Patient Flow in the Capacity Constrained Environments

Hospital clinical department capacity can be categorized in three measurable ways. F**ixed capacity** represents the physical rooms and licensing status of the room. F**lexible capacity** is defined by operations performance such as length of stay. E**lastic capacity**, the most volatile, can be defined by resources available such as labor, or therapeutic surfaces which make the capacity usable for patient care. Effective management of these capacities is the key to vitalizing flow and therefore influencing financial efficiency.

Fixed capacity expansion is a slow and arduous process and therefore is not very effective in response to the nimble adaptation requirements of the current healthcare environment. At a cost of approximately $1,000,000 per room, fixed capacity is expensive to create. (REFERENCE) Expansion requires years of planning and construction while incurring financing costs, taxes, regulatory oversight and maintenance regardless of the occupancy rate. Defining the necessary fixed capacity requires long term planning, historic utilization analysis and strategic planning of customer demand. Once the capacity is physically built and licensed, even repurposing or closing hospital space with low occupancy is a financial challenge. Because changing this capacity incurs such high costs in both time and capital, this is not a viable consideration for improving operational effectiveness when need is imminent.

Flexible capacity has received significant attention in pursuit of operational improvements that "create" timely capacity. Expanding this capacity offers a mid-term solution compared to the other capacities and it holds sustainable financial benefits. Each bed has a fixed capacity of one day of patient care. In an environment where the average patient length of stay is 3 days, the flexible capacity represents opportunity to treat 10 patients in 30 days. Keeping in mind that Inpatient Length of Stay (LOS) and Geometric Mean Length of Stay (GMLOS) only count care that crosses the midnight census, tremendous efficiency awaits as we shave hours off consumption by discharging earlier in the day. (REFERENCE) Operational performance improvement initiatives using LEAN and 6-Sigma methodologies can increase flexible capacity by delivering incremental improvements. When the LOS is decreased from 3 days to 2.5 days, the effect is an increased flexible capacity that can accommodate 20% more patient days. This capacity is significantly more rapidly achieved than expanding fixed capacity, however it does not come without cost.

Flexible capacity change requires resources and significant effort to hardwire the change. It requires a timeline and commitment of staff and executives who support the initial design labor expenditure. In the tight margin environment of healthcare, the premium labor expense associated with backfilling the Kaizen participants' roles as otherwise deployable patient care labor requires thoughtful consideration and cost/benefit analysis. This capacity is rich in opportunity while limited by availability to temporarily re-deploy scarce labor resources. The results can accommodate incremental growth, preserve capital and reduce cost; therefore, it can prove to be an effective lever in improving margins.

Elastic capacity development demonstrates the most rapid influence and holds immediate impacts on the financial performance. Long term data on diagnosis, population and gender demand, as well as specialty bed or equipment utilization

has value in the annual budgeting process, but labor management holds immediate relevance. Effective management of labor based elastic capacity hits the bottom line immediately, yet financial risk can be incurred if labor becomes excessively constrained. Without effective matching of supply to demand for elastic resources, an organization risks increased costs per unit served, missed opportunity to deliver revenue generating services and lost opportunity to apply management resources to revenue producing pursuits. According to LEAN principles, time spent moving equipment and adjusting staffing in or out of service is waste as it increases some overhead cost while seeking to decrease others. (REFERENCE) Without a balanced approach to margin improvement though revenue generation, constraining costs can create a downward revenue spiral. It is a challenge to identify an organization that is known for shrinking to greatness.

Over-constraining labor hours creates a risk that can negatively impact flow contingent revenue and it is an easy mistake to deliver when analysis is based only on the mathematical average midnight census. Hours per patient day (HPPD) credits and targets are commonly generated using fractional midnight census volumes. (REFERENCE) What looks like an HPPD opportunity or cost efficiency achieved through a fractional change to the right of a decimal in a formula (10.4569 Average Daily Census (ADC) * 87.6721 HPPV) can result in significant elastic capacity waste. Expecting intra-shift adaptation of labor deployment in pursuit of productivity targets derived from annualized averages may lead department managers to bottleneck flow. The example below illustrates how a targeted percentage of hours budgeted can augment the risk of lost opportunity in pursuit of nominal departmental productivity savings.

Example: Telemetry Unit (where the highest turnover of beds exists, representing significantly more direct bedside effort than a consecutive night stay) (REFERENCE?)

Fixed capacity: 20 beds

RN ratio: 4:1

Budgeted Average Daily Census: 13.56

Budgeted HPPD bedside RN credit: 8.63 (includes 24 hours of charge/break nurse)

Budgeted hours: 117

Mathematic hours needed if you could have a fraction of a patient and a fraction of a RN: 110 hours

Mathematic shift RN's: 9.16 or 4.583 per 12-hour shift.

Practical RN hours needed (including charge/breaks): 120 or 10 splits in 5 shifts each, days and night.

Productivity target achievement if practical staffing is delivered: 97.52%

Elastic Gap: 2.975 hours

Opportunity for flow if staffed at practical census: at least 4 boarded patients flow out of PACU or ED

Cost of opportunity on the tele unit: $223.29 (assuming $75/hr. labor cost)

Break even Return On Investment (ROI): 3 hours of ED capacity of a single bed, which converts to one care completion of an ED Left Without Being Seen (LWBS). Keep in mind bridging the opportunity gap on the tele unit occurs during the period when LWBS occur.

Sustaining the tele staffing after discharges allows for prompt flow upon receipt of admission orders and opens flow for 4 times as many ED patients as needed to break even. Any boarded admissions will consume the labor "saved" on the tele

unit by flexing off a nurse on the inpatient unit. It should also be noted that if the ED does not experience a LWBS, the lobby will be emptied 1-4 patients sooner which at the average ED discharge LOS will save even more labor hours in the ED budget than on the tele floor.

Difference between budgeted and practical in this example: 0.22 HPPD or 0.345 ADC. Note: neither change may be visible depending on the decimal display setting in the spreadsheet.

Effectively managing labor environments is necessary and worthwhile work. Cardiac physiology science refers to the Starling Stretch effect where optimal efficiency of the heart is achieved when the muscle is optimally stretched. Fail to stretch it enough, the response in suboptimal output. Stretch it too much, and efficiency falls. Operational labor design cannot afford inadequate stretch, while over-stretching it may introduce inefficiency. If a department leader must function as a silo to succeed in their labor budget, the success of the organization is at risk in their objective to serve the mission, margin and community. By looking at flow across the system, we are more likely to find the vital stretch of labor. By engineering outcomes, we are also engineering the income.

(Key words: Kaizen, nursing labor productivity, vital stretch, engineering outcomes, elastic capacity, flexible capacity)