CREATING DASHBOARD USING POWER BI

TITLE

HOSPITAL EMERGENCY ROOM DASHBOARD

Documented By

THERU HARISCHANDRA PRASAD

LinkedIn: http://www.linkedin.com/in/hari-theru

Mobile.No: +91 9640871665

Gmail: haritheru1672@gmail.com

HOSPITAL EMERGENCY ROOM DASHBOARD

Problem Statement

Hospitals face a massive challenge in managing patient flow in Emergency Rooms. Delays in identifying high patient volume periods, long wait times, and operational bottlenecks lead to dissatisfaction and inefficiency. This Power BI project focuses on building a real-time dashboard to support ER teams in making quick, informed decisions by analyzing patient visits, wait times, referrals, and satisfaction levels.

Abstract

The dashboard integrates hospital emergency room data to display interactive KPIs including average wait times, patient satisfaction scores, admission status, and departmental referrals. It enhances visibility into patient flow and identifies trends by demographics, visit time, and referral sources. Built with DAX and Power BI visuals, the report empowers hospitals with operational intelligence to boost efficiency and reduce patient dissatisfaction.

Introduction

Emergency rooms often experience unpredictable patient volumes. Without data insights, staff struggle with prioritization and efficient management. Using Power BI, this dashboard provides real-time visibility into ER operations by analyzing 9000+ patient records, visualizing key metrics such as wait time, gender distribution, age groups, referral departments, and admission status.

Tools and Technologies used:

- ➢ Power BI – Dashboard creation and DAX calculations
  ➢ Excel – Initial data cleaning and formatting
  ➢ CSV Dataset – Contains emergency visit records
  ➢ DAX – Created calculated measures for KPIs like Avg Wait Time, Referral Count & Admission %
  .

Methodology:

The dashboard was developed using the CRISP-DM methodology:

Data Collection:

Source: Internal hospital patient logs in .CSV format

Fields included: Patient ID, Name, Age, Gender, Race, Admission Date, Wait Time, Department Referral, Admission Status, Satisfaction Score.

Data Cleaning & Preprocessing (Excel & Power BI)

Removed duplicates, filled missing values, formatted text case, and normalized numerical columns.

Data Transformation (Power Query)

Created derived columns like Age Groups, Wait Time Buckets, and Satisfaction Bands.

Data Modeling;

- Used a single table model
- Created calculated columns for Age Group, Gender Count, % Seen Within 30 Min
- Applied DAX for KPIs:
- Avg. Wait Time
- Patient Count
- Patient Satisfaction Score
- Admission Rate
- Seen Within Target

DAX Measures Used :

```
Total_Patients = COUNT(Patient_Data[Patient_ID])

Admitted_Patients = CALCULATE(COUNT(Patient_Data[Admission_Status]),
Patient_Data[Admission_Status] = "Admitted")

Avg_Wait_Time = AVERAGE(Patient_Data[Wait_Time])

Satisfaction_Score = AVERAGE(Patient_Data[Satisfaction_Score])

Seen_Within_30_Min = CALCULATE(COUNT(Patient_Data[Wait_Time]), Patient_Data[Wait_Time] <=
30)
```

Dashboard Analysis:

The dashboard visually reveals that:

- Patients in the 40-49 age group have the highest volume (1,200 in consolidated view).
- Wait times exceeding 60 minutes are highly correlated with lower satisfaction scores.
- General Practice has the largest referral volume (18%), while Orthopedics shows higher patient turnover.
- Males slightly dominate the dataset (48.69%), with equal admission risks across genders.
- Peak patient volume observed between 07:00-09:00 and 13:00-15:00.

Implementation:

Development Phases:

- Download and Open the Dataset : The dataset was sourced from an Excel file containing patient records.

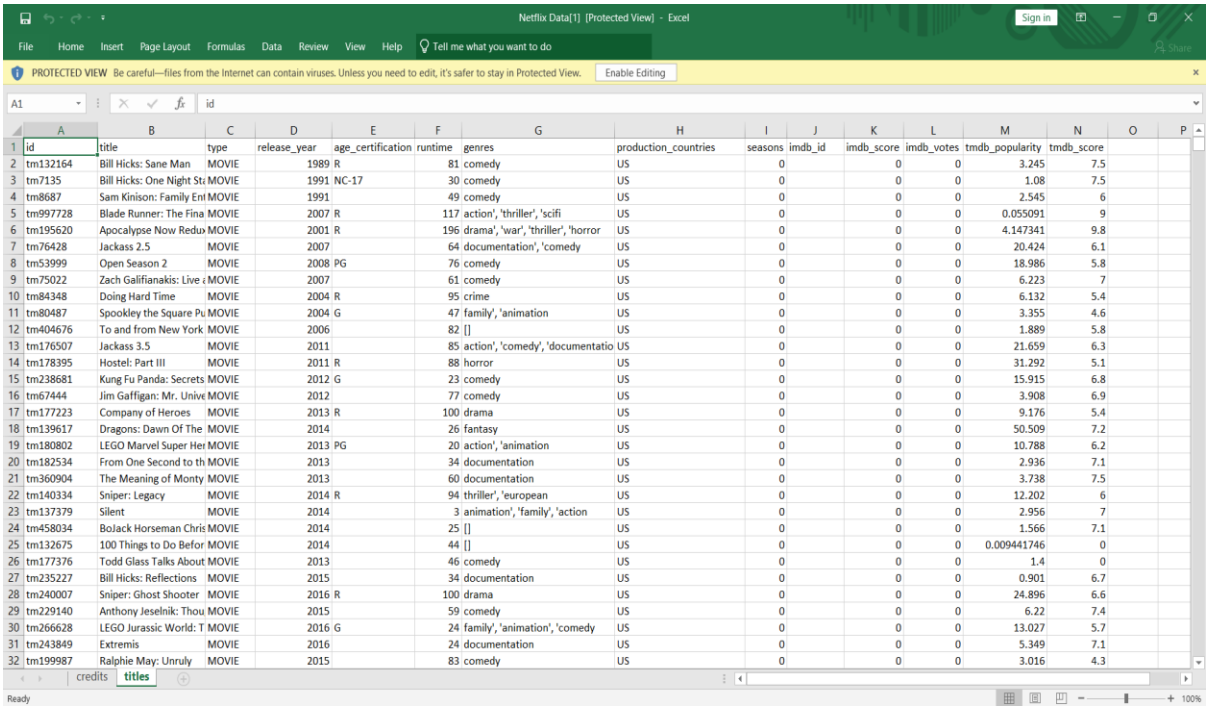
  Remove Duplicates : Go to the Data tab in Excel and select Remove Duplicates.

- Normalize Column Data : Data formatting and transformation in Power Query.

  Save Cleaned Data : Saved the processed dataset

  - .

  - Handling missing data
  - Normalize column data
  - Data Formatting
  - Save cleaned data

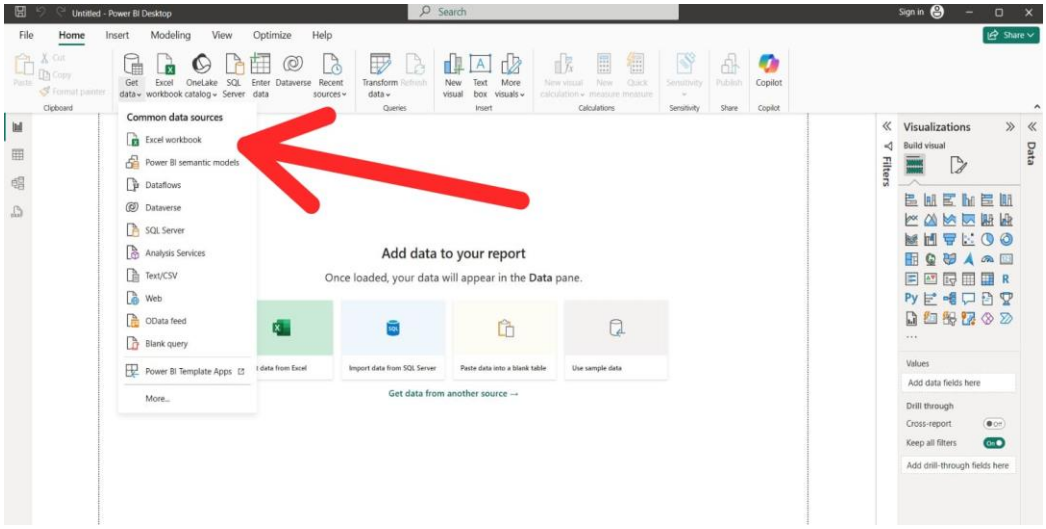


	id	title	type	release_year	age_certification	runtime	genres	production_countries	seasons	imdb_id	imdb_score	imdb_votes	tmdb_popularity	tmdb_score
2	tm132164	Bill Hicks: Sane Man	MOVIE	1989	R	81	comedy	US	0		0	0	3.245	7.5
3	tm7135	Bill Hicks: One Night St	MOVIE	1991	NC-17	30	comedy	US	0		0	0	1.08	7.5
4	tm8687	Sam Kinison: Family Ent	MOVIE	1991		49	comedy	US	0		0	0	2.545	6
5	tm997728	Blade Runner: The Fina	MOVIE	2007	R	117	action', 'thriller', 'scifi	US	0		0	0	0.055091	9
6	tm195620	Apocalypse Now Redu	MOVIE	2001	R	196	drama', 'war', 'thriller', 'horror	US	0		0	0	4.147341	9.8
7	tm76428	Jackass 2.5	MOVIE	2007		64	documentation', 'comedy	US	0		0	0	20.424	6.1
8	tm53999	Open Season 2	MOVIE	2008	PG	76	comedy	US	0		0	0	18.986	5.8
9	tm75022	Zach Galifianakis: Live a	MOVIE	2007		61	comedy	US	0		0	0	6.223	7
10	tm84348	Doing Hard Time	MOVIE	2004	R	95	crime	US	0		0	0	6.132	5.4
11	tm80487	Spookley the Square Pu	MOVIE	2004	G	47	family', 'animation	US	0		0	0	3.355	4.6
12	tm404676	To and from New York	MOVIE	2006		82	[]	US	0		0	0	1.889	5.8
13	tm176507	Jackass 3.5	MOVIE	2011		85	action', 'comedy', 'documentatio	US	0		0	0	21.659	6.3
14	tm178395	Hostel: Part III	MOVIE	2011	R	88	horror	US	0		0	0	31.292	5.1
15	tm238681	Kung Fu Panda: Secrets	MOVIE	2012	G	23	comedy	US	0		0	0	15.915	6.8
16	tm67444	Jim Gaffigan: Mr. Unive	MOVIE	2012		77	comedy	US	0		0	0	3.908	6.9
17	tm177223	Company of Heroes	MOVIE	2013	R	100	drama	US	0		0	0	9.176	5.4
18	tm139617	Dragons: Dawn Of The	MOVIE	2014		26	fantasy	US	0		0	0	50.509	7.2
19	tm180802	LEGO Marvel Super Her	MOVIE	2013	PG	20	action', 'animation	US	0		0	0	10.788	6.2
20	tm182534	From One Second to th	MOVIE	2013		34	documentation	US	0		0	0	2.936	7.1
21	tm360904	The Meaning of Monty	MOVIE	2013		60	documentation	US	0		0	0	3.738	7.5
22	tm140334	Sniper: Legacy	MOVIE	2014	R	94	thriller', 'european	US	0		0	0	12.202	6
23	tm137379	Silent	MOVIE	2014		3	animation', 'family', 'action	US	0		0	0	2.956	7
24	tm458034	BoJack Horseman Chris	MOVIE	2014		25	[]	US	0		0	0	1.566	7.1
25	tm132675	100 Things to Do Befor	MOVIE	2014		44	[]	US	0		0	0	0.009441746	0
26	tm177376	Todd Glass Talks About	MOVIE	2013		46	comedy	US	0		0	0	1.4	0
27	tm235227	Bill Hicks: Reflections	MOVIE	2015		34	documentation	US	0		0	0	0.901	6.7
28	tm240007	Sniper: Ghost Shooter	MOVIE	2016	R	100	drama	US	0		0	0	24.896	6.6
29	tm229140	Anthony Jeselnik: Thou	MOVIE	2015		59	comedy	US	0		0	0	6.22	7.4
30	tm266628	LEGO Jurassic World: T	MOVIE	2016	G	24	family', 'animation', 'comedy	US	0		0	0	13.027	5.7
31	tm243849	Extremis	MOVIE	2016		24	documentation	US	0		0	0	5.349	7.1
32	tm199987	Ralphie May: Unruly	MOVIE	2015		83	comedy	US	0		0	0	3.016	4.3

Data Preparation Using Excel

Data import and model building in Power BI:

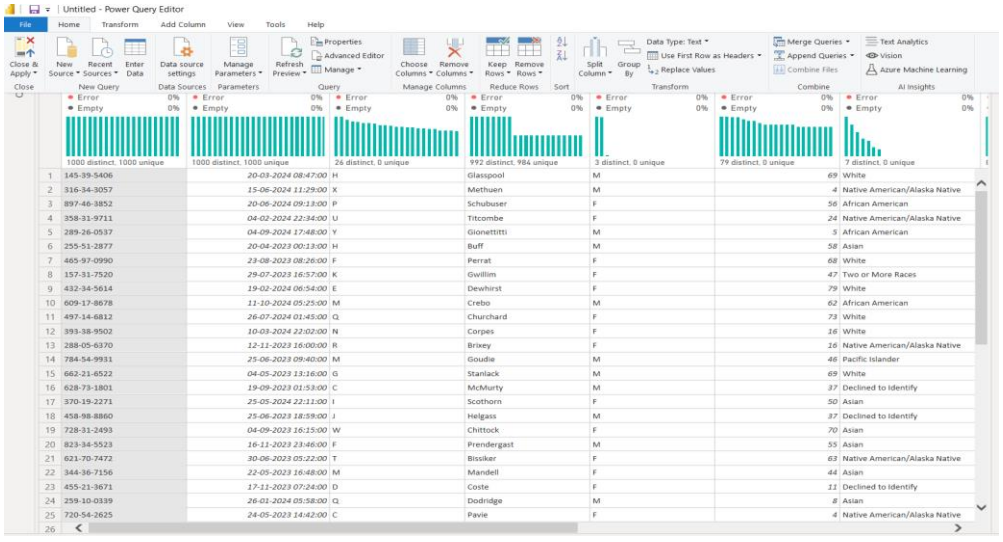
- Import cleaned excel files



Import Excel File to power BI

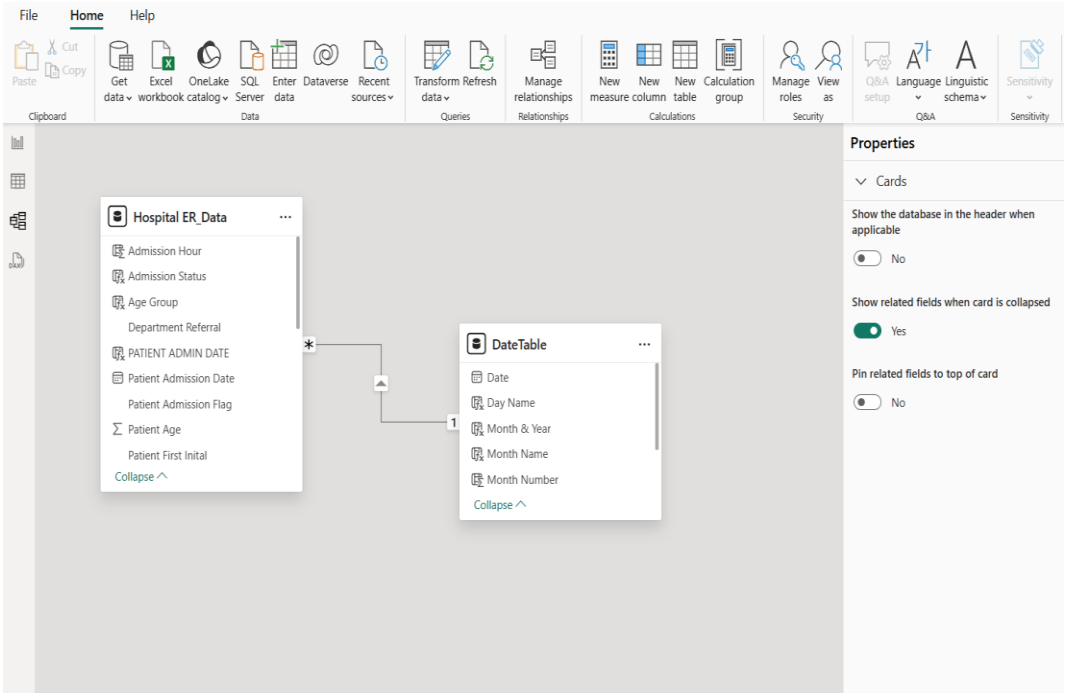
- Transform data in power query

Add extra columns for age groups, wait time ranges, and time-based metrics.



Power Query Editor

➢ Define Relationships :



Relationship

Creating Visuals:

- **Patients by Gender**: Donut Chart with Gender in Legends, Patients in Values.
- **Patients by Age Group**: Bar Chart with Age Group on X-Axis, Patients on Y-Axis.
- **Patients by Department Referral**: Bar Chart with Department Referral on X-Axis, Patients on Y-Axis.
- **% of Patients Seen Within 30 Minutes**: Donut Chart with Time Efficiency metrics.
- **Patients by Day and Hour**: Heatmap with Day on X-Axis, Hour on Y-Axis, Patients as values.
- **Trends Over Time**: Line Chart with Date on X-Axis, Metrics on Y-axis

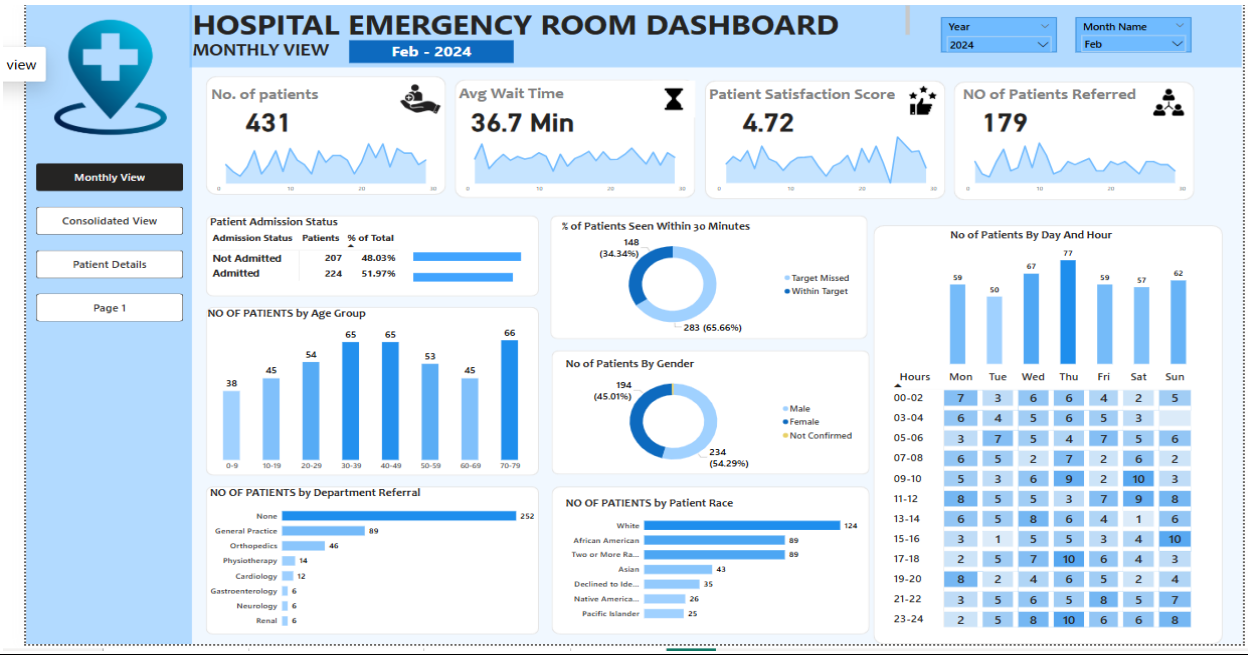
Results and Discussion :

The final dashboard allowed dynamic slicing and deep dives into key ER influencers. With an average wait time of 35.3 minutes and a satisfaction score of 4.99, hospital leadership can now target peak hours (07:00-09:00) and optimize General Practice and Orthopedics referrals for efficiency.

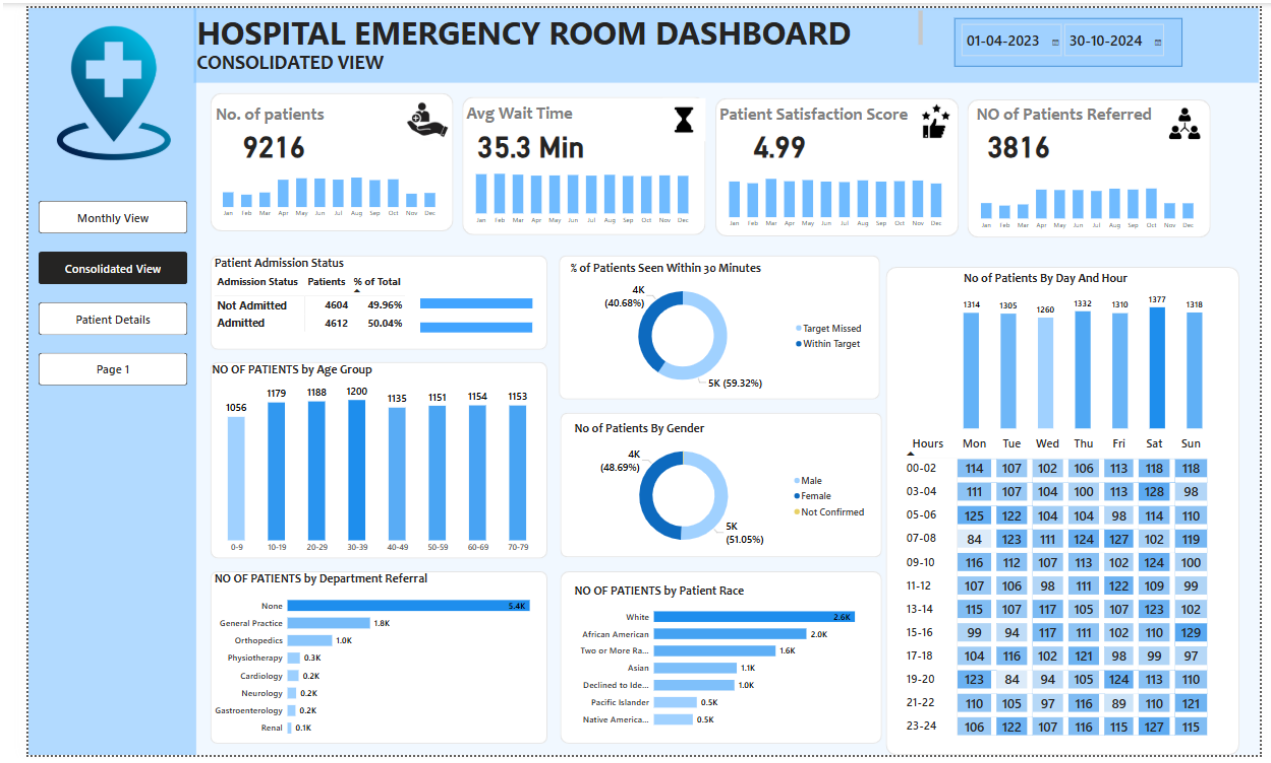
Conclusion & Future Scope :

This project effectively utilized Power BI to deliver a decision-support tool that reveals operational trends in ER performance. Future extensions could involve integrating machine learning for wait time predictions, adding real-time patient feedback, or setting up alerts for peak volume periods.

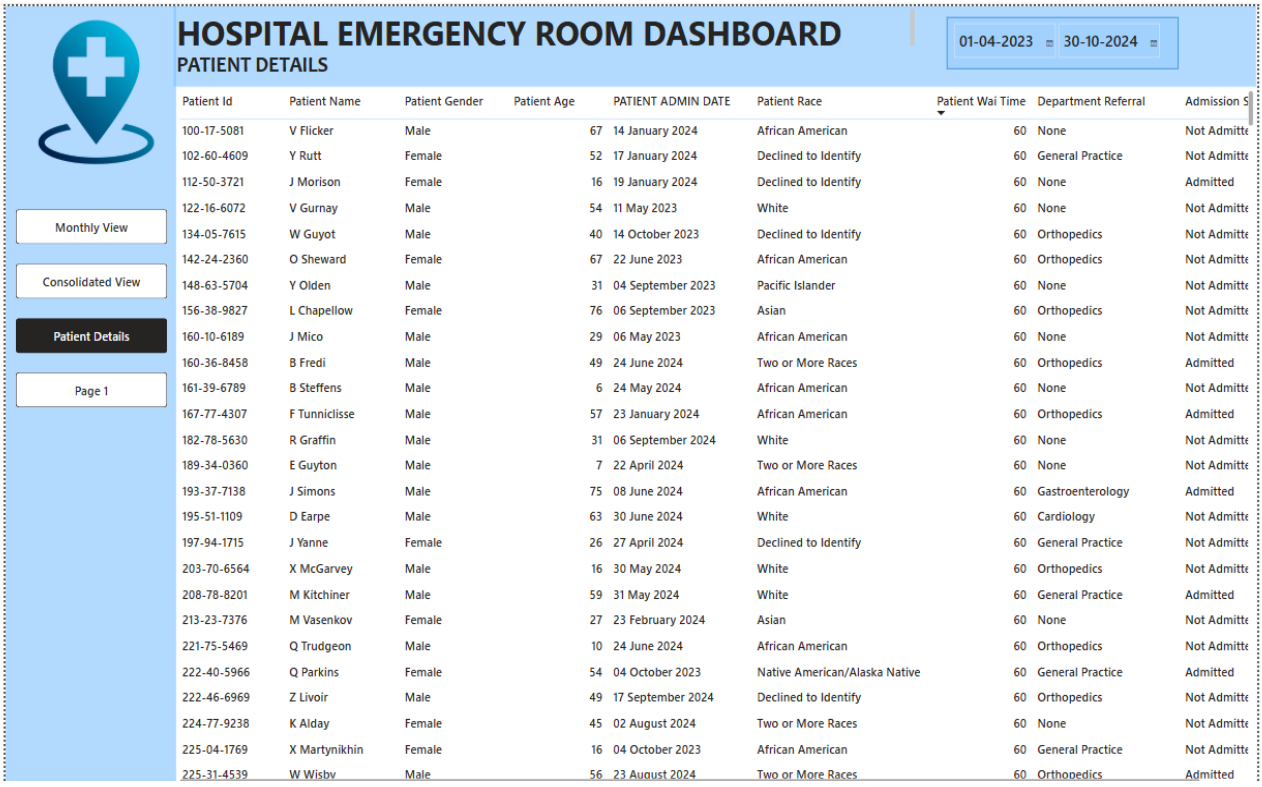
Output :



1.Monthly view



2.Consolidated View



Patient Id	Patient Name	Patient Gender	Patient Age	PATIENT ADMIN DATE	Patient Race	Patient Wai Time	Department Referral	Admission S
100-17-5081	V Flicker	Male	67	14 January 2024	African American	60	None	Not Admitte
102-60-4609	Y Rutt	Female	52	17 January 2024	Declined to Identify	60	General Practice	Not Admitte
112-50-3721	J Morison	Female	16	19 January 2024	Declined to Identify	60	None	Admitted
122-16-6072	V Gurnay	Male	54	11 May 2023	White	60	None	Not Admitte
134-05-7615	W Guyot	Male	40	14 October 2023	Declined to Identify	60	Orthopedics	Not Admitte
142-24-2360	O Sheward	Female	67	22 June 2023	African American	60	Orthopedics	Not Admitte
148-63-5704	Y Olden	Male	31	04 September 2023	Pacific Islander	60	None	Not Admitte
156-38-9827	L Chapellow	Female	76	06 September 2023	Asian	60	Orthopedics	Not Admitte
160-10-6189	J Mico	Male	29	06 May 2023	African American	60	None	Not Admitte
160-36-8458	B Fredi	Male	49	24 June 2024	Two or More Races	60	Orthopedics	Admitted
161-39-6789	B Steffens	Male	6	24 May 2024	African American	60	None	Not Admitte
167-77-4307	F Tunniclisse	Male	57	23 January 2024	African American	60	Orthopedics	Admitted
182-78-5630	R Graffin	Male	31	06 September 2024	White	60	None	Not Admitte
189-34-0360	E Guyton	Male	7	22 April 2024	Two or More Races	60	None	Not Admitte
193-37-7138	J Simons	Male	75	08 June 2024	African American	60	Gastroenterology	Admitted
195-51-1109	D Earpe	Male	63	30 June 2024	White	60	Cardiology	Not Admitte
197-94-1715	J Yanne	Female	26	27 April 2024	Declined to Identify	60	General Practice	Not Admitte
203-70-6564	X McGarvey	Male	16	30 May 2024	White	60	Orthopedics	Not Admitte
208-78-8201	M Kitchiner	Male	59	31 May 2024	White	60	General Practice	Admitted
213-23-7376	M Vasenkov	Female	27	23 February 2024	Asian	60	None	Not Admitte
221-75-5469	Q Trudgeon	Male	10	24 June 2024	African American	60	Orthopedics	Not Admitte
222-40-5966	Q Parkins	Female	54	04 October 2023	Native American/Alaska Native	60	General Practice	Admitted
222-46-6969	Z Livoir	Male	49	17 September 2024	Declined to Identify	60	Orthopedics	Not Admitte
224-77-9238	K Alday	Female	45	02 August 2024	Two or More Races	60	None	Not Admitte
225-04-1769	X Martynikhin	Female	16	04 October 2023	African American	60	General Practice	Not Admitte
225-31-4539	W Wisby	Male	56	23 August 2024	Two or More Races	60	Orthopedics	Admitted

3.Patient Details :