

Improving Patient Length of Stay

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Agenda

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Assumptions, Challenges, & Risks

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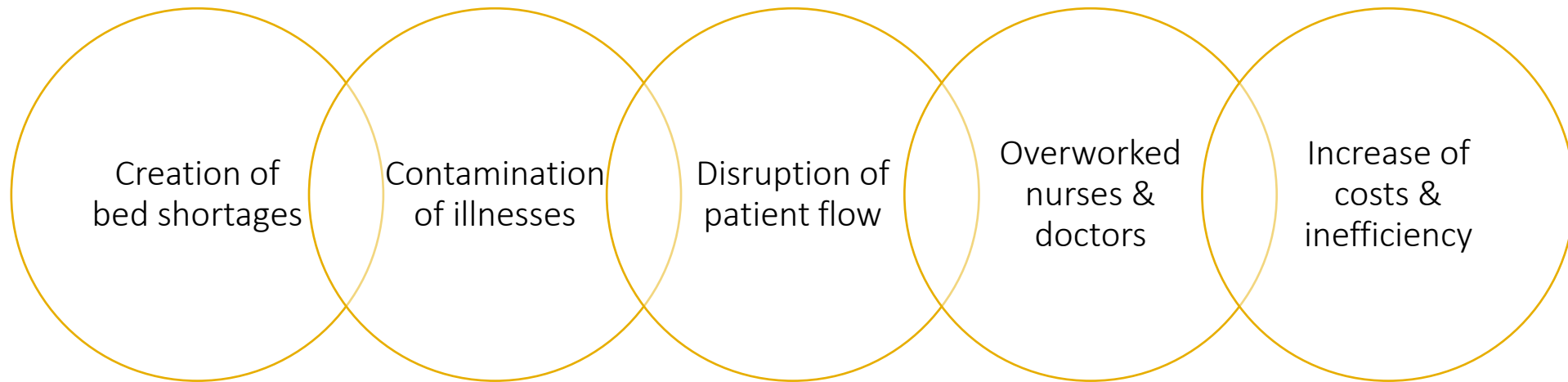
Outcomes & Takeaways

UIHC Problem Overview

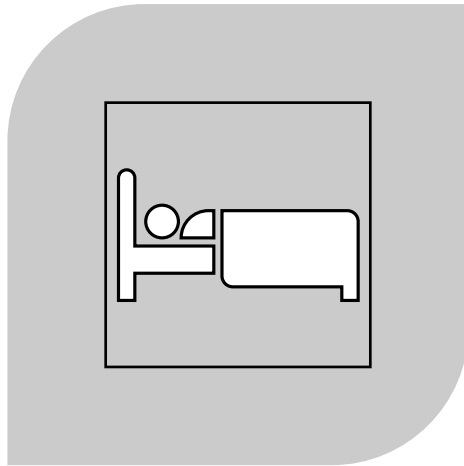
- **Who:** University of Iowa's Hospitals and Clinics
- **What:** Patient length of stay
- **How:** Create a dashboard in Slicer Dicer using Epic
- **Why:**
 - Extended length of patient stays throughout the University of Iowa facilities
 - Discover underlying variables that affect extended stay
 - Create simple and easy to read dashboards for the UIHC doctors and nurses
 - Analyze departments with extended stays based off patient data

Importance of Patient Length of Stay

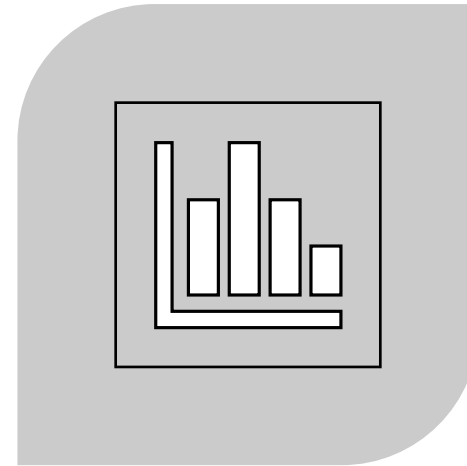
- UIHC average patient length of stay (LOS): 6.8 days
- National average patient length of stay (GMLOS): 4.5 days



Objective of Analysis



FIND UNDERLYING VARIABLES
RELATING TO PATIENT LENGTH OF STAY



CREATE AN INFORMATIVE DASHBOARD
TO ANALYZE FINDINGS

Exploratory Analysis Tools

Epic

- Main electronic health record system used at many hospitals, specifically the University of Iowa's hospitals and clinics
- Includes all patient medical history and records
- Allows all clinical information to be stored in one convenient and secure database



Slicer Dicer

- Data exploration tool within Epic that allows customization abilities to explore patient history and data
- Provides physicians, department managers, and other users with intuitive and customizable data exploration abilities
- All patient data found within Slicer Dicer comes from Epic



Project Timeline

Focus on Project Background
to Create a Strong Foundation

Understand underlying problems affecting patient length of stay throughout the hospitals and clinics
Learn exploratory analysis tools: Epic and Slicer Dicer

Understand Underlying
Variables Affecting Extended
Patient Length of Stay

Analyze and interpret measures, values, and patient variables
Observe trends, patterns, and outliers of current patient statistics as well as patient history

Create Intuitive Visuals in
Slicer Dicer using Epic

Build 6-8 different visuals such as tables, models, and graphs
Create an effective and informative dashboard in Slicer Dicer to present our analysis

Assumptions



Average length of stay is around 3 days



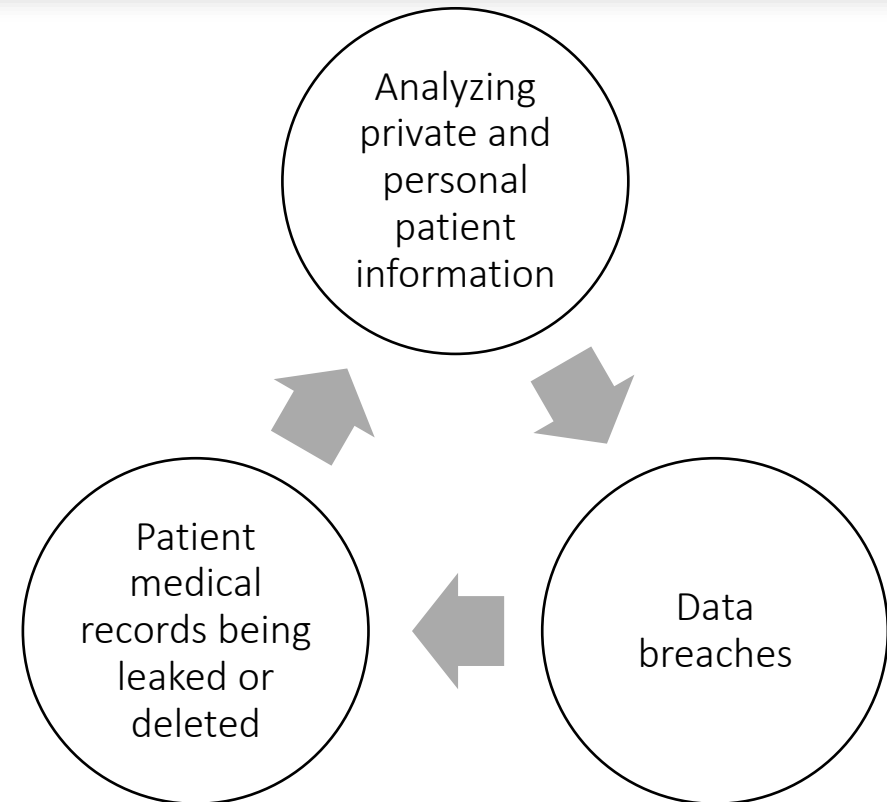
Older patients will be the focus of extended length of stay



Emergency Department receives the most visits

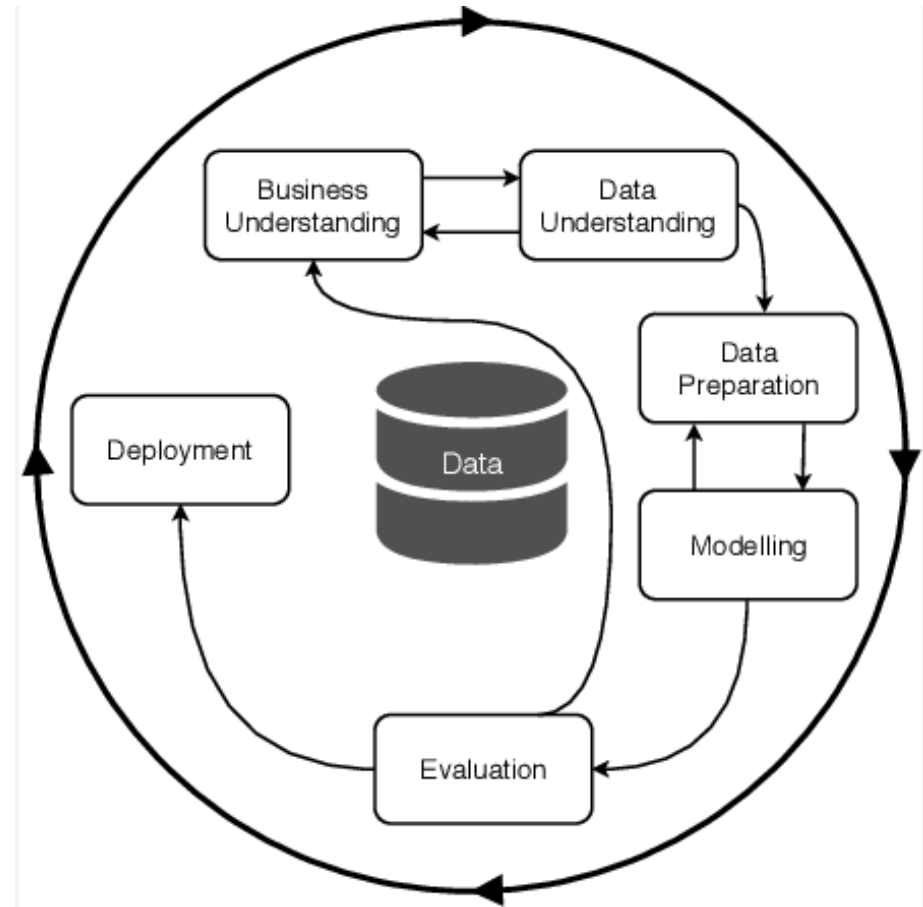
Challenges & Risks

- **Challenge #1:** Choosing most important patient variables to find correlation between patient length of stay
- **Challenge #2:** Different visualization options to display information on project dashboard
- **Challenge #3:** Analyzing significant variables in relation to group recommendations





Methodology

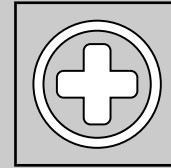


CROSS INDUSTRY STANDARD PROCESS FOR DATA MINING (CRISP-DM MODEL)

Business Understanding



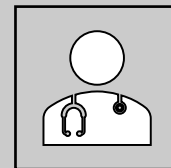
Analyze underlying variables affecting patient length of stay



Determine which departments have the longest inpatient stays



Assist UIHC nurses and doctors in creating intuitive and accessible dashboards



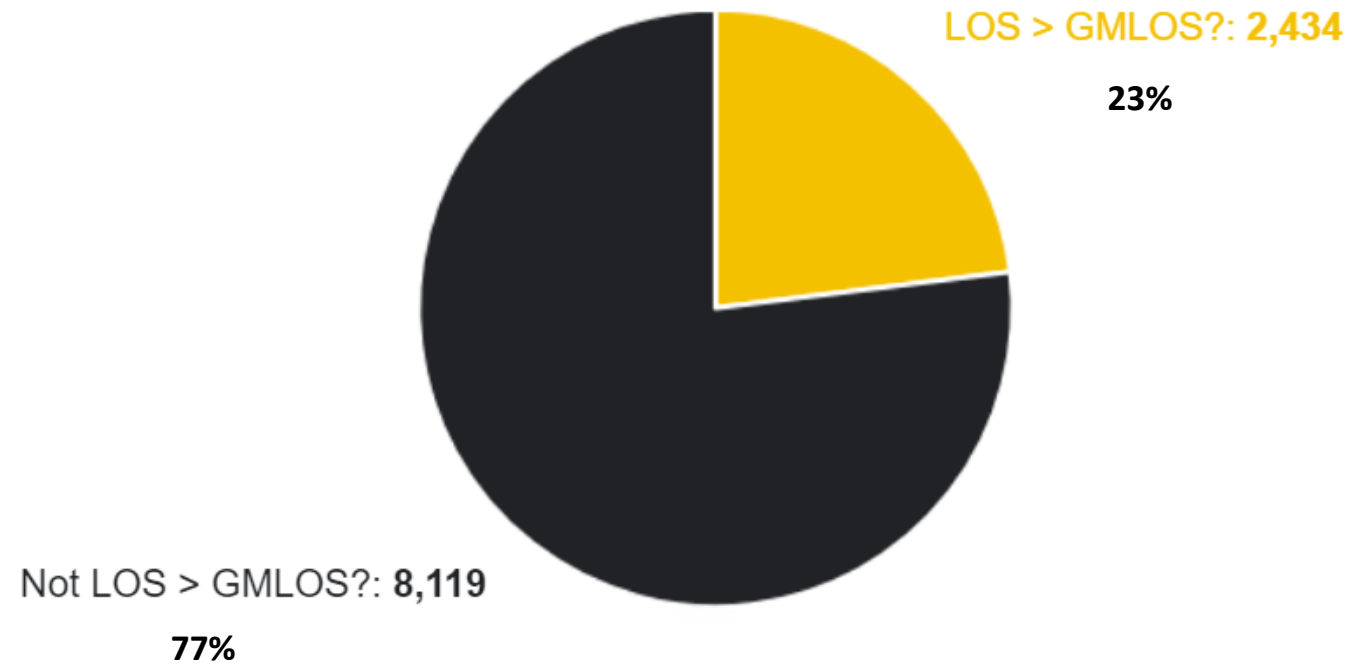
Help the University of Iowa's facilities leverage data analysis regarding extended patient stays

Data Understanding

- Focusing on past 6 months
 - Understanding of recent trends
 - Rapidly changing environment
- Analysis includes current patient statistics, demographics, & medical history
- LOS>GMLOS: where length of stay at UIHC is greater than the geometric mean length of stay

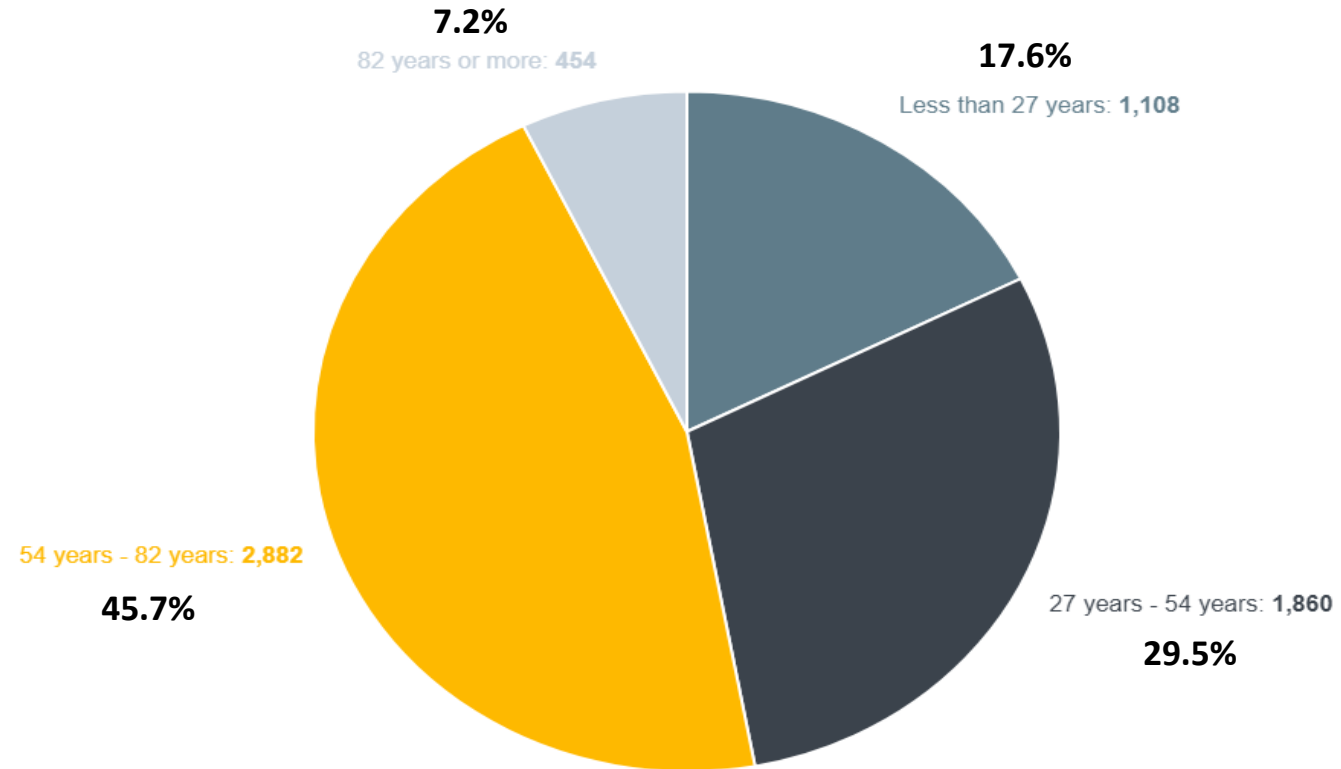
Number of Hospital Admissions by LOS > GMLOS

Last 6 months



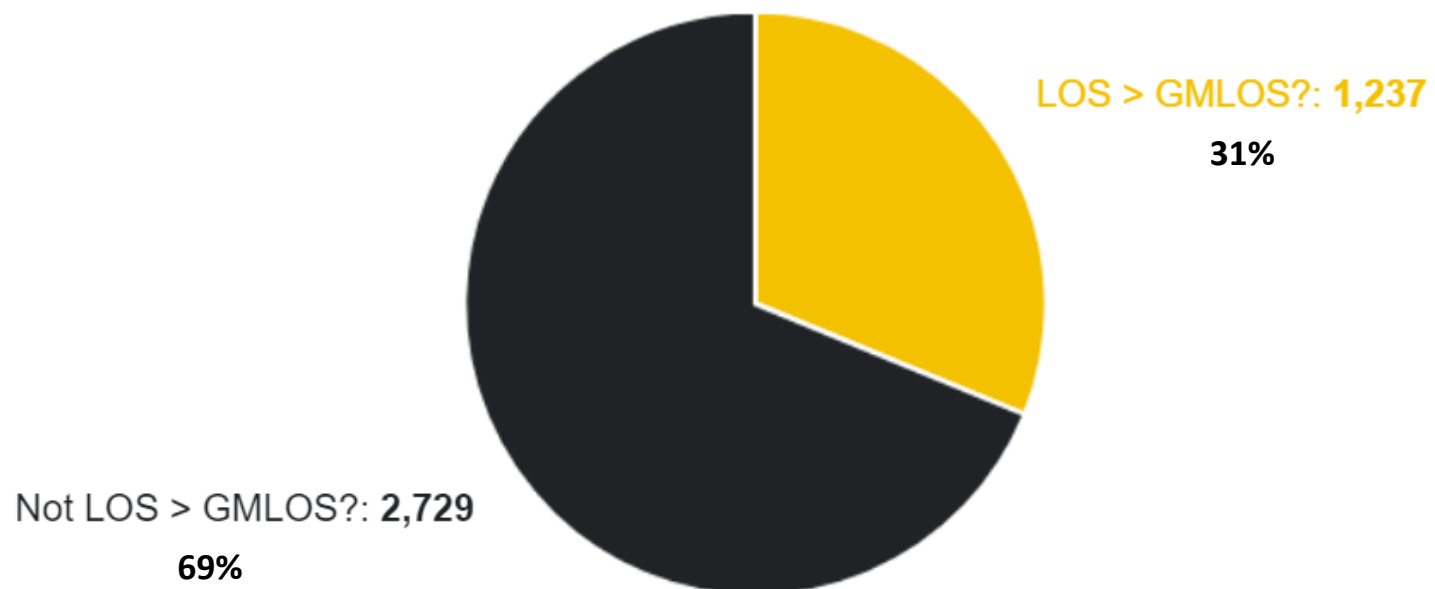
Breakdown of Patients w/ LOS>GMLOS by Age Range

Last 6 months



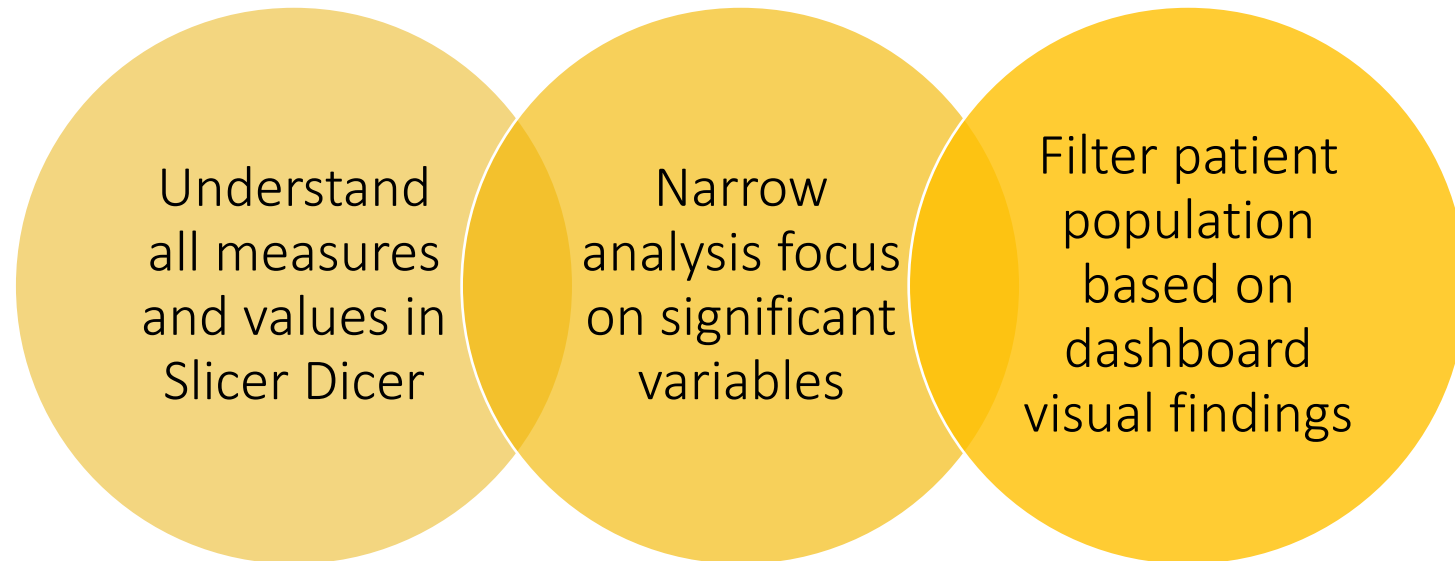
Number of Hospital Admissions by LOS > GMLOS (54-82 years)

Last 6 months





Data Preparation



As we are working with real-life patient information, our data preparation of our length of stay analysis did not incorporate any cleaning, transformation, or deletion of data.



Modeling

Hospital Admissions

Age

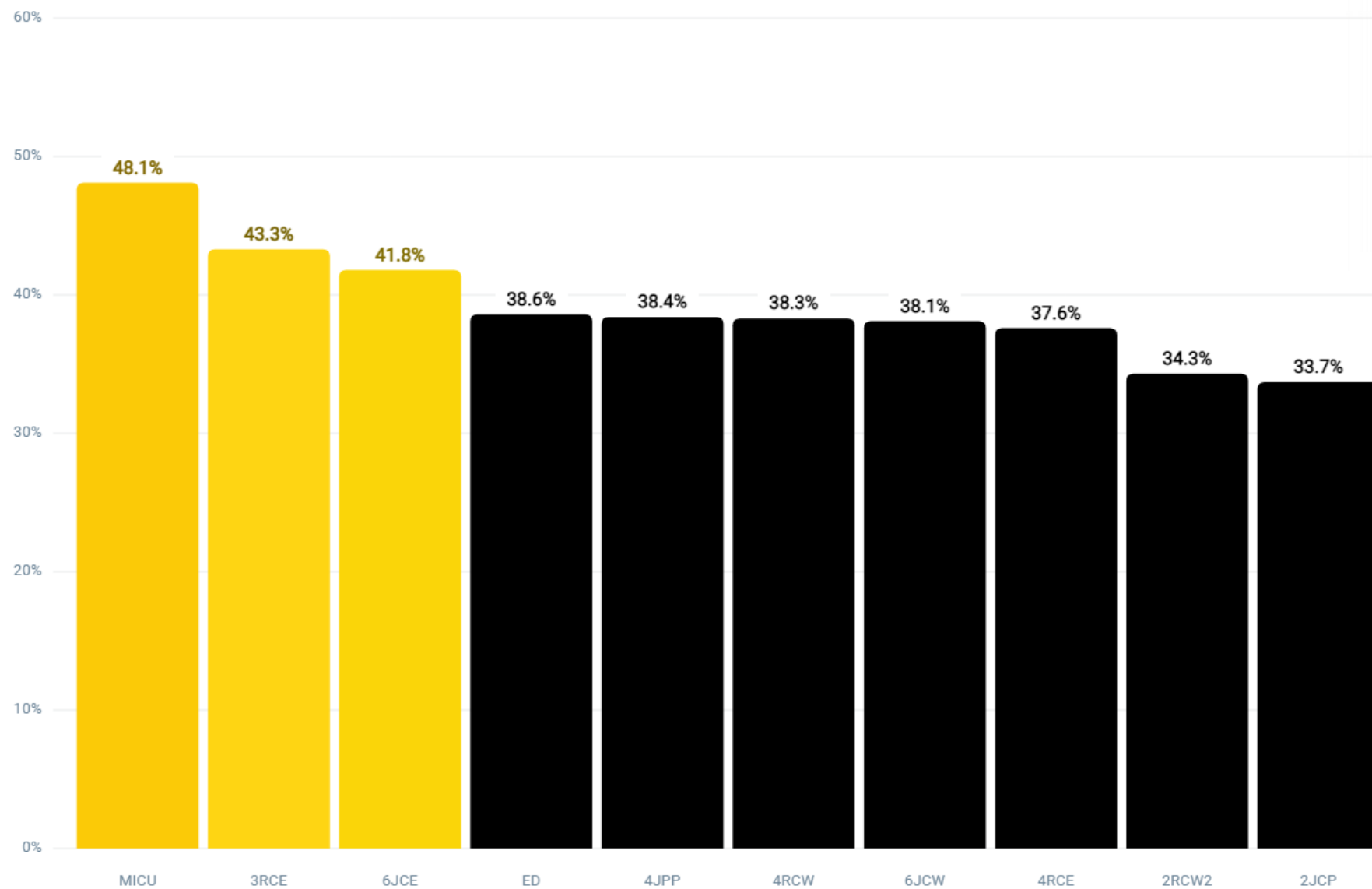
Department

Pre-Existing Conditions

Percent of Patients by Quarter

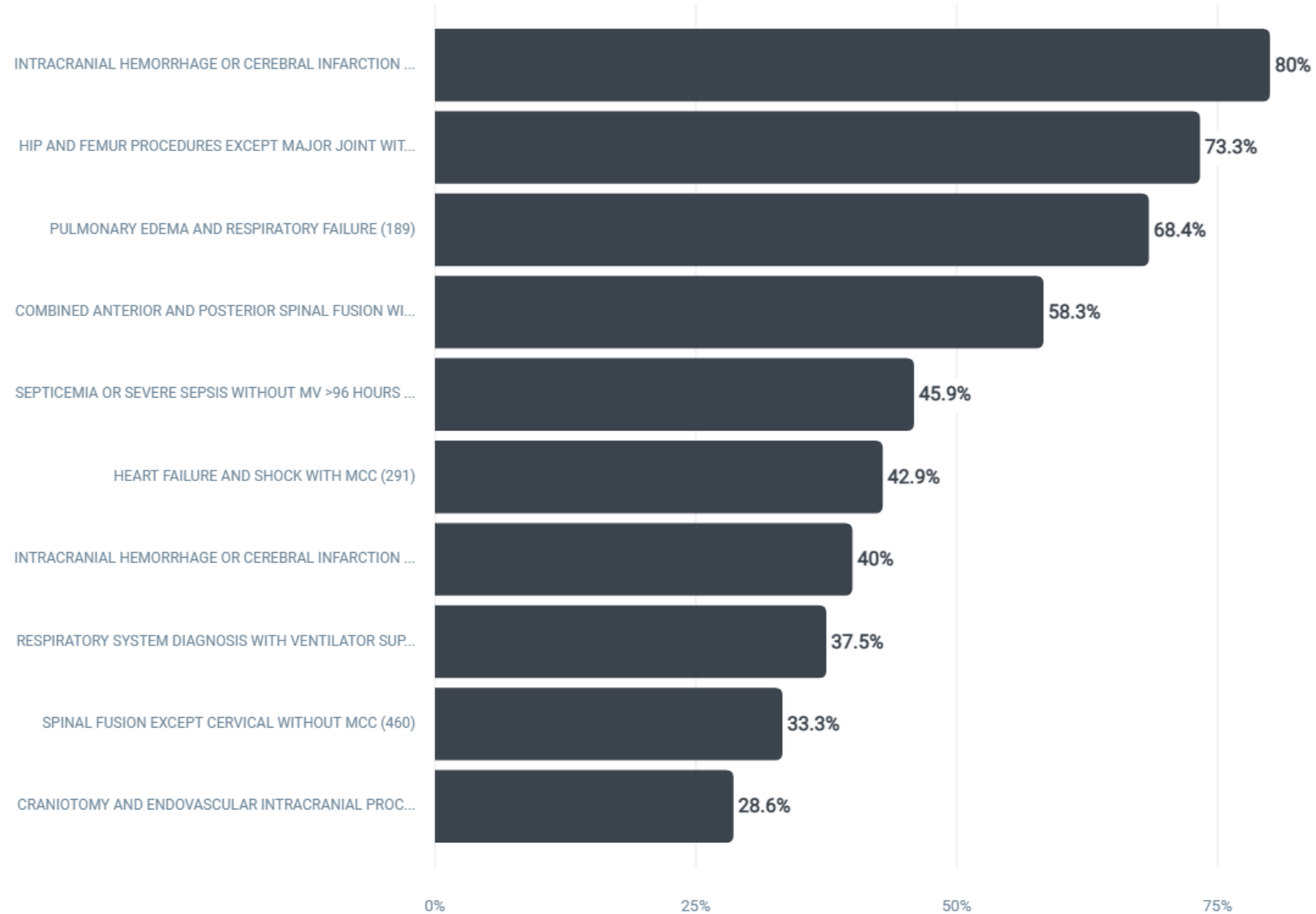
Highest LOS>GMLOS Percentage Among Top 10 Discharge Departments

Last 6 months



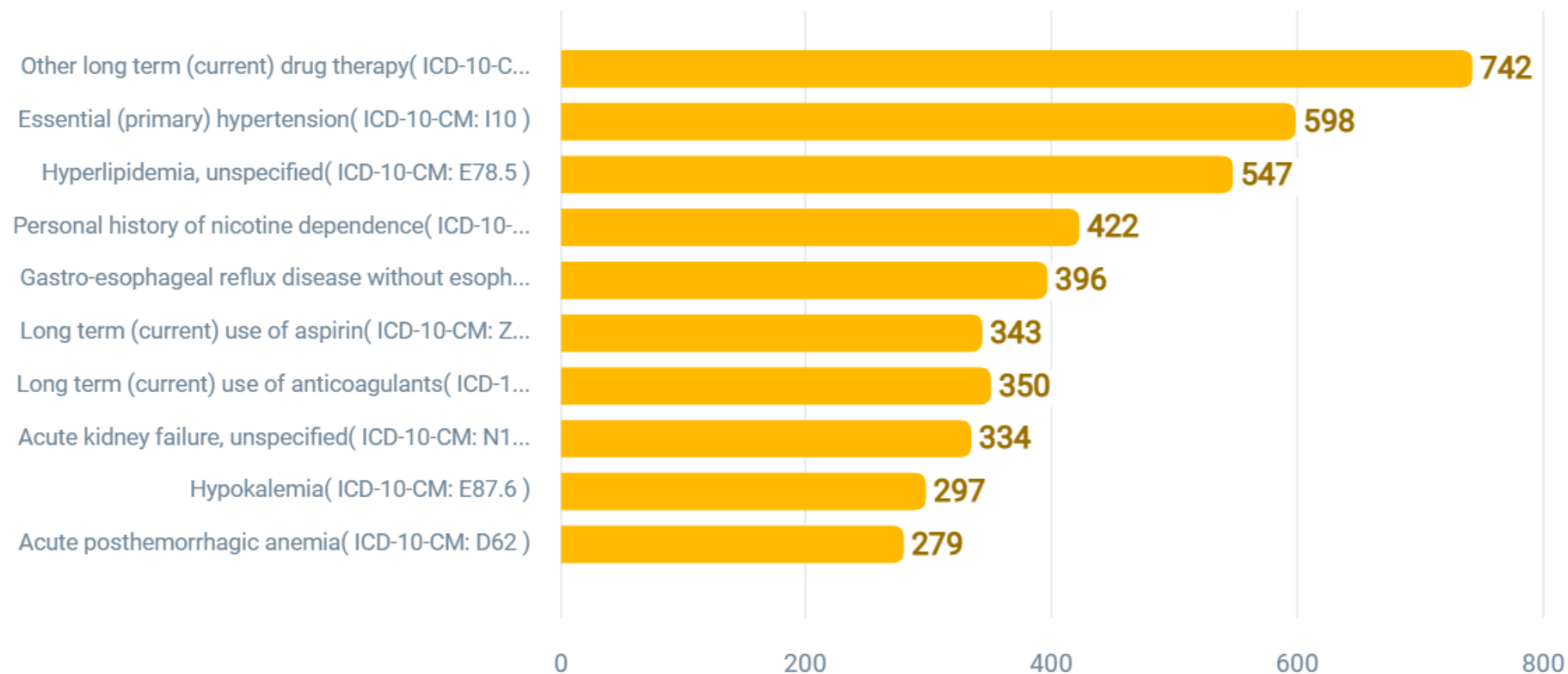
Top MS DRGs Within Discharge Departments of Concern

Last 6 months



Top 10 Pre-Existing Conditions for Patients Ages 54-82

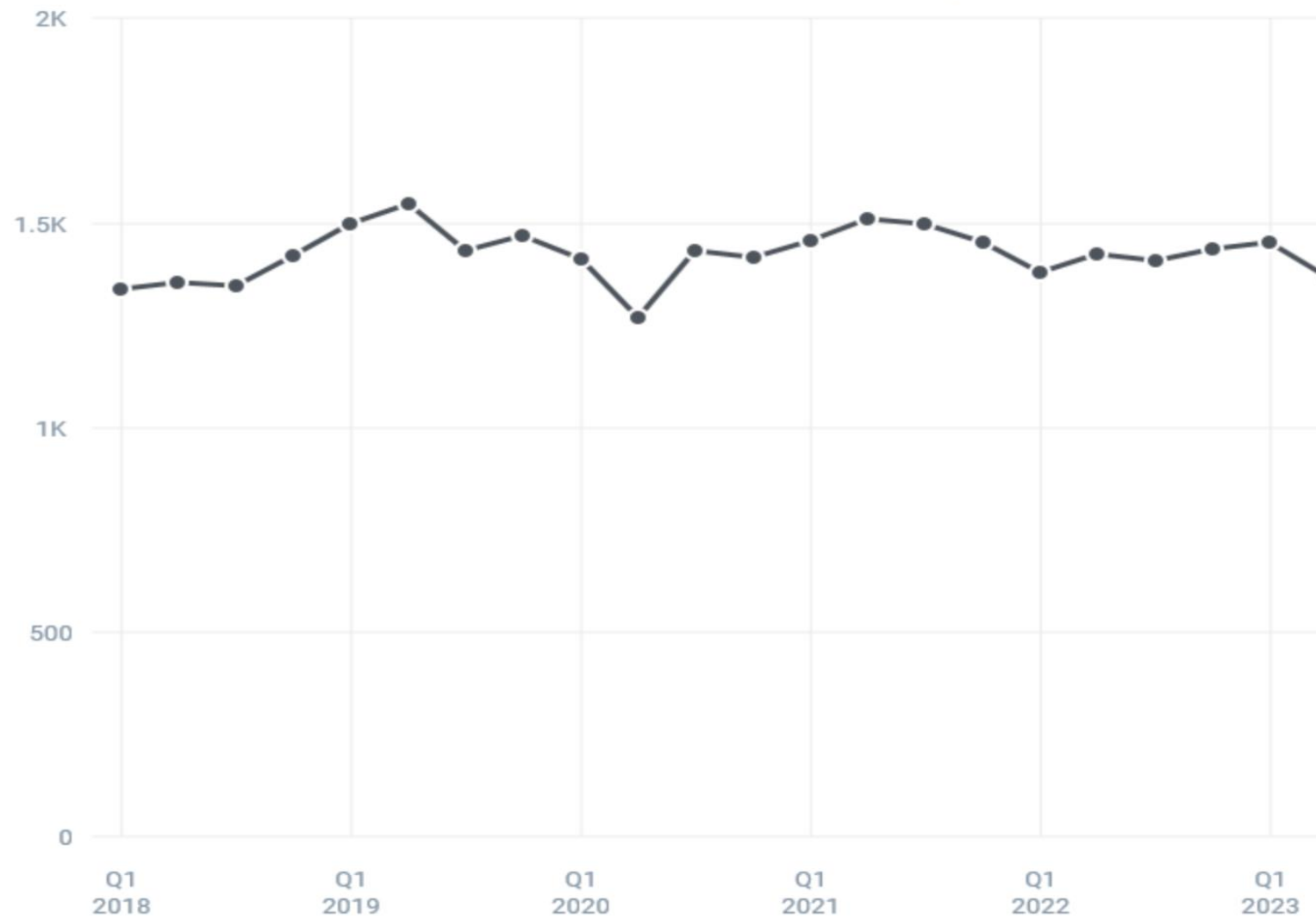
Last 6 months



Number of Hospital Admissions ages 54-82

Highest % of Patients > GMLOS by Quarter

Between 1/1/2018 and 9/30/2023 by quarter





Evaluation

- Over the past 6 months, 23% of patients have exceeded the GMLOS
- 31% of patients ages 54-82 years old have a LOS>GMLOS
- Medical Intensive Care Unit (MICU) is the top discharge department of patients ages 54-82 with LOS>GMLOS
- Treatment by medication (drug therapy) is the most common pre-existing condition for patients ages 54-82
- There has been a steady percentage of patients with extended stays greater than GMLOS since 2018

Recommendations & Deployment



Hospital structure



Overstaffing
departments



Collaborative care
coordination



Data driven
decisions

Outcomes & Takeaways



Patient information can be inconsistent and unpredictable



Data cleaning solutions are unique to the problem at hand



Communication is vital to succeed