ER Efficiency & Staffing Analysis Report

Project Title: Emergency Room (ER) Efficiency Dashboard **Tools Used:** Power BI, Power Query, DAX **Analyst:** [MAHIMA GUPTA] **Date:** December 2025

1. EXECUTIVE SUMMARY

The objective of this project was to analyse patient wait times and service efficiency within the hospital Emergency Room. By transforming raw admission data into an interactive Power BI dashboard, we identified critical bottlenecks in staffing and patient processing.

***KEY FINDING**: THE ER EXPERIENCES PEAK CONGESTION ON FRIDAYS AT 2:00 PM, AND THE YOUNG ADULT (18-35) DEMOGRAPHIC EXPERIENCES THE LONGEST AVERAGE WAIT TIMES (49 MINUTES).*

2. PROBLEM STATEMENT

The hospital management faced challenges with:

- *Inconsistent patient wait times.*
- *Lack of visibility into "peak hours" for staffing.*
- *Inability to identify which patient groups were being delayed.*
- *Raw data that was unorganized and difficult to interpret manually.*

3. METHODOLOGY & DATA PROCESS

A. Data Cleaning (Power Query)

The raw dataset contained combined Date/Time fields and unstructured text.

- ***Transformation:** Split Arrival Date and Arrival Time to allow for hourly analysis.*
- ***Standardization:** Grouped inconsistent text values (e.g., "Skipped" or "Null") into a standardized "NC" (Not Captured) category for cleaner reporting.*
- ***Validation:** Verified data types for calculation accuracy.*

B. DAX Calculations

Key Performance Indicators (KPIs) were created using Data Analysis Expressions (DAX) to aggregate the raw rows into meaningful metrics:

- ***Average Wait Time:*** *Calculated the mean time between "Arrival" and "Service Start."*
- ***Total Patients:*** *Distinct count of Patient IDs to measure volume.*
- ***Average Satisfaction:*** *Aggregated patient survey scores (1-10 scale).*

4. DASHBOARD VISUALS & INSIGHTS

The final dashboard consists of three analytical sections:

I. Heatmap Analysis (Temporal Patterns)

- ***Visual Used:*** *Matrix with Conditional Formatting (Heatmap).*
- ***Purpose:*** *To spot high-traffic time slots instantly.*
- ***Insight:*** *The darker red cells indicate that* ***Fridays between 14:00 (2 PM) and 15:00 (3 PM)*** *are the busiest hours. Staffing shifts should be adjusted to overlap during this window.*

II. Root Cause Analysis (Demographics)

- ***Visual Used:*** *AI Decomposition Tree.*
- ***Purpose:*** *To break down the "Average Wait Time" by various factors (Age, Race, Gender) to find the highest outliers.*
- ***Insight:***
  - ***Young Adults (18-35):*** *Highest wait time at 49 minutes.*
  - ***Missing Data (NC):*** *Patients with incomplete registration data face delays, suggesting a process failure at the front desk.*

III. Departmental Filtering

- ***Visual Used:*** *Interactive Slicers.*
- ***Purpose:*** *Allows department heads (Orthopaedics, Cardiology, etc.) to filter the entire report to see only their specific patients.*

5. Recommendations

Based on the data analysis, the following actions are recommended:

1. ***Staffing Adjustments:*** *Increase nursing staff on* ***Fridays from 12:00 PM to 6:00 PM*** *to handle the identified surge.*
2. ***Process Review:*** *Investigate the registration process for "Young Adults" and patients with missing info (NC) to reduce the 49-minute bottleneck.*
3. ***Data Quality Training:*** *Train registration staff to reduce the number of "NC" (Not Captured) records, as these correlate with longer wait times.*