

Introduction

- Capacity strain is defined as excess in hospital bed demand relative to hospital bed supply¹, resulting in hospitalized patients (inpatient or observation status) boarding in the Emergency Department or being cared for in auxiliary patient care units.
- Most large academic medical centers across the United States have been facing hospital-capacity strain and hospital census fluctuations for years.
- Factors contributing to capacity strain include: fewer acute care beds, increased inpatient demands, & staffing shortages.²
- In response to worsening hospital capacity strain, the Institute for Healthcare Improvement published, "Achieving Hospital-Wide Patient Flow" wherein high-level strategies were suggested to improve hospital flow and reduce capacity strain.⁵
- To address these issues, hospitals and hospitalist groups have increasingly had to develop innovative solutions to manage extreme fluctuations in patient census.^{3,4}
- Hospitalists participate in and manage flow in the hospital, making them poised to lead initiatives to mitigate the negative impacts of bottlenecks.
- However, mechanisms by which hospitals and hospitalists can manage the day-to-day patient surges have been less well described and warrant further investigation.

Methods

- Researchers conducted semi-structured interviews via telephone or in person with at least one hospitalist leader and one hospital administration leader from geographically dispersed large academic medical centers across the United States.
- The semi-standardized interviews focused on three domains:
 - (1) impacts of hospital-capacity strain on key stakeholders
 - (2) interventions utilized to mitigate hospital-capacity strain;
 - (3) perception of the impact of these interventions.
- Interviews were recorded and professionally transcribed by a third party organization with no ties to project design or analysis.
- Interviews were carried out until thematic saturation occurred as evidenced by the absence of new emerging topics or ideas.
- Using Dedoose software, each interview transcript was coded by teams of two researchers who were blinded to the others' coding.
- Analysis was conducted using an inductive method at the semantic level, allowing themes to emerge from the interviews.
- Derived themes were developed into recommendations for hospital systems, hospitalists, and patient flow leaders regarding which strategies may be beneficial to implement in order to improve management of hospital capacity strain and large swings in patient census.

Results

Proactive Interventions

Successful interventions are proactive rather than reactive & use data to understand and monitor patient flow or capacity challenges.

"I think the...thing that's worked the best is the ability to kind of predict these surges, and then shift in the culture to consider a surge as a predictable event as opposed to kind of an unpredictable random event."

Plan For Discharge At Time Of Admission

Solutions to high-capacity situations involve trying to shift focus or culture to proactively work on discharging patients.

"The intervention that we've put into place is when we have those huddles...we as physicians are asked to classify the patients according to like a color scheme to designate...they are ready to discharge, and again I think that's helped...each of us know which patients need to be focused on."

Impacts of Capacity Strain Summary

Patient volume is dynamic with sporadic surges. When reactive measures are used, provider and system efficiency or productivity are noticeably impaired.

Because drivers of hospital capacity are complex and difficult to predict; failure to appropriately anticipate means that managing capacity is often prioritized over all other healthcare missions.

Capacity strain delays care delivery time, prolongs length of stay, decreases time with patients, impairs patient safety, and increases stress on clinical staff & the hospital system.

Ensure Sufficient Staffing

Solutions involve building in flexibility, developing proactive surge plans, teamwork, and ensuring sufficient staff to care for patients being admitted.

"I think it's ideal to staff at a level where there is – it's just built-in that there is some ability to flex up. I mean, in my experience, there's really no way to accurately model and predict volume...it's very, very difficult to control volume, so you have to accommodate it"

Identify Barriers To Discharge With Multidisciplinary Team

Ideal interventions identify barriers proactively rather than reactively, allowing for advanced preparation of conditional discharge orders, medication reconciliation, and discharge summaries.

"The whole premise is this focus on transition of care and planning - preparing for patients who are going to be discharged the next day. I think each one is modeled after the other."

Limitations

- Most leaders interviewed were recruited from academic medical centers, limiting generalizability of findings to other settings or types of healthcare organizations.
- Analytical bias could have been introduced during coding as the coders were aware of the study's aims. However, using several independent coders may have helped to minimize this.
- Sample sizes for both hospitalist leaders and hospital administration leaders were overall low, limiting power.
- Recommendations have not yet been evaluated clinically and administratively; as such, effectiveness can't be ascertained.

Future Work

- Expand interview breadth to include hospitalist leaders and hospital administration leaders from other organization types (including community, safety-net, and rural hospitals).
- Focus on developing education materials for providers and administrators that describe methods most likely to succeed in managing capacity strain and large swings in patient census.
- Evaluate the impact of hospitalist & administrator approved recommendations on improving capacity strain & the negative impacts it leads to for patients, providers, and health systems.

References

- Eriksson CO, Stoner RC, Eden KB, Newgard CD, Guise JM. The Association Between Hospital Capacity Strain and Inpatient Outcomes in Highly Developed Countries: A Systematic Review. *J Gen Intern Med* 2017;32:686-96.
- SHM Benchmarks Committee. Maximizing Throughput and Improving Patient Flow. *The Hospitalist*. <https://www.the-hospitalist.org/hospitalist/article/122911/maximizing-throughput-and-improving-patient-flow>. Accessed Jan 07, 2021.
- Chadaga SR, Shockley L, Keniston A, et al. Hospitalist-led medicine emergency department team: associations with throughput, timeliness of patient care, and satisfaction. *J Hosp Med* 2012;7:562-6.
- Chadaga SR, Maher MP, Maller N, et al. Evolving practice of hospital medicine and its impact on hospital throughput and efficiencies. *J Hosp Med* 2012;7:649-54.
- Institute of Medicine of the National Academies. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academies Press; 2001.

Acknowledgments & Disclosures

- University of Colorado Division of Hospital Medicine
- Nemanja Vukovic has no conflicts of interest to disclose.
- The study is IRB exempt under COMIRB protocol.

Summary of Findings

Impacts of Hospital Capacity Strain

Delayed delivery of care
Prolonged length of stay
Impaired patient safety
Increased provider & system stress
Prioritization of managing capacity over other healthcare missions

Recommendations For Managing Strain & Surges

Focus on proactive rather than reactive interventions
Ensure sufficient staffing & flexibility as part of proactive plan
Plan for discharge at the time of admission
Identify barriers to discharge early
Coordinate structured multidisciplinary discharge planning