GE Healthcare

Capacity Strategy: The Science of Improving Future Performance

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In these uncertain times, planning for the future is more difficult than ever. This is particularly applicable to the U.S. healthcare industry. Nearly 100% of hospitals and health systems are executing strategies to lower cost while improving quality of care delivered. Most experts would agree that among the priorities that rise to the top of any cost-reduction platform is increased operational efficiency. However, many of the organizations grappling with this challenge fail to recognize the impact that inadequate capacity management can have. Much of the struggle stems from reactive management of patient flow rather than a proactive approach, along with a lack of understanding how changes in one area impact another. Without a formal strategy for maximizing capacity, it is difficult to quantify and prioritize the initiatives that will have the greatest impact in taking cost out of a system.

Developing strategic plans that are well-vetted against the inherent variability associated with healthcare delivery is critical to success along with the ability to sustain management control over future performance. Developing multiple likely capacity scenarios that can take into account the dynamic interdependencies of a system across a range of future states can help strategies such as these withstand the test of time.

Controlling variability to manage the unknown

Operational capacity in healthcare is a measure of how well a hospital or health system manages its resources—physical space, infrastructure, staff, equipment, and support services—in order to provide patient care. A system not designed intentionally for capacity optimization will evolve on its own—and not in a good way.

Ideally, a hospital should be able to operate efficiently in the 85% to 90% capacity range. However, studies show that without a strategic approach to capacity management, hospitals with bed occupancy rates exceeding 85% can expect regular bed shortages, periodic bed crises, and difficulty in providing timely access to care.[1,2] Conversely, hospitals operating at 85% capacity or lower are not using their existing capabilities efficiently and thus operate at a higher cost per patient day.

Although the ideal target for operational capacity is different for every organization, the key to achieving it is the same—reducing unwanted, controllable variation in care delivery to avoid the swings in utilization that stress the organization and impede its ability to manage access, quality, and cost.

Controllable variations are distinct from random variability, which accounts for factors such as the volume of patients in the ER on a given night (although that, too, can be predicted with a great degree of accuracy). Variation within the control of the organization reflects the outcomes of deliberate operational decisions such as the days on which elective surgeries are performed or how patients are scheduled and prepared for discharge.

When operational decisions are made without an understanding of the system dynamics and interdependencies within a hospital, capacity problems arise. If 80% of a hospital's elective surgeries are scheduled in the middle of the week, then the PACU, ICU, and the inpatient units will likely suffer the effects of capacity overload on Tuesday, Wednesday, and Thursday. A flood of emergent surgeries on those days would likely be a real tipping point into gridlock. If patient discharges are not managed aggressively and left to happen "mid-afternoon sometime," the backlog of rooms to be cleaned and put back into the system will result in long wait times for ED patients or admissions from other sources in the community who have been waiting for a bed.

Capacity issues also occur when operational decisions are not aligned to organizational goals. For example, a hospital with the strategic intent of becoming an orthopedic center of excellence almost had its efforts derailed by the failure to think through and plan for the housewide ramifications of its growth plans. This facility brought additional ortho specialists onboard, ramped up marketing, and experienced a rapid influx of new patients. Early success exposed the lack of capacity planning: Overwhelming demand led to long lead times for appointments; there was no room on the surgical block schedule for the new surgeons; and wait times for a bed in the ortho unit often stretched to greater than six hours for patients waiting in the PACU or ED.

Whether planning for future growth or trying to reduce congestion and operate at higher utilization, healthcare organizations need strategies for operationalizing care delivery on a systemwide basis rather than by department, service line, or care area. Articulating an effective capacity strategy is a powerful lever that can help a healthcare organization:

- **Control costs**—Right-sizing capacity in use gives an organization better control over the sources' variation. For example, one of the largest expenses for a hospital is labor. Improved capacity management reduces the need for flex staffing to cover swings in demand and census.

- **Grow patient volume and revenue**—Service line growth targets can be realized more effectively with implementation strategies that are built with a clear understanding of the likely effects on capacity utilization throughout the organization. Smoothing out peaks in demand and reducing patient flow congestion can yield an increase in throughput, opening the doors to latent demand and recapturing patients who have gone elsewhere due to long wait times for appointments or admissions.

- **Improve patient, physician, and staff satisfaction**—A healthcare delivery system that functions with less congestion reduces the stress level for all stakeholders, improving the care experience for the patient and the day-to-day work environment for caregivers.

Understanding the demand profile

Understanding the supply and demand dynamics that affect utilization is the first step in creating an effective approach to capacity management. Capacity strategies developed in the absence of this basic understanding will likely fail or be unsustainable.

Demand for capacity at any unit level within the hospital can be made up of several different patient types or segments. Each patient flow segment can have a distinctly different demand timing and capacity requirement. Understanding how these various segments of the patient population aggregate to form the overall demand profile and daily capacity requirements is the key to forming an effective capacity strategy and is the basis for managing capacity utilization in such a dynamic environment.

An ideal capacity management system is aware of these critical dynamic relationships between segments of the patient population and more fully considers the potential consequences for the system of planned changes to demand volume or mix.

The value of system-level modeling

In working with clients to help them create and deploy effective capacity strategies, our approach is to optimize current capacity utilization and springboard from that strong foundation to devise and implement approaches that will transform the organization.

We begin by developing a comprehensive set of models that provide this system-level view of the complex demand mix that affects capacity usage for the healthcare system. These models provide the baseline for understanding how the dynamics of this particular system are created and where the multiple sources of variation originate. Combining these system behavior insights with in-depth discussions with the hospital leadership on future strategic capacity goals, the models are then used to test potential strategies for achieving long-term capacity strategy objectives.

Capacity strategy in action

Hospital A. A 190-bed hospital in the Midwestern United States was challenged by capacity bottlenecks in the emergency department and congestion on inpatient units, exacerbated by a 10% growth spurt in patient volume. In advance of building a new patient care tower, the hospital engaged GE Healthcare Performance Solutions to take a scientific approach in determining a new capacity strategy, with the following goals in mind:

- Provide the right level of care for each patient
- Allow for more predictable staffing
- Increase staff/physician/patient satisfaction
- Lower operating costs

Dynamic simulation was used to model the impact of changes to capacity, length of stay, and case mix on congestion and utilization of a unit. In partnership with the hospital's executive leadership team, more than 14 different capacity management scenarios were tested, iterated, and refined before arriving at a strategy that met the hospital's goals. The principal change was a definitive segmentation of inpatient units by levels of care, including the designation of a progressive care unit with the flexibility to care for higher-acuity patients and a short stay unit for quicker turnaround of patients needing little intervention. These changes enabled the hospital to recognize more than $750,000 in financial benefit from both cost savings and incremental revenue due to additional direct admits.

Hospital B. This 700-bed hospital in the southern United States wanted to find new strategies for managing patient flow. Even when operating at less than 80% capacity, the facility "felt" full and care delivery was slowed. Working with GE Healthcare Performance Solutions, the executive team examined existing operations, looking at utilization metrics by care area and service line, market factors, and historical demand. This assessment revealed both constraints and opportunities for growth. Among the key findings:

- The facility would have to grow admissions by more than 10% to exceed 80% occupancy with its existing operational capacity—a goal that seemed unlikely, given trends in admissions.
- Care operations were hampered by a high degree of artificial variability. This variation was driving a misalignment of supply and demand on a daily basis that manifested in congested patient flow. For example, the volume of OR admissions for elective surgeries varied significantly from day to day, causing drastic swings in the inpatient census that affected capacity in the ICU, the ED, and inpatient units.

The team developed four capacity scenarios to test, each one projecting a different rate of volume growth: significant, modest, no growth, and negative growth. These scenarios were validated and tested via GE's dynamic simulation tools, and iterated through dialogue and working sessions with executive stakeholders. The team selected a modest growth (+2%) capacity strategy that called for shuttering two or three units; implementing OR scheduling changes to reduce variability and expand capacity in high growth areas such as neurosurgery; and aggressively managing discharge processes to reduce overall length of stay (LOS). **The models forecast 80% to 85% capacity utilization and $13M to $17M in potential cost savings resulting from an increase in OR cases, reduced LOS, and the closing or reassignment of underperforming units.**

Governance: Preventing variation from creeping back into the system

A critical aspect of capacity transformation is governance—the organizational structures, policies and procedures, committees, and metrics through which activity is measured, change is managed, and decisions are made. Governance is where operational factors intersect with the political and cultural factors that exist in every organization. An effective and well-integrated governance structure relative to capacity management enables decisions at every level that are data-driven, transparent, and aligned with the goals of the organization. This requires that leaders have access to a global view of hospital operations—one capable of synthesis for key indicators such that variations can be identified and dealt with in a timely manner.

Authors

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Brian has developed and applied innovative solutions for healthcare delivery systems, including scheduling and patient flow simulation models for oncology clinics, emergency departments, and perioperative services.

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[1]Mountain D., Fatovich D, McCarthy S. Myths of ideal hospital occupancy. *Med J Aust*. 2010;193(1):61-62.
[2]Bagust A, Place M, Posnet JW. Dynamics of bed use in accommodating emergency admissions: stochastic simulation model. *BMJ.* 1999;319(7203):155-158.

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