**Analyzing patient billing trends by medical condition, insurance provider, and age group.**

**Tools Used:**

Microsoft Excel (Pivot Tables, Pivot Charts, Data Cleaning

**Project Objective:**

The objective of this analysis is to explore hospital billing data to identify key trends that influence total billing amounts across various medical conditions, insurance providers, and patient demographics.

This analysis seeks to:

* Determine which **medical condition** contributes the highest total billing amount.
* Assess how **insurance providers** and **age groups** influence hospital billing patterns.
* Generate actionable **business insights** for better healthcare financial management and planning

**Project Description:**

Analyzed hospital billing data using Excel Pivot Tables to uncover how medical conditions, insurance providers, and age groups influence hospital costs. The project highlights trends in patient billing and demonstrates strong data visualization and insight interpretation skills.

**Pivot Table Analyses:**

**Analysis A – Billing by Medical Condition and Insurance Provider**

**Business Question:**

Which medical condition contributes the highest total hospital billing amount, and how does it vary across insurance providers?

**Pivot Setup:**

* **Rows:** Medical Condition
* **Columns:** Insurance Provider
* **Values:** Sum of Billing Amount

**Pivot Chart:** Clustered Column Chart (Billing by Condition & Provider)

**Key Insight:**

Cancer generates the highest overall billing total, particularly among patients insured by Cigna and UnitedHealthcare.

Obesity-related cases also account for significant billing costs, showing potential areas for preventive healthcare investment.

**Analysis B – Billing by Medical Condition and Age Group**

**Business Question:**

How does the total billing amount vary across different age groups for each medical condition?

**Pivot Setup:**

* **Rows:** Medical Condition
* **Columns:** Age Group (grouped in 10-year intervals)
* **Values:** Sum of Billing Amount

**Pivot Chart:** Stacked Bar Chart (Billing by Age Group)

**Key Insight:**

The 40–59 age group contributes the highest billing totals for chronic illnesses such as Hypertension and Cancer.

Younger patients (20–29) have lower billing totals, indicating shorter stays or less severe conditions.

**Analysis C – Billing by Medical Condition, Insurance Provider, and Age Group**

**Business Question:**

How does the total billing amount for each medical condition vary across both insurance providers and age groups?

**Pivot Setup:**

* **Rows:** Medical Condition → Age Group
* **Columns:** Insurance Provider
* **Values:** Sum of Billing Amount

**Pivot Chart:** 3D Column or Multi-Series Clustered Chart

**Key Insight:**

Middle-aged patients (40–59) under Cigna show the highest billing totals, especially for Cancer and Hypertension.

**Medicare** covers mostly older patients (60+) with moderate costs, while **Aetna** and **Blue Cross** have more balanced distributions across age groups.

**Overall Findings**

* **Top Condition:** Cancer - highest total billing amount across multiple insurance providers.
* **Top Insurance:** Cigna - consistently handles high-cost patients across age ranges.
* **Top Age Range:** 40–59 years - contributes the most to total billing costs.
* **Operational Insight:** Hospitals and insurers can use this analysis to optimize coverage, reduce costs for chronic conditions, and allocate resources more efficiently.

**Recommendations**

1. **Preventive Health Programs:**

Invest in preventive programs targeting obesity and hypertension to reduce future billing costs.

1. **Insurance Optimization:**

Reevaluate billing agreements with **Cigna** and **UnitedHealthcare** to manage high-cost claims effectively.

1. **Targeted Awareness:**

Design outreach programs for middle-aged adults to promote early screening and health education.

**Skills Demonstrated**

* Data Cleaning and Formatting
* Pivot Table Creation and Grouping
* Multi-variable Analysis
* Data Visualization (Pivot Charts)
* Insight Writing and Business Interpretation