Management 201: A New Era Of Tight Capacity

The hospital industry has become bimodal: either full and congested or poorly utilized — both capacity management issues.

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In this new era, there is an urgent need for new approaches to capacity management as health systems are forced to either build new capacity or function at higher levels of utilization. Far too many healthcare executives do not recognize surplus capacity as a problem and have become complacent operating at lower utilization. Indeed, the changing environment will make such “capacity overhang” untenable. In all cases, capacity is a costly and ultimately scarce resource, and every effort must be made to value it accordingly.

The capacity crisis — before and after

So, what are the forces that have converged to create new urgency around capacity management?

Despite a decade of working off huge amounts of excess capacity, the U.S. healthcare system still is struggling with capacity issues. Some hospitals still are stuck with far more beds than they need because they are in areas where they could not “grow their way out.” Other hospitals are bursting at the seams. In too many cases, hospitals operate with an average census between 60% and 70% but “feel” full as a result of high variation in day-to-day and week-to-week census. This is usually the result of variation in the OR schedule that ripples through the critical care units and across the house.

For example, variation in the elective surgical schedule leads to peaks and valleys of demand in downstream units. The staff is overwhelmed during the peaks and, therefore, operating at higher occupancy seems impossible. There are relatively few hospitals, indeed surprisingly few, that are actually right-sized; that is, having the proper alignment of resources to meet demand across all units/departments in the organization.

Understanding the relationship between costs and utilization

To deliver more and better care with much smaller per capita workforces and infrastructure, providers must move beyond simply economizing on or “rationing” care. Productivity is now paramount. Providers have had little incentive to practice effective capacity management in years past because the opportunity costs of capacity have been quite low. Management expertise was neither developed nor rewarded for the simple reason that it has not mattered as long as beds were routinely empty and equipment was utilized 50% or less.

Going forward, however, bottlenecks, delays, and chronic congestion will be the norm. As a matter of survival, health systems everywhere must develop competencies to identify and remediate these problems.
### Competition

<table>
<thead>
<tr>
<th>Brick and Mortar</th>
<th>Workforce</th>
<th>Reimbursement</th>
<th>Financial Capital</th>
<th>Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>For four decades after World War II, government at all levels subsidized growth of the nation’s physical healthcare infrastructure (e.g., via the Hill-Burton Act). The introduction of diagnosis-related groups in 1983 helped dampen the ardor for more buildings, as average length of stay (ALOS) dropped by one-third and one-third fewer people were admitted to hospitals as inpatients. This emptied out hospitals and by the late 1990s had driven bed utilization through the floor.</td>
<td>Infrastructure growth was matched by an increase in the medical workforce. The capacity of medical school classes doubled between 1965 and 1980, triggering four decades of robust physician workforce growth. Even within the past decade, many healthcare experts were writing of an oversupply of physicians overall and a glut in some specialties at the expense of primary care. The nursing workforce also grew during this time, reaching near 3.1 million in 2008, and nurses training improved markedly.</td>
<td>Fee-for-service (FFS) reimbursement has provided economic cover for the construction boom, ensuring that “if you build it, they will come.” It rewards providers for high utilization rather than quality, efficiency, or good outcomes, thereby driving up costs without improving health. Today, the U.S. spends twice as much on healthcare per citizen as Great Britain does, but posts higher rates of diabetes, heart disease, strokes, lung disease, and cancer. FFS was hugely successful in one area: spurring life-saving and life-enhancing innovations but, again, without regard to cost.</td>
<td>Hospitals and health systems have long enjoyed easy access to highly subsidized financial capital due to overwhelming public support. Employing large, highly trained, and well-paid workforces, hospitals have been powerful economic engines with sustained, recession-proof growth. They also add prestige, making the community a more attractive place to live and work. Public monies that subsidize investments in “hard assets” (e.g., a larger emergency department) show clear and highly visible payoffs. Finally, subsidized credit, loan guarantees, tax preferences, and other “off-budget” largesse have long provided a politically attractive means for governments at all levels to subsidize health care.</td>
<td>Historically, local providers have had relatively little competition, especially in smaller cities and rural areas. In most U.S. ZIP codes, one or at most two hospitals have served as destinations for most inpatient care, and these hospitals often have dominated such key outpatient services as imaging, as well. Absent competition, inefficiencies and quality issues could go unchecked. There was little need to improve.</td>
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<td>The debilitating after-effects of decades of unfocused facility growth remain with us today. The U.S. is awash in hospital closings and more downsizing and consolidation loom — fallout from the current recession and post overbuilding. New York and other states are forcibly shuttering hospitals and Certificate Of Need requirements are tightening up as state and local governments attempt to control costs. In certain areas and types of hospitals, population growth is filling up the beds, creating overutilization. In many other areas, however, inpatient occupancy remains low. <strong>Capacity Take-away:</strong> The hospital industry has become bimodal: either full and congested or poorly utilized — both capacity management issues.</td>
<td>The rough balance going forward between retiring physicians and graduating doctors guarantees that the per capita workforce soon will start to shrink. Meanwhile, demand from 78 million aging baby boomers and 30 million newly insured Americans grows. In fields such as general surgery and primary care, shortages already are serious. Most analysts believe that were it not for the recession, nurses also would be in increasingly short supply. <strong>Capacity Take-away:</strong> Per capita human capital in healthcare is declining even as demand is rising, creating a situation where simply “working harder” will not suffice to overcome capacity issues.</td>
<td>In the fractious national debate over healthcare reform, there is consensus on one idea: FFS must be replaced with a model that incentivizes providers to achieve good clinical and financial outcomes. A March 2010 Medicare Payment Advisory Commission (MedPAC) Report to Congress notes: “Many of the barriers that prevent Medicare from improving quality and controlling costs stem from the incentives in Medicare’s payment systems, which are primarily FFS and provide incentives that reward more services instead of better quality.” Accordingly, MedPAC and other payers are moving to new methodologies that remove these incentives. <strong>Capacity Take-away:</strong> Only efficient and effective providers will be able to recoup their capacity investments.</td>
<td>The recent recession and credit crisis mark an abrupt and likely permanent end to health systems’ ambitious capital spending. For three years, capital projects have been scaled back en masse or canceled outright, and capital budgets have not bounced back even as the economy has stabilized. Health systems have lost access to cheap debt that long fueled their growth. States and municipalities are no longer fiscally sound enough to step up with their historical backing, and many systems’ tax preferences are coming under increasing scrutiny. <strong>Capacity Take-away:</strong> Reduced access to capital requires that far greater rigor be applied to capital planning and budgeting.</td>
<td>Competition has become pervasive, intense, and fraught with risk. Providers are coalescing into integrated systems that compete vigorously with one another, with for-profit independent providers, and sometimes with their own medical staffs for the loyalty of insurers, patients, referring physicians and physician groups, and even CONs. Health reform has opened up “land grabs” with potential for huge “first-mover” advantages, but without clarity on the direction that policy eventually will take. Third-party payers also are consolidating and wielding more leverage. Providers no longer can count on high margins in specific service lines to cross-subsidize other mission-critical but money-losing activities. <strong>Capacity Take-away:</strong> High-cost providers will be at an insurmountable disadvantage going forward. All providers must be far better stewards of their capacity to ward off competition that imperils both their business models and their underlying missions.</td>
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Shifting, moving and bending the cost curve

Most healthcare costs are fixed, meaning they do not vary with the level of patient activity. Where costs are mostly fixed, the relationship between costs and utilization is straightforward to explain.

Imagine that Julia, a college senior, rents a three-bedroom house for $2,400/month. To reduce her own expense she seeks out roommates. Having one roommate drops the rent to $1,200. Two roommates bring her outlay down to $800, and thereafter it falls to $600, then $480, and so forth. But Julia notices that there is a limit to this amortization of her rent — the incremental savings get smaller and smaller while the line to use the bathroom each morning gets longer and longer.

What Julia seeks is a reasonable tradeoff between the benefits from further amortization and the costs of congestion. Depending upon her overall budget constraints and those of her roommates, this might entail having just one or two roommates or as many as five or more. The optimal tradeoff depends upon many considerations, but the principle and the intuition generalize to cover any fixed asset — the optimal utilization long term reflects a tradeoff between amortizing fixed costs (i.e., maintaining high utilization) and mitigating congestion costs.

This tradeoff is captured in a textbook U-shaped average cost curve, pictured below. Unit costs are minimized where output equals Q*. This is the point where utilization is high and where congestion is present, but where a reasonable balance has been achieved. The aim is not 100% utilization, especially in highly variable environments. The aim instead is to strike an appropriate balance, implying that the targeted utilization will be influenced by a number of considerations.

This U-shaped curve offers a simple device to summarize four approaches for reducing costs:

**AMORTIZE** — Move *along* the curve to Q*

In a simple graph, it is easy to point to Q* as the obvious best place to operate — where amortization is weighed optimally against congestion. In practice, physical capacity is often chosen “up front” and at great expense; thereafter, it is long-lived, specialized to one or a very few tasks, and immobile, especially in the short run. There are myriad ways to improve this tradeoff, and to move aggressively toward Q*, but these measures require a basic understanding of core management principles. The workforce must know, for example, how to find and break bottlenecks, expedite critical pathways, and mitigate variability.

An example that illustrates this point well is how the USC Transplant Institute at USC University Hospital in Los Angeles met the challenge of amortizing its existing capacity more fully. Kidney and liver transplant patients were waiting three to four months to be seen by the transplant team. It was determined that a key factor in the delay was congestion caused by inefficient intake processes. By expediting that critical pathway with workflow technology and governance, the referral-to-seen cycle time dropped by two-thirds and the institute freed up capacity for 400 more cases a year, allowing it to improve the flow of patients into the system.

Moffitt Cancer Center in Tampa, Fl., faced a similar capacity management challenge. The center needed to create room for more surgical cases to accommodate demand, but did not want to add capacity in the form of new operating rooms or longer hours. Through analysis of operational data, it was determined that many surgeons were not utilizing all of the time allocated to them. Using sophisticated constraint modeling and nuanced governance, a more realistic block schedule was configured and implemented, freeing up latent capacity for 900 additional cancer patients a year.

**ECONOMIZE** — *Shift* the curve downward

Healthcare experts and health policy both focus almost exclusively on this one approach to cost containment: “Use less of everything.” This is effective but brute force, especially if the workforce has little or no understanding of underlying costs. The tiny snacks that airlines serve to their passengers attest to the need to manage variable costs even in high fixed cost settings, but relative to the $70 million cost of the aircraft, for example, the savings from shrinking these snacks amounts quite literally to a few peanuts.
The conventional approach of using less of everything is indiscriminate and after several decades of relentless cutting shows diminishing returns. Efforts now must be directed to where they will have the most impact, and increasingly that means overhauling the care delivery model to root out institutionalized inefficiencies that drive up costs.

Ochsner Health System of Louisiana found itself in such a position. Some of its medical-surgical nursing units were not meeting targets for length of stay and patient satisfaction, and costs were rising. Ochsner opted to totally rethink staff utilization in these areas. Using dynamic simulation models to find and root out inefficiencies, staff workflow patterns were reworked so that nurses now spend one-third less time traveling through the unit and more time on outcome-focused care.

Another system-rooted cause of financial waste in medical institutions is preventable errors. Each year, 2 million Americans acquire infections while in the hospital, according to the Centers for Disease Control and Prevention. Proper hand-washing is acknowledged as a key defense against such infections but efforts to “institutionalize” hand-washing protocols have met with limited success. In an effort to find a systematic and sustainable approach to this problem, Froedtert Hospital near Milwaukee is working with GE Healthcare to develop a process-based technology solution to monitor and improve hand hygiene compliance and thus reduce infection rates.

RATIONALIZE — Move to the best curve
Every asset has its own U-shaped average cost curve. The upfront cost of a snow shovel, for example, is more quickly amortized than the cost of a snow plow, but it is also more quickly congested. Rationalization involves a host of measures that healthcare providers can take to make the best possible investments in capacity up front, and thereafter to ensure that the right patient is cared for at the right time, in the right place, with the right infrastructure.

Gundersen Lutheran Health System in La Crosse, Wi., wanted to address capacity issues around the delivery of critical care before its new facility was off the drawing board. Gundersen staff used simulation models to test a variety of concepts, including functional capacities, future state technologies, and operational plans such as staffing ratios and shift structures. The result was a design that improved the quality of care while saving millions in capital and operating costs. The lessons learned from the simulation process enabled not only an optimal capacity strategy for the new space, but drove workflow changes in Gundersen’s other facilities as well.

OPERATIONALIZE—MAKE LEAN — Attack congestion to bend the curve
Healthcare operations tend to focus on averages around costs, flow times, utilization, and other key performance indicators. Of course, it is important to improve upon these metrics. Yet congestion often is driven by a combination of high utilization and variability, and variability rarely is measured or directly managed. Excessive variability gives rise to problems everywhere, but especially in intrinsically variable settings. Many health systems recently have begun adopting “lean principles,” and employees have been taught basic and intuitive principles (e.g., reduce batching) that can be applied immediately, and with demonstrable results. Such “quick wins” are important and empowering but limited in scope. They must be followed up with more sophisticated and institutionalized approaches that will truly get at the core problems around variation in care delivery.

Variability comes in many forms. Patients get sick and seek medical care, creating random demand on healthcare capacity. This can be managed by queuing models that smooth out patient flow. There is also clinical variability. New approaches and technologies, like GE Qualibria, are emerging to help address this type of variability by bringing together patient data, evidence-based best practices, and an organization’s clinical standards to alert caregivers to variations from desired outcomes. The most controllable cause of variation in healthcare is artificial constructs like surgical block schedules. Peaks in demand for inpatient beds due to variable surgical schedules are a persistent problem in hospitals. The John C. Lincoln Health Network in Phoenix reconfigured its block schedule to increase “same surgeon to follow” scheduling and standardize surgeon time and space assignments as much as possible for greater staffing consistency. The result was not only additional capacity for surgical cases but a significant improvement in the utilization of inpatient units in the main hospital.

Capacity management 201
As the healthcare environment changes rapidly, it is clear that better capacity management is the essential operational lever. It is also clear that improving capacity management is hard. The simple approaches for reducing cost (variable supply costs, process improvement) have been attempted and returns are diminishing. The next era of capacity management is about creating access for more patients while also reducing costs. This means operating our healthcare system at higher occupancy.
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