Data Analysis Report for MediCare General Hospital

Data Analyst	Dakolo Emmanuel & Oluwayemisi Oyedeji	
Client	MediCare General Hospital	
Accountable officer	Daniel Ovie	
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Executive Summary

This report summarizes the data analysis conducted for MediCare General Hospital over a 10-week period. The project focused on optimizing hospital operations through analysis of patient wait times, treatment costs, doctor performance, and revenue patterns. During the 10-weeks Insights derived from Excel, Power BI, Python, and SQL were used to uncover inefficiencies and guide data-driven decisions. The analysis covered critical indicators such as average treatment cost, departmental revenue, doctor performance, profit margins, and wait times.

Key findings revealed that departments like Emergency and Radiology experienced the longest delays, while some units like Orthopedics demonstrated negative profit margins. Additionally, data showed a strong correlation between high-performing doctors and lower readmission rates. These insights were visualized using dynamic dashboards, enabling performance tracking and more informed decision-making by hospital administrators.

The report concludes with strategic recommendations designed to optimize resource allocation, streamline patient flow, and improve financial sustainability, laying the foundation for a data-driven transformation at MediCare General Hospital.

Introduction

The MediCare 001 Project was executed to tackle operational challenges at MediCare General Hospital, including prolonged patient wait times, high treatment costs, inefficient departmental performance, and fluctuating revenue. The goal was to leverage the power of data analytics to uncover inefficiencies, identify performance trends, and provide strategic insights that could support better decision-making by hospital management.

During this project, the team collected hospital data which were cleaned, explored and visualized. Key performance indicators (KPI) were derived and analyzed using Excel. Database was created using SQL, Python was used also for data cleaning and visualization, and Power BI for dynamic and interactive dashboards. Using these tools, we were able to transform raw data into meaningful insights.

Background

MediCare General Hospital faced increasing concerns around long patient wait times, variable treatment outcomes, declining patient satisfaction, and unpredictable revenue patterns. Recognizing the need for a comprehensive solution, the hospital leadership initiated the MediCare 001 Initiative—to investigate these challenges, to identify root causes and recommend solutions.

Purpose

The purpose of this analysis is to:

1. Identify inefficiencies in high treatment costs, patient dissatisfaction, long wait times, and fluctuating revenue.
2. Provide a visual and statistical overview of Key performance indicators (KPI).
3. Generate insights to drive smarter decision-making for hospital administrators.

Limitations

1. The analysis was limited to only the data provided at the time of this project
2. The data given had no time stamp or period to help determine periodic revenues

Key Questions

1. Which departments experience the longest waiting times and highest patient volumes?
2. How does doctor performance correlate with patient outcomes and readmissions?
3. What is the distribution of treatment costs and profit margins across departments?
4. How can the dashboards help hospital leadership monitor real-time KPIs?

Process and Methods

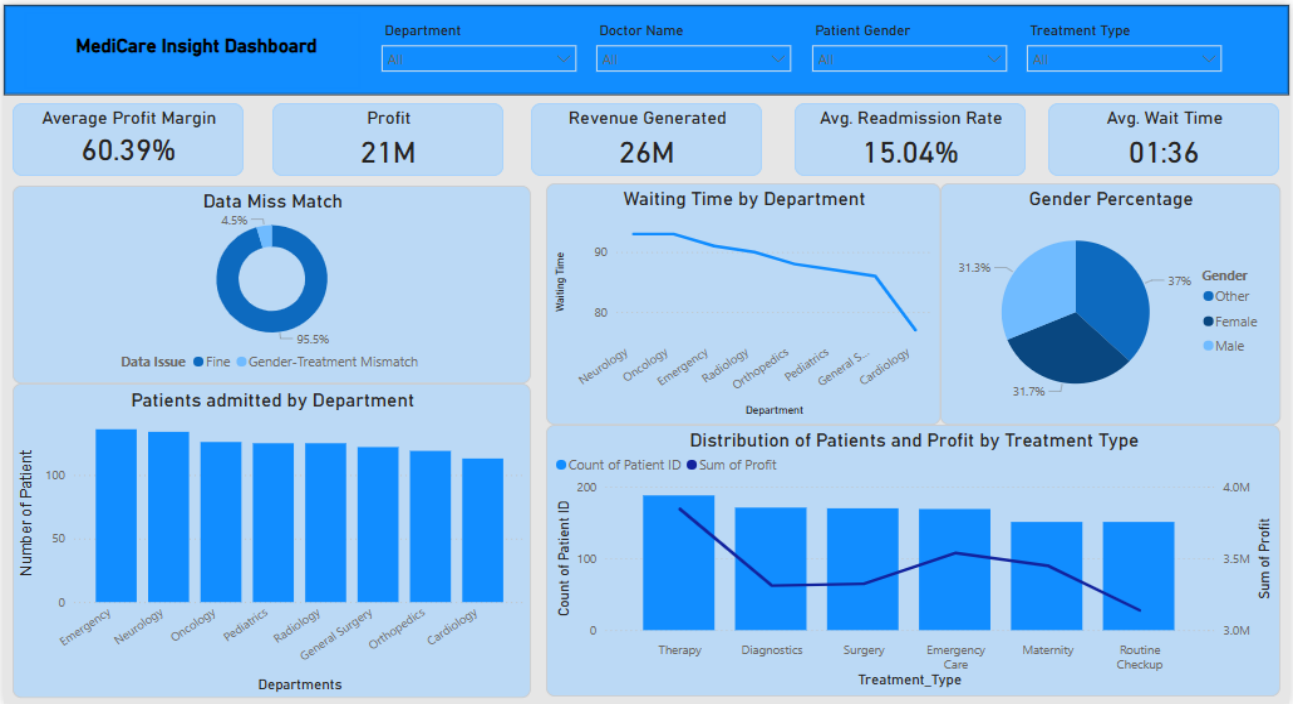
Data Sources: MediCare operational datasets including patient ID, gender, department, doctor name, costs, revenue, and insurance type.
Tools Used: Excel, SQL, Python (Jupyter Notebook), Power BI

Process:

- **Data Collection & Cleaning:**
  - Imported raw data into Excel and Python, the data was reviewed, duplicate entries were removed, corrected data types, added additional columns, and identified missing values.
- **Exploratory Data Analysis:**
  - Descriptive statistical analysis was conducted to identify baseline performance trends, pivot tables were created, and calculated KPIs such as average wait time, average profit margin and average readmission rate. During this stage we were able to highlight critical patterns such as revenue per departments, identify underperforming departments with their profit margins.
- **Data Visualization and Dashboarding:**

The insights generated were visualized using Power BI, where the cleaned dataset was imported for interactive reporting.
Dynamic dashboard was created using slicers and charts to allow hospital management to explore:

- Data miss match
- Waiting time by each department
- Patients admitted to each department
- Profit generation
- Average Profit margin
- Average readmission rate
- Average waiting time



Power BI Dashboard

Sample

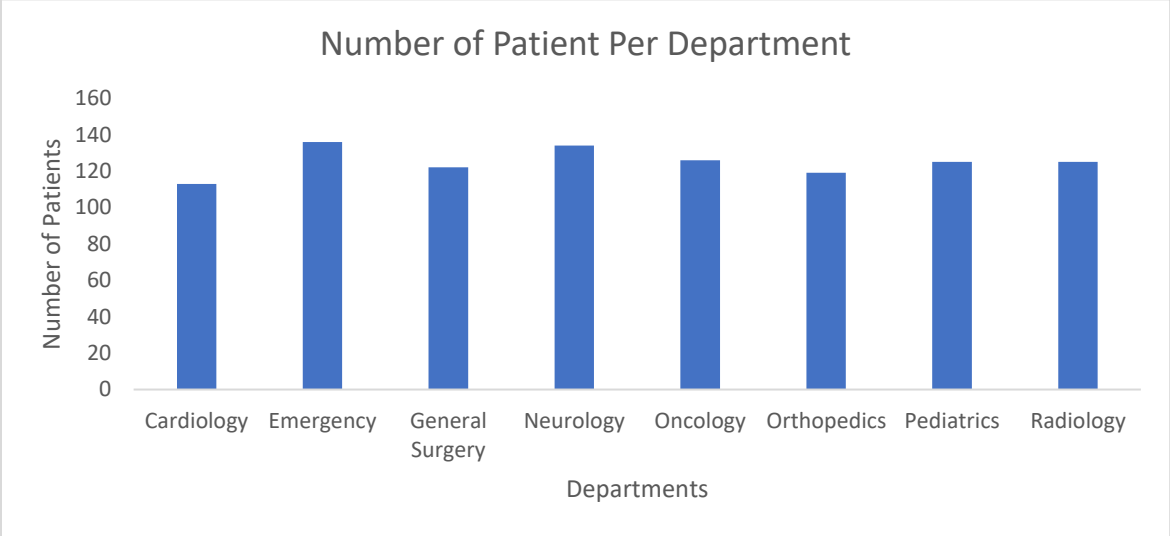
- Data Analysts: Dakolo Emmanuel, Oluwayemisi Oyedeji
- Supervisor: Daniel Ovie

Instrumentation

- **Tools**: Excel, Power BI, Jupyter Notebook, MySQL Workbench
- **Platforms**: WhatsApp, Google meet and Zoom were used for collaboration

Results & Key Insights

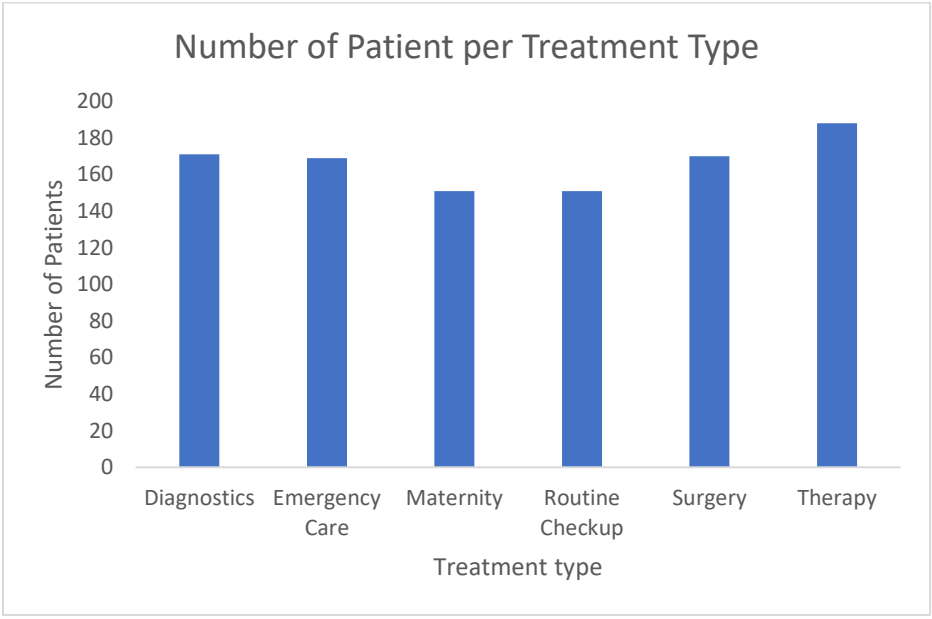
1. Number of patients per department:



A total of 1000 patients were treated at MediCare General Hospital with the Emergency department having the highest patients 136 admitted patients.

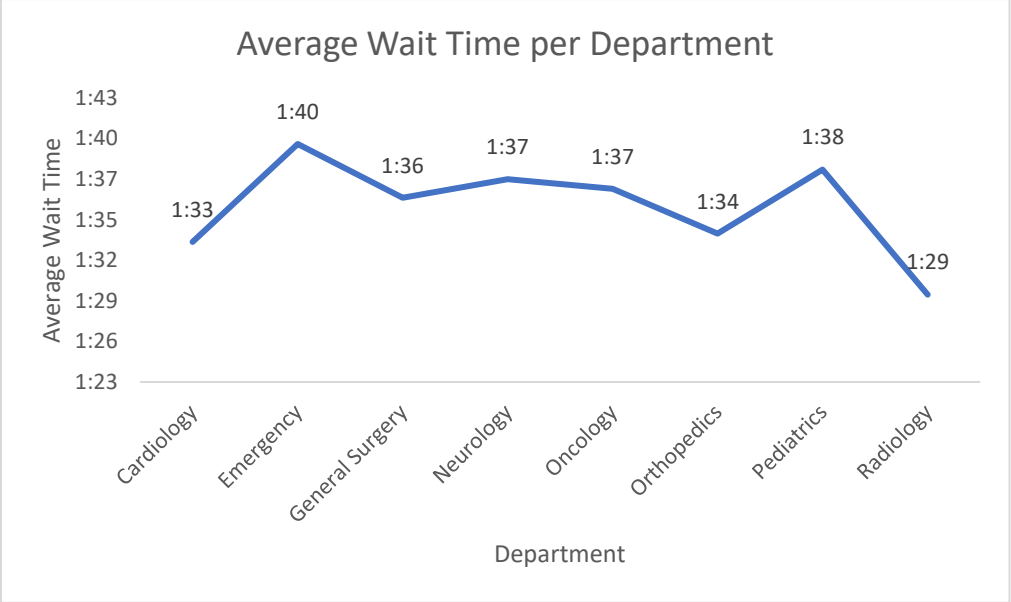
2. Number of patients per treatment type:

- Based on treatment types MediCare general hospital have more patients coming for Therapy



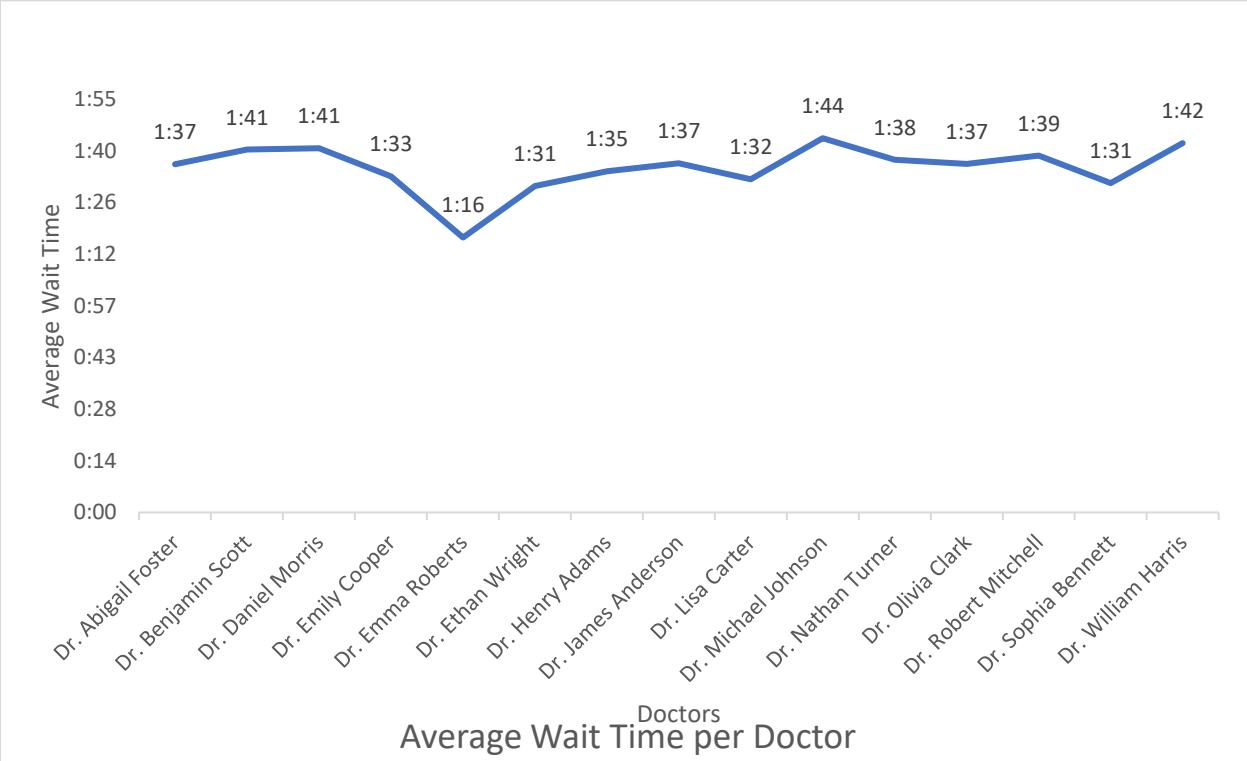
3. Average waiting time per Department

- From the data given we look at the average waiting time for each department to see departments with long waiting times.



4. Average waiting time per Department

- We will look at how long it takes each doctor before they attend to a patient and see how we can resolve long waiting times.



Recommendations

Based on the analysis of operational performance through the MediCare dashboard, the following strategic recommendations are proposed to enhance efficiency, improve patient outcomes, and optimize resource utilization:

1. **Emergency Department Optimization**
   The Emergency Department generates the highest revenue and handles the largest volume of patients but suffers from the longest waiting times.
   Recommendation:
   - Implement a fast-track triage system to prioritize critical cases and reduce congestion.
   - Consider adding more staff or redistributing shifts during peak hours to improve throughput.
   - Explore telemedicine or pre-assessment tools to streamline initial consultations.
2. **Improve Cardiology Department Performance:**
   Cardiology has the highest readmission rate (15.53%) yet contributes the least revenue, signaling inefficiencies in treatment and follow-up care.
   Recommendation:
   - Review and enhance post-discharge care plans for cardiac patients.
   - Implement regular follow-up calls or digital monitoring tools to reduce readmissions.
   - Conduct internal audits to assess care quality and staff training.
3. **Review Dr. Emily Cooper's Patient Outcomes:**
   While Dr. Emily Cooper attended to the most patients, she also recorded the lowest profit margin (47.87%).
   Recommendation:
   - Provide support tools or assistants to enhance operational efficiency.
   - Consider workload distribution across the doctors.
4. **Expand Access to Therapy Services:**
   Therapy recorded both the highest number of patients and the highest profit, suggesting strong demand and financial viability
   Recommendation:
   - Add more specialists for therapy sessions.
5. **Prioritize Elderly Care Services:**
   Patients over 60 have high readmission rates.
   Recommendation:
   - Develop specialized care programs focused on chronic condition management for elderly patients.
   - Introducing home-care support partnerships to minimize preventable readmissions

Summary

The MediCare Performance Dashboard revealed critical operational insights that guided the following recommendations:

1. Streamline the workflows of the Emergency Department to reduce patient wait times without compromising revenue-generating capacity.

2. Enhance care quality in the Cardiology Department to reduce its high readmission rate and improve revenue performance.

3. Evaluate Dr. Emily Cooper's clinical practices, as her high patient volume contrasts with the lowest profit margin.

4. Expand Therapy services, which demonstrated both the highest patient engagement and profit potential.

5. Strengthen care programs for patients aged 60 and above, who have high readmission rates, improve treatment quality, and include follow-up care for patients to reduce readmission rate.

6. Introduce financial support frameworks for the large population of uninsured patients.

7. Collaborate with MediCare insurance providers to address the high readmission rates observed in their patient segment.

8. The use of dynamic dashboards will enable hospital administrators to make informed decisions based on real-time data, ensuring timely interventions and strategic planning.