Power BI Project Report: Hospital Length of Stay & Cost Analytics

Live Dashboard

👉 View the Live Healthcare Analytics Dashboard

If access is restricted, please contact istiak36@gmail.com.

Executive Summary

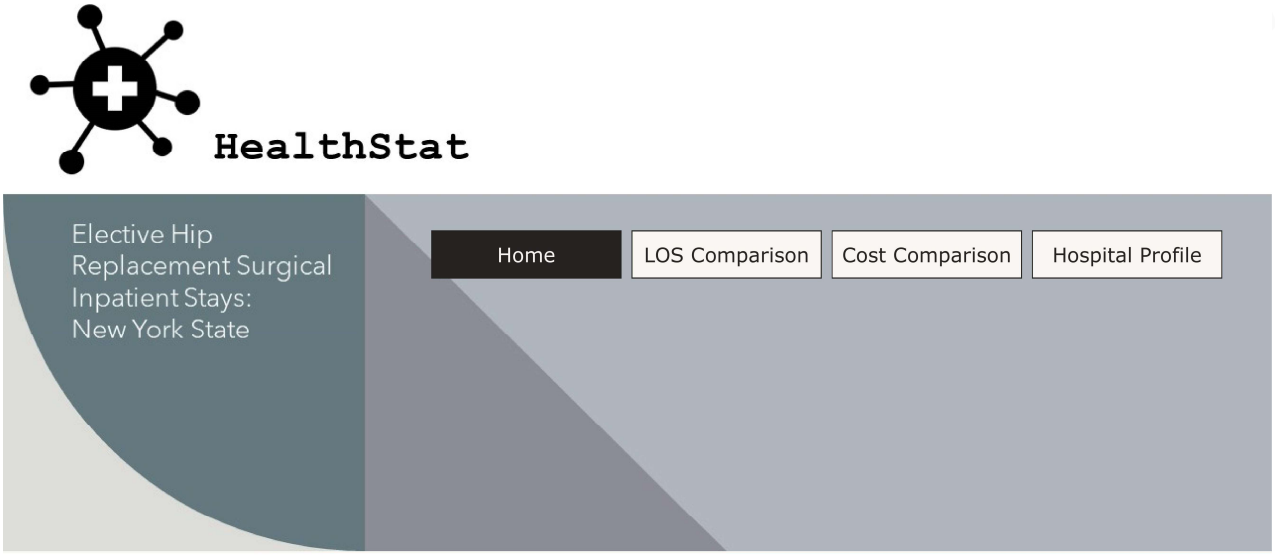
This Power BI dashboard project analyzes elective hip replacement inpatient stays across New York State hospitals. It equips healthcare stakeholders to understand and benchmark average length of stay (LOS), cost per discharge, and clinical root causes behind extended hospitalizations and high costs. The solution enables targeted quality improvement, efficient resource allocation, and cost containment.

Project Objectives

- Assess and compare LOS and cost per discharge in hip replacement cases across hospitals and regions.
- Identify factors (severity, risk, hospital, geography) impacting LOS and cost.
- Provide actionable, visual benchmarks for hospital leaders, clinicians, and policy analysts.
- Leverage advanced analytics (DAX, Key Influencers) to surface drivers for improvement.

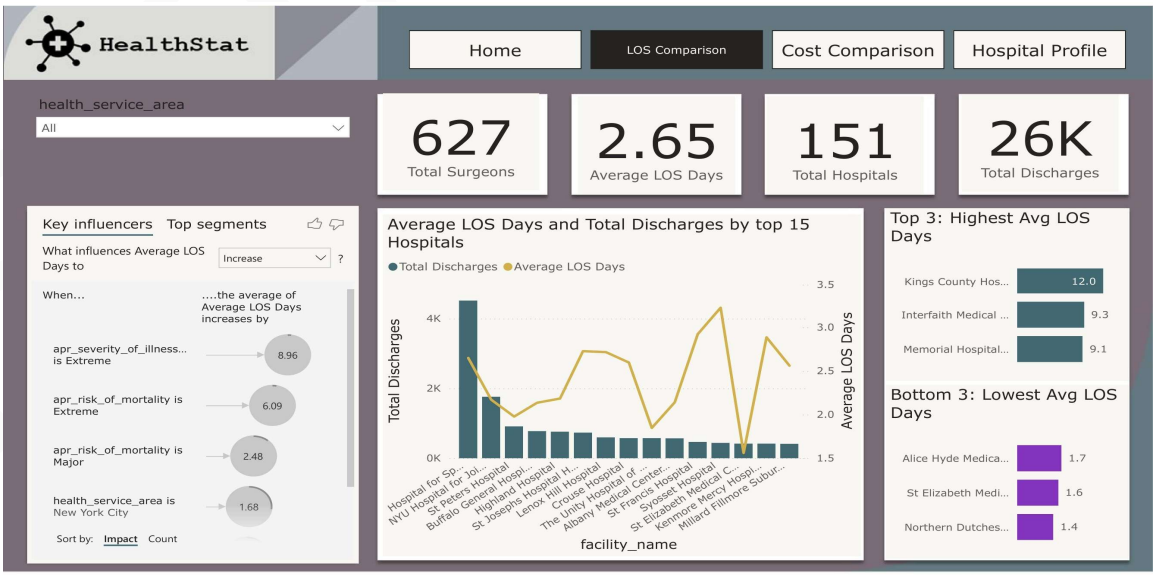
Key Insights & Visuals

1. Drivers of Hospital Length of Stay



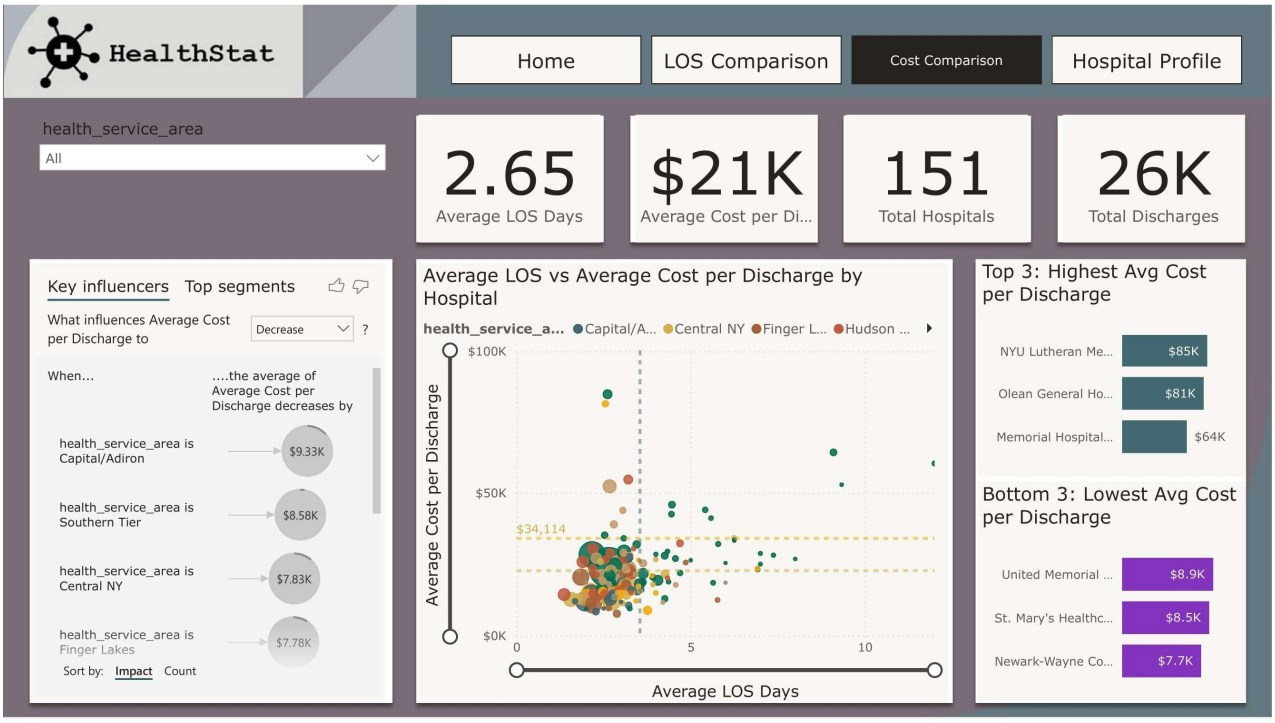
- **Extreme severity of illness** and **extreme/major mortality risk** most strongly increase LOS, as revealed by the Key Influencers analysis.
- Location matters: New York City hospitals see higher average LOS.

2. Hospital & Region Cost Benchmarks



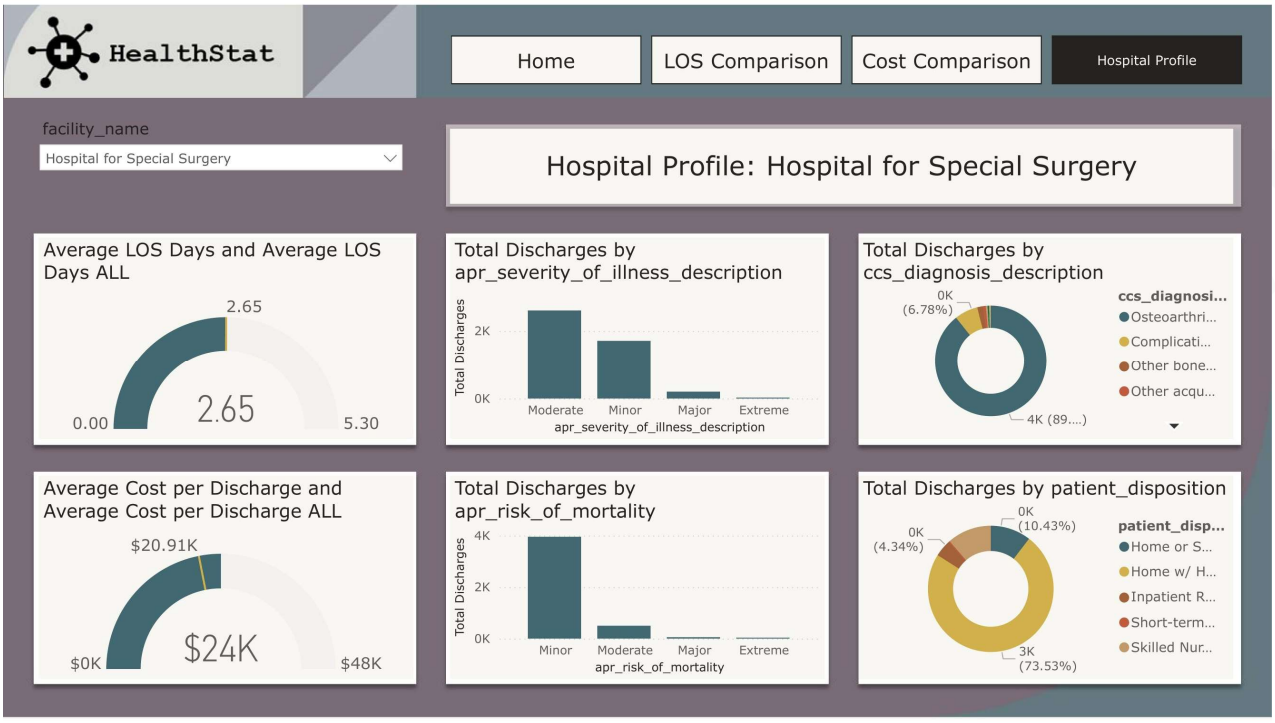
- Hospitals in the Capital/Adirondack, Southern Tier, Central NY, and Finger Lakes regions show **lower cost per discharge**.
- Top 3 hospitals for average cost >$80K/discharge; bottom 3 < $9K—highlighting large operational differences.

3. Discharge Volume & Severity Patterns



- Majority of cases are minor or moderate severity; average LOS and cost increase with case complexity.
- Discharge outcomes split between home/self, skilled nursing, and rehab settings.

4. Individual Hospital Profile



- Example: Hospital for Special Surgery has average LOS and cost broken down by severity, risk of mortality, diagnosis, and disposition.
- Discharge and outcome analysis allow state-wide and peer-to-peer benchmarking.

Recommendations

- Implement intensive case management for high-severity/mortality-risk patients to safely reduce LOS.
- Examine and replicate cost-containment strategies of top-performing facilities.
- Strengthen care transition planning, leveraging discharge destination analysis to minimize readmissions and downstream costs.

Technical Implementation & Project Lifecycle

Data Source

- Public New York State administrative records on inpatient elective hip replacement stays, gathered from the state health department's open data portal.

Data Storage

- Original CSV files stored securely in a SharePoint team folder.
- Analytical model built in Power BI Desktop; all datasets appended in the PBIX file.

Update Frequency

- NYS data refreshes quarterly. Project refreshes on-demand upon new CSV drop.

ETL Process

- ETL managed fully in Power Query within Power BI—filtered surgery type, standardized hospital/facility, mapped severity/risk fields.

Connection Mode

- Import mode used for optimized performance and flexibility in modeling.

Data Transformation

- Conducted in Power Query (M): filtered rows, merged tables, standardized field values, grouped outcomes.
- **Challenge:** Inconsistent codes for hospitals and diagnosis—solved via creation of mapping tables and applying conditional logic.

Data Modeling Challenges

- Many-to-one and one-to-many relationships validated and set for hospital-discharge tables.
- **Resolution:** Built star schema for analytics, ensuring fast visuals and valid aggregations.

DAX Functions

- **CALCULATE, FILTER, VAR, ALLSELECTED, RANKX, SWITCH** heavily used for sliceable KPIs, ranking, and filtering across dimensions.
- Key Influencers visual for automated driver analysis.

KPIs

- Average Length of Stay (LOS)
- Average Cost per Discharge
- Total Discharges
- Metrics by Severity, Risk Group, Region, and Facility
- Discharge Outcome (home, rehab, etc.)

Best Practices

- Star schema modeling, self-describing calculated/measured columns.
- User-friendly labels/tooltips.
- Color-safe palettes and clarity-first layouts.

Performance Optimization

- Query folding in Power Query.
- Minimized calculated columns; complex transformations done before model load.
- Limited complex visuals per page for speed.

RLS (Row Level Security)

- Not enabled (all data public/state). For hospital-internal projects: RLS by region/facility is strongly recommended.

Data Validation

- Benchmarked all numbers with NYS-published public statistics.
- Row count/sum checks after every ETL/transformation.
- Manual call-outs and DAX cross-validation for outlier hospitals.

End Users

- Hospital admin, quality teams, analysts, and state policy makers.

Data Refresh

- Manual during design; easily switched to scheduled refresh in Power BI Service for ongoing deployments.

Collaboration & Sharing

- Published to Power BI Service for secure sharing with stakeholders.
- Feedback requested via Teams/email; static exports provided as backup for board meetings.

About

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