

GE Healthcare Partners: Integrating Workflow and Facility Design

How University of Texas Medical Branch is Using Simulation to Optimize Care Delivery

CHALLENGE:

UTMB is opening a new hospital with inpatient units twice the size of their current layout. How should care delivery processes be modified for the much larger space?

SOLUTION

Using simulation technology to test a range of future-state workflow scenarios gave UTMB the hard data they needed for decisions affecting the cost, quality, and efficiency of care.

Facility design can be a powerful lever to improve the quality and cost-effectiveness of care when aligned with the right workflow patterns. Forward-thinking healthcare organizations are combining workflow optimization, simulation modeling and facility design to transform care delivery.

The University of Texas Medical Branch (UTMB) at Galveston is scheduled to open a new state of the art facility – the Jennie Sealy Hospital in 2016. The inpatient units have been a key design focus. Their spacious private rooms have a spa-like feel and the open layout of the nursing areas promotes a team-based, patient-centered approach to care – one that is likely to make the new hospital one of the leading inpatient care resources in Texas.

In anticipation of this move, UTMB engaged GE Healthcare Partners to assess the efficiency of current care processes in its medical inpatient units, analyze how the more open design of the new hospital would impact those processes, and test a range of nursing delivery scenarios to find the optimal model for the new space.

UNDERSTANDING THE NEW GEOGRAPHY

The size of the med/surg units in the new hospital was driving the questions. As is the case in the existing hospital, each unit will have 16 patient rooms. However, the footprint of each unit will double in size. Rooms are larger, hallways longer, and nursing stations more decentralized compared with the smaller, hub-and-spoke design of current units.

“We needed to understand the unit workflows within the physical geography of the new space,” says Mark S. Kirschbaum RN, PhD, chief quality, safety and clinical information officer for UTMB. “Given how our care model is working in our current space, what will be the implications when we dramatically increase the footprint? How will the new physical layout impact the care model, patient assignment, and distribution of resources?”



To assist UTMB, GE Healthcare Partners tapped its Hospital of the Future discipline, which provides proprietary simulation technology and expertise to evaluate the impact of different alignments of physical capacities, workflows, and staffing models on the quality, efficiency, and economics of patient care.

Kirschbaum says this solution augmented and informed UTMB Health's in-house quality improvement capabilities.

ANSWERS WITHOUT PROLONGED TRIALS

Current care delivery patterns on two representative inpatient medical units were evaluated based on staff interviews, historical data analysis, and more than 200 hours of front-line observations by GE consultants. Based on this assessment, major opportunities were identified in the areas of patient flow and care coordination, staff utilization in direct patient care, and variation in patient care. A current state model was then built and validated with senior leadership to ensure it was an accurate representation of current operations. From there, a future state model was created that allowed for the trial of various different scenarios.

All future state scenarios were simulated in the new layout of the Jennie Sealy Hospital, replicating the increased travel time to ancillary departments. The goal was to understand which scenarios would improve key performance indicators: resource utilization, dropped tasks, patient wait times for beds, and length of stay. "The simulation work helped us avoid prolonged trials that take not only time but significant resources," says Kirschbaum.

In evaluating how to best impact these areas, UTMB senior leadership and staff met in working sessions facilitated by GE consultants. From the 100+ ideas generated, three scenarios were identified for future state simulation: care model, nurse servers and patient assignment.

THREE SIMULATION SCENARIOS

1. Care model – what is the right balance of skills?

Multiple experiments were undertaken to determine which model of care would allow all caregivers to operate at the top of their license, meet all KPIs, and have a positive financial impact for the organization.

In UTMB's existing model of care, one registered nurse (RN) manages a pod of four patients. The simulation suggested an opportunity for UTMB to consider a team-based model of care for the new facility. In the most promising scenario, a three-person team – RN, licensed practical nurse (LPN), and patient care technician (PCT) – would be responsible for eight patients. This approach led to fewer dropped tasks, reduced patient wait times and length of stay, and more effective resource utilization. There was also the potential for substantial cost savings if implemented across all med-surg units.

"GE was willing to work with us in a hybrid role so we could learn from them. They had expertise and the methodology in simulation that we were only beginning to accrue. Our industrial systems engineers took part in the data collection and used the methodologies and simulation tools, learning how we might apply them elsewhere."

Mark S. Kirschbaum RN, PhD,
chief quality, safety and clinical
information officer for UTMB

2. Nurse servers – yes or no?

Since the layout of the new unit doubles in size, the effectiveness of nurse servers – small supply cabinets outside patient rooms – was simulated to see if they would have a positive impact on staff efficiency. Simulation showed that neither travel time nor task time decreased significantly by having conventional nurse servers in place. Nurses still spent as much time gathering supplies and performing medication prep. “Those findings were instrumental in helping us reshape some of the physical layouts of the unit design and configure patient rooms to enable local supply availability,” says Kirschbaum. From a financial perspective, UTMB Health was able to avoid the cost of purchasing and maintaining nurse servers as well as potential architectural change fees to incorporate the cabinets into the new building.

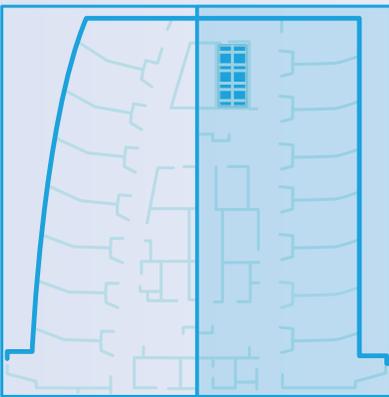
“One of the provocative findings from the GE analysis was that we were using highly skilled individuals for tasks that didn’t necessarily require that skill.”

Mark S. Kirschbaum RN, PhD,
chief quality, safety and clinical
information officer for UTMB

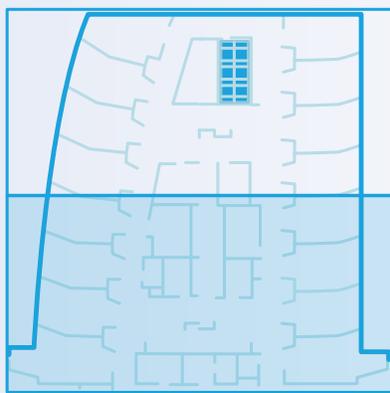
3. Patient assignments – how does placement impact RN travel time?

The third simulation area focused on how patients were assigned. The prevailing belief was that random or acuity-based patient assignments would increase nurse travel time in the larger physical space. Three patient assignment scenarios were evaluated – down the hall, across the hall, and random/acuity. (See diagrams below) Simulation revealed that compared to the baseline model (current state) there was no impact on either travel time or dropped tasks from any of the three types of assignments. These findings suggested an opportunity for UTMB Health to begin assigning patients based on acuity and staff competency to reduce variation on staff utilization and potentially improve staff and patient satisfaction. “That feedback was highly useful with implications for the units we will be opening in the new hospital,” says Kirschbaum.

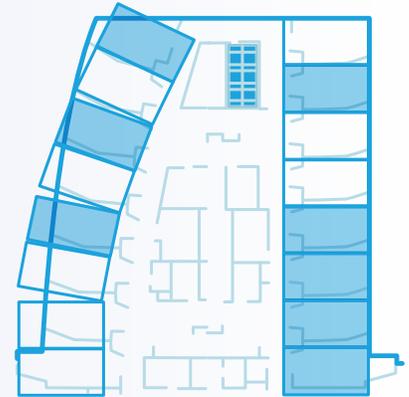
Type 1 - “down the hall”



Type 2 - “across the hall”



Type 3 - “random” or “acuity”



No impact on either travel time or dropped tasks from any of the three types of assignments.

UTMB HEALTH'S PLANS FOR SIMULATION

One of the main takeaways from the initiative, says Kirschbaum, was an appreciation of the multiple inputs and outputs involved in patient care delivery.

Looking ahead, UTMB will take those learnings and, in combination with purchased simulation software, move forward with a broader patient flow agenda. "GE started us with a focus on a single med/surg unit. We've now opened that up for the targeted workflows around bottlenecks and how we move patients from ED to inpatient admission," Kirschbaum says. "In addition to discrete event analysis in that level, we're also stair-stepping up to a dynamic, whole-system view for our hospital to understand potential changes in workflow and what they might mean for us."

For more information visit partners.gehealthcare.com.

"The GE process helped us become better at monitoring transitions in care – the days/times that patients were entering and leaving a given unit and when staff from laboratory, pharmacy, and other departments were coming and going. It helped us understand patient assignment workloads, workflows, and work processes, with an orientation to maximizing the value of the nurses' time on the units."

Mark S. Kirschbaum RN, PhD,
chief quality, safety and clinical
information officer for UTMB



imagination at work

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