GE Healthcare

CASE STUDY

GE Healthcare Partners: Hospital of the Future Simulation

Using simulation modeling to help right-size and boost efficiency in a new hospital and surgery center

CHALLENGE:

Central Iowa Healthcare (CIH) was faced with high costs and loss of market share, largely because its 125-bed hospital was out of date and inefficient.

SOLUTION

The collaborative design effort will save CIH more than $20 million in construction costs and save millions more per year in operating expenses.

Soon after celebrating its 100th birthday, CIH (formerly Marshalltown Medical and Surgical Center) decided to build a new hospital and ambulatory surgery center (ASC). In separate engagements, CIH worked with GE Healthcare Partners to help design both facilities to optimize the patient experience while maximizing operational efficiency.

This collaborative effort included the application of robust, proprietary simulation modeling from GE Healthcare Partners to test different design strategies. The simulation enabled CIH to evaluate different approaches in a risk-free environment before making significant investments to implement solutions.

Once the simulation was complete, GE explored the model's output in iterative working sessions with CIH leadership, helping to align the organization's commitment around a strategy and action plan. As a result of the engagements, CIH avoided millions of dollars in construction and operating costs while improving patient throughput and thereby enhancing revenue.

CHALLENGES OF AGING

CIH, headquartered in Marshalltown, mirrors many rural Iowa communities in experiencing a trend toward declining inpatient days. At present, fewer than 60 of the 125 licensed beds are staffed regularly. The excess capacity has led to sub-optimal patient flow management, including:

- Non-critical patients cared for in the ICU because of the nursing skill available there, or physician preference.
- Short-stay patients cared for in inpatient medical/surgical beds.
- Some medical/surgical beds used for infusions with stays of less than 12 hours.
- Local cultural norms extending length of stay – some children admitted "just to be safe," and no patients discharged in the late evening.

A GE review of market leakage and regional trends showed no reason to expect inpatient days to grow. Meanwhile, CIH executives were concerned about patients going to other, newer facilities. "People recognize when a building has aged," says John Hughes, CEO. "Things they can see, touch and hear affect their perceptions about the quality of care.

"In our area, there are hospital and healthcare options in every direction within an hour to an hour and a half. People who aren't happy with our amenities have the option to get in a car and go somewhere else. Those with the means and ability to travel easily are the ones you lose first, and we've seen some of that."

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> Todd Burch, CFO

Todd Burch, COO, observes that surrounding hospitals tend to be significantly newer: The CIH hospital was built in 1914 and expanded about every 25 to 30 years. "The last update to our building was to add a cath lab and clinic space in 2007," Burch says. "The hospital space itself really hasn't been touched since 1976. The space is old and outdated, and we have lost market share because of it. We're in a service area with a patient base that suggests we should be a $120-million-a-year hospital, and today, after growing significantly in the last two years, we're at $76 million net revenue."

OPTIMIZING CARE FACILITY DESIGN

To help optimize care facilities, GE Healthcare Partners leverages its proprietary Hospital of the Future simulation to test different design options and gain insights to the impacts on patients, clinicians, capacities and costs. The simulation model is built to mimic the actual behavior of the facility, considering factors such as patient volume, patient pathways, the nature and duration of procedures, admit/discharge patterns, and much more. The model is then used to quantify the effects of changes in the parameters and of different facility layouts and configurations.

The simulation for the ASC, performed late in the construction phase, led to changes CIH considered worth making despite relatively high cost. "Along the main corridor, separating the check-in/checkout rooms from the ORs, we had a wall of administrative offices," says Burch. "Based on the simulation, we turned those offices into check-in/checkout rooms, so that prime real estate is now used for patient care and generating revenue."

Another critical insight came from simulating how patients would actually flow through the space. "If you draw something on paper, it's one thing," Burch says. "Actually seeing the lines of transport come to life really makes a difference.

"We had planned for all patients to enter through one particular door. Through the simulation, we found that was going to create a bottleneck right behind the door in the main hallway. We realized we needed to open up a second door and use that as another entrance. By doing that, we shifted a significant portion of the volume closer to the rooms the patients would use, and ultimately closer to the ORs they would use. We rerouted the traffic more appropriately."

SIZING THE HOSPITAL

Pleased with the ASC simulation, CIH leaders engaged GE Healthcare Partners early in the hospital construction process, before the architectural design had progressed beyond block diagrams. The collaborative effort aimed to identify the appropriate number of beds of each type, create a high-level layout, and define the sensitivity of the recommendations to changes in assumptions.

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> John Hughes, CEO

CIH was intent on an optimally efficient facility after operating for years in an oversized and inefficient space. Hughes observes, "We have walls where we don't want walls. We have cramped spaces that aren't built for the equipment we use today. We have areas where our people walk significant distances. Old windows, the size of areas, the amount of space we have to heat and cool – all those things add up to high costs, limitations on our staff's ability to deliver the quality care they would like, and a less than optimal patient experience."

Sized at 38 beds, the new hospital will be highly efficient, Hughes and Burch agree. "I can safely say the savings will be in the millions per year, just because of the way we can staff, the way we can heat and cool, and the efficiencies with which we'll be able to operate," Hughes says. "We expect some volume growth, as well. In some areas today, our patient throughput is sub-optimized and there's not much we can do about it. We lose patients because we're unable to accommodate them. That won't be the case in the new facility."

Keeping the facility below 50 beds also substantially affects reimbursements. Under Medicare/Medicaid rules for Provider-Based Rural Health Clinics, hospitals with fewer than 50 beds are exempt from the reimbursement cap for clinic visits – CIH will be able to receive reimbursement that better reflects its actual cost of care.

New Central Iowa Healthcare rendering.

GEARING UP FOR CHANGE

Working in a right-sized facility will require staff to work in new and more efficient ways. To that end, CIH has launched a two-year initiative to implement Lean methodology. "Every process will have to change as we transition to a new building," says Burch. "Everything that worked in the existing building will be substantially or completely different when we move into the new space. Lean is becoming the way we do work, standardizing processes across the organization. That will continue as we reduce our bed count in preparation for moving to the new building."

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John Hughes, CEO

On one project, the hospital's Environmental Services department redesigned its workflow for cleaning medical/surgical rooms, cutting the time required from 45 minutes to 15. Other projects focused on reducing turnaround time for troponin tests for emergency patients suspected of having heart attacks, and bypassing the emergency room for patients identified in the field as having heart attacks and delivering them directly to the cath lab.

SIGNIFICANT RETURN

The reduction in the hospital bed count will save CIH more than $20 million in construction costs and save millions more per year in operating expenses.

Hughes found that the benefits of the GE approach reached beyond the purely financial. "I like the thoroughness," says Hughes. "They made it very easy for me to create confidence in our board. They needed to understand the logic that went into the conclusions. Being heavy on the data side with pretty logical conclusions created an easy trail for the board to follow.

"In addition, what it did and will continue to do is help everybody get on the same page. Everybody had ideas about how much capacity we needed, and those ideas varied widely. This engagement took out all the guesswork and all the anecdotal information. Once we're aligned on the same page, we can all pull in the same direction pretty quickly."

CIH is now working with an architect on the final design of the hospital project, to include an inpatient tower, two medical office buildings and ancillary buildings. The new inpatient tower is scheduled to open in 2018.

"The GE team members knew what they were doing," Hughes says. "They're easy to work with. They were very accommodating. It was a good experience overall, and we were pleased to engage them."

Burch sums it all up concisely: "The return on investment is exponential."

imagination at work

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