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Process improvement

Boston hospital sees big impact from smoothing elective schedule

When Boston Medical Center (BMC) accepted a $250,000 grant 2 years ago to address overcrowding in the emergency department (ED), it volunteered for a tough assignment—smoothing the elective surgical schedule.

Research has shown, surprisingly, that in hospitals with strained capacity, the elective surgical schedule actually is a bigger source of bottlenecks on patient units and ICUs than emergencies.

BMC has applied the research findings, and a year later the efforts are paying off.

In the process, one of BMC's surgical suites, which does its trauma cases, "blew up" most of its block schedule, replacing it with a dedicated room for urgent/emergent cases and mostly open scheduled time. The new schedule has dramatically reduced canceled cases. Not only have surgeons not rebelled, they're finding life is easier for them and their patients.

In making the changes, BMC has embraced the work of Eugene Litvak, PhD, of Boston University, who has studied the effect of variability in patient flow on hospital operations. Interest-ingly, a major source of what he terms "artificial" variability is elective surgery.

In a study published in 2003, Litvak and colleagues from Harvard Medical School found that during the hospital's busiest times, nearly 70% of the diversions from the ICU were associated with variability in the scheduled caseload—when elective surgery peaked, so did the number of patients diverted from the ICU.

Say, for example, the cardiac surgeons have block times on Wednesday and Thursday. When those patients come out of surgery, they go to the ICU. Soon those beds are full. There is no more room for patients who come in as emergencies, and the ED is placed on diversion. If the demand for ICU beds is high enough, some surgical patients may need to be held in the postanesthesia unit.

"When you have a peak in elective surgical demand, all of a sudden your resources are being consumed by those patients. You don't have enough beds to accommodate the medical demand," Litvak told *OR Manager* in an interview last year. (See November 2003 *OR Man-ager.*)

Smoothing the elective surgical schedule can avoid these peaks and valleys. Moreover, he has demonstrated that when the schedule is smoothed, surgeons can get more cases done. Nursing costs are reduced because there are fewer surges and less overtime. There also are likely to be fewer errors because clinicians are not as stressed.

Boston Medical Center is a hard test case for Dr Litvak's theories. As Boston's safety-net hospital, the 547-bed facility is New England's largest trauma center. Its ED treats nearly 120,000 patients a year, including many who have been shot or seriously injured in auto accidents.

A problem with lack of beds

BMC's surgical scheduling project started with vascular surgery. The hospital's patient flow manager, Janet Gorman, noted the surgical stepdown unit had a problem with a lack of beds, especially on Wednesday and Thursday. The unit cares for patients who are too sick to go directly to the floor and not sick enough to go to the intensive care unit. Patients coming to the unit from the OR were competing with patients coming from the surgical ICU.

Gorman noticed that the vascular service did cases in batches. They might do 4 cases one day and none the next. These were elective cases, not emergent ones, says John B. Chessare, MD, MPH, BMC's chief medical officer and senior vice president for medical affairs.

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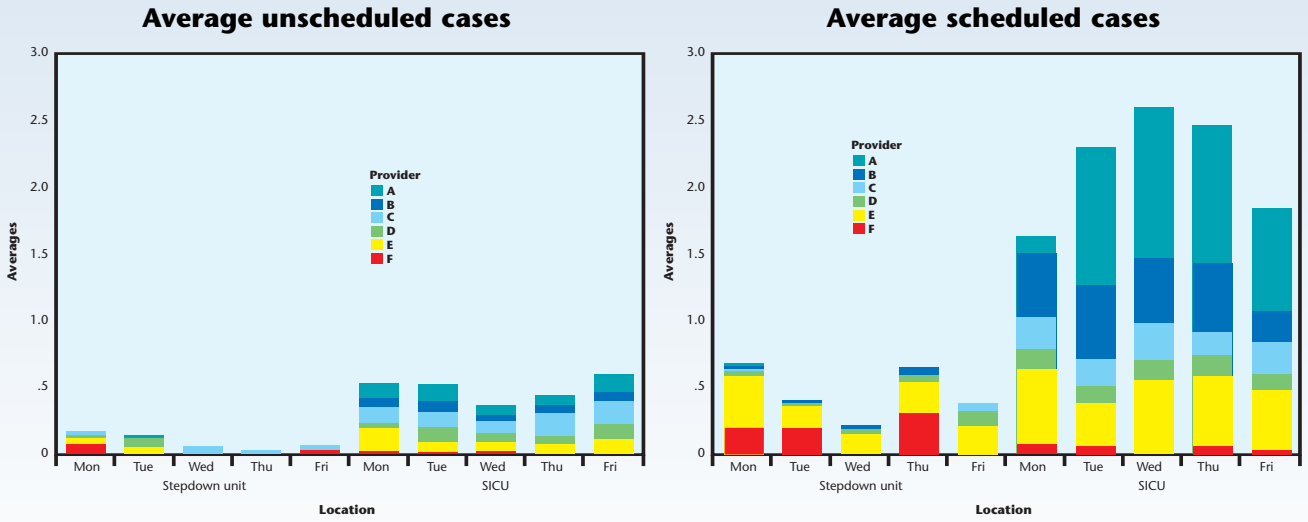
Cardiothoracic surgery cases on weekdays



Scheduled cardiothoracic surgery cases had unnecessary peaks during the week, which resulted in peaks in the stepdown unit and the surgical ICU. Because these beds are full, there can be backups in the ER. Source: Boston Medical Center. Reprinted with permission.

Dr Chessare and his team worked with the chief of vascular surgery, James Menzoian, MD, to cap the number of elective vascular surgery patients going to the stepdown unit at 2 per day. In exchange, they offered him more OR time on Monday and Friday and a guarantee his cases would never be bumped.

The result: A smoother flow of cases, and the surgeon has found it easier to get his cases done.

The stepdown unit's nursing hours per patient day decreased significantly by about 0.5 hours. "The reason is that during the peaks, the unit has to call in extra staff and pay overtime. And during the valleys, the staff has idle time," Dr Chessare explains. "So by getting rid of the stress, you can reduce costs significantly and get more cases on the schedule."

Next challenge—cardiac surgery

The next project was cardiac surgery, which had big peaks in the middle of the week. When the team met with the chief of cardiothoracic surgery, Richard J. Shemin, MD, his first reaction was that emergencies were the problem.

Dr Chessare says, "We ran a report that showed it isn't the emergent cases—the emergent cases are sent by God." Over the long run, there is equal probability that an emergency case will come on any day of the week. Instead, the scheduled cases were causing the peaks. (See illustrations.)

To smooth the schedule, the team asked one of the cardiac surgeons to change his clinic day from Friday to Wednesday and do his elective cases on Friday instead of Wednesday.

The 2 projects combined—smoothing the vascular and cardiac surgery schedules—reduced variability in the surgical stepdown unit by 55%. Nursing costs in that unit fell by an annualized amount of $130,000.

An urgent-emergent room

Building on their success, the team decided to tackle the schedule in the Merino

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Separating urgent from elective cases

Before	After
April-September 2003	**April-September 2004**
• 157 emergent cases (Mon-Fri, 7 am to 3:30 pm)	• 159 emergent cases (Mon-Fri, 7 am to 3:30 pm)
• **334** elective surgical procedures were delayed or canceled.	• **3** elective surgical procedures were delayed or canceled (1 canceled, 2 delayed)

Source: Boston Medical Center.

Pavilion where the trauma cases are done. The pavilion, which has 8 ORs and an annual volume of about 6,600 procedures, was plagued by a 20% cancellation rate and 15 to 20 add-ons a day. The schedule was tough on everyone, especially the elective surgery patients.

"Think of the woman who has been waiting 3 weeks for her elective GYN surgery," says Dr Chessare. "Her daughter has flown in from Denver. She has been NPO since midnight. At 10 am, someone walks into her room and says, 'We're sorry, but we have to cancel your case because we've had 3 bad car wrecks.'"

Litvak's research shows that isn't necessary. A hospital can separate its urgent/emergent flow from its elective admissions and have a more predictable schedule. This is accomplished by setting ORs aside each day for urgent/emergent cases.

The first step was to reach a consensus on a definition of urgent and emergent cases. Sometimes an "urgent" case was more for a surgeon's convenience than the patient's medical condition. The team agreed on the following definitions for when surgery must be done:

- Emergent: Within 30 minutes
- Urgent: 30 minutes to 4 hours
- Semi-urgent: 4 to 24 hours
- Nonurgent: >24 hours.

Cases in the first 3 categories would be done in the urgent-emergent room.

After tracking data for several months, the team found they had a choice to set aside 1 or 2 urgent-emergent rooms daily. With 1 room, they would occasionally have to bump an elective case. With 2 rooms, they would never have to cancel an elective case but would have a significant amount of idle time in the second OR. They decided to set aside 1 room.

Blowing up the schedule

When Dr Chessare and Litvak presented that plan, they got a surprising reaction from the pavilion's chiefs of surgery and anesthesia. They said, "As long as we are going to have to take a block away from someone, even though we know they'll be better off, why don't we just blow up block scheduling?" Dr Chessare recalls.

Dr Chessare and Litvak initially were skeptical that they could pull this off. But the chiefs convinced them this would be the right thing to do, saying, "You've taught us the goal is to do more cases and make it easier for the surgeons to get their cases done.

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We're sure if we have nonblock scheduling, those 2 things will happen. We can show them the numbers."

They also promised the surgeons that if they changed the schedule, and the results didn't pan out, they would go back to the old method.

The pavilion now has 1 room for urgent/emergency cases, 5 open rooms, and 2 rooms still blocked for orthopedics. The orthopedic rooms were left blocked because they are used at 100% capacity, and orthopedic surgeons manage their own bumping due to a lack of surgeons, not ORs.

Results have been dramatic: Delays and cancellations for elective cases fell 99.5% for the period of April through September 2004 compared to the same period in 2003, while the emergency volume stayed almost the same. For the 2004 period, only 3 elective cases were cancelled—compared with 334 elective cases in that period the year before.

"We've also saved the cost of human time, angst, overtime, and the effort to reschedule all of those delayed cases," Dr Chessare says.

Is the message that you are better off without block scheduling?

"You are better off with scientific management," he responds. "The problem with blocks is that when you cut up the time into small segments, you lose flexibility. When you leave the time open, you gain flexibility.

"If the goal is to get more cases done and to make it easier for surgeons to get their cases done, blocks actually make it somewhat harder."

On the other hand, if blocks are fully utilized, and cases aren't constantly being bumped, blocks may work fine, he says.

In practice, surgeons at BMC who maximize use of their block still have their cases scheduled in the same time frames as before, but they don't "own" a block.

"It's not in the hospital's interest either to have a surgeon do 1 case on Monday morning and 3 cases on Tuesday afternoon," he says.

But because surgeons don't "own" blocks, the hospital is free to schedule into that time if it is not used.

In addition to the improved scheduling, BMC has shaved its average wait time in the ED from 60 to 40 minutes and improved its ED throughput by 45 minutes. "When you multiply that 45 minutes times 120,000 patients, it's significant," he says.

Relief for the ER

The *Boston Globe,* in a front-page article this summer, said BMC "is becoming a model of how to bring relief to the nation's beleaguered emergency rooms."

Health care quality guru, Don Berwick, MD, head of the Institute for Healthcare Improvement, Boston, told the *Globe,* "I won't be surprised if 5 years from now, this is the biggest change in health care. We have to bring the science [of management] back into health care in a way we haven't for a very long time."

Dennis O'Leary, MD, president of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), said, "Anyone who comes to me and says, 'I can't do this,' I'm going to send to Boston Medical Center."

JCAHO is sending the message that patient flow issues need to be actively managed. The commission has adopted a standard for 2005 that will require hospitals to actively address flow problems that cause backups in the emergency room and other units. The standard requires leaders to assess patient flow issues, develop indicators, and plan how to modify processes that may be blocking the efficient flow of patients.

BMC's grant was from the Robert Wood Johnson Foundation's Urgent Matters project, a $4.6 million grant program intended to reduce emergency department overcrowding. BMC is the only hospital that used its grant money to address the elective surgical schedule as a patient flow issue. ❖

For more information about Boston Univer-sity's Variability Program, http://management.bu.edu/research/hcmrc/mvp/ index.asp

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