

Lowell General Hospital Project

A Data-Driven Review of Key Performance Metrics (2020–2024)

Prithivi N

Problem Statement & Objective

Problem Statement:

- Lowell General Hospital is committed to prioritizing patient well-being. To uphold this mission, we closely monitor key factors that impact patient safety and satisfaction. A structured analysis of these metrics is essential to identify trends, assess performance, and develop data-driven recommendations for enhancing customer satisfaction.

Objective:

- Assess KPI impact on customer experience.
- Analyze correlations between KPIs.
- Benchmark performance and recommend improvements.

Dataset Overview

Sample Dataset:

Month	Average Licensed Bed Occupancy Rate	Unassisted Fall Rate per 1,000 Patient Days	Staff Responsiveness Domain Top Box Score	Unassisted Fall %	Staff Responsiveness Domain Top Box Score %	Staff Responsiveness Top Box Score Benchmark
1 Jan 2020	96%	2.21	68.34	0.221	0.6834	65
1 Feb 2020	96%	1.79	72.75	0.179	0.7275	65
1 Mar 2020	81%	1.03	67.07	0.103	0.6707	65
1 Apr 2020	94%	1.97	71.21	0.197	0.7121	65
1 May 2020	101%	3.41	57.68	0.341	0.5768	65
1 Jun 2020	98%	2.61	67.86	0.261	0.6786	65
1 Jul 2020	95%	2.42	66.09	0.242	0.6609	65
1 Aug 2020	94%	2.09	70.38	0.209	0.7038	65
1 Sep 2020	95%	3.11	53.31	0.311	0.5331	65
1 Oct 2020	92%	1.6	67.55	0.16	0.6755	65
1 Nov 2020	95%	2.31	60.35	0.231	0.6035	65
1 Dec 2020	98%	2.47	61.33	0.247	0.6133	65
1 Jan 2021	100%	3.03	61.06	0.303	0.6106	65

Key Performance Indicators (KPI's)

1. Average Licensed Occupancy Rate:

This measure is captured internally and is measured as a percentage. It is calculated as

$$\frac{\text{Number of Patients in Licensed Bed Per Day}}{\text{Number of Licensed Beds}} \times 100$$

2. Staff Responsiveness Top Box Score:

This measure is captured by the Hospital Consumer Assessment of Healthcare Providers and Systems(HCAHPS) Survey, which is sent out to patients following discharge from the hospital. It includes 2 questions:

- After you pressed the call button during the hospital stay, how often did you get help as soon as you wanted it?
- How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

$$\frac{\text{Number of patients answering "Always" to both questions}}{\text{Number of patients answering both questions}} \times 100$$

Key Performance Indicators (KPI's)

3. Unassisted Patient Falls per 1000 Patient Days:

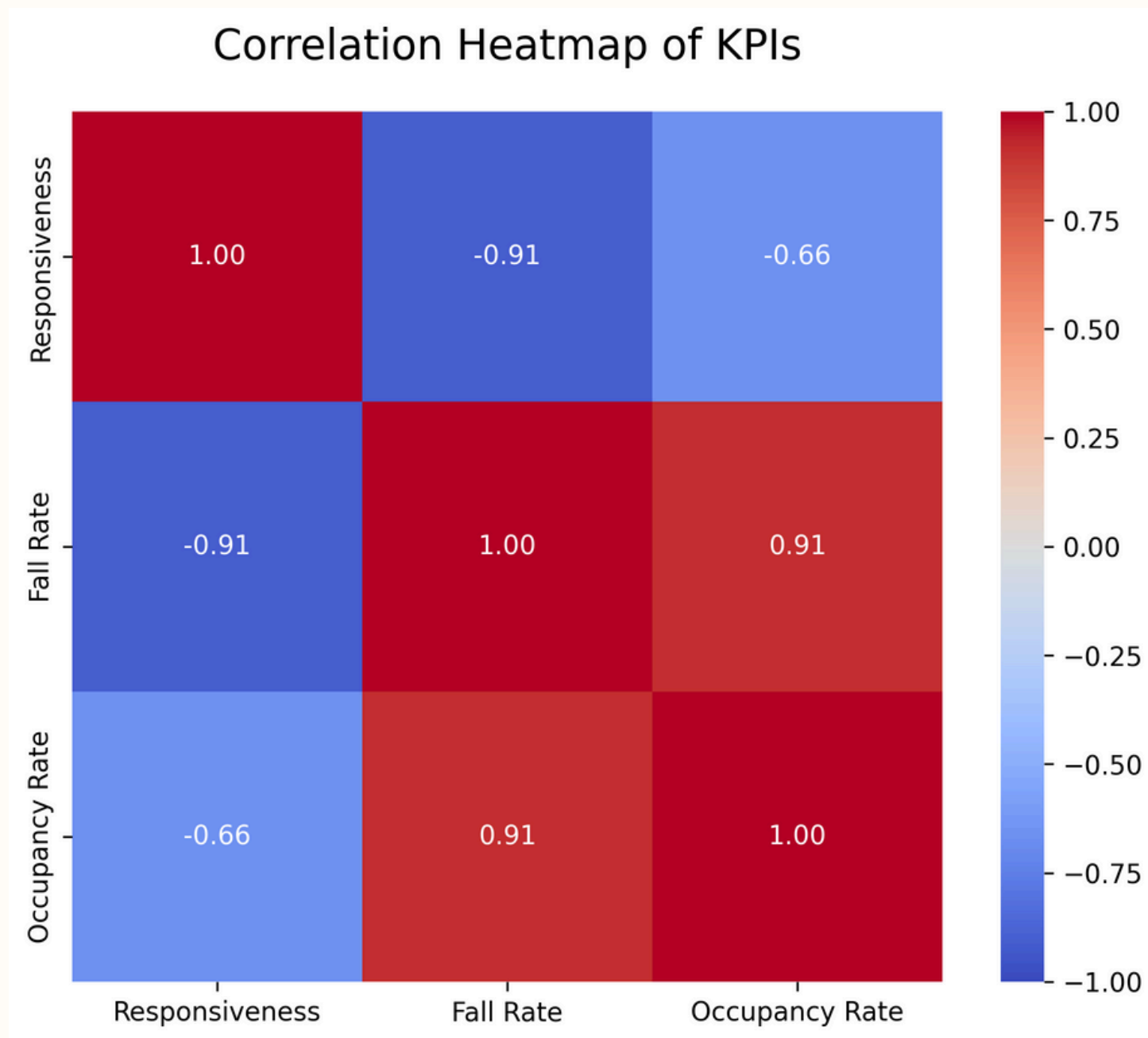
This measure is captured by the National Database of Nursing Quality Indicators (NDNQI). A patient fall is defined as an unplanned descent to the floor with or without injury. Unassisted falls are where there is no staff member present to assist the patient. This is measured as:

$$\frac{\text{Number of Patient Falls}}{\text{Number of Patient Days}} \times 100$$

Industry Benchmarks Overview

- Staff Responsiveness Top Box: ~67% (national HCAHPS average)
- Bed Occupancy Rate: Optimal range 85% to 95%
- Unassisted Fall Rate: ~ 3.44 falls per 1,000 patient days (NDNQI)

Relationship between the KPI's



- Bed Occupancy Rate & Fall Rate per 1,000 Patient Days – **0.91 (Strong positive correlation)**
- Bed Occupancy Rate & Staff Responsiveness Score – **-0.66 (Moderate negative correlation)**
- Fall Rate per 1,000 Patient Days & Staff Responsiveness Score – **-0.91 (Strong negative correlation)**

Relationship between the KPI's

1. Bed Occupancy Rate & Fall Rate per 1,000 Patient Days – 0.91 (Strong Positive Correlation)

- A correlation of 0.91 shows a strong positive relationship between Bed Occupancy Rate and Fall Rate.
- As Patient falls increases significantly as the hospital gets fuller (higher occupancy).
- This suggests staff may be overstretched, reducing their ability to monitor at-risk patients.
- Consider increasing staff or enhancing fall prevention measures during high-occupancy periods.

2. Bed Occupancy Rate & Staff Responsiveness Score – -0.66 (Moderate Negative Correlation)

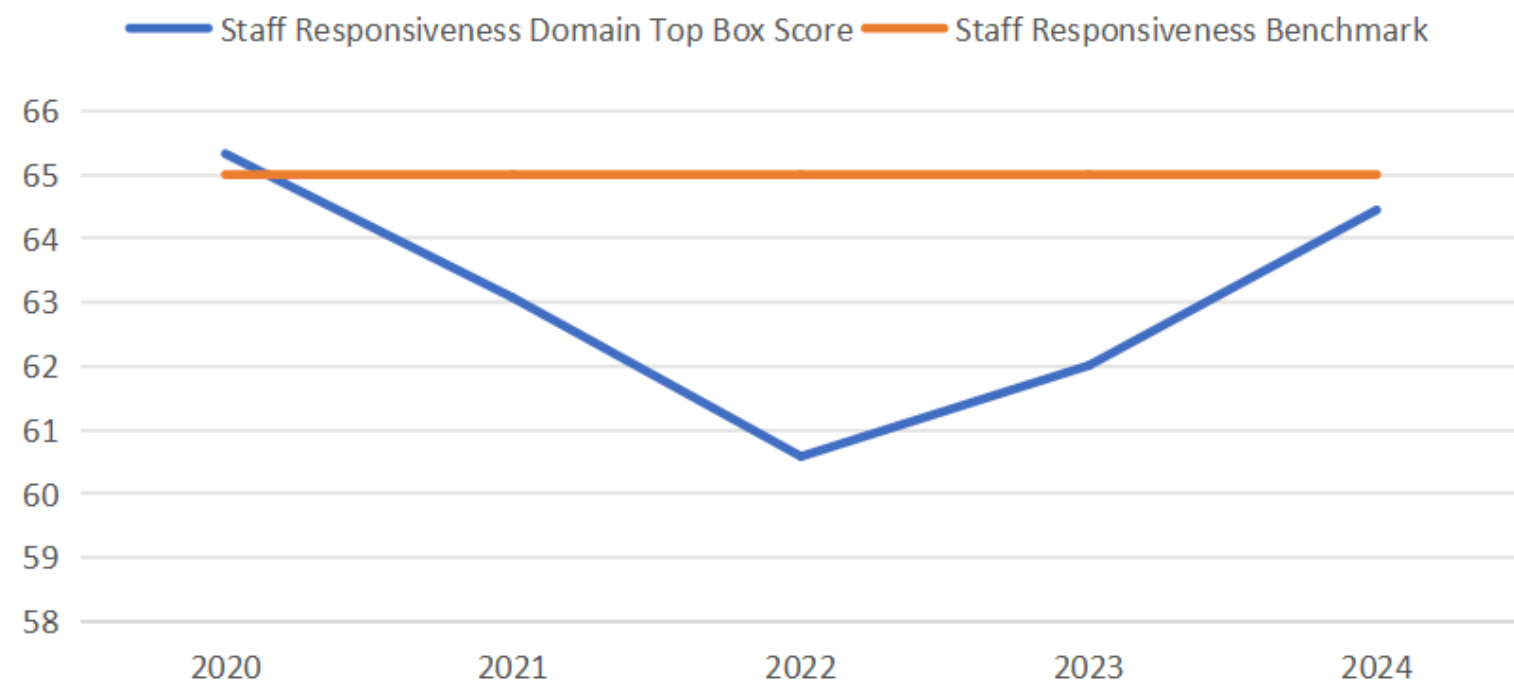
- A correlation of -0.66 indicates a moderate negative relationship between Bed Occupancy Rate and Staff Responsiveness Score.
- Higher occupancy leads to lower responsiveness scores, as staff struggle to meet patient needs promptly.
- This impacts patient satisfaction, highlighting a need for better resource allocation.
- Adjusting staffing levels during peak times could help maintain responsiveness.

3. Fall Rate per 1,000 Patient Days & Staff Responsiveness Score – -0.91 (Strong Negative Correlation)

- A correlation of -0.91 reflects a strong negative relationship between Fall Rate and Staff Responsiveness Score.
- Lower responsiveness scores strongly correlate with more patient falls, likely due to delayed assistance.
- Improving staff response times could significantly reduce fall incidents.
- Prioritize training staff to respond quickly to at-risk patients to enhance safety.

Trends in Data Overtime

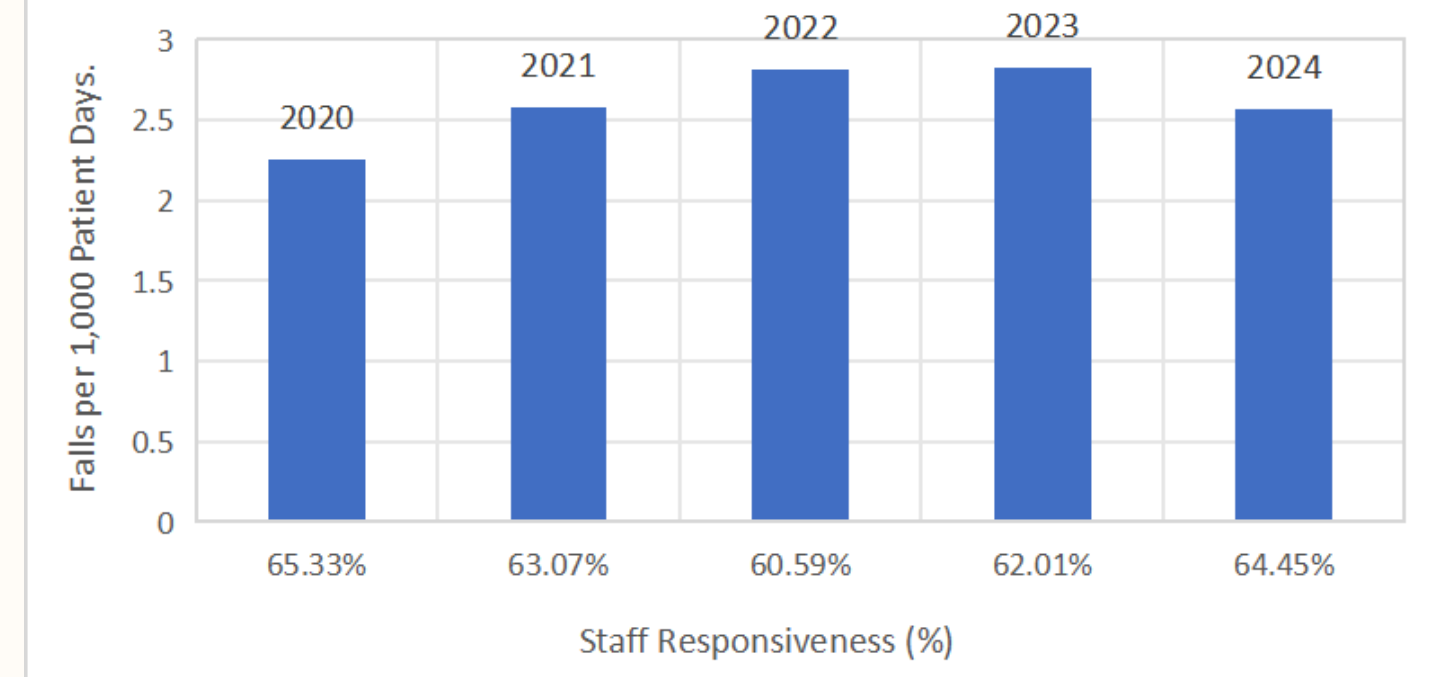
Staff Responsiveness vs. Benchmark



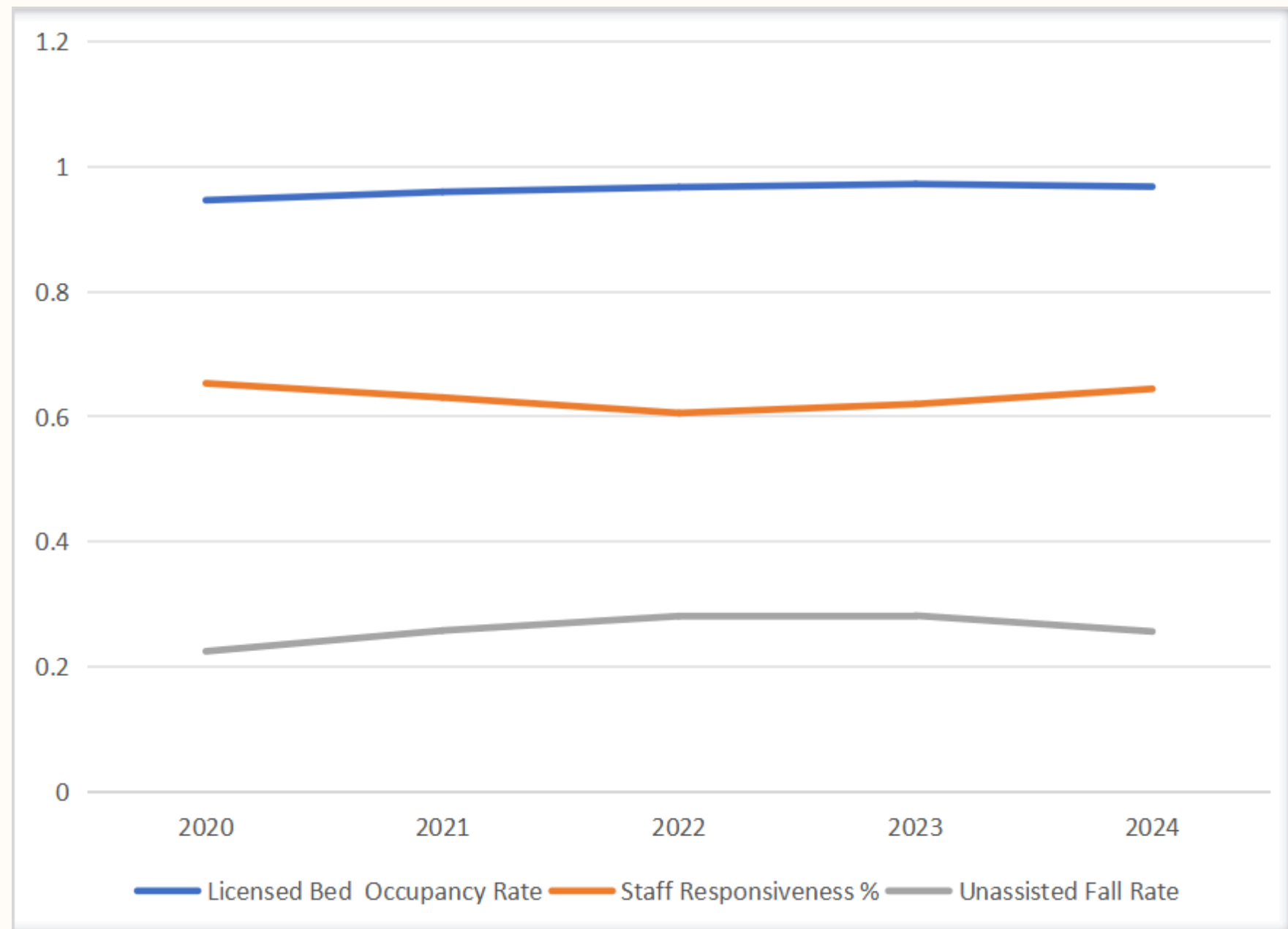
- Our average is 65%, below the 67% goal.
- Responsiveness was lowest in 2022 (60.5%) and highest in 2020 (65.32%).
- Dip in 2022, recovery in 2024
- Indicates possible staffing or process issues in mid-period

- This chart shows us that the fall rate has increased when the staff's responsiveness has decreased.
- Rise till 2022, plateau in 2023, slight drop in 2024
- High fall rate concerns; possible link to responsiveness

Responsiveness vs Falls by Year



Trends in Data Overtime



Patient Care Trends (2020–2024)

Caption:

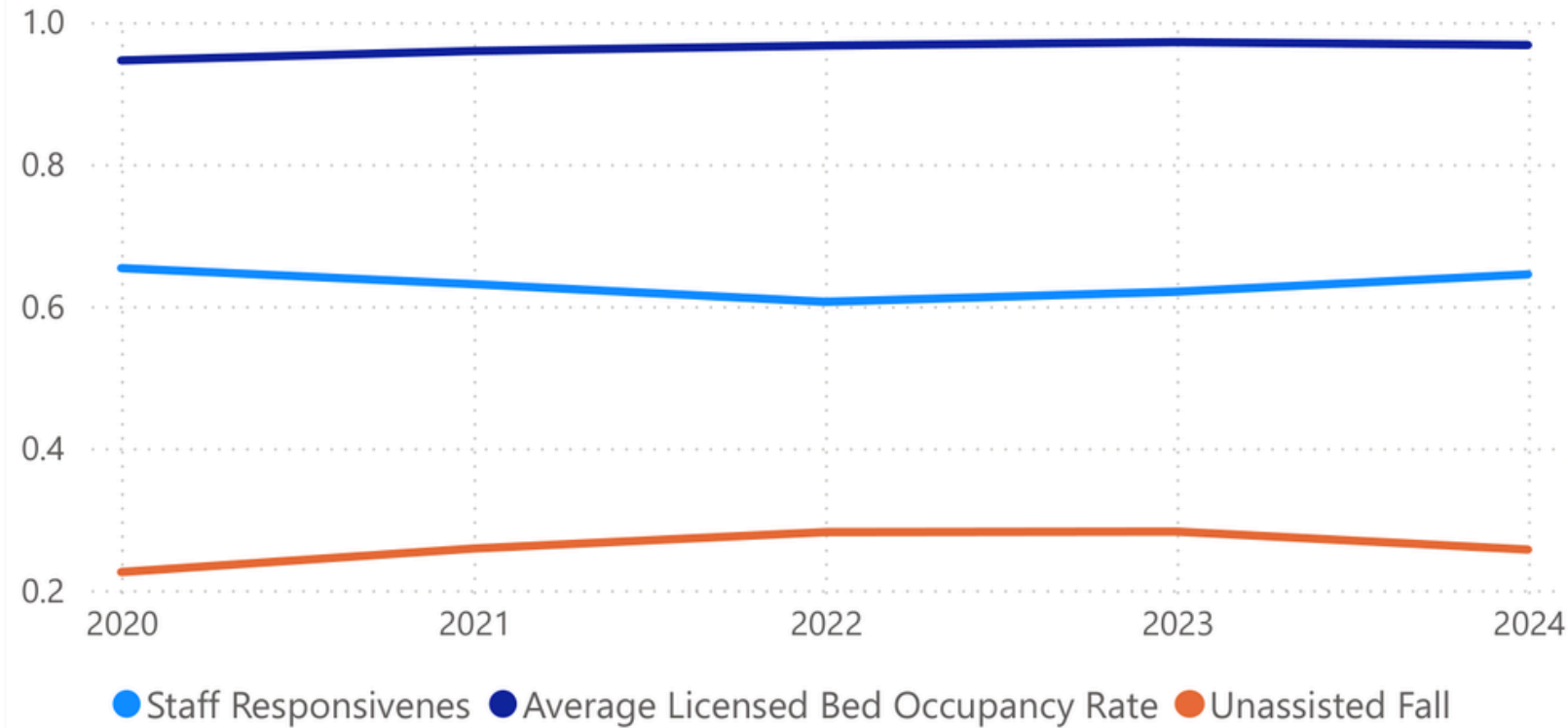
→ "Trends from 2020 to 2024 indicate consistently high bed occupancy, a temporary dip and recovery in staff responsiveness, and a rise followed by a slight decline in unassisted fall rates—highlighting the importance of sustained staff performance in ensuring patient safety."

Key Highlights:

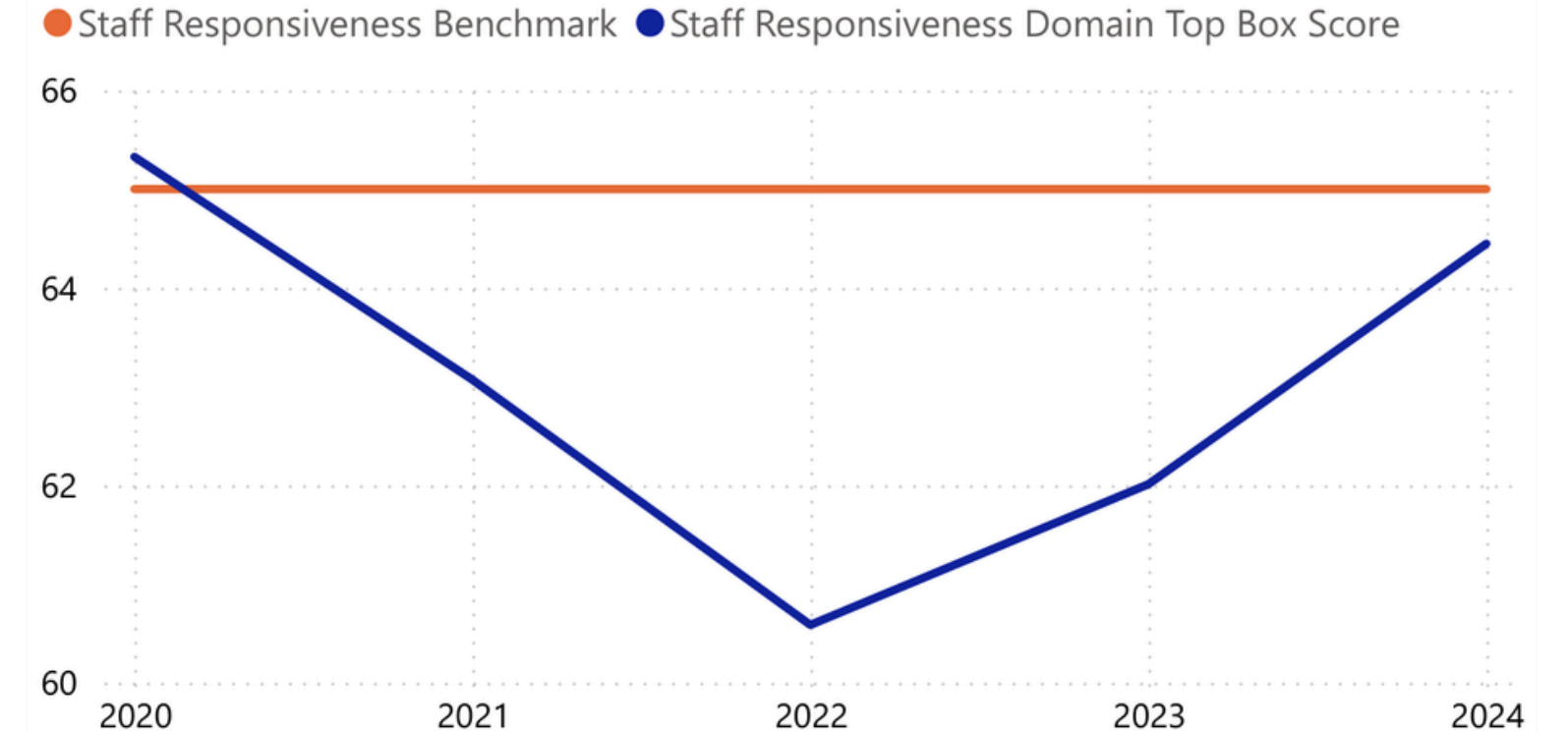
- Licensed Bed Occupancy Rate remained consistently high (~95%-97%), indicating strong facility utilization.
- Staff Responsiveness % declined from 2020 to 2022, then showed gradual improvement by 2024.
- Unassisted Fall Rate increased until 2022, plateaued in 2023, and slightly decreased in 2024, possibly reflecting improved safety measures.

KPI DASHBOARD

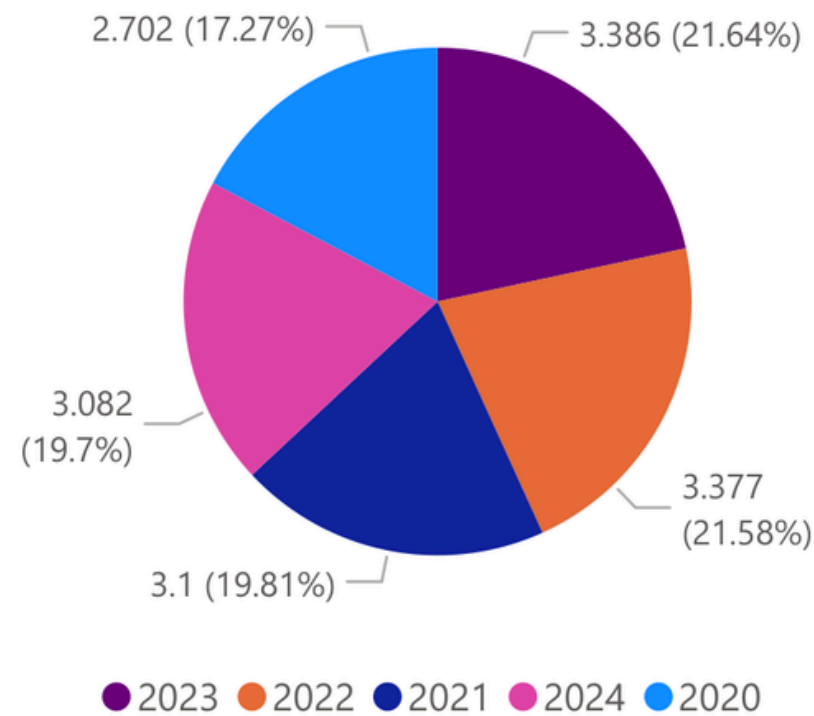
KPI's Trend



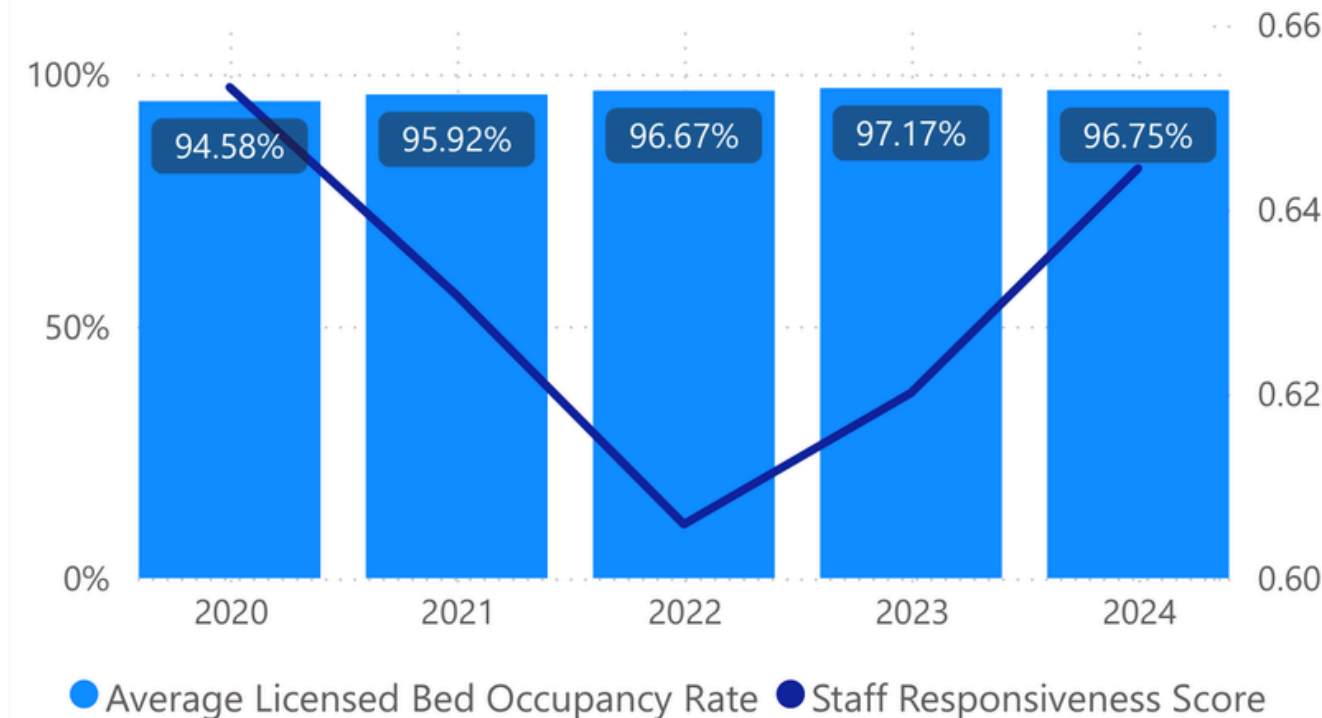
Staff Responsiveness vs Benchmark



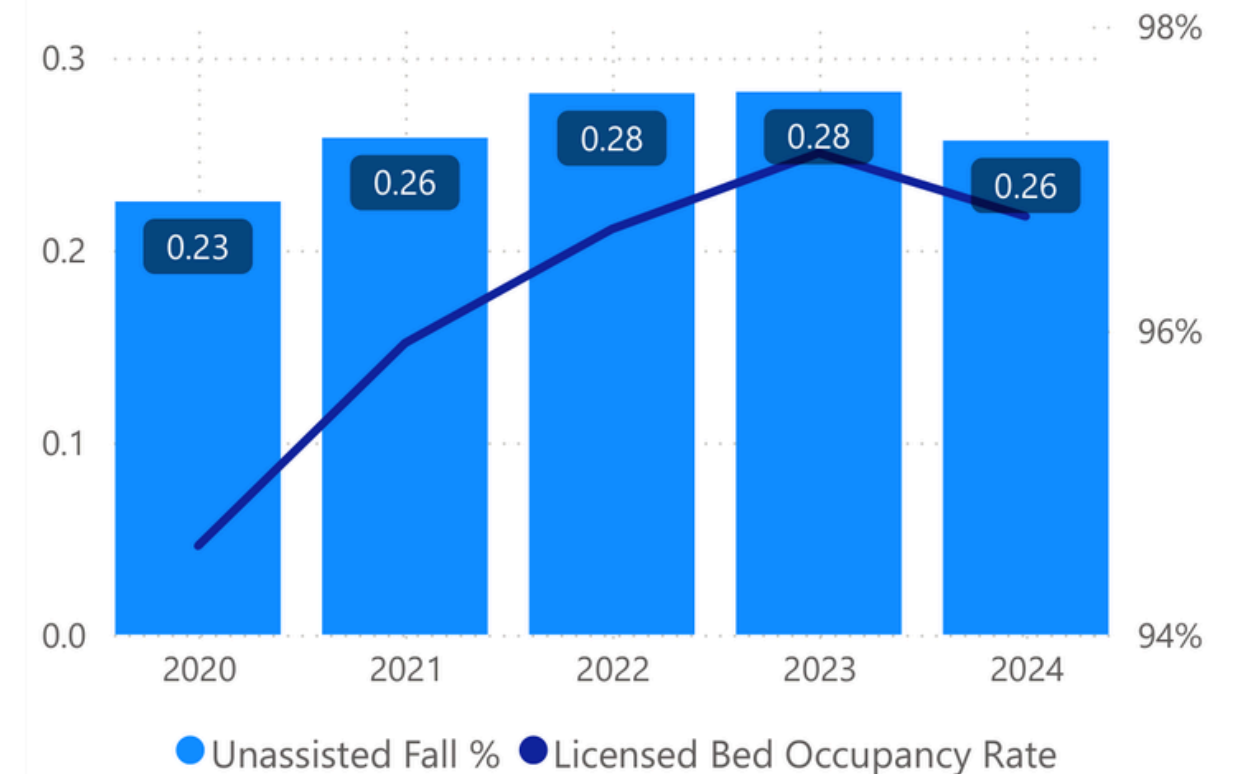
Unassisted Fall Rate by Year



Average Licensed Bed Occupancy Rate vs Staff Responsiveness Score



Unassisted Fall % vs Licensed Bed Occupancy Rate



Final Assessment

Key Findings

- Staff responsiveness significantly impacts fall rate.
- High occupancy may strain staff, affecting responsiveness
- Performance improving post-2022, but still below benchmarks

Recommendations

- Invest in staff training and patient monitoring tech
- Schedule adjustments to manage peak times better
- Set internal targets aligned with or better than benchmarks
- Track KPIs monthly and conduct root cause analysis on spikes

Conclusion

- Monitoring KPIs like staff responsiveness, bed occupancy, and fall rates is essential for patient safety and operational efficiency.
- Data shows a strong link between staff performance and unassisted fall incidents, highlighting the need for targeted improvements.
- Performance has improved since 2022, but still requires closer alignment with industry benchmarks.
- KPI monitoring reaffirms its value in supporting high-quality, safe patient care.
- Ongoing, data-driven quality improvement is key to sustaining long-term success.

Thank You