

Healthcare and traffic management

How ensuring patients move through your hospital in an efficient manner can increase staff satisfaction, patient safety, and even your bottom line, according to EUGENE LITVAK.

What's the link between the following two statements?

Hospitals are overcrowded and waiting times for both emergency and elective procedures are longer than we would like.

When allowed to choose, most surgeons prefer to carry out the majority of their procedures in the mornings.

At first glance, it appears that 'nothing' would be the correct answer. However, the truth is that the second is partly to blame for the first. Read on to find out why.

Eugene Litvak, President and CEO of the Institute for Healthcare Optimization, points out that the problems of overcrowding and long wait times in hospitals are not unique to the US. "One may speculate about why that happened – because of an increase in the demand from the baby boomers, for example – but the bottom line is that the demand now exceeds capacity in many countries," he says. "Here in the US, the situation is even deeper. Because of the healthcare bill, we are going to add another 30 million people to the demand."

The issue of simple overcrowding is compounded by the problem of uneven patient flow. Because patient demand at most hospitals fluctuates significantly from day to day, medical staff become stressed, which in turn is one of the main causes of medical errors and lapses in patient safety. "When we have a peak in patient demand, that doesn't just impact the throughput of waiting time. It also affects patient safety and nurse satisfaction. What happens when we have a peak? We don't have enough nurses, because no hospital staffs to the peak 24 hours a day every week. They staff somewhere below the peak, probably to the average level.

"When there is a peak, you don't have a sufficient number of nurses. We call in on-call nurses, travel nurses, etc., but they do not arrive immediately. It takes time, and during this time, patients are in danger. Nurses are also stressed because when we have a valley, we cannot save those nursing resources to use for tomorrow's peak, so they are gone. Day after day, they alternate different types of stress. One day you have a valley, you have stress; another day you have a peak, you have stress. That's how all hospitals work."



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There has traditionally been a strong belief that these peaks and valleys are patient driven, which leads to a sense of powerlessness. As Litvak puts it, “Even if we say it’s not good when the hospital has rest and then stress, what can we do if it’s patient driven and we don’t have resources to staff through the peak because we don’t have enough money?”

The bad/good news is that, according to Litvak, many of these peaks are not patient driven. “When I say that the demand exceeds capacity, I usually reformulate it. Demand currently exceeds capacity, given the way that capacity is being managed. To state it even more boldly, demand exceeds mismanaged capacity. That’s why patient flow is becoming extremely important – how to manage capacity to meet the demand.

“Another thing is that when you have those peaks, your emergency departments become overcrowded. In the UK, for example, there is a four-hour limit on waiting time in emergency departments. In the US, we don’t have this rule, and our waiting time could be 10 hours or more.

“Even in the UK where the limit is four hours, after that the patient should be put on the floor, but if there is no space, if there is a peak that day, the only solution then for the hospital administration would be to discharge patients to free up beds. Patients are then being discharged prematurely. This all has consequences on quality of care. Those peaks and valleys probably are the worst enemies today in healthcare.”

Litvak says there are only two ways of addressing this issue. The first is to go to the government and say, “Give us more money so we can staff through the peak.” This is not always a feasible solution, and especially with the current situation in the US.

The second solution is to challenge the nature of those peaks by drilling deeper and finding out how to get rid of them.

Practicalities

According to the IHO, achieving breakthrough levels of improvement in patient flow requires work in three areas: within-day variability, between-day variability, and lengthening the chain. Litvak explains lengthening the chain this way: “What does it mean when the patient is ready to be discharged, but there is no other facility? Suppose the patient needs some rehabilitation care, but there are no rehabilitation beds or rehabilitation facilities available. Patients then get rehabilitation care in the acute facility, when in fact they should be somewhere else. They would then needlessly occupy beds in their acute hospital, which prevents other people from entering. That’s why it’s important to make sure that the patients who are ready to be discharged are being discharged; that we don’t give them longer than we should.

“In terms of variability, there are several types. There is seasonal variability: the demand, for example, when people have flu clearly is greater in the winter than in the summer, so there is variability between different seasons. This variability is not dangerous; it is relatively easy to adjust to because in the winter we anticipate these cases, so we make sure that we provide sufficient resources.”

The second type of variability is variability between days – the peaks and valleys. In order to discover the root cause of this variability, Litvak says it’s important to look at why elective procedures are scheduled the way they are.

“If we schedule elective admissions, what would prevent us from scheduling them evenly? If the average number of surgeries that the hospital performs is 50 surgeries a day, what would prevent us from scheduling somewhere between 47 and 53 surgeries? Nothing, and yet at a hospital with that average, one day we may have 20 surgeries, and another day 75.

“That’s what puts hospital under stress, and this variability is much greater than the variability caused by the person who broke her leg and came to the emergency room. It is literally easier for us to predict when somebody will their break leg and come to the emergency room than when elective scheduled surgery will take place.”

This seems counterintuitive, but Litvak explains that the cause is historical. “Until relatively recently, hospitals have been cost-plus reimbursed. If I have as much money as I want, I will not look at what is on the sale in the supermarket.” “I will just buy whatever looks good to me. Hospitals used to have excess capacity, so when we had those peaks, we didn’t feel anything, because we had plenty of open beds. Not anymore. So now all of a sudden we feel these peaks and valleys.

“Let me give an example: If you look at someone who is buying a car for a teenage son or a daughter, what kind of car would these parents be looking for? Short of the cost – everybody wants cheap – what would be the most important parameters for such parents? Probably making sure that the car is safe: That the car has a big bumper, that the car looks like a tank. Why? Because they know that this car is going to be subjected to frequent stresses.

“What has happened to our financial bumper in healthcare? We used to have a tank and a very thick bumper on our healthcare car, but now our financial bumper is getting thinner and thinner. We’ve started feeling more and more of those stresses. That’s why it is more important today than yesterday, and as long as our healthcare cost is being controlled, we will feel more and more of those peaks.”

Scheduling

There’s also the question of variability during the day. Most US hospitals discharge more patients in the afternoons. As Litvak points out, if a patient’s disease is driven by their healthcare status – if their stay at the hospital is driven by their condition – why would they suddenly become healthier in the afternoons?

“As much as we have to reduce peaks and valleys in our admission, we have to reduce peaks and valleys in our discharging,” Litvak says. “What happens is that most surgeons, when asked to choose the times of their surgeries, will choose morning hours. Their minds are fresh, they feel good, and they want to finish the job as soon as possible and go and do something else. So what you see frequently is that in the morning, especially on

Monday and Tuesday, there is a peak in patient surgeries. In the afternoon, you have a valley. When you have a peak in patient admissions in the morning and the patients are still not being discharged, you immediately have a peak in bed occupancy, then it drops in the afternoon.

“First of all, we should understand that discharging patients comes second after admissions. Artificial variability in patient admissions – the peaks and valleys that are being created by us – must be eliminated. We simply cannot afford them any more.

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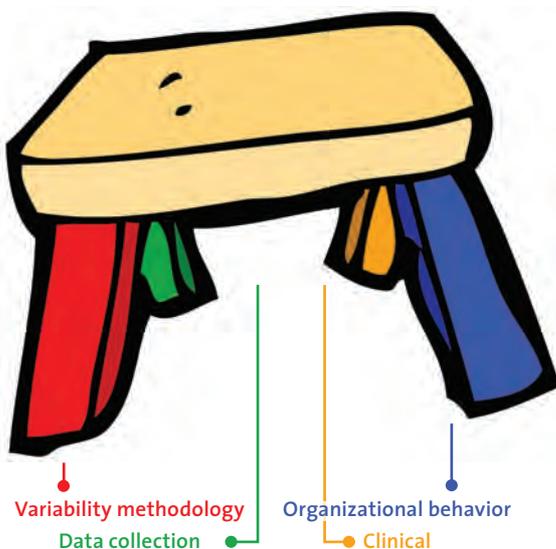
“We are no longer cost-plus reimbursed. We shouldn’t have nurses under stress, or have somebody’s emergency surgery delayed because everything is scheduled based on individual people’s convenience. It’s no longer just about money; it’s about patient mortality and patient safety.”

Litvak explains that while hospitals have their internal teams to help patients when the patient deteriorates, patients often deteriorate because they are put in the wrong beds. “Why are they put in the wrong beds? Suppose we have an average surgical case volume at a particular hospital of about 50, and suppose that today they have 80. It means that 30 more beds will be taken away from patients that are coming for example from emergency rooms. Nurses, instead of taking care of 50 patients, would be taking care of 80 patients. Clearly that would diminish quality of care and patient safety.”

To counter this, when Litvak and his team are advising a hospital, they recommend the following:

if the average is 50 surgeries a day, that hospital should never do more than 55. “That should be more than sufficient for them to get all their patients through because that’s based on their average. We would not allow them to have 60 surgeries a day, and certainly not 70 or 80. I know hospitals where the increase in those peaks could be 50 percent above the average as well as 50 percent below, so the difference in elective scheduled hospital admissions between two neighboring days could be 100 percent. The hospitals cannot tolerate it any more.”

The ‘four-legged stool’ of patient flow



Progress

Litvak and the IHO are working with several hospitals to improve this crucial aspect of patient flow, including the well-known Cincinnati Children’s Hospital. To explain the changes made there, Litvak uses the following analogy: “Suppose you have a road between point A and point B and you want to send as many cars between them as possible. You could send your cars in uneven clusters, such as 10 cars then 70 then 0 then 50 then 100; or you could send your cars in a steady flow. Under which scenario will you send more cars?”

The correct answer is that using the steady flow allows you to send more cars. The peaks fill up the valleys, and overall throughput increases. In a hospital scenario, this allows more patients to be processed in the same amount of time.

Over the past seven years, Litvak has worked with Cincinnati Children’s to streamline patient flow between the emergency department and post-surgical recovery areas. The changes made have allowed hospital physicians to look after more patients in less time more efficiently and with fewer logistical issues.

According to the hospital administration, improvements in efficiency have given it a boost in capacity equivalent to a \$100-million, 100-bed expansion, and have raised its



income by an even greater amount. While medical staff at the hospital were initially wary, they have come to appreciate the new system. It has also made doctors and nurses happy, because schedules became more predictable. And hospital officials say the changes have also made their hospital safer by reducing the times when nurses and doctors are under extreme stress.

“They were planning to build additional beds to deal with the peaks,” Litvak says. “Once they figured out that they could keep the number of beds they have, their avoided capital cost was \$100 million. I am not aware of any project in healthcare, in any country, that an individual hospital would get this return on investment.”

Another hospital, Boston Medical Center, significantly increased its throughput thanks to the IHO’s intervention. Compared to the previous year, the number of ambulances diverted to other hospitals fell by 12 percent. Take it back four years, and the difference is even more astounding – diversions were down by 40 percent.

“They used to have 700 cancelled or postponed surgeries a year,” Litvak continues. “After implementing our concepts, their number of surgical postponements or cancellations in the last three years was 16. That’s more than 100 times less.

“Once we discovered the cause, we started working on how to change it. Our methodology includes the following factors. First, operations management model-

ing; we do very deep and rigorous analysis. An equally important component is data collection and cleaning. Hospitals have never been concerned about their capacity and scheduling, so many of the data we need for the analysis are simply not being collected.

“When we start with a hospital, we ask them to collect the data and then we help them to clean the data and put them on the right track, because the variability methodology, is 99 percent, 100 percent data driven. If you don’t have reliable data from individual hospitals, there is no way we can provide a reliable solution.”

Litvak believes this situation will improve with the introduction of radio frequency (RFID) technology, which should provide a dramatic improvement in the ability to obtain accurate data, and avoid the need for extensive data cleaning.

Education

There is another component in the effort to improve the efficiency of patient flow: education and organizational behavior. “I’ve never come to a hospital and had the surgeons cry on our shoulders and say, ‘Oh, we were waiting for you,’” Litvak laughs. “That’s not the case. The case is for them is to push back. Then what we do, once we have data, is to start educating them about the concept and explaining that they’re going to do more surgeries, not less. Then we tell them another benefit for surgeons: they are going to go home not at 11 p.m., but at 5 p.m., and yet still do more surgeries. Their overtime is reduced significantly. That’s a very, very big attraction.”

To make the transition easier, Litvak shows them results from other hospitals his team is working with. Once they have implemented phase one of their plan at a hospital, they send a questionnaire to surgeons. Then when the team goes into a new hospital, they show the surgeons there how their colleagues at the other hospital felt. “Second, we show them their own data,” Litvak says, “and explain to the individual surgical subspecialties how they’re going to benefit from that in terms of the number of cases and reduced overtime.



“There is another parameter for surgeons that they’re very sensitive to – they call it turnover, the time needed to clean the room between two cases. If you’re a surgeon, for you it’s a waste of time, because you don’t do anything, you just sit and wait. Surgeons want to reduce this time. If you come to any surgical department and ask them, ‘Give me one thing that you want to change,’ they will tell you turnover, and it doesn’t matter whether turnover is good or bad. They want to reduce it anyway. For them the ideal scenario would be zero.

“What happens today in terms of turnover? Suppose that you convince nurses that they should work harder and do it faster, and they do it. During the day they have, let’s say, four or five surgeries and instead of having a turnover of let’s say 40 minutes they make it 20 minutes. So these four or five cases, 20 minutes reduction in turnover each – you will get 100 minutes out of it.

“What would the consequence of that be? If they work hard and save this 100 minutes, they would be rewarded with another case. ‘Oh, you finished early? Good. We can do another project.’ That’s exactly how it works today.”

What Litvak does instead is guarantee that everybody – surgeons, nurses, anesthesiologists – will leave the hospital at a certain time every day, usually at 4 p.m. or 5 p.m. This provides a better incentive for the nurses – they work faster because they know that once they’re done, they can leave.

Variability methodology and operations management; data collection and verification; organizational behavior; clinical – Litvak calls these elements of improved patient flow the ‘four-legged stool’. If you ignore or take away one leg, the whole stool will fall.

Organizational behavior means explaining to people how they personally would benefit. “If I come to a surgeon and say, ‘Your hospital will benefit on your back,’ they would not be happy with that,” Litvak rightly says. “We explain to the doctors how they benefit, to the nurses how they benefit, to the anesthesiologists how they benefit.

“Finally the fourth leg of this stool after organizational behavior is the clinical part. We show that we significantly reduce waiting time for emergency and urgent surgeries.

“Another part of the clinical leg is this: Surgeons, when they have a broken schedule, it’s not because they’re mean-spirited people. They are very devoted people. They

just have a lot of other responsibilities: office hours, clinics, etc. They do the surgeries, they do their best to save patients, and then the patient is being placed in the wrong bed because the right bed is being occupied because they had a peak today in admissions, so they get inadequate healthcare.

“This inadequate nursing care affects the outcomes. So how should surgeons feel about putting their whole energy and passion into the surgery if after that somebody is going to diminish it? They feel very, very bad. I know surgeons who will stay at the hospital overnight if they know that their patients are put in the wrong bed. That’s a big stress. That’s why we tell them that as a result of our methods, their patients will be in the right beds.”

Litvak says he is convinced that with the current state of the US hospital system, there is absolutely no choice but to optimize patient flow in this way. When asked about timescale, he is less definite. “We are working with different organizations on how to develop a plan that would make this available as widely as possible. We have to bring in education. We cannot roll it out to hospitals one by one, that would take too long. What we’re doing now is exploring group collaborative training of several hospitals.”

Despite facing such a daunting task, Litvak is upbeat. He says it’s exciting that hospitals are finally listening. “Our demand already exceeds our capacity; that’s why we started changing the model. What is interesting that although we were less sophisticated in our work years ago, our message was the same, and yet at that point nobody listened. The situation has changed now. Hospitals are already under stress and they understand that stress levels will only increase with the new healthcare bill. So they are much, much more amenable. It’s like a different world.

“It reminds me of what Mark Twain said about how when he was 14, his father was stupid, but when he got to be 21, he was surprised at how much his father had learned. Now all of a sudden, in healthcare, the father has become smarter.” ■