HealthStat Hospital Efficiency Dashboard

Domain: Healthcare Analytics | **Platform:** Power BI | **Focus:** Operational Efficiency & Cost Analysis

1. Executive Summary

Improving efficiency while maintaining high-quality patient care is a central challenge in healthcare. This project analyzes hospital operations using over **27,000 inpatient discharge records** from various hospitals across New York State.

The goal was to assist HealthStat—a fictional consulting firm—in identifying key drivers of Length of Stay (LOS), hospital costs, case severity, and discharge outcomes. The final product is a fully interactive, multi-page Power BI dashboard that equips executives with actionable insights into efficiency gaps and cost structures.

2. Tools & Technologies

- **Core:** Power BI Desktop, Power Query
- **Analytics:** DAX (Data Analysis Expressions), AI Visuals (Key Influencers, Decomposition Tree)
- **Data Architecture:** Star Schema Modeling
- **Dataset:** 27,000+ records including Demographics, Clinical variables (APR-DRG, Severity), and Financials (Charges vs. Costs).

3. Dashboard Architecture

The solution consists of four distinct analytical views designed to guide the user from high-level metrics to granular facility profiles.

Page 1: Executive Overview

- **Purpose:** A high-level summary of system performance.
- **Key Metrics:**
  - Total Admissions: **27K**
  - Avg Length of Stay (LOS): **2.67 days**
  - Avg Cost per Stay: **$20.99K**
- **Visual Strategy:** Uses scatter plots to cluster efficiency and AI visuals to identify key influencers for admissions.

Page 2: Length of Stay (LOS) Comparison

- **Purpose:** Operational efficiency analysis across facilities.
- **Key Insights:** Identifies which hospitals manage patient flow efficiently versus those requiring process improvements.

- **Key Metric: LOS Efficiency Score** (calculated based on benchmark LOS).
- **Visual Strategy:** Top/Bottom analysis and Decomposition Trees to break down LOS by severity and county.

Page 3: Cost Comparison

- **Purpose:** Deep dive into financial performance and profitability.
- **Key Metrics:**
  - Total Charges: **$89.83M**
  - Total Costs: **35.75M**
  - Profit Margin: **0.60**
- **Visual Strategy:** Comparison of Cost-to-Charge ratios to identify overbilling or revenue model gaps.

Page 4: Hospital Profile (Drill-Through)

- **Purpose:** A dynamic, one-page snapshot for specific facility leadership.
- **Technical Feature: Dynamic Recommendation Engine** using `SWITCH` logic to auto-generate suggestions based on the facility's specific performance against benchmarks.

4. Technical Achievements

This project goes beyond basic visualization by implementing advanced data modeling and calculation techniques.

- **Advanced DAX:** Created dynamic benchmark metrics (e.g., `Avg LOS (All)`, `Avg Cost (All)`) to compare individual facilities against the system average.
- **Logic-Based Recommendations:** Developed an automated engine that reads performance data and displays text-based strategic advice dynamically.
- **AI Integration:** Leveraged Power BI's "Key Influencers" and "Decomposition Tree" to statistically analyze drivers of cost and duration.
- **UX Design:** Implemented multi-level slicers with dynamic titles and color-coded efficiency scoring for intuitive navigation.

5. Key Findings & Strategic Recommendations

Based on the data analysis, the following insights were generated for HealthStat:

Insights

1. **Process Inefficiencies:** Significant variation in LOS suggests that while some hospitals have strong patient flow, others face bottlenecks in diagnostics and bed management.
2. **Cost Drivers:** High costs are heavily correlated with specific counties and severity groups. Outliers in low-severity cases indicate resource mismanagement.
3. **Revenue Gaps:** A high variance in Cost-to-Charge ratios suggests inconsistent pricing structures across the network.

Recommendations

Category	Strategic Action
Operational	Streamline discharge planning workflows and adopt digital patient-flow management systems.
Financial	Investigate cost outliers in specific service lines and use benchmark-driven targets for budgeting.
Quality	Invest in capacity for severe cases and enhance staff training for high-acuity care to reduce LOS.
Technology	Automate periodic reporting and implement predictive models for LOS forecasting.

6. Project Outcome

The HealthStat dashboard successfully transformed raw discharge data into a strategic asset. It allows leadership to measure efficiency, benchmark facilities against peers, and make data-driven decisions to optimize both cost and patient care quality.