

Exploring Medicare Hospital Spending and Quality in the Upper Midwest

CIS 671 Final Project

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Motivation and Tasks

- User: insurers/healthcare consultants
- High-spend, high-inpatient volume counties
- Hospital stars vs market spend
- Top DRGs by inpatient volume
- Michigan vs neighbors' spending

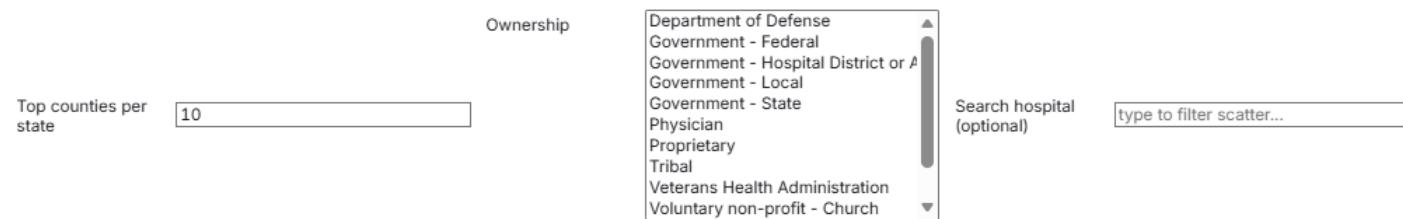
Data Sources

- **CMS** (Centers for Medicare & Medicaid Services)
- Medicare Geographic Variation Public Use (2023)
- Hospital General Information (2025)
- Medicare Inpatient Hospitals by Provider and Service (2023)
- US Census county shape (2023)

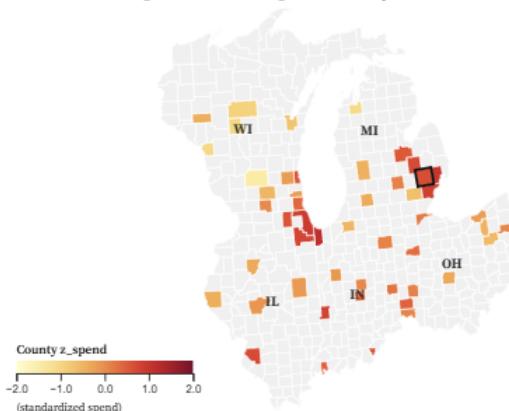
Data Processing and Derived Measures

- **Region:** MI, OH, IN, IL, WI
- **Tools:** Python, GeoPandas, Observable
- Link hospitals to counties via FIPS
- County metrics: bed-weighted stars, z_spend
- DRG metrics: top-5, HHI, payments, Med/Surg mix
- County ranking: beds_sum and discharges_sum

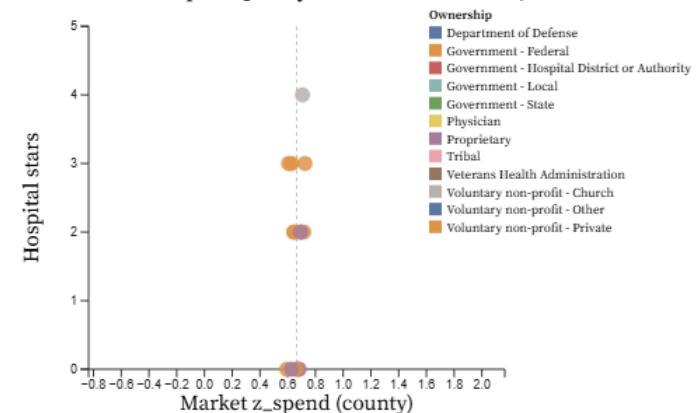
Interactive Dashboard Layout



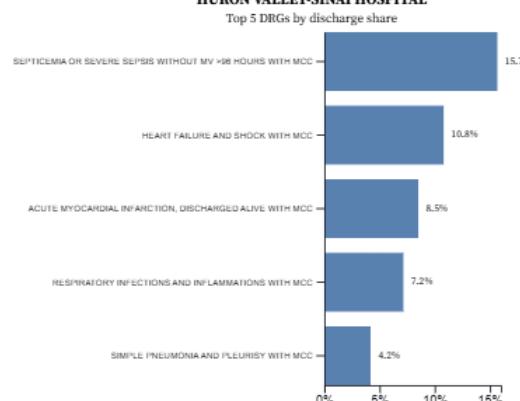
Top 10 counties per state by total discharges



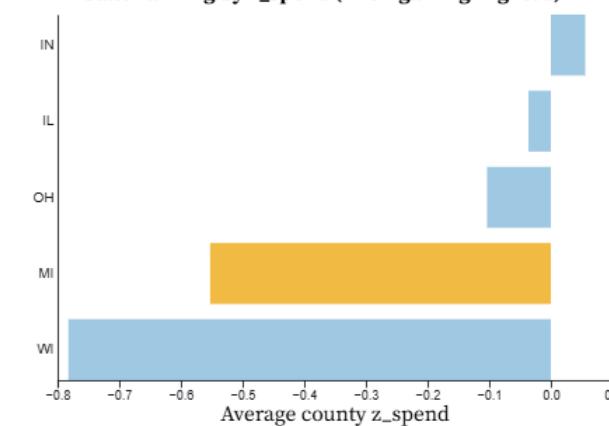
Hospital Quality vs Market — Oakland, MI



HURON VALLEY-SINAI HOSPITAL

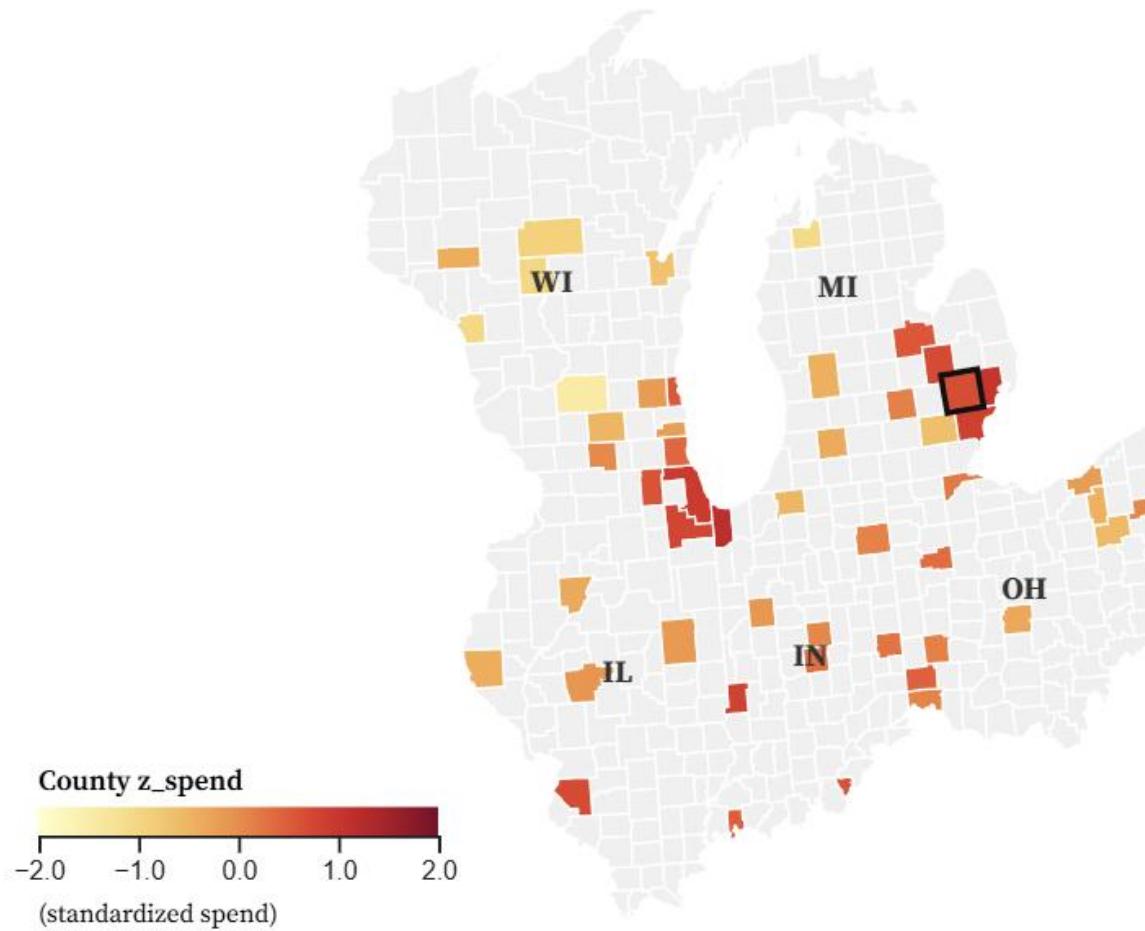


State ranking by z_spend (Michigan highlighted)

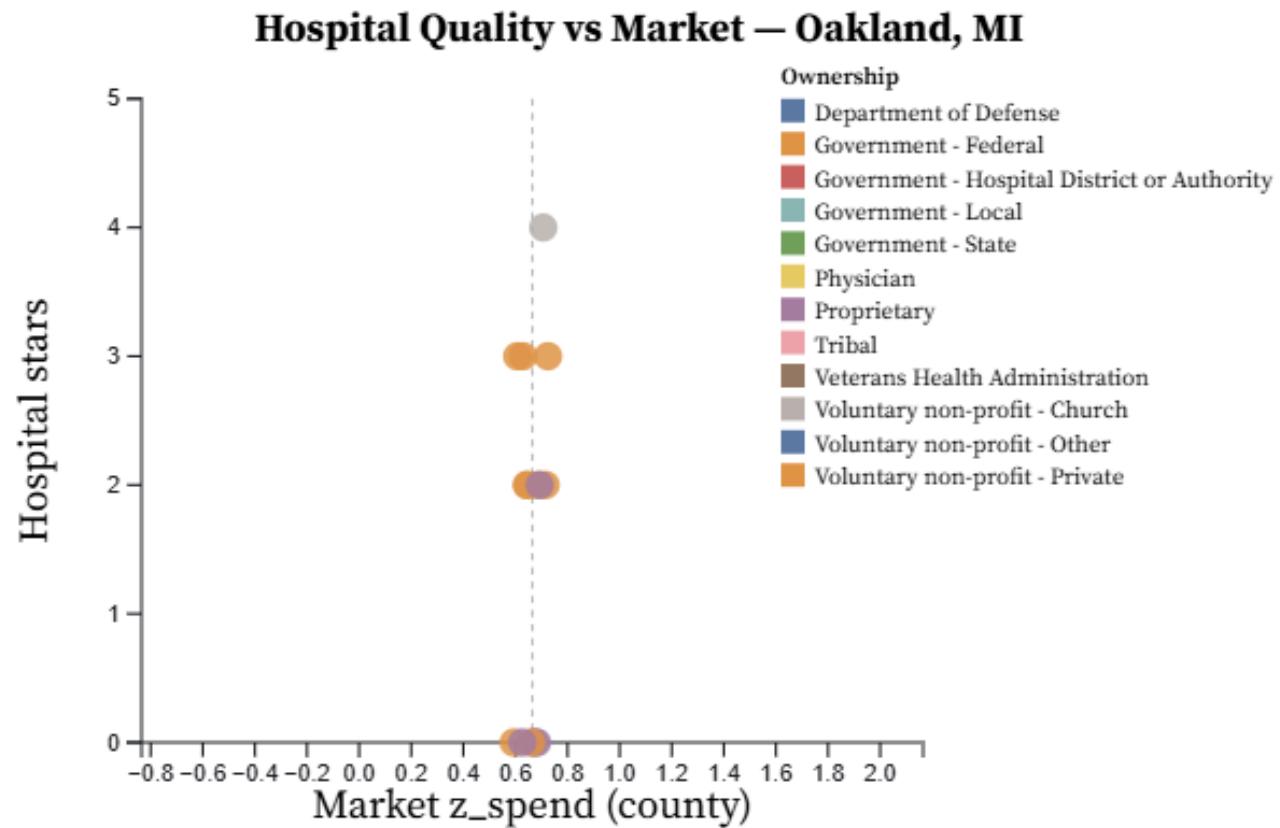


Map of Top Counties per State by Discharges

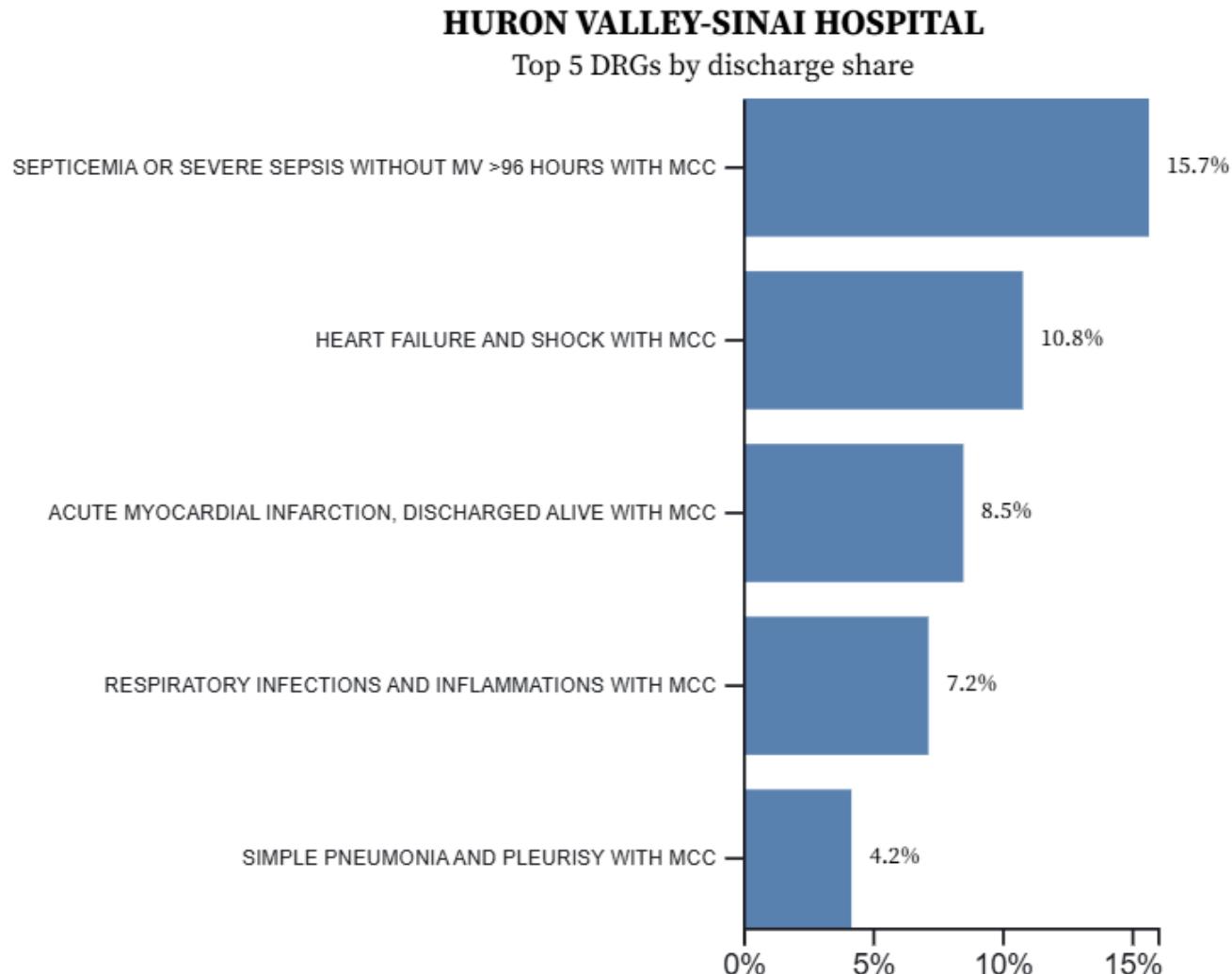
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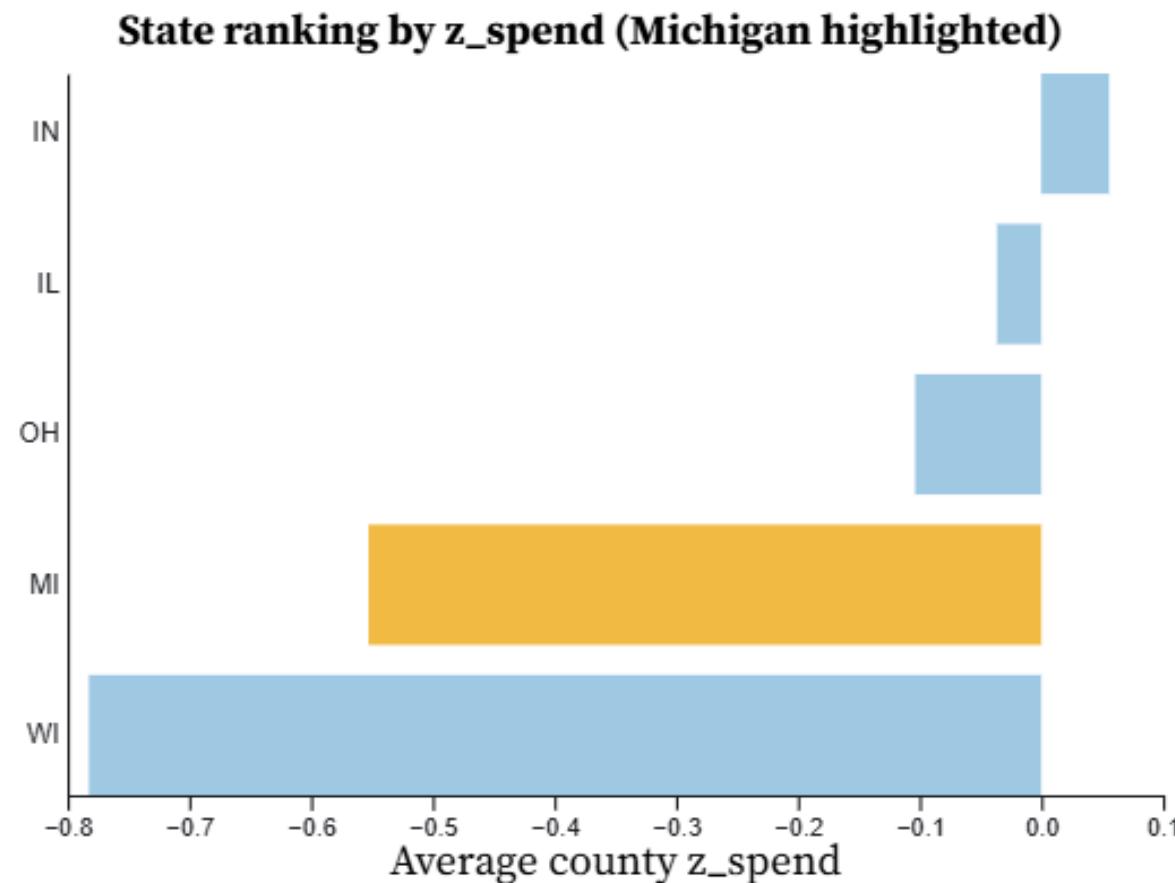
Hospital Quality versus Market Spending



Hospital Service Mix: Top 5 DRGs



State Level Benchmarking



Insights from the Dashboard

- High-spend, high-discharge counties cluster around major metros.
- Some markets: high spending, mostly low-star hospitals.
- Inpatient volume concentrates in a few high-impact DRGs.
- Michigan's average spending sits mid-range among five states.

Limitations and Future Extensions

- County-level spend ≠ hospital efficiency
- Star ratings are a limited quality proxy
- Only one year, Medicare-only data
- Add readmission, mortality, and post-acute metrics
- Add diagnosis filters, hospital comparisons

Thank you!