VII. BOSTON MEDICAL CENTER (Case study)

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Summary: *In 2003, Boston Medical Center, home to New England's largest and busiest Level I trauma center, received an Urgent Matters grant from the Robert Wood Johnson Foundation to address the pressing issues of emergency department (ED) overcrowding and ambulance diversion. In collaboration with Eugene Litvak, Ph.D., professor of health care and operations management and Director of the Program for Management of Variability in Health Care Delivery (MVP) at Boston University Health Policy Institute, and MVP faculty, the Medical Center applied operations management tools and techniques to successfully smooth patient flow in the hospital.*

Issue:

Recent years have seen an increased focus on the use of engineering tools—namely, operations management and variability methodology—as an effective solution for the problems facing many hospitals. By using these tools, hospitals can address patient flow issues; widely recognized as causes of decreased quality of care and increased risks to patient safety.[1] Variability in patient demand is the basic cause of patient flow issues. Most hospitals are aware of their average patient demand; however, the real-time variability in patient demand that they experience is not accurately reflected in their average demand figures. Most hospitals staff to their average demand. As a result, resources are wasted when demand is lower than the average. Alternatively, they face severe stress when demand exceeds the average—quality of care is diminished and staff satisfaction decreases.

A major consequence of above average demand is the particularly negative impact on the ED. When an intensive care unit (ICU) or a medical-surgical floor is caring for more patients than it should, back-ups funnel to the ED.[1] Patients face longer wait times, they are often "boarded" in hallways as they wait for an inpatient bed to become available, more patients leave without being seen and, in severe situations, hospitals must go on diversion status, turning away ambulances from bringing patients to the hospital. The results of ED crowding lead to lower quality of care as well as decreased numbers of patients getting into the hospital; if fewer patients are able to get through the hospital, revenues decrease.

The Institute of Medicine (IOM) published a report in June 2006, calling hospitals to use operations management tools hospital-wide to address patient flow issues that lead to ED crowding. This report states, "Crowding in emergency departments creates serious risks to the quality, safety and timeliness of emergency care. While many of the factors contributing to ED crowding are outside the immediate control, many are the result of operational inefficiencies in the management of hospital patient flow."[2] The IOM report recognizes that every hospital is a system, and within the system every component is interdependent on the others. Thus, the ED crowding must be addressed by adopting strategies that improve patient flow in all areas of the hospital. According to the report: "By smoothing the inherent peaks and valleys of patient flow, and eliminating the artificial variabilities that unnecessarily impair patient flow, hospitals can improve patient safety and quality while simultaneously reducing hospital waste and cost."[2]

Objective and Intervention:

The issue of ED overcrowding has been particularly pressing in Massachusetts, where one-third of EDs have closed since 1981 and hospitals routinely divert ambulances to other medical centers because they cannot handle more patients. In fact, the state's hospitals set a record for ambulance diversions during a flu outbreak in December 2003.[3]

Boston Medical Center in Boston, Mass., was no exception to this trend. In 2003 Boston Medical Center was experiencing the problems of emergency department (ED) overcrowding, ambulance diversion and high rates of patients leaving without being seen (LWBS). According to a statement from John Olshaker, MD, Chief of Emergency Medicine at Boston Medical Center:

> "Emergency departments [in Massachusetts], as in everywhere, have gotten more and more crowded, increasing volumes of patients at the same time that in the state and throughout the country the number of hospital beds has gone down and the number of hospitals has gone down. So we clearly here, like everywhere, are seeing these increased volumes and it is a challenge to take care of everybody expeditiously and safely."[1]

In an effort to address these problems, Boston Medical Center initiated a comprehensive project to identify and address hospital operations inefficiencies that inhibited effective patient flow through the hospital.

Organization and Leadership:

Boston Medical Center is a 547-bed facility, serving as the primary teaching affiliate for Boston University's School of Medicine. The Medical Center is the largest and busiest 24-hour Level I trauma center in New England, and is the city's safety net hospital. In 2003, the hospital's ED was staffed by 26 full-time physicians and treated over 120,000 patients annually.[2] Approximately 50 percent of its patients are either uninsured or have Medicaid, and four out of 10 ED arrivals have no primary care physician.[4]

Boston Medical Center has two operating suites: the Newton Pavilion Operating Room (OR) and the Menino Pavilion OR. The two pavilions offer some overlapping and some unique services but have distinct characteristics; the Newton Pavilion OR has a higher proportion of scheduled versus unscheduled cases than the Menino Pavilion because the Newton Pavilion does not perform trauma surgeries.

John Chessare, MD, Chief Medical Officer at Boston Medical Center, led the hospital's implementation process. "Before embarking on the project, Boston Medical Center CEO Elaine Ullian, established a project stakeholders group which included, among others, hospital leadership, the chiefs of surgery and anesthesiology, and key nursing staff."[2] The key advisor to the project was Eugene Litvak, Ph.D., professor of health care and operations management, and Director of the Program for Management of Variability in Health Care Delivery (MVP) at Boston University Health Policy Institute.

Dates of Implementation: The Urgent Matters grant funded a formal project from May 2003 to May 2004**.** However, the initiatives developed during the project are still ongoing at Boston Medical Center.

Process:

In 2002, John Chessare heard during an Institute for Healthcare Improvement (IHI) presentation that a faculty member at Boston University had tools to improve one of the key issues on the horizon for the health care system, patient flow. The concept of patient flow improvement resonated with Chessare, who was grappling with serious problems at Boston Medical Center's ED. According to Chessare:

> The pressure was on us to figure out how to better use the capacity that we had, and Boston Medical Center started seeing this as a problem with emergency department overcrowding and ambulance diversion. Why emergency department overcrowding? Because first of all, a lot of sick people come in through the emergency department. and also, when people are sick enough to need an inpatient bed, but there isn't one, the emergency department is frequently the only place that is set up to accommodate the patient waiting for an inpatient bed…Our emergency department was of considerable size when it was built, but it was not built to handle an ever-increasing number of patients waiting for inpatient beds.[1]

He first approached Litvak after learning that Litvak worked at Boston University. "When I learned…that the recognized guru of hospital flow, Dr. Eugene Litvak, was on the faculty at my own university, I nearly fell out of my seat," said Chessare. After speaking with Litvak, Chessare successfully pursued a $250,000

Urgent Matters demonstration grant through the Robert Wood Johnson Foundation to bring MVP on board as consultants to examine and improve patient flow throughout the hospital.[4]

Litvak and the MVP faculty members were enthusiastic to work with Boston Medical Center, but Litvak's initial outlook was not entirely optimistic. He openly expressed concerns that Boston Medical Center would shy away from implementing his recommendations; based on his experience with other hospitals he feared that once Chessare and his colleagues faced resistance from physicians and others at the hospital, they would give up, finding it too politically difficult to implement the necessary changes. Despite his initial pessimism, the MVP readily embarked on the project.

As a first step, three issue-based teams were established:

1. A Surgical Smoothing Team
2. An Inpatient Flow Team
3. An ED Team

Each of these teams would address specific patient flow issues, recognizing that all systems within the hospital are interdependent and that by focusing on all three of these areas, the hospital would be able to best improve patient flow throughout the hospital system. These teams were overseen by a Leadership Team composed of hospital leadership members, the chiefs of surgery and anesthesiology, and key nursing staff.

The MVP collected and analyzed extensive hospital data on hospital-wide and unit-specific admissions, discharges, and census, as well as data on urgent and

elective surgical cases, surgical minutes, and countless other metrics that allowed them to analyze demand and identify ways to improve patient flow. They found that at Boston Medical Center, similar to every other hospital they have examined, on any given day, the flow of patients coming into the ED is more predictable than the elective surgery schedule. Whereas ED demand is random, elective surgery schedules are not; they are typically designed to maximize surgeons' convenience. The artificial variability created by the elective surgical schedule places stress on the system, causing problems in the OR as well as in inpatient units and the ED; this stress can be minimized by altering or "smoothing" the elective surgical schedule and by taking other actions to improve patient flow throughout the hospital.[5, 6, 7]

SURGICAL SMOOTHING

MVP's data analysis and recommendations served as the launching point for the initiatives undertaken around surgical smoothing. The Surgical Smoothing Team examined and addressed the Newton Pavilion OR and the Menino Pavilion OR separately, since the pavilions are physically separate and have different characteristics. The table below illustrates the key differences between the two ORs before the project's inception.[8]

	Newton Pavilion	Menino Pavilion
Number of ORs	12	8
Cases Per Day	30-35	25-32
Cases Per Year	8601	6608
Weekend Cases	0-4	2-20
Cancellation Rate	10%	20%

Add-Ons Per Day	1-2	5-10
Unique Services	Cardiac, Ophthalmology	Pediatrics, Trauma, Gastric Bypass, OB

Newton Pavilion—Smoothing Vascular and Cardiac Surgery

Chessare and the Surgical Smoothing Team began with the Newton Pavilion by examining vascular and cardiac surgery; he first worked with his colleagues and with MVP to identify the constraints. Prior to the project's initiation, Boston Medical Center's vascular surgery staff performed, on average, three to five elective surgeries per week that required care in the surgical step-down unit directly from the operating room. MVP's data analysis revealed that the bulk of the scheduled surgeries were performed on Tuesdays, Wednesdays, and Thursdays, with Thursdays as the heaviest days and very few cases performed on Mondays and Fridays. According to MVP, this is a common pattern; surgeons often prefer to reserve Mondays and Fridays for office hours and other responsibilities, and cluster their surgeries into the middle days of the week. Cardiothoracic surgery patterns were very similar; most scheduled procedures were performed on Tuesdays, Wednesdays, and Thursdays, with Wednesdays as the heaviest days.

As a result of the clustering of scheduled surgeries, it was very difficult to accommodate unscheduled cases on the busy operating room (OR) days. In addition, these peaks in surgeries created downstream peaks in the destination units for these patients, which in turn have an eventual impact on availability of inpatient beds for ED patients awaiting admission.

To begin assessing the downstream impact, Chessare and Litvak approached a key member of the Surgical Smoothing Team, Janet Gorman, RN, then a tenured Nurse Manager for Unit 6West; a 27-bed unit with 10 step-down beds used for vascular and cardiac surgery patients. They asked Janet where the critical constraints were, and she replied without hesitation "in the [step down unit] on Wednesdays and Thursdays due to the competition between vascular cases from the operating room (OR) and cardiothoracic surgery cases coming from the surgical intensive care unit (SICU)." Her perception of the constraint was supported by data MVP collected, illustrating peaks in bed need for vascular and cardiothoracic surgery patients beginning on Tuesdays, and worsening on Wednesdays and Thursdays.

According to Gorman, the peaks in demand from the two groups of surgery patients were so regular and predictable that she was able to build in overtime in her staffing plan to accommodate the peaks. She consistently used overtime staff on Tuesdays, Wednesdays, and Thursdays, and as a result she significantly exceeded her staffing budget each month. Although she and her staff had undertaken efforts to cope with the peaks in demand, at times there were simply not enough beds for the patients coming to 6West. On particularly heavy days, elective surgical patients were either cancelled or they had to stay overnight in the recovery room, which was not ideal from a quality of care perspective. The mid-week influx of surgical patients to the unit was a stark contrast to Mondays and Fridays, when they would often only receive one patient from surgery, and have several step-down beds empty.

In order to address the vascular surgery issues, MVP simulated various scenarios based on the number of vascular surgery cases per day, week and year. The team settled on a recommendation to limit vascular surgery to sending two patients per

day to the step-down beds. MVP also recommended moving one cardiac surgeon's procedures from Wednesdays to Fridays to smooth cardiac surgical volume.

Implementation

In the implementation phase, Chessare and Anesthesia Chief Dr. Keith Lewis first approached Jim Menzoian, MD, Chief of Vascular Surgery, and asked him to spread out complex surgeries throughout the week so that vascular surgeons did not unwittingly delay ED patient surgeries and admissions on Wednesdays and Thursdays, and so that 6West could adequately accommodate all of the patients coming to the unit. The surgeons would need to rework their schedules in order to ensure that they were sending no more than two patients per day to the step-down beds in 6West. In exchange, they offered him more OR time on Monday and Friday and a guarantee his cases would never be bumped. The reaction to his request was not initially positive. According to Menzoian, "I have to admit I didn't like the idea in the beginning, because, you know, we're doctors and we don't like people telling us what to do."[3] But Menzoian told Chessare that "we want to be team players," so the surgeons changed their schedule.

To implement changes in cardiac surgery, Chessare approached Richard Shemin, MD, whose first reaction on seeing the mid-week peaks in cardiac surgery was that emergencies were causing the problem. However, according to Chessare, he was able to demonstrate to Shemin that this was not the case: "We ran a report that showed it isn't the emergent cases—the emergent cases are sent by God." Instead, it was the elective cases that were causing the peaks.[9] To smooth the schedule, Chessare asked one of the cardiac surgeons to change his clinic day from Friday to Wednesday and to move his Wednesday elective cases to Fridays.[9]

For both the cardiac and vascular surgery changes, Chessare assured the surgeons that they would closely examine the data after making the changes and, if the changes did not have a positive impact, they would revert back to the previous system of elective surgical scheduling. Chessare was confident that the changes would be effective, because as he stated, "What we were doing with [Litvak] was based on science, so to say that it wouldn't work would be like saying gravity wouldn't work." Chessare felt it was not risky because the process was so logical, methodical, and reliant on data; however, he wanted to assuage the physicians concerns by reminding them that the changes were experimental and their impact would be assessed.

The changes were very successful; Menzoian later admitted that the program works with little inconvenience to the five surgeons in his section and with fewer complaints about delays from patients who come to him through the ED."[3]

Menino Pavilion—"Blowing up" Block Scheduling

After their success with vascular and cardiac surgery, Chessare and the Surgical Smoothing team examined the Menino Pavilion OR. The OR had a cancellation rate of 20%. Canceling an elective surgical procedure means that, for example, a patient who had scheduled an elective gynecological (GYN) procedure weeks in advance, had made arrangements for a family member to come into town to help her after the surgery, and had emotionally prepared herself for the surgery, was told on the day of surgery, when she was already in the hospital, that her surgery was cancelled because of a bad car accident.[9] This was happening in one of every five elective cases at the Menino Pavilion.

MVP claimed that this high cancellation rate was not necessary. Based on Litvak E, Long MC. "Cost and Quality Under Managed Care: Irreconcilable Differences?" (2000), he recommended separating the urgent/emergent flow from elective cases in order to better accommodate and minimize wait time for urgent/emergent cases and to minimize delays and cancellations of elective cases. However, in order to effectively separate urgent/emergent cases from elective cases, there must first be agreed-upon, clinically driven definitions of urgent/emergent cases. In many hospitals, surgeons label cases "urgent" for their convenience rather than based on patients' condition. With MVP'S guidance, the team settled on the following classifications:

- Emergent—30 minutes
- Urgent—30 minutes to 4 hours
- Semi-urgent—4 hours to 24 hours
- Non-Urgent—greater than 24 hours

MVP recommended that cases in the first three categories be performed in a dedicated urgent/emergent room. The goal of this recommendation is to prevent the need for bumping elective cases when an unscheduled case needs to be performed. However, it was initially unclear how many dedicated rooms the Menino Pavilion would need, since there was not historical data on the four-tiered classification system of urgent/emergent cases. After using the new classification system for several months, MVP analyzed the data and presented the team with two data-driven scenarios for accommodating the urgent/emergent cases.

The team had the option of setting 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 they would have a significant amount of idle time in the second OR. Ultimately the team decided to set aside 1 room in order to maximize the total number of cases performed in the Menino Pavilion. The other 7 rooms were slated to continue to be reserved for scheduled cases.[9]

Implementation

When Litvak presented MVP's recommendations to Chessare and the Surgical Smoothing Team, he was surprised by their reaction. After deciding to dedicate one room to urgent/emergent cases, surgery leadership—led by Keith Lewis, MD, Chief of Anesthesia, and Jim Becker, MD, Chief of Surgery—actually wanted to make changes that were far more radical than those Litvak recommended. Lewis broached the idea of eliminating block scheduling altogether, moving to an open scheduling system in the ORs that would be used for scheduled cases. He said, "As long as we are going to have to take a block away from someone [to accommodate the urgent/emergent cases], even though we know they'll be better off, why don't we just blow up block scheduling?"[9] They proposed an open scheduling system where all surgeons would schedule their cases on a first-come, first-served basis.

Both Chessare and Litvak were initially very hesitant about this idea due to the potential for political resistance, although scientifically, the idea was well-founded. Surgery leadership promised them that they would be able to generate physician support for the idea, and assured them that they would revert to block scheduling if the changes were not effective.

Prior to implementing the changes, Chessare, Lewis, and Becker held a meeting centered around a data-driven presentation on the proposed changes. In addition to Menino Pavilion surgeons, attendees included OR leadership and key members of hospital administration. The meeting was very tense, but did not result in wholesale physician revolt that some might have expected; Lewis notes that they were fortunate their surgeons were open-minded. While a small number of surgeons adamantly opposed the idea of blowing up block scheduling, most reserved judgment and maintained what Chessare terms a "healthy skepticism" towards the idea. Concerns expressed by the surgeons included a basic hesitation to change their existing practices, fear that they would lose their preferred times, concerns that they would have cases scheduled "all over the place" as opposed to sequentially, and fears that they would have reduced OR access and therefore reduced income. Nonetheless, the surgeons agreed to experimentally try the new system and assess its impact.

Of the 8 ORs in the Menino Pavilion, the new system was implemented in 5 rooms; 1 room was dedicated to urgent/emergent cases and 2 rooms remained dedicated to orthopedic surgery. The 2 orthopedic rooms were used at 100% capacity, and the orthopedic surgeons continued to use block scheduling and to manage the schedules in these two rooms. Orthopedics was treated differently because the constraint on getting orthopedics cases done was a deficit in the number of surgeons and not in room availability. Dedicated schedulers would be trained and dedicated to the 5 open rooms in order to ensure efficient scheduling.

The first month without block scheduling was "hideous," according to Lewis, mainly because of surgeons' initial concerns with the new system; some surgeons

were very vocal in their complaints. Lewis urged the surgeons to be patient with the new system before making a final judgment on it. To monitor the impact of the changes, the team reviewed all cases on a daily basis and met weekly.

Despite the initial difficulties, the Surgical Smoothing Team and the Menino Pavilion surgeons soon found that open scheduling offers many advantages. It gives surgeons and schedulers more flexibility in scheduling, allows for equal access to all surgeons, and promotes booking in advance to secure preferred time slots. In many cases, the surgeons still perform surgeries in the time slots that they previously used; however, they no longer "own" that time and if they do not schedule cases in those slots, other surgeons can use that time. This system minimizes the impact of vacation time and meetings, and increases overall surgical utilization.

Dedicating an open room to urgent/emergent cases contributed to the increase in overall surgical utilization; elective cases were no longer being cancelled due to cases coming from the ED. In order to make the idea of having a dedicated room "stick," Lewis notes that continuing to review all cases performed in the room is important to ensure that all cases are clinically urgent. Boston Medical Center has a focused, engaged charge nurse who monitors cases performed in the room and ensures that no exceptions are made to the rules. In addition, they continue to solicit and consider input from anesthesia and surgeons regarding the dedicated room.

More than two years after the project's end the open scheduling system is still in place and is working extremely well. According to Lewis it is now a self-sustaining process that maximizes OR utilization and minimizes waits and

cancellations. Surgeons are pleased with open scheduling, and patients reap the benefits of a more efficient system.

In complement to surgical smoothing efforts, Boston Medical Center's Inpatient Flow team focused on additional, specific steps to improve inpatient flow. Janet Gorman participated on the Inpatient Flow team as well as on the Surgical Smoothing team. Gorman identified a constraint in inpatient flow; most cardiac surgery patients were discharged in the afternoon, at an average time of approximately 4:00pm, when Gorman desperately needed those beds available earlier in the day. Gorman and the other members of the team worked with cardiac surgery on an early discharge initiative. Average discharge time was 2:30 before; now 60% are discharged by noon. Cardiac surgeons were supportive of the focus on early discharges because they saw that if they were able to get cardiac patients out of the unit, it would free up beds for their other patients coming from surgery, minimizing delays in the recovery room and improving patient throughput.

Boston Medical Center has also created a "bed czar" or "patient flow coordinator" position The purpose of this position is to have one point-person maintain an overall view of flow in an out of all units. Janet Gorman assumed this role, and in her position she is able to manage transfers to the hospital and between units, as well as admissions from the ED, by prioritizing and knowing when patients are going to be discharged.

The Role of the Bed Czar

Janet receives a call about a patient from a suburban hospital whose family wants him transferred to Boston Medical Center. She makes sure a bed is available in the accepting unit (the SICU), and connects the accepting doctor on the phone with the transferring doctor. However, about 20 minutes later, the ED calls her saying a patient from the ED needs to be transferred into the SICU. When deciding what to do, because there is only one bed currently available, Janet prioritizes. Her reasoning: "the patient at the suburban hospital is stable, in a bed, and he can wait there until someone gets discharged from the SICU later today. The patient in the ED needs a bed in the SICU as soon as possible, so he takes priority." With two more quick phone calls, the new plan is in effect.

The Inpatient Flow Team also addressed several other issues, including reducing the time to get a room ready for the next patient by streamlining the system for notifying housekeeping of the need to clean a room and registering a bed as ready after it had been cleaned. These efforts contributed to the overall goal of improving inpatient flow throughout the hospital.

ED FLOW

Neils Rathlev, MD, Executive Vice Chair of the Department of Emergency Medicine at Boston Medical Center, headed the ED Team. Similar to the Inpatient

Flow Team, the ED Team embarked on specific initiatives to support the project's overall goal of improving patient flow in the hospital.

In the ED, employing a rapid cycle change (RCC) model allowed him and the team to implement small changes that were quickly evaluated by staff. The team first identified a specific aim or goal intended to improve patient flow; next they developed, implemented and evaluated strategies on a small scale. They monitored results and modified or rejected the strategies based on those results, all typically within a one-week timeframe. Speaking about this approach, Rathlev explains:

> If the results were poor or we felt this simply was a change that was not sustainable, was not going to improve our results, we would simply scrap it very quickly. If we thought it was something that had potential but needed further work, we would do that work and then we would try again. And if, in short order, we achieved the results that we wanted, we would maintain the change and keep it for a long period of time and continue to check our progress over time.[1]

Rathlev noted that this approach allowed the team to gain the trust of the staff, and allowed for a more fluid trial-and-error process that ultimately generated many positive changes. One main change to reduce ED throughput time was based on suggestions from the nursing staff and nurse manager to adopt a "zone nursing" approach in which nurses were assigned to patients in a particular area of the ED. The idea behind this strategy was to reduce the amount of time lost from nurses running back and forth to tend to their patients scattered throughout the ED. The approach was tested on a small scale for one week and resulted in a 70-minute

reduction in ED throughput time. Based on this success, the team expanded the zone nursing approach to the entire ED.[2]

Results:

The overall results of the project were noteworthy and received extensive media attention.[10, 11]. According to Chessare, the results were "dramatically, profoundly more than I expected." From an overall hospital perspective, inpatient flow throughout the hospital improved as a result of all the changes. Stress on nurses was reduced as their patient case volume became more stable and patient quality of care was improved. Boston Medical Center also saw a reduction in bed turnover time from 90 minutes to 63 minutes.[9] Specific results in surgical services and the ED are detailed below.

Newton Pavilion—Surgical Smoothing in Vascular and Cardiac Surgery:

The changes in elective vascular and cardiac surgery scheduling had the following impact:

- 55% reduction in variability in admissions to step-down beds in Unit 6West.
- Decreased nursing hours per patient day by .6 in the step-down beds in 6West. As a result, Gorman was able to work within her staffing budget each month.
- In fact, the changes resulted in a reduction in the unit's nursing costs of an annualized amount of $130,000.[9]

Menino Pavilion

Chessare noted that the changes to the Menino Pavilion had the non-quantifiable impact of saving "the cost of human time, angst…and the effort to reschedule all of those delayed cases."[9] In addition, the Menino Pavilion surgical services also enjoyed the following results based on these changes.

- 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.[9]
- Surgical volume in the Menino Pavilion has increased by more than 1,000 cases per year.

Emergency Department:

In 2004, after the changes were implemented, Boston Medical Center was "reducing treatment delays and closures to ambulances when [EDs] are more crowded than ever."[3]

- Reduced diversion
- Boston Medical Center emergency physicians treated more patients in 2004 than they did in 2003 and reduced average time in the waiting room from 60 minutes to 40 minutes.[3]
- The changes also improved ED throughput by 45 minutes. "When you multiply that 45 minutes times 120,000 patients per year, it's significant," says Chessare.[9]

Lessons Learned:

Leaders from Boston Medical Center emphasize the importance of the following steps to build support for patient flow improvement efforts.

1. **Timing is everything:** According to Chessare, severity of the problems facing Boston Medical Center's ED prior to the project's inception and a call from the hospital CEO to make improvements created a "burning platform" that motivated hospital leadership to actively support the project. Chessare notes that if there is not urgency around the situation and an incentive for improvement, it is less likely that staff will be supportive of the major changes that are required to make a project like this successful. Chessare also observes that being chosen for the Urgent Matters grant was helpful in lending the efforts more formality, creating a timeline, and generating positive publicity for the project.

2. **Strong leadership is critical:** Individuals at Boston Medical Center emphasize that this type of project cannot succeed without a strong, consistent commitment from the highest level of the hospital. If just one area makes it a priority; nursing, for example, when they hit pockets of resistance, which is inevitable, the effort will stagnate. When there is an institution-wide commitment and vocal support from the CEO, hospital leaders are better able to address and mitigate pockets of resistance. In addition, physician leadership is crucial to carrying out implementation. Chessare was an effective leader on the Boston Medical Center project because he had a passion for improving patient flow and a favorable

reputation among clinicians. He and the other physician leaders involved in the project were able to gain the trust and support of medical staff at the hospital to implement changes.

3. **Implementation is not easy**: In theory the solution to the artificial variability introduced by elective surgical schedules should be easy to correct; however, in reality it is an extremely sensitive and politically fraught issue. While most physicians are interested in the ideas of operations management and variability methodology from an intellectual perspective, when it comes to giving up some of their coveted block time to dedicate an operating room to urgent cases, most are initially very resistant. The surgical smoothing component of the project at Boston Medical Center was initially a very tough sell; it involved a big risk on the part of the project leaders, and required physicians to take a leap of faith in giving up their block time.

4. **Start small**: Boston Medical Center began its surgical smoothing efforts with one service—vascular surgery. By starting small, closely monitoring results, and building upon successes, they were able to build credibility for their ideas. As a result they were able to effect major changes without creating major resistance and without radically altering the system at one time.

5. **Treat physicians like they have "the same DNA as everyone else"**: According to Chessare, avoiding change because of fear of physician reaction can be a self-fulfilling prophecy. "If you treat doctors like they have different DNA from everyone else, they will act like they have

different DNA from everyone else." When working with the physicians at Boston Medical Center on this project, Chessare and the other leaders treated the physicians "like rational, sensible people, who want the same things for patients as everyone else" a strategy that proved very successful.

6. **These are complex processes; to have a simple solution is not possible**: Boston Medical Center's approach of tackling several areas at once to improve patient flow reflects the interdependence of all areas of the hospital system. To make changes in one area would not be effective; changes must be made in all areas of the hospital to improve overall patient flow. Similarly, there is no "one size fits all" solution to patient flow issues; each hospital is unique and must assess how to make changes that will be best for its specific characteristics and issues.

7. **The work is never done**: An important message in patient flow improvement efforts is that this effort is never "done." There are always new issues coming up, new surgeons or procedures involved, and new constraints. Boston Medical Center has established a patient flow committee that meets bimonthly as a forum to address ongoing issues. Any current or upcoming patient flow-related issues are discussed in these meetings, and the committee members create an action plan to address the issues in a timely way.

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