

Coding Challenge – Advanced Hospitalization Analytics

A multi-specialty hospital wants to analyze **admissions, treatments, costs, and outcomes**. They are facing challenges with:

- **High readmission rates** in some departments
- **Uneven resource utilization** (beds, doctors)
- **Rising treatment costs**

The hospital management wants a **Power BI dashboard** that provides **deep insights** to support better decision-making.

Objective

To analyze hospitalization data with **multiple dimensions** (patient, doctor, department, time, cost, and outcome) and build a **dashboard** that supports:

- Optimizing hospital resources
- Reducing readmissions
- Tracking cost per department
- Improving patient recovery rate

Dataset Description (Sample Fields)

Column Name	Description
PatientID	Unique patient identifier
AdmissionID	Unique hospitalization identifier
AdmissionDate	Date of hospital admission
DischargeDate	Date of discharge
Age	Patient age
Gender	Male/Female
Department	Cardiology, Orthopedics, Pediatrics, Oncology, General Medicine
DoctorID	Treating doctor's ID

Column Name	Description
Diagnosis	Heart Disease, Fracture, Infection, Cancer, Diabetes, etc.
TreatmentType	Surgery, Medication, Therapy
BedType	General, Semi-Private, Private, ICU
LengthOfStay	Number of days admitted
TreatmentCost	Cost of treatment (USD)
InsuranceCovered	Yes/No
Readmitted	Yes/No (within 30 days)
Outcome	Recovered, Ongoing, Deceased

Tasks to Perform

1. KPIs

- Avg Length of Stay per Department
- Total Treatment Cost & Avg Cost per Patient
- % Readmission Rate (overall + per department)
- Recovery Rate (%)
- Bed Occupancy Distribution (General vs Private vs ICU)

2. DAX Measures

- Readmission Rate by Department
- Avg Cost per Day =

$$\text{DIVIDE}(\text{SUM}(\text{Data}[\text{TreatmentCost}]), \text{SUM}(\text{Data}[\text{LengthOfStay}]))$$
- % Insurance Coverage =

$$\text{DIVIDE}(\text{COUNTROWS}(\text{FILTER}(\text{Data}, \text{Data}[\text{InsuranceCovered}] = \text{"Yes"})), \text{COUNTROWS}(\text{Data}))$$

3. Visualizations

- **Line Chart:** Monthly Admissions & Readmissions trend

- **Stacked Bar:** Avg Treatment Cost by Department & Insurance Coverage
- **Heatmap:** Bed Type usage by Department
- **Scatter Plot:** Age vs Treatment Cost (colored by Outcome)
- **Table:** Patients with LengthOfStay > 15 days & Cost > \$10,000 (highlighted)

4. Slicers/Filters

- By Department, Gender, Age Group, Insurance Status

Deliverables

- Power BI Dashboard (.pbix) with advanced visuals
- At least 3 DAX measures (Readmission %, Avg Cost/Day, Insurance %)
- Insights report (e.g., “Oncology has the highest avg cost per day, but most are insurance-covered”)

Expected Learning Outcomes

By completing this challenge, you will:

- Perform **multi-dimensional analysis** in Power BI
- Build **KPIs for cost, resource, and patient outcomes**
- Use **DAX for advanced calculations**
- Apply **conditional formatting to highlight at-risk patients**
- Generate **actionable insights for hospital management**