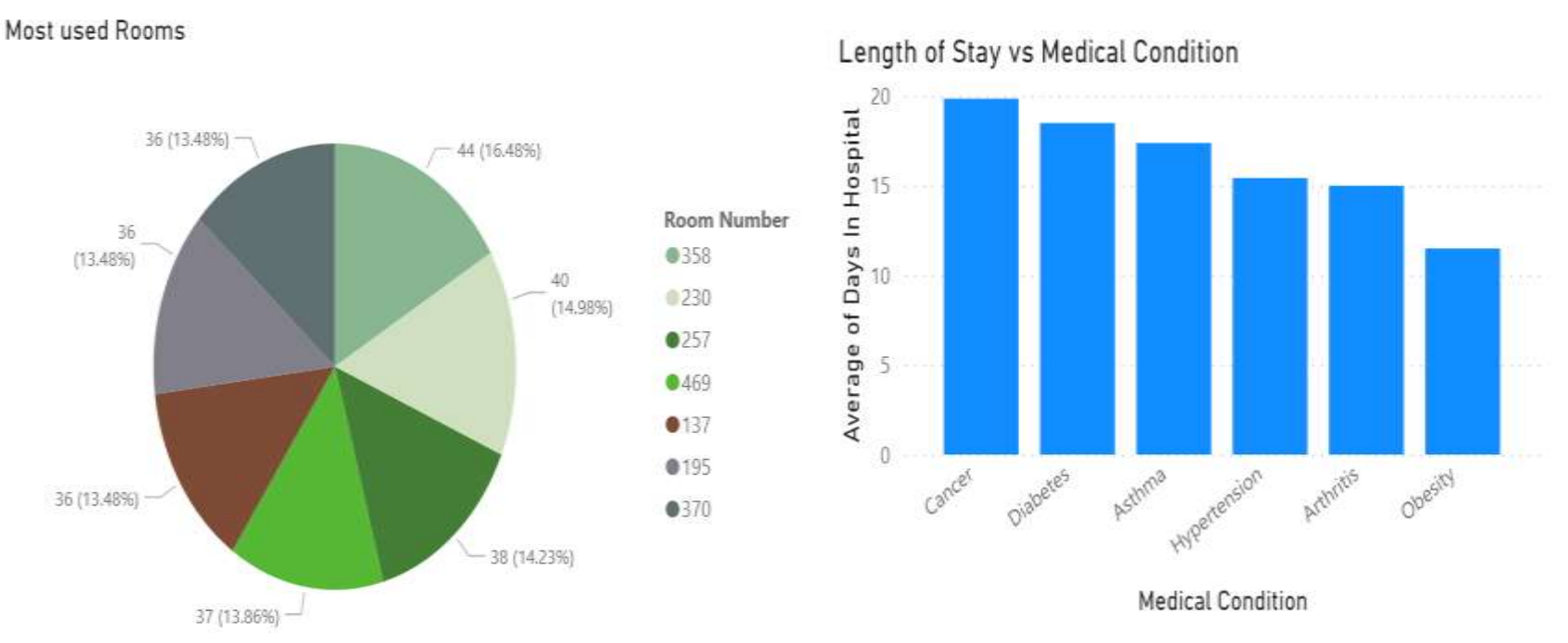
Donut Chart to illustrate most visited Hospitals and a Bar Graph to show top visited Doctors.



Interpretation: Smith PLC is the most visited hospital and Micheal Johnson is the most popular doctor.

4. Healthcare Utilization

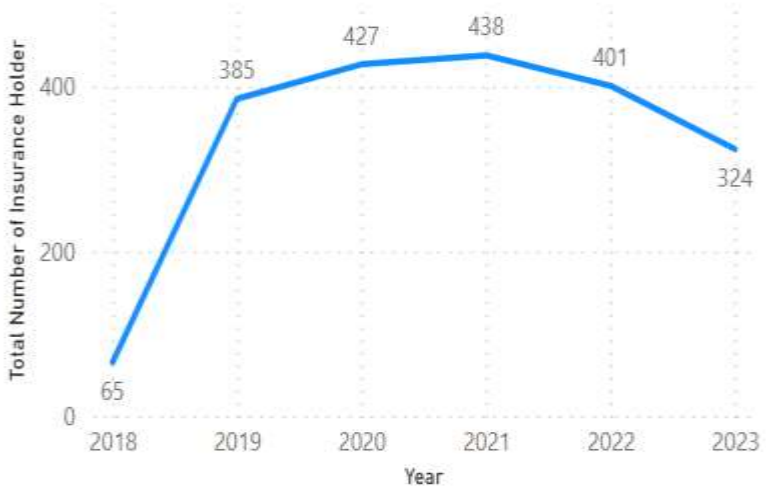
Pie Chart to illustrate most used rooms and a Bar Graph to show average length of hospital stay for patients with different medical conditions.



Interpretation: The most used room is Room Number 358 and Patient with Cancer stays longer than other.

5. Insurance Coverage

Line Graph to demonstrate trend of Insurance Provider over the years and a Table to show the percentage of patients covered by each insurance provider and the average billing amount for each.



Insurance Provider	Average of Billing Amount	% of Patients
Cigna	25,656.95	20.40%
Blue Cross	25,652.49	20.32%
Aetna	25,837.92	20.25%
UnitedHealthcare	25,404.69	19.78%
Medicare	25,002.48	19.25%
Total	**25,516.81**	**100.00%**

Interpretation: There is sudden increase in number of Insurance holder at the start of 2019 and Cigna pays highest amount of bill on average.

Dashboard

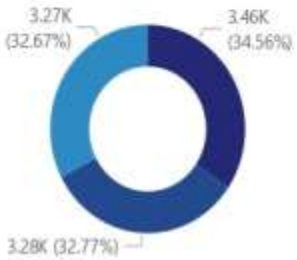
Total Patients

10K

Blood Type	Frequency
O+	1248
O-	1244
B+	1244
B-	1252
AB+	1258
AB-	1275
A+	1241
A-	1238
Total	**10000**

Age Group	Frequency
Child	164
Senior	2934
Adult	6902
Total	**10000**

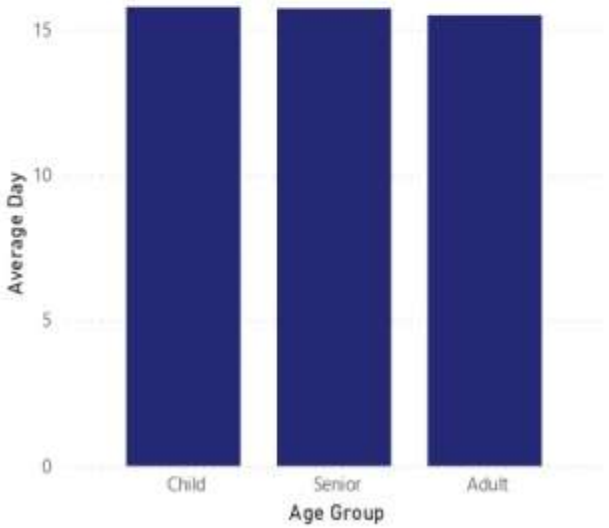
Test Result by Outcome



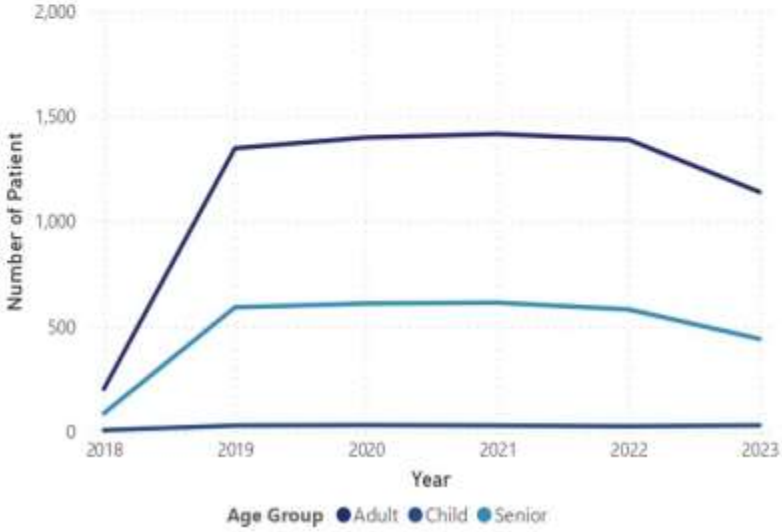
Number of Patient by Month

Most Popular Doctor

Average Days In Hospital by Age Group



Admission Trends by Age Group



Dashboard Description

- *The dataset contains a total of 10,000 patients, with AB- being the most common blood type. However, all blood types are present in almost similar numbers. It consists of 64 children, 2,934 seniors, and 6,902 adults.*
- *The line graph illustrates that the highest number of hospital admissions occurs in November, reaching 883, while February sees the lowest admissions at 778.*
- *The most frequented doctor is Michael Johnson, as indicated in the dashboard's Treemap. On average, children spend more days in the hospital compared to other age groups.*
- *Although the number of child admissions remains steady over the years, adult and senior admissions sharply rise after 2018, stabilizing until 2022 before declining in 2023.*
- *Normal test outcomes are observed in 32.57% of cases.*

Conclusion

We conclude that hospitals need to prepare for November, as it consistently sees the highest number of admissions. Allocating more resources during this month would ensure adequate support for the influx of patients. Given the lower proportion of children in the dataset, hospital administrations should consider hiring additional medical professionals targeting adult and senior care. Efforts should also be made to reduce inconclusive test outcomes by implementing proper methods and tools.

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THANK YOU