Crowded emergency rooms, ambulance diversions, and bed capacity issues in the nation’s hospitals have created a crisis that politicians, administrators, and patient advocacy groups are scrambling to address. Many are focusing on the emergency departments (EDs) or building new beds. In some cases, that is the right approach. But in many cases, they aren’t looking in the right place.

The operating room schedule is the first place to look. Although it seems counterintuitive, research shows that the elective surgery schedule is the source of the variability that leads to peaks and valleys in hospital census (sidebar, p 20). Emergency admissions to the hospital, although not scheduled, actually are more predictable than elective surgical admissions (Graph 1). The variability caused by the elective surgical schedule causes capacity constraints for inpatient beds and the ED because patients are not able to be assigned to beds. Variability also causes staffing shortages and equipment conflicts at peak times.

Peaks and valleys

Block schedules for elective surgery are usually the result of surgeon preference or requirement, history, convenience, and utilization. Rarely is a block schedule built on the patient’s ultimate destination or case type. Examination of the block schedule pattern will identify peaks and valleys in available elective block time. Thus, the OR schedule is a key driver to inpatient capacity—or lack thereof.

Most surgery departments have peak days in the surgery schedule, usually on Tuesday and Wednesday. This is primarily because surgeons who perform complex cases with longer lengths of stay want to perform them earlier in the week so patients can be discharged before the weekend when an on-call physician might have to assume their care. Also, ancillary services often aren’t available on weekends. As a result, inpatient bed capacity is filled early in the week, leaving fewer beds for urgent and emergent patients. This taxes the hospital’s resources and creates competition between the OR and the ED for inpatient beds. When inpatient beds are full, the ED becomes overcrowded, and patient safety is compromised.

Peak days also require more expert OR staff and equipment, which can lead to resource conflicts and excessive flash sterilization. The peaks may also result in longer turnover times, case delays, and cancellations. Patients may be held up in the postanesthesia care unit waiting for beds.

A hospital in this situation must make tough decisions. Patient, staff, and physician satisfaction plummets. The elective surgery schedule must be delayed or cancelled, and/or the emergency department must divert ambulances. In some communities that have only a few hospitals, as in our community, diversion may not be an option. Then the surgery schedule suffers because canceling elective cases is the only alternative for decompressing the bed crunch. Limiting or canceling cases may permanently damage referrals, managed care contracts, and the hospital’s financial viability. To avoid canceling or delaying cases, patients may be placed in the first available bed. Surgical patients may be placed on cardiology floors, orthopedic patients on pediatric units, and so forth. Placing patients on inappropriate units leads to extended stays and compromises safety.

What’s the solution?

The solution? Smooth the flow of elective admissions to the hospital. Although not easy, this is a long-term solution. One way to accomplish smoothing is to provide consistent block availability by surgical service throughout the week based on utilization. This requires accurate data for surgeon and surgical service utilization of the OR.
Data should include patient-in-room to patient-out-of-room time plus associated turnover time. Once the number of hours utilized in a given time frame is determined, the result can be divided to obtain the average number of hours needed every week; this is further divided equally for every day of the week. This smoothing provides a service or surgeon with consistent block time throughout the week. The advantage to the surgeon is more consistent placement of patients in the appropriate inpatient beds.

A project to smooth the flow

Learning about the research on variability led the physician and hospital leadership at St John’s Regional Health Center in Springfield, Mo, to embark 2 years ago...
on the difficult task of smoothing the flow of elective surgical admissions. Prior to the smoothing project, block time was allocated according to surgeons’ preference and utilization. As a result, variability in elective admissions was largely a result of a surgeon’s scheduling availability (Graph 2).

Fortunately, at St John’s, collaboration, leadership, and a willingness to improve through change are deeply cemented. Since 1995, blocks have been changed every 4 to 6 months based on block utilization, with 70% utilization required to maintain block time. Block scheduling rules apply to all surgeons regardless of their “rank” or seniority.

Surgeons participate in the governance of perioperative services through the Perioperative Services Guidance Team, co-chaired by the chair of the department of surgery (a surgeon) and the director of perioperative services. Five surgeons from resource-intensive, high-volume services; an anesthesiologist; perioperative managers; and materials management round out the committee, which meets twice a month at 6 am. Meeting attendance is 100% because it is well known that this group

Graph 3
August 1 block schedule

In August 2005, all of the sections were allocated block time evenly across the week.

Graph 4
Elective surgical admissions

After the block schedule was redistributed, the peaks and valleys of inpatient admissions were smoothed.
“gets things done.” This committee reports to the larger Surgical Executive Committee and, ultimately, to the hospital board. Without fail, every 4 months, the block schedules for both the hospital OR and surgery center are reviewed for utilization, adjusted, and approved for recommendation to the Surgical Executive Committee.

Creating an add-on room
Smoothing began with creation of an add-on room in 2002. An add-on room reduces variability by separating the predictable, scheduled cases from unpredictable, unscheduled cases to improve the flow of scheduled cases. The add-on room provides the flexibility to improve throughput and allow scheduled cases to proceed in a more predictable manner. No longer is bumping necessary to make room for unscheduled add-on cases.

The Perioperative Services Guidance Team began by clearly defining add-ons as:
• emergent (next room available, threat to life or limb)
• priority (requires a room within 2 hours)
• urgent (needs a room within 6 hours)
• to follow (needs to be done in the next 24 hours).

It is the surgeon’s responsibility to designate the patient’s acuity and prioritize the case to be placed on the add-on list, and the case will be done accordingly. The OR staff is no longer responsible for determining patient or case priorities.

If the case is not started within 30 minutes of the surgeon-defined time, the case becomes an emergency and receives the next room available. If a patient’s condition does not warrant surgery within 24 hours, the case should be scheduled into the next available block or open time.

An add-on room is not intended to be utilized more than 60% of the time available. If utilization is more than 60%, the room’s flexibility may be lost. Staff can be reassigned to ensure expert staff for the add-on case being performed. Cases that are not prioritized appropriately are taken to the Perioperative Services Guidance Team for review and disposition. (Results are in the sidebar.)

Smoothing the elective schedule
After the success of the add-on room, the next step was to smooth the flow of elective surgical admissions. Even after creation of the add-on room, peaks and valleys in the block schedule were still creating bed capacity issues as well as cancellations, delays, and ED diversion.

Because of their strong physician leadership, the orthopedic surgeons were approached in 2004 about smoothing the flow of their elective admissions by evening out their elective block time. The Perioperative Services Guidance Team agreed that orthopedics as a specialty would be provided with an additional 19 hours of block time in return for changing their schedules in the office and the hospital to smooth their elective OR time. The average weekly orthopedic surgical volume was calculated over the previous quarter and distributed evenly throughout the week.

The orthopedic surgeons then distributed this allotted time among themselves, working closely with the OR management team. The result was a block schedule that reduced resource conflicts for orthopedic staff and equipment in the OR. The new schedule also reduced the overflow of postoperative orthopedic patients to nonorthopedic floors by at least 12%, with 96% now placed in the appropriate bed.

The success in orthopedics fueled the further implementation of smoothing of the schedule across all services. In August 2005, all of the sections were allocated block time evenly across the week (Graph 3). They were asked to review their block utilization and distribute the time among their sections. Graph 4 shows the result—the peaks and valleys of inpatient admissions were smoothed; 27% fewer procedures were performed on the peak day of Tuesday, and the case volume was spread throughout the week.

Capping a service’s hours
The other method of smoothing the schedule is to cap the number of cases or hours of surgery a service is able to perform based on destination and bed availability, providing consistency in utilization throughout the week. An example of this
method, used by Boston Medical Center, was described in the December 2004 OR Manager.

St John’s is currently using this strategy to smooth the cardiothoracic elective admissions primarily to the ICU. In March, St John’s plans to allocate 12 hours of elective surgical block time to this group based on its historic utilization by week. The rest of the service’s 16 hours will be available for urgent, emergent, and inpatient cases, which now are frequently performed after hours.

A combination

A combination approach is also an option, providing flexibility and smoothing simultaneously. Flexibility and open time for add-on cases must be ensured and are critical for success with smoothing the schedule. Utilization of block time must be consistently evaluated and adjusted regularly based on utilization (at least every 6 months—quarterly is best). In addition, at least 10% to 15% of open unblocked time should be available daily to accommodate cases that are not scheduled. Having a defined block release policy for every service also ensures optimal utilization of available elective time.

Collaboration, trust crucial

Because surgeons must change operating days and office or clinic days to smooth the schedule, a high degree of physician and hospital collaboration and trust are crucial. These are a few keys to success based on our experience:

- Trials are encouraged to cement the collaborative relationship, address issues, and enable rapid-cycle improvements.
- The hospital administration must be fully aware and supportive of this initiative.
- Choosing the right physician champion is important.
- Providing the surgeons with incentives like more block time in exchange for participating in a trial of a particular option may allow for a smooth trial and transition. At St John’s, each time a section was asked to participate in a trial of a scheduling change, the service was given extra block time and the promise that if the trial was not successful, the previous schedule would be reinstated with no reduction in time.

This collaborative approach is the only method for implementing this strategy successfully. The gains in quality, patient safety, improved revenue, capacity, and throughput are tangible and irrefutable.

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Add-on room results

- Surgical case volume increased by 5.1% between 7:30 am and 1:30 pm.
- Overall volume has increased by at least 7% every year for the past 3 years with associated revenue growth.
- Need for operating rooms at 3 pm, 5 pm, 7 pm, and 11 pm decreased by 45%.
- Overtime overall was reduced to 2.9%.
- Trauma surgeon revenue increased by > 4.6%.
- Nursing floors are able to better predict staffing.
- Patient, physician, and staff satisfaction increased.
Research on smoothing patient flow

Eugene Litvak, PhD, of Boston University, has studied the effect of variability in patient flow on hospital operations. Interestingly, a major source of what he terms “artificial” variability is elective surgery.

In a study published in 2003, Litvak and colleagues 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.

For example, the cardiac surgeons have block times on Wednesdays and Thursdays. 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 emergency department 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 said in a 2003 interview with OR Manager.

Smoothing the elective surgical schedule can avoid these peaks and valleys. Moreover, Litvak 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.

References


Smoothing OR schedule can ease capacity crunches, researchers say. OR Manager. November 2003;19(11):1,9-10.

Hear Eugene Litvak, PhD, at a breakout session on smoothing patient flow at the Managing Today’s OR Suite conference Nov 8 to 10 in Orlando, Fla.