Learning from Leaning: Case cart readiness improves after barriers are removed

Bristol Hospital had a supply problem. Instruments were often missing from case carts, so nurses had to scramble to find the items on the morning of a scheduled procedure. Staff wondered whether the problem was caused by shortages, but a Lean process revealed an entirely different scenario and forged a pathway to improvement.

Getting started
The 93-year-old community hospital serves the town of Bristol, Connecticut. With 134 licensed beds, 8 operating rooms, an endoscopy suite, and an outpatient surgery room, the hospital has a volume of about 400 surgical cases each month.

In 2011 the hospital had launched a completely electronic medical records system that included inventory management. Around the same time, the executive leadership team identified Lean thinking and Lean processes as a strategic initiative. In 2013 they assembled 7 Lean teams, giving each a specific charge. All team members were expected to earn Lean Six Sigma Green Belts in the process.

The team tasked with addressing OR supply consisted of the OR director, the OR nurse manager, the central sterile supply (CSS) manager, a perioperative business manager, and others from outside the OR, including the information services manager, individuals from purchasing, and the chief financial officer.

“In perioperative services, we had a global charge to look at inventory management, including the dollar value of what’s on the shelf, how often it turns over in a year, and whether we had the right number of each item on our shelves,” says team leader Lynne Ramer, MSN, RN, CNOR, clinical operations director, perioperative services.

The team was under pressure because the hospital had just hired 2 new surgeons in September 2013. One was an orthopedic surgeon who could perform 6 to 8 procedures a day. The way Bristol’s supply cart system was working at the time, however, meant the staff couldn’t have handled the increase in productivity, says Diane Bouffard, MHA, BSN, RN, CPHQ, LSSBB, system director of quality improvement and holder of a Lean Six Sigma Black Belt certification.

“We knew we had to speed up processes for increased throughput,” she says. “If the supply wasn’t on the cart, we would have to delay a case while someone went to find, clean, and sterilize the equipment. So our challenge was, how do we make this more efficient so that every cart would be ready when the procedure was scheduled to start?”

Unlike larger hospitals, Bristol’s OR does not have a central core. Instrumentation and packs are kept in CSS, and soft supplies are stocked in multiple areas within the OR. As it turned out, that was a big part of the problem. But it wasn’t the only one.

Identifying the problems
After an extensive 2-week data collection and audit process, the team concluded that inventory wasn’t the issue. “We looked 360 degrees at our supplies, how they’re ordered, how they arrive, how they’re decremented and reordered, and how the pa-
tient is charged,” says Ramer, who has a Lean Six Sigma Green Belt.

They had on average an 84-day inventory supply on the shelf, with invoices paid every 90 days. “That meant we were using our inventory before we were paying for it. That’s a good thing. Our inventory was turning about 4 times a year. We were running a very tight ship,” Ramer says.

So why were 20 to 30 items missing from the carts each day? To find out, the team examined their process beginning with the booking of a surgical procedure and ending with the completion of the case cart.

For 2 weeks, they monitored every time a person touched a case cart and the number of minutes associated with each contact. They used several different Lean tools and techniques to map out what was happening, including process maps, Pareto charts, fishbone diagrams, and scatter diagrams.

“We had to do a lot of research to determine what part of our process was broken. We weren’t sure any of it was in the beginning,” Ramer says.

The discovery process took about 5 months and revealed several problem areas. Multiple people were picking instrumentation for the carts from both CSS and the OR, leading to errors. “We found that numerous people were involved, sometimes upwards of 5 to 7 people, and they weren’t always the same people,” Ramer notes.

Carts were being stocked from CSS 36 to 48 hours in advance of procedures, and instruments were often tied up on carts meant for the next day. Nurses would take instruments from those carts, so those items would be missing the next day, and the cycle would continue.

“People were stealing off each other’s carts,” Ramer says, adding that nurses were supposed to record these events but often didn’t. “Sometimes they got pulled away or their shift ended. The whole process was really flawed.”

According to Bouffard, “Historically, nursing staff members tend to be hoarders. As a nurse, you want to make sure you have all the supplies you need without having to chase after them.”

She points out that this type of problem is less likely to happen in a larger hospital where supplies are stored in the central core or in central sterile departments that are stocked with both soft and hard goods with centralized logging. In contrast, Bristol staff lacked control of the process.

The practice of stocking the case carts far in advance had originated to accommodate the schedule of a CSS employee who could only work from 3:00 am to 11:30 am. Because there wasn’t much else to do at that hour, she had been instructed to pick the instruments for the appropriate case carts 2 days in advance.

As so often happens, that practice became entrenched, as did the subsequent scrambling and stealing on the day of procedures. “People were stuck. You find that in every OR. They all have their quirks. We asked why in our drill down multiple times. Frequently, the answer was, ‘it’s because we’ve always done it that way,’” says Bouffard.

The Lean process also revealed that sterilization equipment did not meet the surgical case load demand, and certain surgeons wanted a wide variety of instruments kept handy even when they were unlikely to be used.

At baseline in September 2013, total case cart picking time ranged from 748 minutes to 1,573 minutes, with great variability from 1 day to the next.

**Changing processes**

Once the team identified the problems, they created a flow diagram or value stream map for how they wanted the cart preparation process to work, given that the physical supply room locations couldn’t be changed.

“Having a small central supply area on 1 floor and the soft goods area on another
floor doesn’t make it easy to move back and forth. In ‘Leaning’ it, we tried to make it as easy for nursing staff as possible, so they were doing less running around,” Bouffard says.

The team altered the schedules and responsibilities of both CSS and perioperative services staff. They designated 1 staff member in CSS to pick the instrumentation for the carts and 1 person in the OR to pick the soft goods. They also changed the timing so that carts were prepared within 24 hours of the procedure.

Here’s how they mapped out the workflow:
• Noon: OR prints the doctor’s preference card and CSS prints the pick list from the preference card.
• 1:00 pm: OR picks the soft goods.
• 2:00 pm: OR sends the soft goods to CSS on the sterile elevator.
• 7:00 pm: CSS picks equipment and instrumentation, and marries the cart items together.
• 8:00 pm: CSS brings the first 2 complete carts upstairs. The cart for the next morning’s first case goes to the OR, and the second cart goes to a nearby room. The rest of the day’s carts stay in CSS until the signal from the OR that the prior cases have been completed.

The morning of the procedure, the nurse verifies the case cart’s accuracy. If anything is missing, she calls CSS to have the item brought to the OR. If not, she wheels the cart into the OR and the case is started. “It became like an assembly line,” Bouffard says.

Measuring success
The team pilot tested the plan for 2 weeks. By the end, case cart accuracy had improved 10-fold, with the missing list dropping from 20 to 30 items to 0 to 2. If those remaining 1 or 2 missing items showed up repeatedly, they were considered to be in short supply and more of those items were ordered so that they disappeared from the list. By November 2013, total case cart picking time had dropped to a range of 543.5 to 1,013.9 minutes, with far less variability.

“It was a pretty dramatic change in the process, but what was most interesting was that physicians generally didn’t notice any change in the process. They always felt that their expectations were being met or exceeded,” Bouffard says.

The team also discovered that new sterilizing equipment would be needed to handle the increased case load of the 2 new surgeons. With the new data, they were able to convince management to purchase the needed items.

Some of the nurses were initially hesitant about changing their usual way of doing things. “But they found out how much time they were wasting running around looking for instruments. It ended up ultimately being this incredible win-win situation,” Ramer notes.

A couple of the surgeons also needed some coaxing to accept the new instrumentation flow, but eventually they came around.

Key to success from an OR manager perspective, Ramer says, is the ability to “think outside the box, challenge the norm, and to have crucial conversations about important topics.”

And Bouffard advises: “Walk your environment, observe what’s going on, and look for the waste. Use your data to make decisions and drive change in your organization.”

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