# Healthcare Analytics Report

## Project Summary

This project involved analyzing healthcare operational, financial, and clinical performance using Power BI. The primary objective was to provide stakeholders with a clear view of key performance indicators (KPIs) that drive decision-making, improve efficiency, and enhance patient care.

The dataset included patient demographics, admissions, billing, medical conditions, and stay durations. From this data, we developed interactive dashboards and DAX-based measures to deliver accurate, real-time insights.

The KPIs were carefully selected to address three core areas:

- **Operations** – Monitoring patient volume, bed utilization, and stay durations to optimize capacity and resource allocation.
- **Finance** – Tracking total billing, average revenue per patient, and billing trends to improve revenue integrity and financial planning.
- **Clinical** – Identifying demographic patterns, prevalent medical conditions, and treatment trends to inform care pathway improvements.

By combining DAX calculations with visual analytics, the report delivers:

1. **Business Problem Definition** – Clarifying the operational, financial, or clinical challenge each KPI addresses.
2. **DAX Implementation** – Transparent formulas for validation and replication.
3. **Outcome & Insights** – Actionable findings to support strategic initiatives.

## Tools Used

1) **Microsoft Power BI**
2) **Microsoft Excel**
3) **Power Query**

## Dataset - healthcare_dataset.csv

## Report Pages & Visuals

- **Page: Patient Demographics & Medical Overview**

1) Total Patients

**Business problem:** Understand patient volume to plan capacity, staffing, and resource allocation.
**Dax Measure Used:**

```
Total Patients = DISTINCTCOUNT(healthcare_dataset[Name])
```

**Visuals Used :** Card
**Outcome:** Track monthly/weekly patient counts to identify demand spikes. A sustained increase signals need for staff hiring or expanded facilities; a drop may require marketing or service review.

## 2) Patients Average Age

**Business problem:** Know the age profile of patients to tailor services, preventive care programs, and resource planning

**Dax Measure Used:**

```
Average Age = ROUND(AVERAGE(healthcare_dataset[Age]),1) & " Years"
```

**Visuals Used :** Card

**Outcome:** An older average age suggests higher chronic care needs and longer stays; a younger profile may indicate different service mixes.

## 3) Most Common Medical Condition

**Business problem:** Identify prevalent diagnoses to prioritize care pathways, inventory, and prevention programs.

**Dax Measure Used:**

```
Most Common Condition = MAX(healthcare_dataset[Medical Condition])
```

**Visuals Used :** Card

**Outcome:** If a condition dominates caseloads, allocate specialist resources, update clinical guidelines, and plan supply chain for frequent treatments.

## 4) Total Male Patients

**Business problem:** Gender-based patient distribution to support targeted programs and staff allocation.

**Dax Measure Used:**

```
Male Patients = CALCULATE(COUNT(healthcare_dataset[Gender]), healthcare_dataset[Gender] =
"Male")
```

**Visuals Used :** Card

**Outcome:** Imbalanced gender distribution may prompt targeted outreach or examine whether services favor one group.

## 5) Total Female Patients

**Business problem:** Gender-based patient distribution to support targeted programs and staff allocation.

**Dax Measure Used:**

```
Female Patients = CALCULATE(COUNT(healthcare_dataset[Gender]), healthcare_dataset[Gender] =
"Female")
```

**Visuals Used :** Card

**Outcome:** Imbalanced gender distribution may prompt targeted outreach or examine whether services favor one group.

## 6) Patients by Age Group

**Business problem:** What are the patient counts by age group?

**Visuals Used :** Horizontal Bar Chart

**Outcome:** Targeted health programs and outreach can increase engagement among these groups, improving preventive care and balancing patient distribution.

## 7) Gender Distribution

**Business problem:** What are the patient Gender distribution ?

**Visuals Used :** Pie Chart

**Outcome:** With a balanced gender distribution, the hospital can design healthcare programs that cater equally to both genders, ensuring no bias in treatment offerings and maintaining equitable care standards.

## 8) Blood Type Distribution

**Business problem:** What are the different blood types and its patients count ?
**Visuals Used :** Donut Chart
**Outcome:** Implementing a balanced blood donation and storage strategy ensures that all blood types remain sufficiently stocked, reducing the risk of shortages during emergencies.

## 9) Major Insurance Providers

**Business problem:** What are the Major Insurance Providers ?
**Visuals Used :** Horizontal Bar Chart
**Outcome:** The hospital serves patients from a diverse range of insurance providers, with relatively even distribution. This balanced coverage reduces dependency on a single provider, ensuring financial stability and broader access to healthcare services for patients.

## 10) Top 5 Medical Conditions And Its Patient Count

**Business problem:** What are the top 5 medical conditions and its patients count ?
**Visuals Used :** Bar Chart
**Outcome:** arthritis and obesity are slightly higher in females, while hypertension and cancer are marginally higher in males, with diabetes nearly equal across genders. Overall, these conditions impact both sexes almost equally, underscoring the need for balanced healthcare focus.

## 11) Ilness by Season

**Business problem:** How seasonality impacts on ilness ?
**Visuals Used :** Bar Chart
**Outcome:** The data shows that illnesses peak during winter (18,325 cases), followed by the rainy season (15,427 cases), and are lowest in summer (11,556 cases). This suggests that winter poses the greatest health burden, requiring heightened medical preparedness, while summer records comparatively fewer illnesses.

- **Page: Admission & Billings**

## 1) Average Stay Duration

**Business problem:** What is the average stay duration of the patient.
**Dax Measure Used:**

```
Avg Stay Duration = ROUND(AVERAGE(healthcare_dataset[Admitted Days]),0) & " Days"
```

**Visuals Used :** Card
**Outcome:** The data indicates that the average hospital stay duration is 16 days, suggesting patients require extended care and recovery time. This highlights the need for efficient resource allocation, continuous monitoring, and support systems to manage long-term hospital stays effectively

## 2) Total Billing

**Business problem:** What is the total revenue generated by the hospitals ?
**Dax Measure Used:**

```
Total Billing = SUM(healthcare_dataset[Billing Amount])
```

**Visuals Used :** Card
**Outcome:** The data shows a total billing of 1.42 billion, reflecting the significant scale of healthcare services utilized. This highlights both the high demand for medical care and the substantial financial resources involved in patient treatment and hospital operations.

## 3) Average Bill Per Patient

**Business problem:** What is the average bill per patient
**Dax Measure Used:**

```
Avg Bill Per Patient = [Total Billing]/[Total Patients]
```

**Visuals Used :** Card
**Outcome:** The data shows that the average bill per patient is 35K, indicating a considerable cost of treatment per individual. This reflects both the financial burden on patients and the revenue scale for healthcare providers.

## 4) Admission Type

**Business problem:** What is the admission type and its patient distribution?
**Visuals Used :** Bar Chart
**Outcome:** The data shows that admissions are nearly balanced across all types: Elective (18,655), Urgent (18,576), and Emergency (18,269). This indicates that hospitals handle a diverse mix of planned, semi-urgent, and critical cases almost equally, requiring well-rounded resource allocation to manage all admission types effectively.

## 5) Age Vs Billing Amount

**Business problem:** Identifying relationship between patient age and billing amount needs to be analyzed to understand whether certain age groups are associated with higher healthcare costs.
**Visuals Used :** Scatter Plot
**Outcome:** The scatter plot shows that billing amounts are distributed across all age groups without a strong visible concentration in a single range. This suggests that healthcare costs are incurred consistently across different ages, indicating that no particular age group dominates billing expenses, and hospitals must be prepared to manage costs across the entire patient population.

## 6) Test Results Distribution

**Business problem:** Understanding the distribution of medical test results is crucial to evaluate overall patient health status and the reliability of diagnostic processes. A balance between normal, abnormal, and inconclusive results provides insights into disease prevalence and testing accuracy.
**Visuals Used :** Donut Chart
**Outcome:** Test results are almost evenly split: Abnormal (18,627), Normal (18,517), and Inconclusive (18,356). This shows a balance across categories but also highlights the need to reduce inconclusive results for better diagnosis.

## 7) Billing Amount by Hospitals

**Business problem:** Billing differs across hospitals, and comparing it helps identify top earners and lower performers for better financial planning.
**Visuals Used :** Horizontal Bar Chart
**Outcome:** Johnson PLC has the highest billing (1.08M), while Inc Brown is lowest (0.89M). Overall, hospitals show similar billing levels with slight variations.

## 8) Admission Trend Over the Years and Months

**Business problem:** What is the admission trend over the years and months ?
**Visuals Used :** Line Chart
**Outcome:** The admissions trend remains fairly stable from 2019 to 2023 with minor fluctuations, but there is a sharp drop in early 2024. This indicates consistent patient inflow over the years, with a sudden recent decline that may point to external factors like policy changes, reporting gaps, or reduced patient visits.

## Slicers –

1) Year

Thank You