Data Analytics Portfolio

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Project Name: HEALTHCARE ANALYTICS PROJECT

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1. Problem Statement (Business Objective)

The objective of this project is to analyze hospital operational and financial data to identify patient trends, diagnosis patterns, doctor performance, and revenue distribution.

This analysis helps hospital management:

- Monitor patient demographics
- Identify top-performing hospitals and doctors
- Track revenue trends
- Detect seasonal fluctuations
- Improve operational efficiency
- Support data-driven healthcare decisions

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2. Dataset Information

• Dataset: Healthcare hospital dataset
• Database Created: Healthcare_Project
• Data Source: Structured relational database
• Tables Used:

- Hospitals
- Patients
- Doctors
- Appointments

• Key Fields:

- Patient_ID

- Doctor_ID
- Hospital_ID
- Age
- Gender
- Diagnosis
- Appointment_Date
- Bill_Amount
- Specialization

• Purpose:
To analyze hospital performance, patient distribution, and revenue insights.

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3. Tools Used

• SQL (MySQL) – Data extraction, joins, aggregation
• Power BI – Data modeling & visualization
• DAX – KPI calculations & measures

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4. Data Cleaning & Preparation Steps

Data preparation was performed using SQL before loading into Power BI.

• Created relational database structure
• Defined primary and foreign key relationships
• Joined multiple tables (Patients, Doctors, Hospitals, Appointments)
• Removed duplicate records
• Handled missing values
• Created Age Groups using CASE statements
• Aggregated revenue and appointment counts
• Filtered relevant records for analysis

This ensured a clean and analysis-ready dataset before visualization.

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5. Data Analysis Process

Step 1: Extracted and joined data using SQL queries
Step 2: Imported cleaned dataset into Power BI

Step 3: Created relationships between tables
Step 4: Built DAX measures for:

- Total Patients
- Total Appointments
- Total Revenue
- Average Bill Amount
- Appointment Count by Diagnosis
- Revenue by Hospital

Step 5: Applied Top N filtering for top-performing hospitals
Step 6: Created interactive slicers for:

- Diagnosis
- Specialization
- Hospital Name
- Appointment Date

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6. Dashboard / Visualization

The project consists of two interactive dashboards:

Dashboard 1: Revenue & Operations Overview

• KPI Cards:

- Total Patients
- Total Appointments
- Total Revenue
- Average Bill Amount

• Top 10 Hospitals by Revenue
• Revenue by State
• Monthly Appointment & Revenue Trend
• Gender Distribution (Donut Chart)

Dashboard 2: Diagnosis & Doctor Performance Analysis

• Age & Gender Distribution (Stacked Bar Chart)
• Total Appointments by Diagnosis (Bar Chart)
• Diagnosis Distribution Across Top Hospitals

• Doctor Performance Table (Billing Analysis)
• Interactive slicers

7. Key Insights

• 61+ age group has the highest patient volume, indicating strong demand for geriatric care

• Flu and Diabetes contribute the highest appointment count, highlighting the importance of chronic disease management

• Revenue is concentrated among top hospitals, creating dependency risk

• Monthly revenue dips during mid-year and peaks in later months, indicating seasonal impact

• Doctor billing performance varies significantly, suggesting opportunity for performance optimization

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8. Business Recommendations

• Introduce preventive healthcare packages for chronic diseases

• Implement performance-based incentives for doctors

• Replicate operational strategies from top-performing hospitals

• Launch marketing campaigns during low-revenue months

• Expand services in underperforming states to balance revenue distribution

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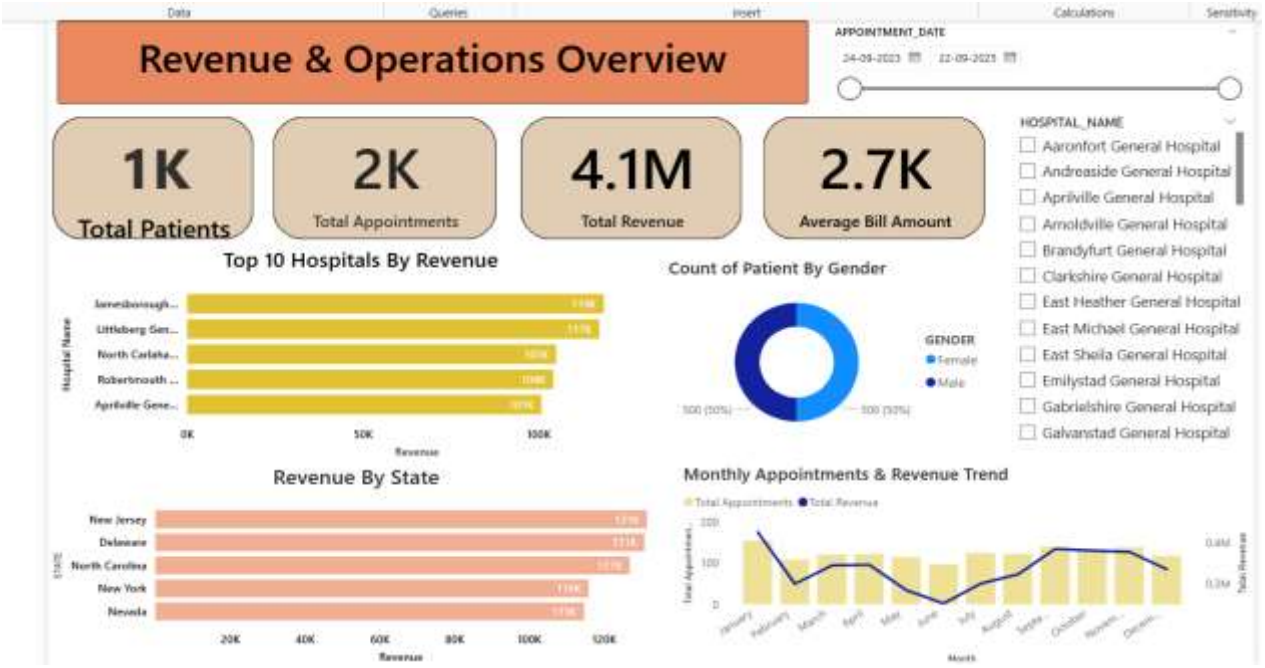
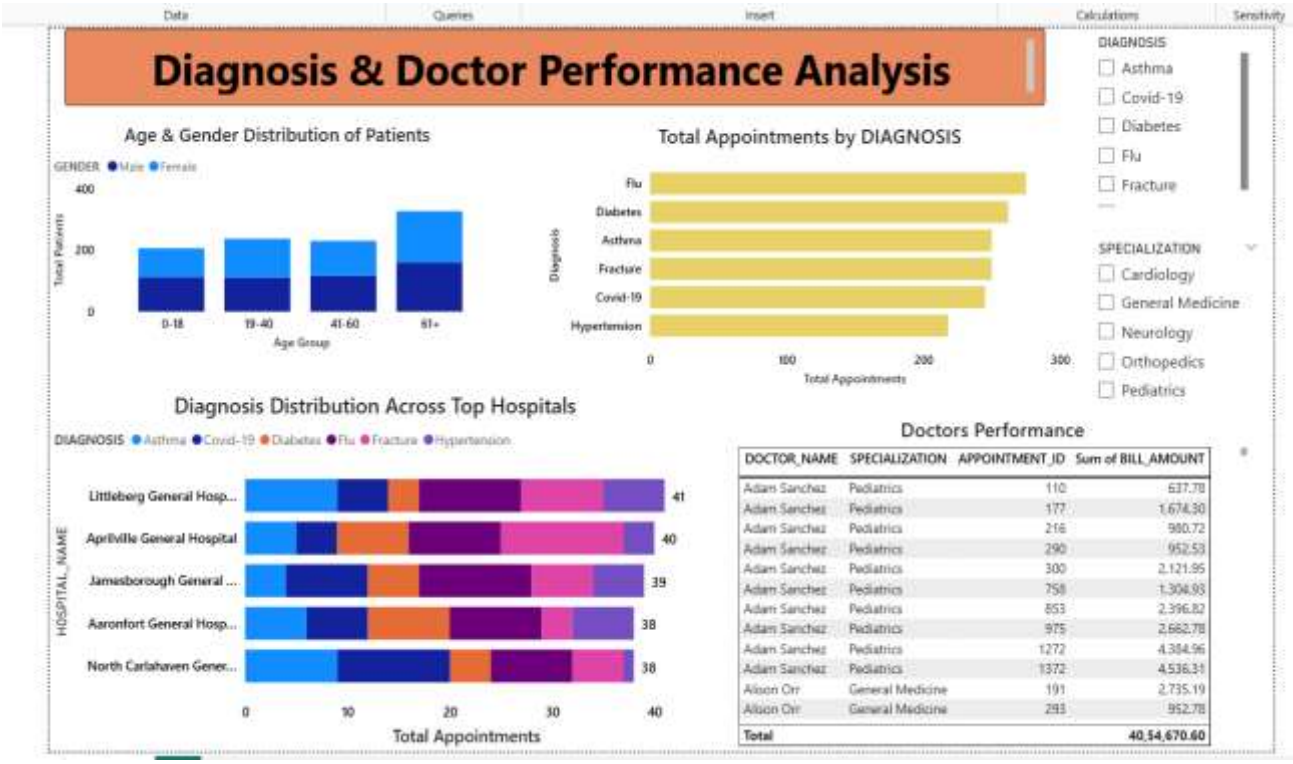
9. Conclusion

This project demonstrates an end-to-end data analytics workflow using SQL and Power BI.

By combining database querying, data cleaning, KPI development, and interactive visualization, the dashboard provides actionable insights for hospital management.

The analysis supports strategic decision-making in revenue optimization, operational efficiency, and patient care management.


Revenue & Operations Overview
APPOINTMENT_DATE
1K
Total Patients
2K
Total Appointments
4.1M
Total Revenue
2.7K
Average Bill Amount
HOSPITAL_NAME
Aaronfort General Hospital
Andreaside General Hospital
Aprilville General Hospital
Arnoldville General Hospital
Brandyfurt General Hospital
Clarkshire General Hospital
East Heather General Hospital
East Michael General Hospital
East Sheila General Hospital
Emilystad General Hospital
Gabrielshire General Hospital
Galvanstad General Hospital
Top 10 Hospitals By Revenue
Count of Patient By Gender
GENDER
Female
Male
Revenue By State
Monthly Appointments & Revenue Trend


Diagnosis & Doctor Performance Analysis
DIAGNOSIS
Asthma
Covid-19
Diabetes
Flu
Fracture
SPECIALIZATION
Cardiology
General Medicine
Neurology
Orthopedics
Pediatrics
Age & Gender Distribution of Patients
GENDER Male Female
Total Appointments by DIAGNOSIS
Diagnosis Distribution Across Top Hospitals
DIAGNOSIS Asthma Covid-19 Diabetes Flu Fracture Hypertension
Littleberg General Hosp...
Aprilville General Hospital
Jamesborough General ...
Aaronfort General Hosp...
North Carlahaven Gener...
Total Appointments
Doctors Performance
DOCTOR_NAME
SPECIALIZATION
APPOINTMENT_ID
Sum of BILL_AMOUNT
Adam Sanchez Pediatrics 110 637.78
Adam Sanchez Pediatrics 177 1,674.30
Adam Sanchez Pediatrics 216 980.72
Adam Sanchez Pediatrics 290 952.53
Adam Sanchez Pediatrics 300 2,121.95
Adam Sanchez Pediatrics 758 1,304.93
Adam Sanchez Pediatrics 853 2,396.82
Adam Sanchez Pediatrics 975 2,662.78
Adam Sanchez Pediatrics 1272 4,384.96
Adam Sanchez Pediatrics 1372 4,536.31
Alison Orr General Medicine 191 2,735.19
Alison Orr General Medicine 293 952.78
Total 40,54,670.60