

# HOSPITAL EMERGENCY ROOM DASHBOARD

## PROJECT OVERVIEW

The Hospital Emergency Room Dashboard provides a comprehensive view of hospital emergency performance metrics across multiple dimensions — patient flow, satisfaction, admission patterns, demographics, and departmental efficiency.

It enables hospital administrators to monitor KPIs, identify bottlenecks, and optimize staff allocation, resulting in improved patient care and operational efficiency.

## TECH STACK

- **Tool Used:** Microsoft Power BI
- **Data Processing:** Power Query
- **Data Storage:** Excel / CSV datasets
- **Data Model:** Star Schema
- **Visualization Tools:** Power BI Charts, Cards, Donut Charts, Heatmaps, and Slicers
- **Scripting / ETL:** Power Query M language
- **Icons & Navigation:** Power BI Buttons and Bookmarks

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## DATASETS (RECOMMENDED SOURCES)

<b>Dataset Name</b>	<b>Description</b>	<b>Source Type</b>
Patients.csv	Contains patient demographics, wait time, satisfaction score, and admission status	Hospital Database / Excel
Departments.csv	Department names and referral details	Hospital HR or Admin System
Admissions.csv	Admission and referral data	Hospital Record Management System
Date_Dimension.csv	Calendar table for time intelligence	Generated using Power Query

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## **DATA PREPARATION & ETL**

### **1. Data Loading:**

- Import all datasets (Patients, Admissions, Departments, Date).

### **2. Data Cleaning:**

- Handle missing values (e.g., “Declined to Identify” in race/gender fields).
- Standardize date formats and categorical labels.

### **3. Transformations:**

- Add calculated columns for Wait Time Category, Age Group, and Admission Status (%).

#### **4. Merging:**

- Merge datasets using **Patient ID** and **Department ID** as keys.

#### **5. Data Validation:**

- Verify counts, averages, and satisfaction scores to ensure consistency.

### **DATA MODEL (RECOMMENDED)**

#### **Star Schema Model**

##### **Fact Table:**

- FactPatientVisits (Patient ID, Department ID, Date, Wait Time, Admission Status, Referral, Satisfaction Score)

##### **Dimension Tables:**

- DimPatient (Patient ID, Gender, Age, Race)
- DimDepartment (Department ID, Department Name)
- DimDate (Date, Month, Year, DayOfWeek)

##### **Relationships:**

- FactPatientVisits[Patient ID] → DimPatient[Patient ID]
- FactPatientVisits[Department ID] → DimDepartment[Department ID]
- FactPatientVisits[Date] → DimDate[Date]

### **KEY DAX MEASURES (KPIs)**

Admission Hour = Hour('Hospital ER\_Data'[Patient Admission Date])

Admission Status = IF('Hospital ER\_Data'[Patient Admission Flag] = TRUE, "Admitted", "Not Admitted")

Age Group =

SWITCH(

TRUE(),

'Hospital ER\_Data'[Patient Age] >= 100, "100+",

'Hospital ER\_Data'[Patient Age] >= 90, "90-99",

'Hospital ER\_Data'[Patient Age] >= 80, "80-89",

'Hospital ER\_Data'[Patient Age] >= 70, "70-79",

'Hospital ER\_Data'[Patient Age] >= 60, "60-69",

'Hospital ER\_Data'[Patient Age] >= 50, "50-59",

'Hospital ER\_Data'[Patient Age] >= 40, "40-49",

'Hospital ER\_Data'[Patient Age] >= 30, "30-39",

'Hospital ER\_Data'[Patient Age] >= 20, "20-29",

'Hospital ER\_Data'[Patient Age] >= 10, "10-19",

"0-9")

Average wait time = FORMAT(AVERAGE('Hospital ER\_Data'[Patient Waittime]), "0.0") & " " & "Min"

No of Patient Referred =

CALCULATE(COUNTROWS('Hospital ER\_Data'), 'Hospital ER\_Data'[Department Referral] <> "None")

No of patients = DISTINCTCOUNT('Hospital ER\_Data'[Patient Id])

Patient Admin Date = DATE(YEAR('Hospital ER\_Data'[Patient Admission Date]), MONTH('Hospital ER\_Data'[Patient Admission Date]), DAY('Hospital ER\_Data'[Patient Admission Date]))

Satisfaction Score = AVERAGE('Hospital ER\_Data'[Patient Satisfaction Score])

Waittime Interval =

SWITCH(

TRUE(),

'Hospital ER\_Data'[Admission Hour] < 2, "00-02",

'Hospital ER\_Data'[Admission Hour] < 4, "03-04",

'Hospital ER\_Data'[Admission Hour] < 6, "05-06",

'Hospital ER\_Data'[Admission Hour] < 8, "07-08",

'Hospital ER\_Data'[Admission Hour] < 10, "09-10",

'Hospital ER\_Data'[Admission Hour] < 12, "11-12",

'Hospital ER\_Data'[Admission Hour] < 14, "13-14",

'Hospital ER\_Data'[Admission Hour] < 16, "15-16",

'Hospital ER\_Data'[Admission Hour] < 18, "17-18",

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'Hospital ER_Data'[Admission Hour] < 20, "19-20",
'Hospital ER_Data'[Admission Hour] < 22, "21-22",
'Hospital ER_Data'[Admission Hour] < 24, "23-24",
"Above 24"

)

Waittime status = IF('Hospital ER_Data'[Patient
Waittime]<=30, "Within Target", "Target Missed")

Table = CALENDAR(MIN('Hospital ER_Data'[Patient
Admission Date]),MAX('Hospital ER_Data'[Patient
Admission Date]))

Day Name = FORMAT('Table'[Date], "DDD")

MONTH & YEAR = 'Table'[Date].[Month] & " " &
'Table'[Year]

Month Name = FORMAT('Table'[Date], "mmm")

MONTH NUMBER = MONTH('Table'[Date])

Week Day = WEEKDAY('Table'[Date], 2)

Year = YEAR('Table'[Date])

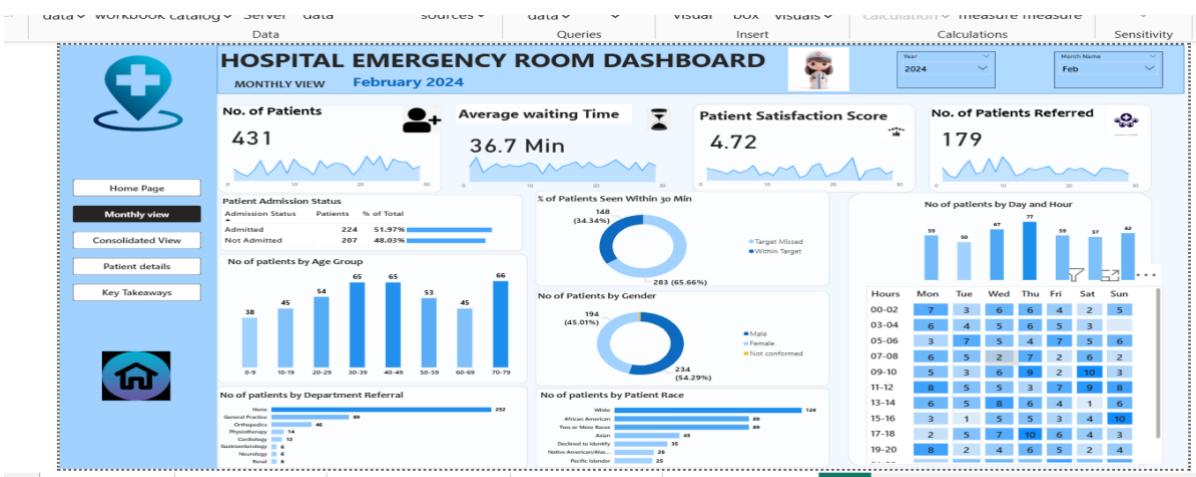
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## **DASHBOARD PAGES (DETAILED)**

### **Monthly View**

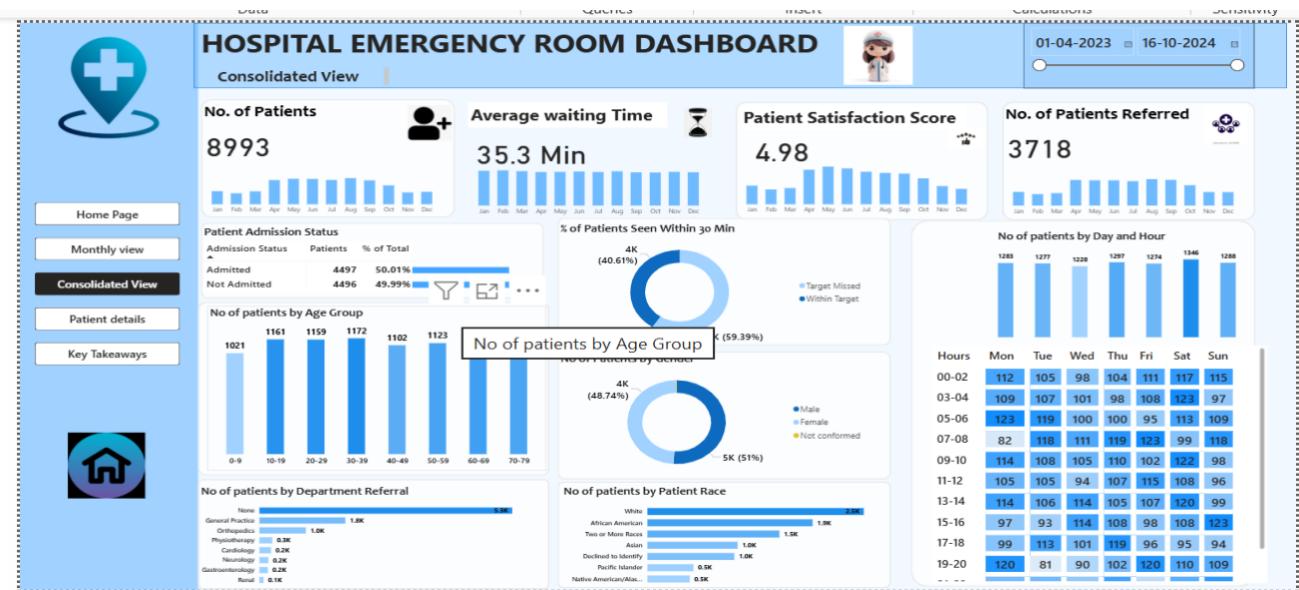
- Displays month-specific metrics (e.g., February 2024).
- KPIs:
  - Total Patients

- Average Waiting Time
- Satisfaction Score
- Number of Patients Referred
- Visuals: Line Charts, Donut Chart (Patients seen within 30 mins), Age Group & Gender Distribution, Day-Hour Heatmap.



## Consolidated View

- Displays overall performance (April 2023 – October 2024).
- KPIs:
  - Total Patients
  - Average Waiting Time
  - Satisfaction Score
  - Referred Patients
- Visuals: Monthly trend charts, Age Group comparison, Gender & Race breakdowns, Hourly activity heatmap.



## Patient Details

- Interactive table showing:
  - Patient ID, Name, Gender, Age, Race, Wait Time, Admission Status, Department Referral.
- Filterable by date range, gender, and admission type.

**HOSPITAL EMERGENCY ROOM DASHBOARD**

**PATIENT DETAILS**

Patient Id	Patient Name	Patient Gender	Patient Age	Patient Admin Date	Patient Race	Patient Waittime	Department Referral	Admission Status
100-04-3993	M St Ange	Female	29	04 April 2023	White	16	None	Not Admitted
100-17-5081	V Flicker	Male	67	14 January 2024	African American	60	None	Not Admitted
100-21-9648	W Marran	Female	39	17 January 2024	Pacific Islander	22	None	Admitted
100-34-6753	B Paulus	Male	43	13 May 2024	Pacific Islander	25	General Practice	Admitted
100-34-9587	U Lamburn	Male	20	01 April 2024	Declined to Identify	24	Neurology	Not Admitted
100-40-2709	O Cammack	Male	77	08 May 2024	White	48	None	Not Admitted
100-66-0896	I Prickett	Male	2	26 March 2024	African American	23	Orthopedics	Admitted
100-66-8222	F Mullane	Female	65	23 December 2023	Asian	17	General Practice	Not Admitted
100-67-1276	S Hallbird	Male	55	03 November 2023	White	11	Orthopedics	Admitted
100-70-0071	R Downham	Male	38	14 January 2024	African American	57	None	Not Admitted
100-72-5705	N Dudny	Female	60	19 June 2024	African American	45	None	Admitted
100-74-3943	M Hallard	Female	3	17 September 2023	White	14	None	Admitted
100-74-5636	A Warwicker	Female	47	13 August 2024	Declined to Identify	25	None	Not Admitted
100-79-0109	P Ulyatt	Female	19	27 February 2024	Pacific Islander	36	Neurology	Admitted
100-81-9769	Y Moncaster	Male	28	09 March 2024	White	59	None	Admitted
100-84-7203	K Ybarra	Female	37	13 June 2023	White	55	None	Not Admitted
101-08-8798	L Willeson	Female	72	31 July 2024	Two or More Races	48	None	Admitted
101-13-4808	V Gowridge	Female	30	25 April 2023	Declined to Identify	30	None	Admitted
101-35-3930	W Andreotti	Female	30	24 January 2024	White	25	None	Admitted
101-35-7039	T Ganter	Male	26	08 February 2024	White	56	General Practice	Admitted
101-38-5868	J Saddington	Male	14	08 October 2024	White	20	None	Admitted
101-50-7359	D Sabey	Female	50	13 October 2023	White	56	None	Admitted

## Key Takeaways

- Descriptive summary generated from dashboard data:
  - Wait Time & Satisfaction insights
  - Departmental Referral patterns
  - Peak busy days/hours
  - Demographic analysis
  - Admission vs Non-admission statistics
- Useful for presentations or executive summaries.

The screenshot displays the 'HOSPITAL EMERGENCY ROOM DASHBOARD' interface. At the top, there are tabs for Data, Queries, Insert, Calculations, Sensitivity, and Share. Below the tabs, a sidebar on the left features icons for a location with a cross (Descriptive Analysis), a house (Home Page, Monthly view, Consolidated View, Patient details, Key Takeaways), and a plus sign (Patient Demographics). The main content area is titled 'KEY TAKEAWAYS' and contains the following sections:

- Descriptive Analysis:** (April 2023 - October 2024) The emergency room dataset, covering a period of 19 months, records a total of 9,216 unique patients.
- Patient Wait Time & Satisfaction:** The average wait time was approximately 35.3 minutes, indicating a need for improvement to enhance patient flow. The average satisfaction score was 4.99 out of 10, suggesting moderate satisfaction and highlighting areas for improving patient experiences.
- Departmental Referrals:** A significant number of Patients (5400) did not require referrals. Among those referred, the most common were General Practice (1840 cases) and Orthopedics (995 Cases), followed by Physiotherapy (276 Cases) and Cardiology (248 Cases).
- Peak busy Periods:** The busiest day were Mondays (1377 Patients), Saturdays (1322 Patients), and Tuesdays (1318 Patients). The busiest hours were 11 AM, 7 PM, 01 PM, and 11 PM indicating need of ample staffing during these periods.
- Patient Demographics:** Age Groups: Adults (30 - 39 Years) formed a large group (1200 Patients), followed by young adults (20 - 29 Years) with 1188 Patients. Other significant groups included middle aged as well (40 - 50 Years).
- Race Distribution:** The largest racial group was White (2571), followed by African American (1951), multi racial (1557), and Asian (1060) patients. A significant number of patients (1030) declined to identify their race.
- Admission Patterns:** Nearly half of the patients (4612) were admitted, while the rest (4604) were treated and released.
- Summary:** The dataset reveals high patient volumes, moderate satisfaction levels, and common referrals to General Practice and Orthopedics.

At the bottom of the dashboard, there are navigation links: Home Page, Monthly view, Consolidated View, Patient details, Key Takeaway (highlighted in green), and a plus sign icon. There is also a search bar and a refresh button.

## KPI's (Key Performance Indicators)

### KPI Name

### No. of Patients

### Description

Total unique patients visiting ER

KPI Name	Description
Average Waiting Time	Mean wait time before treatment
Patient Satisfaction Score	Average score (1–5 scale)
Patients Referred	Count of patients referred to departments
% Patients Seen Within 30 Min	Efficiency metric for prompt service
Admission Rate (%)	Percentage of admitted vs non-admitted
Peak Hours & Days	Identifies busiest operational periods

## INTERACTIVE UI ELEMENTS

- **Navigation Buttons:** Home, Monthly View, Consolidated View, Patient Details, Key Takeaways.
- **Date Range Slicer:** To filter data by custom time periods.
- **Dropdown Filters:** Year and Month selection.
- **Interactive Charts:** Click-based filtering on age, gender, and department visuals.
- **Hover Tooltips:** Show detailed data on hover for trend and donut charts.

## SUMMARY

The **Hospital Emergency Room Dashboard** offers an end-to-end analytical solution for monitoring emergency department efficiency.

It provides actionable insights into:

- Patient waiting times and satisfaction trends
- Departmental workload and referrals
- Admission patterns and demographic insights
- Peak time analytics for better staffing decisions

This interactive Power BI dashboard empowers hospital management to make **data-driven operational decisions** that enhance patient care and optimize hospital resources.

