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How OHSU and GE Healthcare are solving a major headache: Patient logistics

Nov 29, 2018, 1:51pm PST Updated: Nov 30, 2018, 11:22am PST

There's more to securing a hospital bed than meets the eye.

OHSU Hospital's Transfer Center, located near the Emergency Department, fields requests around the clock. They come in from other hospitals, doctors' offices, ambulance arrivals and people walking in the doors. Dozens of variables are at play — the seriousness of the patient's condition, the availability of beds, staffing levels, hangups with discharges and more. How long it takes to figure all this out can be a life-or-death proposition. If no beds are available, the referring physician might have to make several more phone calls to secure the care a patient needs.



CATHY CHENEY | @PORTLAND BUSINESS JOURNAL
 OHSU's Mission Control allows it to drill down to clean beds, dirty beds, assigned beds and available beds.

OHSU found an answer to this logistical challenge that is saving both time and money.

Working with GE Healthcare, GE's \$19 billion health care business, OHSU created a Mission Control Center, a NASA-like hub that displays real-time data on the availability and demand for beds at three hospitals: OHSU, Tuality Healthcare in Hillsboro and Adventist Medical Center in Southeast Portland.

A year-plus into the faster, more efficient and streamlined system, OHSU is declining fewer transfers, sending more to its partner hospitals, Adventist and Tuality, and increasing its own occupancy. Mission Control has created the equivalent of 7.4 beds a day at the main campus, while the two smaller hospitals have accepted more than 500 transfer patients. The return-on-investment has been seven times what OHSU invested, though the university is keeping the exact amount confidential for what it calls competitive reasons.

"The vision is the right patient at the right place at the right time with the right team," said Dr. Matthias Merkel, an anesthesiologist and medical director of adult critical care and chief medical capacity officer at OHSU. "Now we have much more enhanced visibility."

GE Healthcare has installed Command Centers at two hospitals in the U.S. and one in Canada, with three more slated for next year in the U.S. and the first in Europe. OHSU is the only one so far that encompasses an academic medical center and two community hospitals. It will soon be the first to add an alert for patients at risk of sepsis, a complication of infection that is difficult to diagnose and can be fatal.

"Fusing real time data together from multiple electronic medical records into a single picture is revolutionary, and OHSU is the first," said Jeff Terry, CEO of Healthcare Command Centers for GE Healthcare Partners.

Breaking the bottlenecks

The seeds of Mission Control were sown about five years ago, when Merkel started feeling frustrated at having to turn down patients.

"Around 2015-2016, we felt exceedingly full and were not able to accommodate the next patient who called us, especially in the ICUs," Merkel said. "It caught my attention, especially in my role. We wanted to bring in the next ICU patient."

Merkel and his colleagues began assessing how OHSU and other institutions handle transfers. They found that more than 500 transfer patients were being turned away each year. Some had other alternatives nearby, while others had to travel out of state.

“We want to be able to serve people who need our services,” Merkel said. “It’s a pain every academic institution feels — there’s more demand than we can bring in on a regular basis. We looked at the technological solutions and came to the conclusion it was time to change, because we want to turn this around.”

Meanwhile, OHSU was entering into clinical partnerships with Tuality in 2016, followed by Adventist in 2018. The affiliations were intended to extend OHSU’s reach in the region and expand its capacity by sending lower-acuity patients to the two community hospitals, while reserving its own beds for more serious cases. The smaller hospitals would benefit from the OHSU brand, an increased patient load and the greater purchasing power and provider network for insurance panels.

For each hospital to reap the maximum benefit of an integrated system, managing transfers effectively was a critical element. But transferring patients to the optimal site, based on their condition and travel time, was a thorny challenge. Each department within even a single institution, let alone among three separate enterprises, tends to be siloed off from others. Securing a bed would often take multiple calls, with the coordination done by someone armed with pen, paper and a spreadsheet. There was no central repository of real-time data on bed availability or demand.

Bottlenecks can occur when there’s a delay in moving patients out of recovery areas or in room cleaning. Often, five or six patients may be competing for a single bed.

“Before this, when a transfer request came in, the transfer center would refer to the attending physician, I say yes and accept the patient and hang up the phone and wait for the patient to arrive,” Merkel said. “I didn’t spend time on the background of what needs to happen to make the patient appear in ICU. Now we have transformed this.”

GE’s solution

After doing some due diligence, OHSU decided the GE platform was the most innovative. The company had already installed a Command Center at Johns Hopkins Hospital in early 2016. About 18 months later, in July 2017, OHSU’s Mission Control went live.

Multiple screens are mounted on the wall, displaying various “tiles.” Among them: a capacity snapshot for each hospital, current occupancy in adult, pediatric, acute and critical care; the number of people waiting for transfer from EDs and other departments; pending discharges; and tasks needed, such as imaging, cleaning, pharmacy orders or a ride, denoted by icons like a broom or microscope. Managers can even drill down to see

clean beds, dirty beds, assigned beds, “blocked” beds and the forecast for capacity eight days out.

“Dozens of things happen during a stay, and the command center helps with optimizing the sequence of how things happen,” Terry said. “If you were to have a human compile this information, it would take 1,500 mouse clicks and an hour to do that. Nobody can do that all day. By the time you’re done with 1,500 mouse clicks, the first few things change. It’s making it easier to get the patient in the right setting of care.”

The system uses a combination of artificial and human intelligence, Terry said.

“The AI finds the needle in the haystack and the human figures out what to do with the needle to help the front-line caregivers and patients,” he said. “The AI can spot that this patient may be better served at a community hospital, or we should prioritize discharge activity because we’re holding up a bed, so we don’t have a blockage in surgery today. Figuring out what to do about it requires a human to be thoughtful. There’s a lot of nuance.”

The Transfer Center still handles the initial intake, but it is a subset of Mission Control. Management of capacity and placement are under one umbrella. A nurse triages all referral calls to OHSU and identifies patients who can safely be cared for in the partner hospitals, Merkel said. A physician on duty participates in Mission Control’s daily operation to perform medical triage and work with the bed flow manager.

“Before, the ER saw only their world, the ICU only saw its world,” Merkel said. “I didn’t connect the pieces. Now we visualize that and can make decisions on a systems level, which we were not able to do before.”

As an example of the system in action, just a few weeks ago, a patient checked into Mid-Columbia Medical Center in The Dalles with a medical condition the 49-bed hospital wasn’t equipped to address. Fluid had built up in the sac around her heart.

Mid-Columbia needed to send her to Portland to be treated with a “pericardial window,” where a small portion of the sac is removed to drain the excess fluid and decrease the pressure on the heart. Dr. Tom Nichol, the referring physician, contacted OHSU Hospital, which had no beds available but quickly routed his patient to Adventist.

“It’s nice to not have to manage a really sick patient and have to call multiple places to find out where to send them,” Nichol said. “It’s significantly faster.”

The results

The Mission Control system has produced some concrete results. Compared with 2017, OHSU this fiscal year has:

accepted 554 more transfer patients, or 6.4 percent more than 2017

declined 92 fewer transfer patients, an 18 percent reduction

increased the transfer acceptance rate to 96 percent, a 1 percent improvement transferred 519 patients to partner hospitals

Created 7.4 beds per day at the main campus, 2.4 of which are utilized for non-transfer patients

The system has also allowed OHSU to increase its inpatient occupancy from 88 percent previously to 95-to-100 percent occupancy in some of the high-demand units. Tuality has been accepting a transfer patient per day for the last few months, whereas the rate was “nearly zero” before, said Dr. Daniel Lincoln, who works in critical care.

“There were very, very few transfer requests coming to Tuality,” Lincoln said. “It’s a great team that delivered great care, but it suffered from a low average daily census. There’s really only one way to increase your volume. The big way to increase the average daily census in the ICU is to accept outside transfers.”

Joyce Newmyer, president of Adventist Health Pacific Northwest Region, said transfers were already increasing even before Mission Control incorporated Adventist data in real time.

“What we had envisioned is working,” Newmyer said. “It’s all the more important OHSU have the capacity to serve the entire state. Our role is we can ensure we leave that capacity on the hill.”

GE’s Terry said his team is working with OHSU “to think about what we do next.” If Mission Control can do 20 things today, in five years, that number could be 1,000, he said.

“There’s more all the time,” he added.

At a certain point, are care managers going to feel overwhelmed?

“A big part of the command center applications is to titrate that information to not overwhelm,” Terry said. “A big part of the analytics is to separate the wheat from the chafe. We’re not telling you the status of every patient or your job but the few dominoes that

need to move for the system to function well. It's less is more, just the critical information. Everything we do should help the front line. Mission Control is all about what information is needed to trigger action now."

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