# Hospital Patient Records - EDA Report

## 1. Dataset Overview

This dataset contains detailed records of patients admitted to a hospital. It includes demographic information like age, as well as medical details such as the department of treatment, diagnosis, treatments received, admission and discharge dates, room numbers, and the total charges incurred.

We begin by importing the dataset, checking its shape, inspecting datatypes, and summarizing key statistics. Date fields such as 'Admission Date' and 'Discharge Date' are converted to datetime format for analysis. Missing values are identified, and duplicates are removed to maintain data integrity.

## 2. Patient Distribution by Department (Bar & Pie Chart)

Using bar and pie charts, we visualized how patients are distributed across various hospital departments. The bar chart provides a quick look at department-wise patient volume, while the pie chart reveals the proportion of patients in each department. This helps in understanding which departments are most engaged with patients, and resource allocation can be planned accordingly.

## 3. Patient Funnel Chart

The funnel chart outlines patient progression through the hospital system. It shows how many patients were admitted, diagnosed, and treated. This is especially useful to identify drop-offs at each stage and assess the hospital's efficiency in moving patients through the care process.

## 4. Sunburst Chart

A sunburst chart displays the hierarchical relationship among departments, diagnoses, and treatments. It visually demonstrates how each department branches into different diagnoses, and further into treatment types. This helps explore complex interrelations and frequencies of treatments within each medical category.

## 5. Age Distribution Histogram

The histogram shows how patient ages are distributed. Peaks in the graph indicate the most common age groups. Such analysis can guide preventive care and awareness campaigns targeted at specific age segments.

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## 6. Bubble Chart - Age vs Total Charges

This chart uses patient age on the x-axis, total hospital charges on the y-axis, and bubble size to represent room number. It helps visualize how charges vary with age and whether certain age groups incur higher costs due to room allocation or treatment complexity.

## 7. Correlation Heatmap

The heatmap presents correlation coefficients between numeric columns such as Age, Room Number, and Total Charges. Strong positive or negative correlations help us understand how variables are interrelated, aiding in predictive analysis and statistical modeling.

## 8. Bullet Chart - Cardiology Charges vs Target

This bullet chart compares actual charges in the Cardiology department with predefined targets. It is a business-oriented visual used to monitor financial goals and detect any over- or underperformance in the department's billing.

## 9. Key Insights

- The most visited department handles the highest patient volume and should be well-staffed.
- The most frequent diagnosis indicates prevailing health concerns.
- The most commonly used treatment reflects standard care practices.
- A correlation between age and total charges suggests older patients may incur higher costs, possibly due to complex treatments.