

POWER BI PROJECT (DATA CLEANING)

STEP 1: Data Set Selection And Download.

- Data Selected From the Site “Maven Data Challenges” On The Topic Of “Hospital Dashboard”. (It Focus On To Build a top-level KPI dashboard to help a hospital's executive team quickly understand its recent performance in key areas).
- Downloaded It As a CSV. File Named As Power BI Project.

STEP 2: Load Data into Power BI.

- Imported that CSV Dataset Into Power Query .

STEP 3: Clean the Data.

- Renamed Some Columns For Better Understanding.
- Changed Type Of Some Columns.
- Replaced Some Errors On The Some Columns.
- Capitalized Each Words In Text Columns.
- Removed Erros In Some Columns.
- Removed Duplicates In Some Columns.
- Added Custom Column Named “Patient Paid” By Substracting ‘Insurence Comp Paid’ From ‘Total Cost’.
- Reordered Columns For Better Understanding.
- Changed The Type Of ID Into Text.
- Renamed The ID In Appointment As Appointment ID.
- Split The Start Date And Time Column By Deliminitor.
- Changed The Column Type Into Date.
- Renamed The Splited Columns.
- Split The Stop Date And Time Column By Deliminitor.
- Changed The Column Type Into Date.
- Renamed The Splited Columns.
- Used 20 Dax measures And 6 Dax Column.

DATA MODELING

Star Schema Characteristics:

- **Central Fact Table:** **Appointments** acts as a central fact table. It contains foreign keys to several dimension tables (**Patients**, **Hospital**, **Payers**) and also includes measures.
- **Direct Relationships:** **Appointments** has direct, single-level relationships with **Patients**, **Hospital**, and **Payers**.

- This is a classic star schema structure where dimensions are directly linked to the fact table.(Appointments (Many) to Patients (One))

Snowflake Schema Characteristics:


- **Normalized Dimensions:** The **Procedures** table can be seen as a sub-dimension or a more granular fact table linked to **Appointments** and **Patients**. If **Procedures** were considered a dimension of **Appointments**, it would be a "snowflaked" dimension because it's not directly linked to the central fact **Appointments** in a flat, denormalized way, but rather through its own set of details.

VISUALIZING

Home Page (Cover Page)

- **Purpose:** Acts as a landing page and navigation guide.
- **Components:**
 - Hospital image, logo, and tagline: *"Healing Hands, Caring Hearts."*
 - Title: City Hospital Dashboard
 - Navigation Buttons: "Overview", "Page 2", "Page 3", "Page 4", "Page 5"
- **Description Under Each Page:**
 - **Overview:** Key metrics, top procedures, total income & profits.
 - **Page 2:** Cost & profit by payer, class, and year.
 - **Page 3:** Patient vs insurance payments, doctor-wise profits, costliest procedures.
 - **Page 4:** Monthly appointment heatmap, department cost, average patient cost.
 - **Page 5:** Insurance revenue, gender trends, and patient age over years.

Page 1: Overview Page

- **Purpose:** Provides high-level hospital KPIs (Key Performance Indicators).
- **Main Metrics:**
 -  Total Patients: 974
 -  Total Doctors: 10

- 💰 Total Costs: \$113K
- 💰 Total Incomes: \$4,110K
- 💰 Total Profits: \$3,998K
- 🏥 Total Departments: 6
- **Top 15 Procedures Table:**
 - Shows procedure name, average base cost, and procedure count.
 - Example: *Ultrasound scan for fetal viability* done 184 times, avg. cost \$9,205
- **Insight:** Quickly spot major revenue-driving procedures and overall hospital performance.

📄 Page 2: Payer and Class Analysis

- **Purpose:** Breaks down financial metrics by payer and appointment class.
- **Visuals:**
 - **Average Claim Cost by Payer:** Highest – *Medicare* (\$1,454K).
 - **Cost by Appointment Class:** *Ambulatory* class has highest cost (\$2M+).
 - **Cost by Year Line Chart:**
 - Shows declining cost trend from 2011 to 2021.
 - Includes unique patient counts per year.
 - **Profits by Class:** Ambulatory generates highest profit (\$2M).
- **Insight:** Identifies which payers and services contribute most to cost and profit over time.

📄 Page 3: Payment & Doctor Performance

- **Purpose:** Compares patient-paid vs insurance-paid, highlights costliest procedures and doctor profit.
- **Visuals:**
 - **Top 8 Costliest and Most Frequent Procedures:**
 - Includes procedures like COVID-19, drug overdose, and pregnancy.
 - Bar + Line combo chart shows both cost and frequency.
 - **Patient vs Insurance Comparison:**
 - Breaks down how much patients and insurance companies paid.

- **Doctor-wise Profit Chart:**
 - Highest: Dr. Naseef Ahmed (\$572K), followed by Dr. Beena Mathew (\$489K).
- **Insight:** Identifies most expensive treatments and most profitable doctors.



Page 4: Appointment Trends & Department Cost

- **Purpose:** Shows seasonal trends, department-wise costs, and average patient cost.
- **Visuals:**
 - **Monthly Appointment Heatmap:**
 - February and January have highest appointments.
 - October and December lowest.
 - **Total Cost by Department (Donut Chart):**
 - Ambulatory: 50.47% of cost.
 - **Average Cost per Patient:** \$4.22K (Gauge chart).
- **Insight:** Helps optimize staffing and resources based on seasonal trends and department demand.



Page 5: Insurance, Gender, and Patient Age

- **Purpose:** Deep dive into insurance revenue, gender trends, and patient age analytics.
- **Visuals:**
 - **Revenue by Insurance Company:**
 - Medicare highest contributor.
 - **Gender Breakdown by Year:**
 - Stacked bar chart shows M/F patient counts over time.
 - **Average Patient Age Over Time:**
 - Trend line shows age rising from 33 to 52 over a decade.
- **Insight:** Reveals demographic patterns, aging patient base, and insurer impact.