PATIENT SAFETY & EXPERIENCE DASHBOARD

KPI Analysis of Lowell General Hospital

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PROBLEM STATEMENT

Lowell General Hospital's mission is to put patients first in everything we do.

To achieve this, the hospital must continuously monitor both patient care outcomes and operational performance.

Despite collecting extensive data, challenges remain in:

-1.Managing bed occupancy without affecting care quality.

-2. Improving staff responsiveness to boost patient satisfaction.

-3. Reducing unassisted falls to ensure patient safety.

A structured, data-driven approach to these KPIs is needed to identify gaps, uncover trends, and support performance improvement opportunities.

KPIs Used for Assessment

This metric is internally measured and calculated as the average percentage of licensed beds that are occupied by patients.

Average bed occupancy rate=

(Number of patients in Licensed bed per day/Number of Licensed bed)*100

→ Average Licensed Bed Occupancy Rate

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:

(Number of Patient Falls/Number of Patient Days)*100

→ Unassisted Fall Rate Per 1,000 Patient Days

This measure is captured by the Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS) Survey, which is a survey sent out to patients following their discharge from the hospital. It includes two questions in the Staff Responsiveness Domain:

- During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?
- How often did you get the help in getting to the bathroom or in using a bedpan as soon as you wanted? It is calculated as:

(Number of patients answering "Always" to the two Staff Responsiveness questions/ Number of patients answering the two Staff Responsiveness questions)*100

→ Staff Responsiveness Top Box Store

DATASET OVERVIEW

Key Variables:

- **Month**: Reporting period
- **Avg Bed Occupancy Rate**: % beds occupied
- **Unassisted Fall Rate**: Falls per 1,000 patient days
- **Staff Responsiveness Score**: % top patient ratings
- **Unassisted Fall %**: Share of total patient days
- **Staff Responsiveness %**: % form of responsiveness score
- **Responsiveness Benchmark**: Industry standard score

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
Jan-20	96%	2.21	68.34	0.221	0.6834	65
Feb-20	96%	1.79	72.75	0.179	0.7275	65
Mar-20	81%	1.03	67.07	0.103	0.6707	65
Apr-20	94%	1.97	71.21	0.197	0.7121	65
May-20	101%	3.41	57.68	0.341	0.5768	65
Jun-20	98%	2.61	67.86	0.261	0.6786	65
Jul-20	95%	2.42	66.09	0.242	0.6609	65
Aug-20	94%	2.09	70.38	0.209	0.7038	65
Sep-20	95%	3.11	53.31	0.311	0.5331	65
Oct-20	92%	1.6	67.55	0.16	0.6755	65
Nov-20	95%	2.31	60.35	0.231	0.6035	65
Dec-20	98%	2.47	61.33	0.247	0.6133	65
Jan-21	100%	3.03	61.06	0.303	0.6106	65
Feb-21	99%	2.35	65.23	0.235	0.6523	65
Mar-21	95%	2.47	64.02	0.247	0.6402	65
Apr-21	96%	1.94	70.11	0.194	0.7011	65
May-21	94%	2.54	68.16	0.254	0.6816	65
Jun-21	94%	3.17	54.38	0.317	0.5438	65
Jul-21	94%	2.79	64.00	0.279	0.64	65
Aug-21	93%	2.05	66.13	0.205	0.6613	65
Sep-21	97%	3.34	55.17	0.334	0.5517	65
Oct-21	95%	2.44	64.03	0.244	0.6403	65

CURRENT PERFORMANCE VS. BENCHMARKS

Key Message:

While our fall rate is currently good, we are barely meeting our goals.

Our responsiveness score is right at the edge, with almost no room for error.

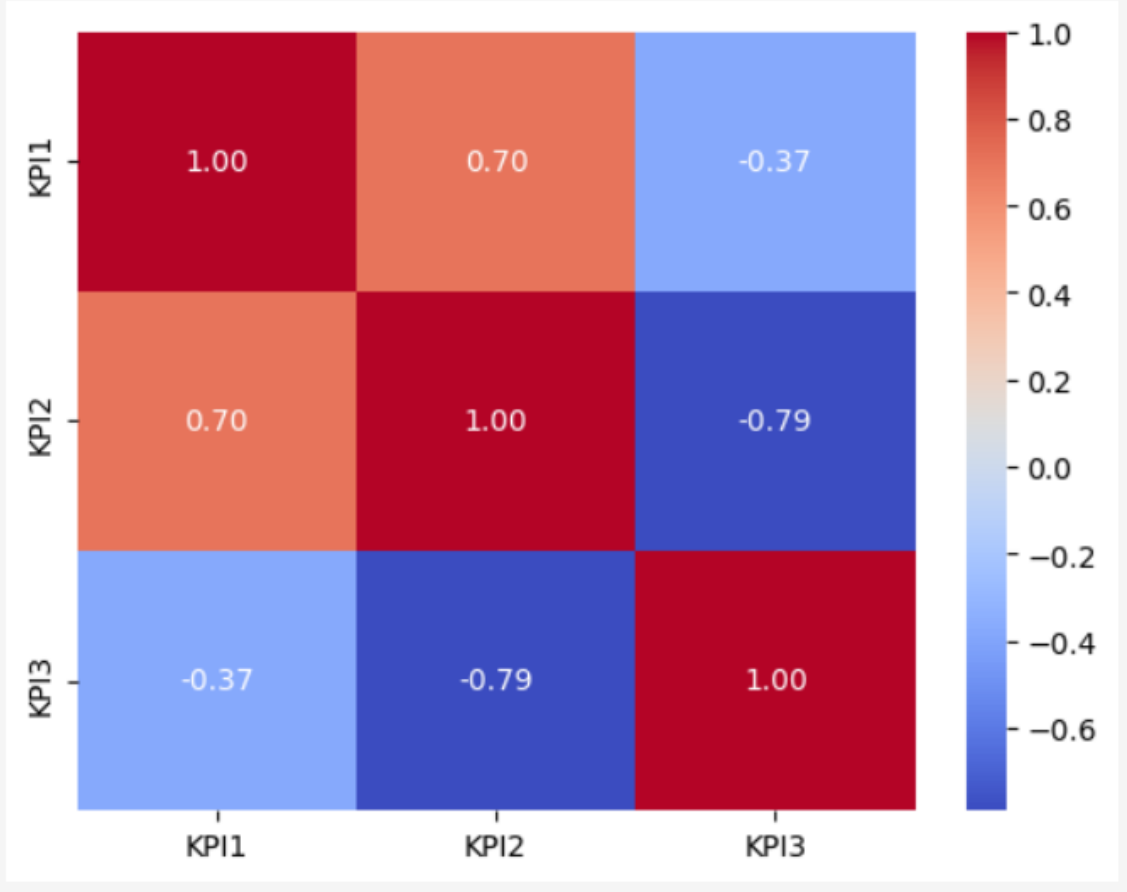
This is a major warning sign.

With the hospital completely full, our staff is stretched too thin. If we don't act now, this pressure will likely cause our fall rate to get worse in the future.

KPI	Actual Value	Goal	Status	Variance vs Goal
Avg. Bed Occupancy	100%	85%	❌ Over	17.65%
Staff Responsiveness	65.08%	65%	✅ Meets (Just)	0.08%
Unassisted Fall Rate	2.81	<3.00	✅ Better	6.33%

Pearson’s Correlation Matrix

KPI1 (Bed Occupancy Rate)
KPI2 (Fall Rate per 1,000 Patient Days)
KPI3 (Staff Responsiveness Score)



KPI1 (Bed Occupancy Rate) and KPI2 (Fall Rate per 1,000 Patient Days) – 0.70:
Strong positive correlation.

KPI1 (Bed Occupancy Rate) and KPI3 (Staff Responsiveness Score) – -0.37:
Moderate negative correlation.

KPI2 (Fall Rate per 1,000 Patient Days) and KPI3 (Staff Responsiveness Score) – -0.79:
Strong negative correlation.

STAFF RESPONSIVENESS OVER TIME

Key Message:

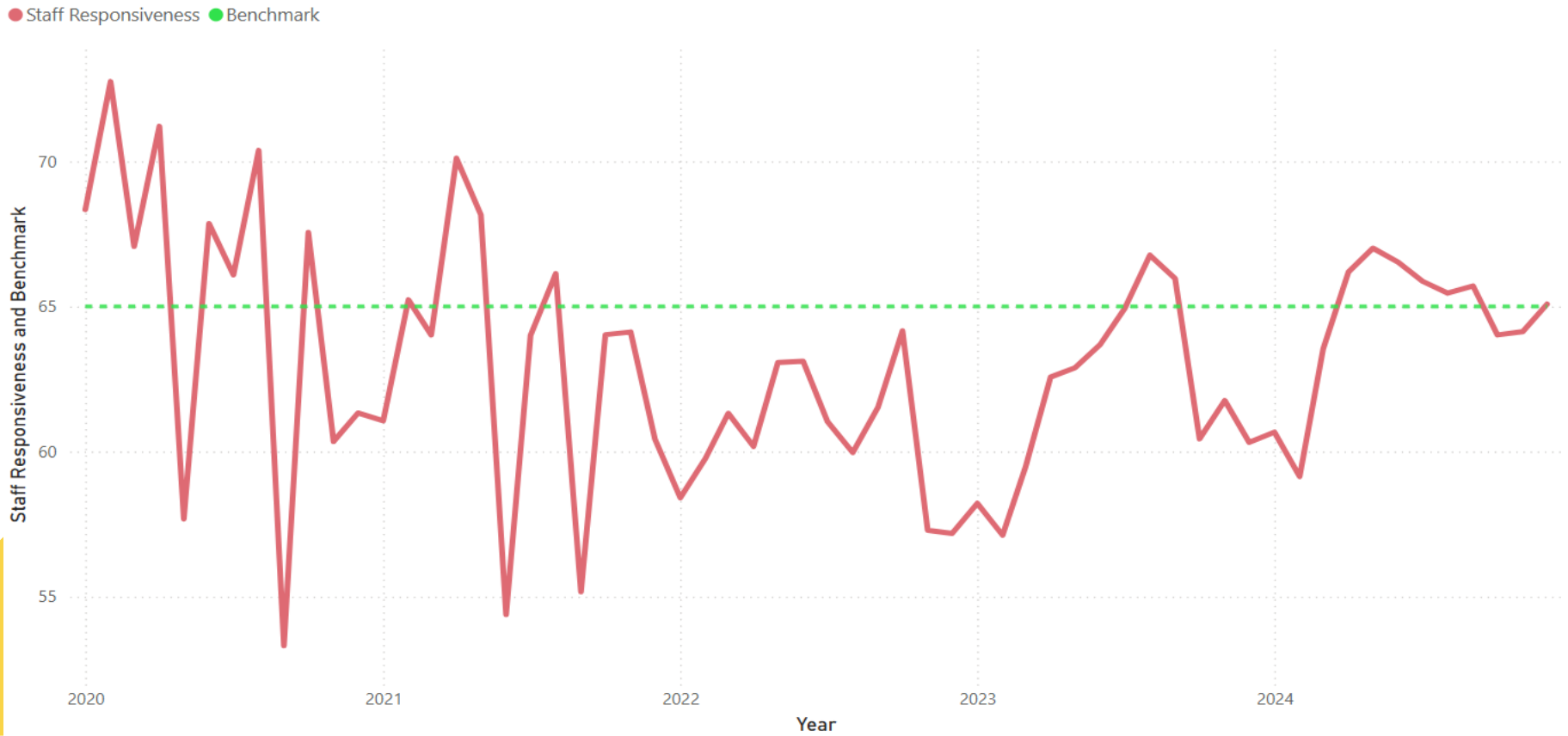
This chart reveals a clear and concerning story about staff responsiveness:

Our average score **(65.08%)** barely meets the 65% goal, leaving no room for error.

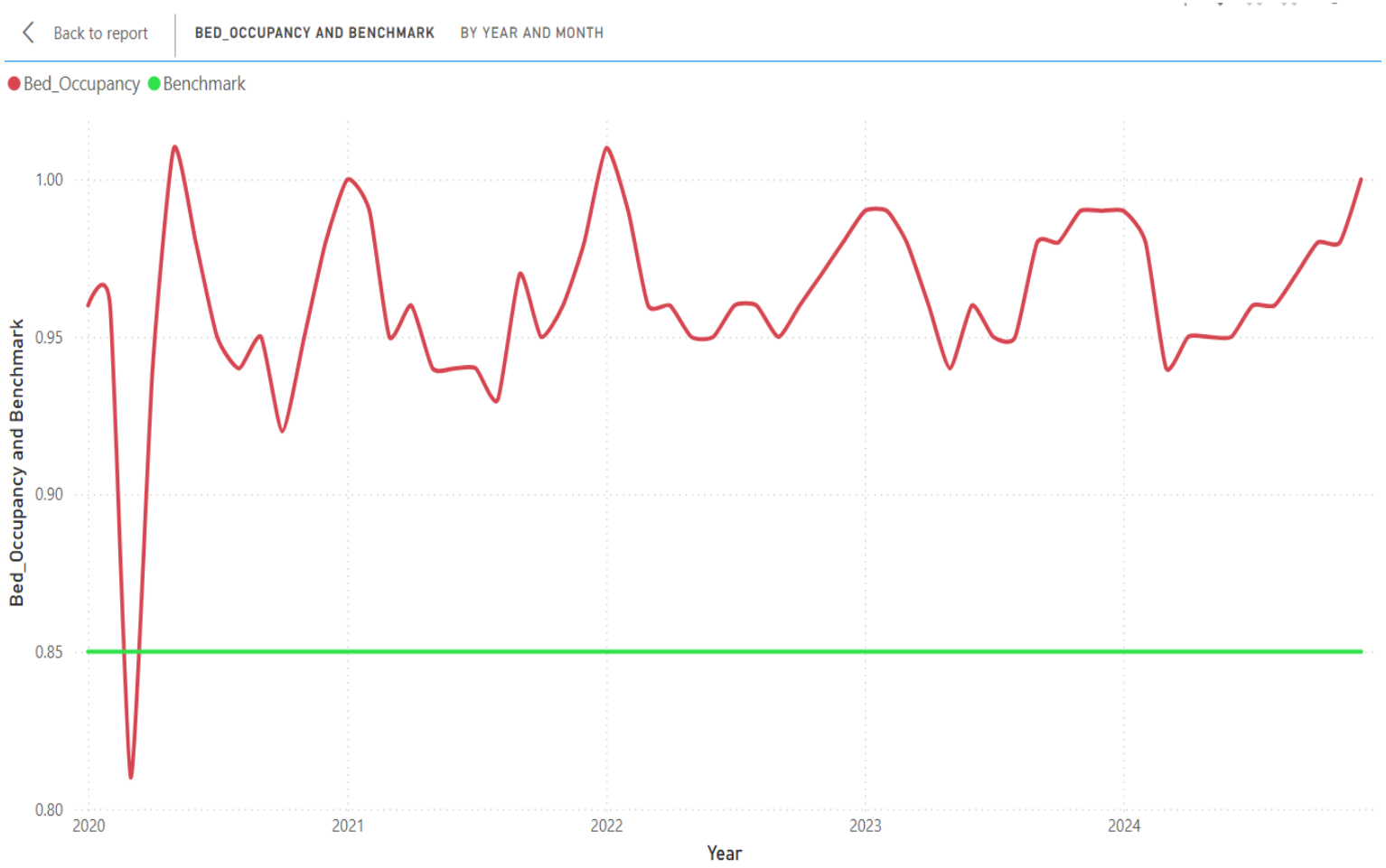
Performance is **frequently below benchmark**, increasingly volatile, and **trending downward**.

The narrow +0.12% margin is a warning sign of unsustainable pressure on staff.

If high bed occupancy continues or increases, responsiveness will drop further, directly risking patient safety.



HIGH OCCUPANCY AS ROOT CAUSE



Key Message:

This chart reveals our core operational challenge: Bed occupancy has consistently and significantly exceeded the safety benchmark for a prolonged period.

We are not dealing with temporary spikes but with a permanent state of over-capacity.

Operating so far above the **85% benchmark** creates constant, unsustainable pressure on our nursing staff and system resources.

RELATIONSHIP BETWEEN KPI'S

Bed Occupancy Vs Unassisted Fall

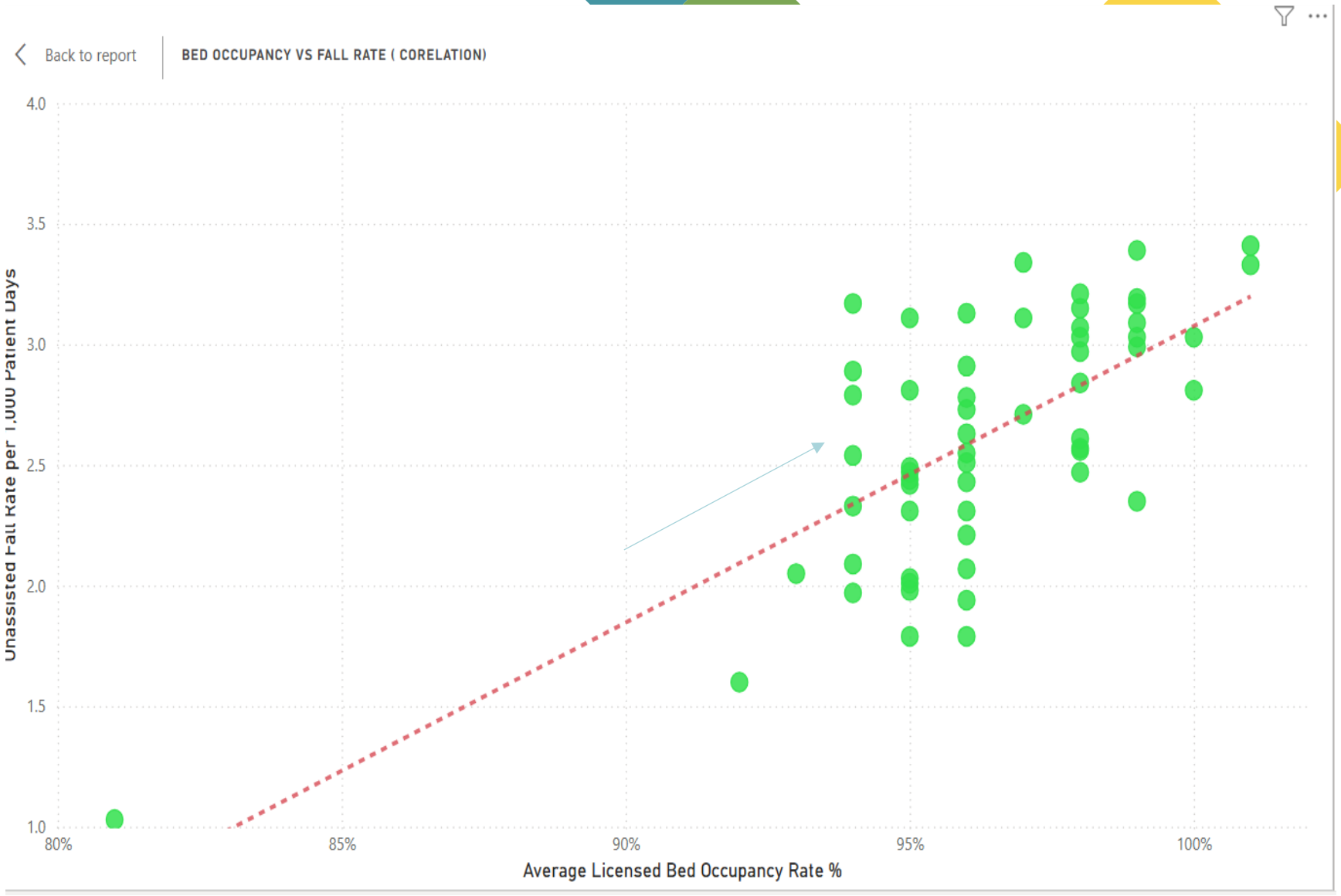
The line of best-fit trends upward, indicating a positive correlation. As the Unassisted Fall % increases, the bed occupancy % increases and vice-versa is also true. The data points are fairly close to the trendline, suggesting the relationship is relatively strong. The spread is moderate, which means other variables might also influence bed occupancy, but fall rate is clearly a significant factor

Statistical analysis confirms a strong, positive correlation (**r = 0.70**) between bed occupancy and patient fall rates.

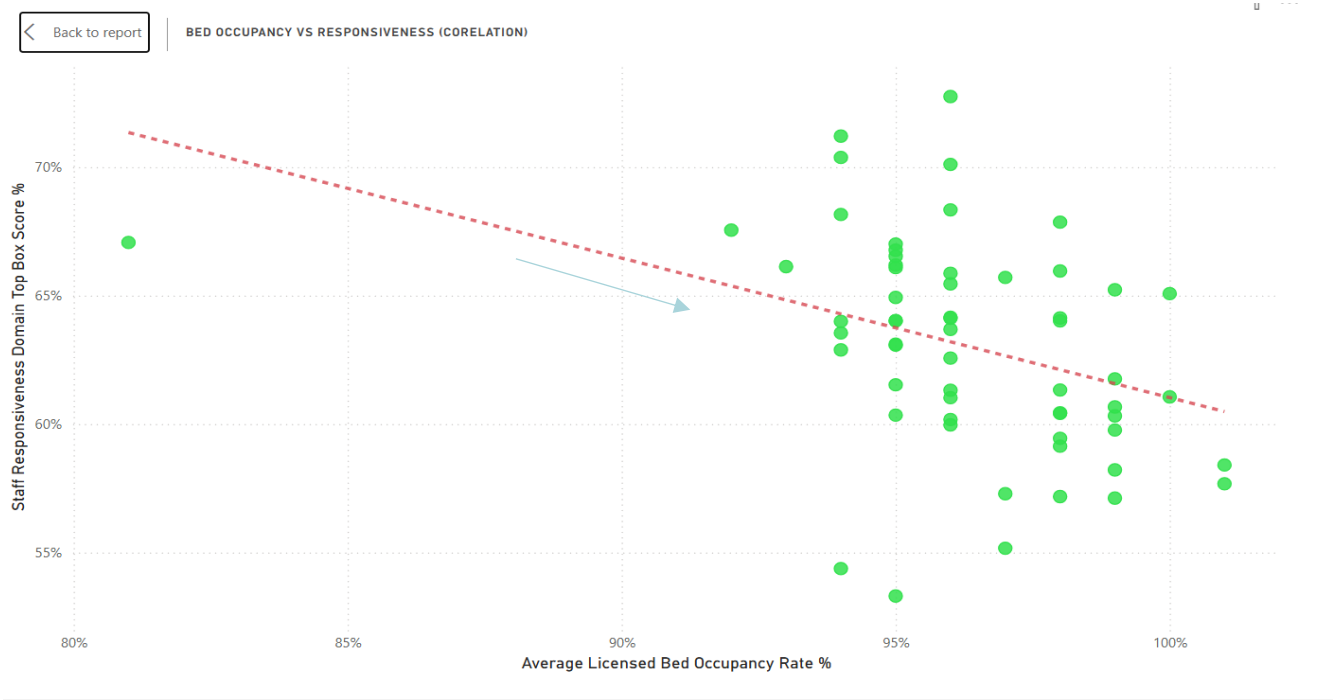
This proves that higher occupancy directly predicts higher risk to patient safety.

The data clusters in the high-risk zone (top-right), where high occupancy and high fall rates meet.

Operating at 100% occupancy places us squarely in this danger zone.



RELATIONSHIP BETWEEN KPI'S



Bed Occupancy Vs Staff Responsiveness

The numbers confirm the story. We see two strong, negative correlations.

The line of best-fit trends upward, indicating a negative correlation. As the Bed occupancy increases, the staff responsiveness decreases. The data points are not close to the trendline, suggesting the relationship is relatively moderate. The spread is weak, which means other variables might also influence staff responsiveness. The value is negative i.e. **-0.37** which shows that they have a negative moderate relationship. This is the root of the pressure.

Staff Responsiveness Vs Unassisted Fall

The line of best-fit trends downward, indicating a negative correlation. As the Staff Responsiveness increases, Unassisted fall decreases. The data points are fairly close to the trendline, suggesting the relationship is relatively strong. The spread is moderate, which means other variables might also influence fall rate but staff responsiveness is clearly a significant factor. The value is negative i.e. **-0.79** which shows that they have a strong relationship but negatively.

Together, they form a predictable chain**: High Occupancy → Lower Responsiveness → Higher Fall Risk.**

RESPONSIVENESS VS FALLS PREDICTION

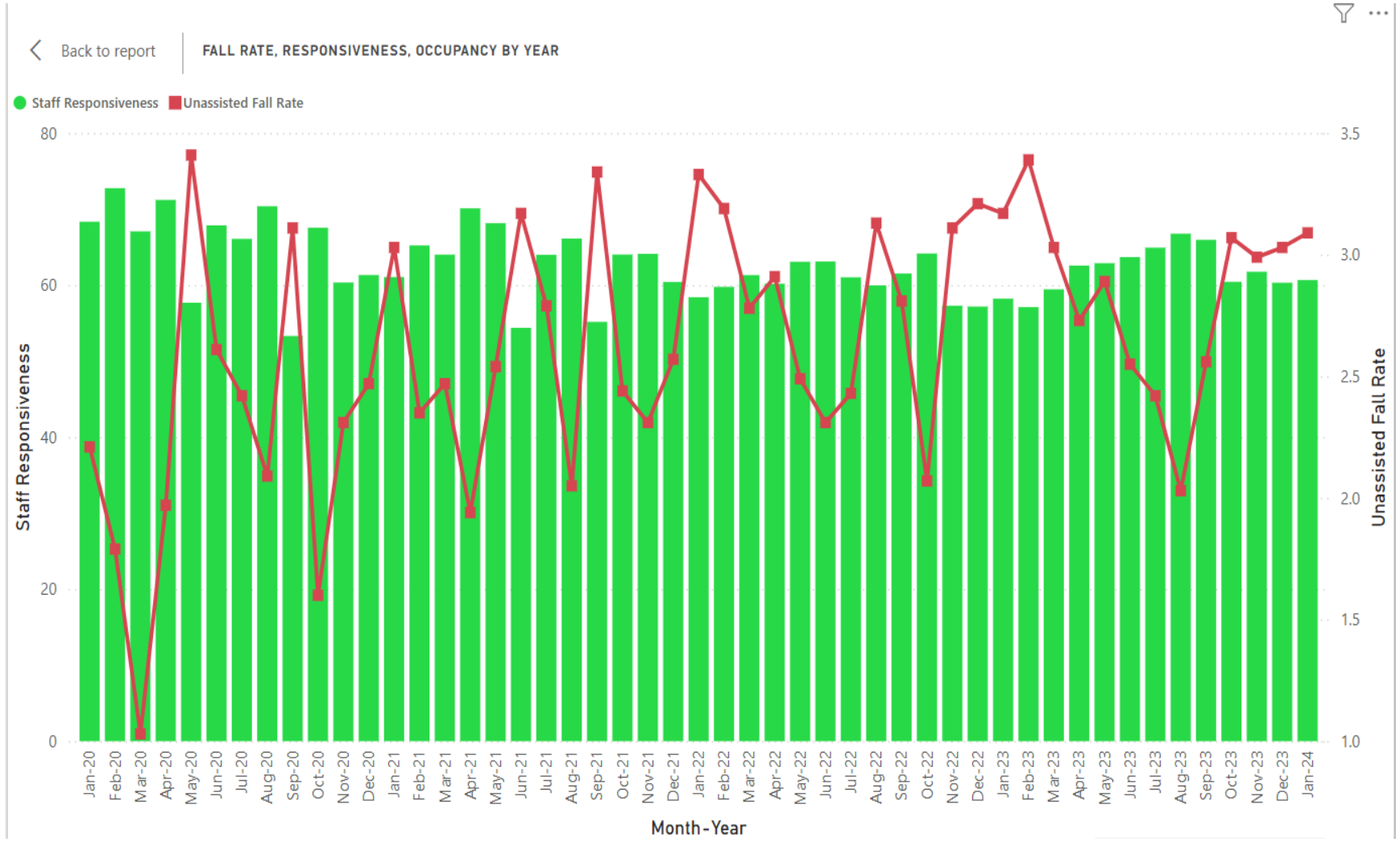
Key Message:

This chart shows the direct, real-time connection between staff support and patient safety.

There is a clear inverse relationship: when staff responsiveness (green columns) drops, patient fall rates (red lines) quickly rise.

This proves that staff responsiveness is a leading indicator of patient fall risk.

Recent steep drops in responsiveness are a critical warning that patient safety is at immediate risk.



KEY FINDINGS

1. Sustained High Occupancy is Creating Systemic Pressure: Bed occupancy has consistently operated at 95-100%, far above the 85% industry benchmark, creating chronic strain.

2. Staff Responsiveness Directly Impacts Patient Safety: A very strong correlation **(r = -0.79)** exists between staff responsiveness and fall rates. A 10% drop in responsiveness is associated with a significant increase in fall risk.

3. Performance Under Pressure is Proven: In months like Feb 2020 (96% occupancy, 72.75%responsiveness, 1.79 fall rate) prove excellence is achievable.

4. Current Performance is Fragile: While the average responsiveness (65.08%) meets the goal, it does so by a razor- thin margin (+0.12%), with high volatility indicating a system under stress.

5. Other Contributing Factors: Variables like patient acuity, staff experience, resource availability and others also play a role in safety outcomes.

KEY RECOMMENDATIONS

1. Adopt Flexible Staffing Based on Occupancy
Action: Create a staffing protocol that increases nursing support when occupancy exceeds 92%.
Goal: Prevent staff from being stretched too thin during peak demand, protecting responsiveness.

2. Establish a Responsiveness Early Warning System
Action: Set an alert to review unit staffing and support whenever the monthly responsiveness score drops below 66%.
Goal: Intervene early to prevent declines in care quality from impacting patient safety.

3. Create a "Fall Prevention Task Force"
Action: Form a team to investigate high-fall periods and identify contributing factors like patient mix, unit design, or equipment issues.
Goal: Develop targeted strategies beyond staffing to reduce fall risks.

4. Invest in Training for High-Pressure Scenarios
Action: Implement simulation training for nurses on managing multiple patient calls and prioritizing care during busy shifts.
Goal: Increase team efficiency and confidence when occupancy is high.

5. Improve Discharge Planning to Smooth Patient Flow
Action: Review and streamline the discharge process to reduce delays and free up beds earlier in the day.
Goal: Reduce average occupancy toward the 85% benchmark to create a more sustainable and safe operating environment.

DASHBOARD


LOWELL GENERAL HOSPITAL
Patient Safety & Experience Dashboard
KPI
Average Bed Occupancy
100%
Goal: 0.85 (+17.65%)
Average Unassisted Fall
2.81
Goal: 2.30 (+22.17%)
Staff Responsiveness
65.08
Goal: 65 (+0.12%)
Trend Visualization (Monthly)
Bed_Occupancy and Benchmark by Year and Month
Bed_Occupancy
Benchmark
Unassisted_Fall and Benchmark by Year and Month
Unassisted_Fall
Benchmark
Staff Responsiveness and Benchmark by Year and Month
Staff Responsiveness
Benchmark
Quarter
All
Year
All
Month
All
Fall Rate vs Responsiveness
Staff Responsiveness
Unassisted Fall Rate
Staff Responsiveness
Unassisted Fall Rate
Month-Year
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21
Apr-21
May-21
Bed Occupancy vs Fall Rate (Corelation)
Unassisted Fall Rate per...
Bed Occupancy vs Responsiveness (Corelation)
Staff Responsiveness D...
Staff Responsiveness vs Fall Rate (Corelation)
Unassisted Fall Rate pe...

Thank you

Sanjali D