

Perfecting Patient Flow

America's Safety Net
Hospitals and Emergency
Department Crowding

National Association
of Public Hospitals
and Health Systems



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Prepared by the
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The National Association of Public Hospitals and Health Systems (NAPH) represents over 100 of America's most important safety net hospitals and health systems. These facilities provide high-quality health services for all patients, including the uninsured and underinsured, regardless of ability to pay. They provide many essential community-wide services, such as primary care, trauma care, and neonatal intensive care, and educate a substantial proportion of America's doctors and nurses. NAPH hospitals and health systems are also major providers of ambulatory care services, providing nearly thirty million ambulatory care visits annually. NAPH advocates on behalf of its members on issues of importance to safety net health systems across the country. NAPH also conducts research on a wide range of issues that affect public safety net health systems.

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For more information about the Learning Network initiative and/or the *Urgent Matters* project, please visit our Web site www.urgentmatters.org.

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Executive Summary

Emergency department crowding and delays have become major issues for America's safety net hospitals and health systems. Many facilities are experiencing increasing wait times, a need to "board" admitted patients in emergency department (ED) hallways, and rising numbers of hours spent on "diversion" or "bypass." These trends result from increased patient demand at a time when the number of emergency departments has declined and hospital inpatient capacity has lagged. Other factors also may contribute to the crisis. Patients without access to medical specialists may view the ED as the quickest route to specialized services. Overburdened physicians may be more likely to refer patients to an ED for care, especially if they view the ED as a comprehensive diagnostic center. Meanwhile, shortages of nurses and on-call specialists may slow the care of patients once they get to the ED. Given these complex factors, solutions we once thought would relieve ED demand, like expanded primary care capacity, may actually do little to alleviate this crisis.

For patients as well as caregivers, these are more than issues of convenience. Many of the patients who, due to their frustration at the long wait, leave a hospital ED without being seen by a physician do indeed need immediate medical care. Overworked health professionals are more prone to error, and a crowded ED is more likely to experience high turnover and vacancy rates. Long delays and overextended staffing are recipes for low quality, medical error, and poor morale.

Faced with the unique mandate of the Emergency Medical Treatment and Labor Act of 1986 (EMTALA), as well as with historic missions to care for all, safety net hospitals may be especially strained by these conditions. These hospitals often run large emergency departments with trauma and other specialized services and treat many medically and socially complex patients in an environment of declining or no payment. Yet they are expected to care for all comers, and to do it well while being accountable to the public.

The National Association of Public Hospitals and Health Systems (NAPH) commissioned this report, *Perfecting Patient Flow: America's Safety Net Hospitals and Emergency Department Crowding*, to describe practical approaches to reducing ED crowding as implemented in three member hospitals. Each of these hospitals participated in the year-long Robert Wood Johnson Foundation-funded safety net collaborative, *Urgent Matters*. These three hospitals, The Regional Medical Center at Memphis, Boston Medical Center, and Grady Health System in Atlanta, were chosen through a highly selective process to participate in the project, which was headquartered at The George Washington University Medical Center School of Public Health and Health Services. Each hospital devoted significant attention and resources to the project, knowing that they were serving in essence as laboratories for America's hospitals. These institutions developed and applied their own strategies to improving patient flow, often with dramatic improvement. Some of the highlights include:

- **The Regional Medical Center at Memphis** (The MED) often had patients in the ED waiting 48 hours for an inpatient bed. The MED focused heavily on the

use of a Discharge Resource Room and improved turnaround of vacated beds to speed admissions from the ED.

- **Boston Medical Center** implemented “zone nursing” in its ED to ease the ED nurses’ work. In addition, it spread out scheduling of elective surgery to improve hospital-wide patient flow.
- **Grady Health System** concentrated on improving care processes for frequent ED users through a new Care Management Unit, while also improving the performance of their “Fast Track” unit.

This report includes detailed case studies on the problems each of these hospitals sought to address over the course of the collaborative, their goals for improvement, the strategies they used to achieve those goals, and the lessons these cases hold for other hospitals. For these three hospitals — faced with their own problems, culture, and history — the strategies clearly differ, but several overarching themes emerged:

- **Hospitals must recognize that ED crowding is a hospital-wide problem, not an ED problem.** Hospitals that treat this simply as an “ED problem” do not understand or recognize the nature of the problem and will achieve modest improvement at best.
- **Multi-disciplinary, hospital-wide teams are essential to overseeing and implementing change.** Given that this is a hospital-wide problem, the solutions need to be managed as such, breaking down the organizational silos that often block hospital innovation.
- **A “champion” for change must be identified or cultivated in the institution.** Someone with energy and leverage must lead the way and be willing to advocate tirelessly for improvement.
- **Senior leadership needs to send a clear and consistent message that improving patient flow is a priority.** Without support from senior management, the rest of the organization will not be able or willing to cut across the organizational barriers that pose an obstacle. The CEO should publicly support these efforts and set expectations for his/her team.
- **Hospitals must learn and use formal improvement methods, like rapid cycle change, on a daily basis and track results.** These quality improvement methods should be simple and straightforward and aim to achieve results quickly in defined, limited areas. Otherwise, organizational attention will dissipate.
- **Institutions must commit themselves to using rigorous metrics, because “we can’t fix what we can’t measure.”** Most hospitals collect a limited amount of useful patient flow data.
- **Transparency around initiatives and data must become an organizational value, so that all stakeholders have the information they need to do their jobs.** Transparency means open sharing. Improvement becomes possible once staff know how things are now and can see objective evidence of positive change.

Introduction

America's emergency departments are in crisis. Local and national media report long waits, crowding, and alarming instances of “diversion” (or “bypass”)¹ in dozens of U.S. communities. While such conditions would be distressing in any part of the American health care system, emergency departments operate under a unique mandate.

The Emergency Medical Treatment and Labor Act (EMTALA)² imposes special rules on hospitals and their emergency departments. EMTALA requires hospitals that accept Medicare funding to screen and stabilize all patients presenting for care at the emergency department (ED); hospitals may then discharge or transfer these patients to another facility. Essentially, EMTALA established a universal federal right to ED care without earmarking payment for this care.

EMTALA effectively turned EDs into the “safety net for the safety net.” Despite shortcomings and barriers in the rest of a community's health care system, its ED must provide virtually open access to individuals who may not have real or perceived alternative choices.

Given this role, current conditions in EDs are not tolerable. In an April 2002 Lewin Group survey, 62 percent of all U.S. hospitals reported being “at” or “over” operating capacity, with this proportion rising to 79 percent for urban hospitals and 87 percent for Level I trauma centers.³ Many cities now report dramatic increases in ED wait times and ambulance diversions, with implications for the health and health care of millions. We know, for instance, that diversion can lead to delays in needed patient care that may result in patient death. Meanwhile, our EDs are overwhelmed with sick patients, many of whom may “board” for hours or even days in the ED. Boarding in the ED means that patients are cared for in a suboptimal setting while they strain the already overextended ED staff, treatment space, and equipment.

Why the Crisis?

ED crowding may be partly a consequence of increased ED use. According to the Centers for Disease Control, the number of annual ED visits rose by almost a quarter in the decade ending in 2002, while the number of EDs diminished (mainly due to hospital closures) by 15 percent in the same period.⁴ The average volume of visits per ED increased by almost 45 percent. Increased demand and

1 The U.S. Government Accountability Office defines diversion as when “hospitals request that ambulances bypass their emergency departments and transport patients that would have been otherwise taken to those emergency departments to other medical facilities.” (GAO-03-460, 2003, p. 6).

2 Emergency Medical Treatment and Active Labor Act (EMTALA), 42 US C. Sec. 1395dd (1990). Full text and regulations of EMTALA may be found at <http://www.emtala.com/#stat>.

3 Emergency department overload: A growing crisis. (April 2002). The Lewin Group analysis of AHA ED and hospital capacity survey data.

4 McCaig, L.E., Burt, C.W. “National Hospital Ambulatory Medical Care Survey: 2002 Emergency Department Summary.” Web Page, No. 340, March 18, 2004. Available at www.cdc.gov/nchs/data/ad/ad340.pdf. Accessed April 2004

a reduced supply of ED services can certainly lead to crowding, but a few other factors bear noting.

First, while the common wisdom says that EDs are overrun by the uninsured, the reality may be much different. An October 2003 study by the Center for Studying Health System Change found that increased ED utilization was mainly due to more visits by insured individuals.⁵ This may not surprise some observers, given the obstacles even the insured may find when trying to access services, particularly specialty care. The ED may become the quickest route to a specialist, and overwhelmed physicians, unable to schedule patients for days or weeks, may be more likely to tell their patients to “go to the ED.” Some health policy experts and emergency medicine physicians theorize that such increased physician referral may stem from medical liability concerns. All of this has important implications. The causes of this crisis may be broader and deeper than first realized and may include factors that go beyond a simple demand for services; for example, issues of specialty care access and physician practice patterns. Thus, reforms aimed at reducing the number of uninsured or increasing access to primary care (e.g., community health center expansions) may have much less impact on ED use than originally predicted.

Many other trends may contribute to ED crowding. A growing and aging population, the loosening of managed care controls, and a view of EDs as comprehensive diagnostic centers may all play a role. Or patients using EDs may be sicker than they once were. Given all these trends, it is understandable that many hospital leaders have given up trying to cope with the ED crisis and have come to see delays, crowding, and diversion as a natural, immutable part of the landscape. Since these effects are driven by factors outside of the hospital’s control, many leaders assume they must be reluctantly tolerated.

Other factors amplify these trends. Shortages of nurses and on-call specialists and the steady shrinkage of inpatient hospital capacity have made it harder for hospitals to move patients through the ED and, when necessary, to admit them in a timely fashion. However, hospitals may have some influence over these conditions. Many experts have begun to question whether improving the hospital processes that affect patient flow through the ED could fix these bottlenecks. In other words, although numerous dimensions of the problem lie outside hospitals’ control, other processes *within their control* could be improved. This line of reasoning means that hospital leaders need to look hospital-wide, not just in the ED, for solutions. They also need to establish a formal approach to improve processes and achieve measurable results.

Special Challenges for the Safety Net

EMTALA imposes formidable requirements on America’s hospitals, but for safety net hospitals these obligations and their concomitant challenges are even more pronounced. These hospitals have a history, mission, and often a legal mandate to care for some of the nation’s most vulnerable individuals. This may include the uninsured with poor health status and no other source of care, the poor

⁵ Cunningham, P., May, J. Insured Americans drive surge in emergency department visits. (October 2003). Available at www.hschange.org/content/613/613.pdf. Accessed August 2004.

and the homeless with higher risks of serious illness, migrant farm workers, undocumented immigrants, persons with chronic illnesses, and substance abusers. These people also may live in underserved areas where residents suffer the health effects of unemployment, poverty, stress, inadequate health care infrastructure, lack of access to needed services, and poor living and environmental conditions. The results are high infant mortality rates, poor perinatal outcomes, domestic violence, tobacco and alcohol-related morbidity and mortality, poor dental hygiene and care, substantial mental health problems, and nutritionally related illness and disease.

Caring for this population and its complex health needs falls in large part to safety net hospitals and their emergency departments. But fulfilling this mission strains the limited resources of these hospitals. A March 2003 United States Government Accountability Office (GAO) study found that ED crowding was more pronounced in hospitals in areas with larger uninsured populations.⁶ The report also noted that crowding was more pronounced at teaching hospitals and trauma centers. The report singled out an inability to move admitted patients to inpatient beds in a timely fashion as the most important predictor of crowding.

Safety net hospitals must cope with these issues without the relatively more generous payer mix of many of their peers. They often do not have the ability to hire and retain additional staff, expand physician coverage, invest in new bricks and mortar and information systems, and meet the demands placed upon them. The safety net's solutions to ED crowding and patient flow may lie in making better use of existing resources.

⁶ U.S. Government Accountability Office (March 2003). Hospital emergency departments: Crowded conditions vary among hospitals and communities. (GAO-03-460).

A Model for Improvement

The Robert Wood Johnson Foundation, concerned about the state of America's safety net, launched *Urgent Matters*⁷ in the fall of 2002 and housed the national program office at The George Washington University Medical Center School of Public Health and Health Services. One of the program's original goals was "to improve the ability of safety net providers to respond to increasing emergency department volumes." To this end, the program created a 10-hospital collaborative Learning Network that used quality improvement techniques to smooth patient flow and reduce ED crowding. The program used a competitive selection process that required participating hospitals to have a Level I or Level II trauma center.

These Learning Network hospitals began working together immediately and continued their collaboration for one year. The hospitals received a variety of resources from the *Urgent Matters* program including on-site technical assistance, defined metrics for assessing patient flow and system performance, a model for understanding patient flow, training in a specific quality improvement technique (Rapid Cycle Change), a toolkit of best practices, and periodic conference calls and face-to-face meetings.

These resources enabled the Learning Network hospitals to understand patient flow bottlenecks in their facilities and to focus on eliminating or alleviating those bottlenecks. The following sections highlight four of those resources — the patient flow model, defined metrics, Rapid Cycle Change, and creation of a hospital-wide patient flow team — which can be adopted by any hospital to improve patient flow.

The Input/Throughput/Output Model of Patient Flow

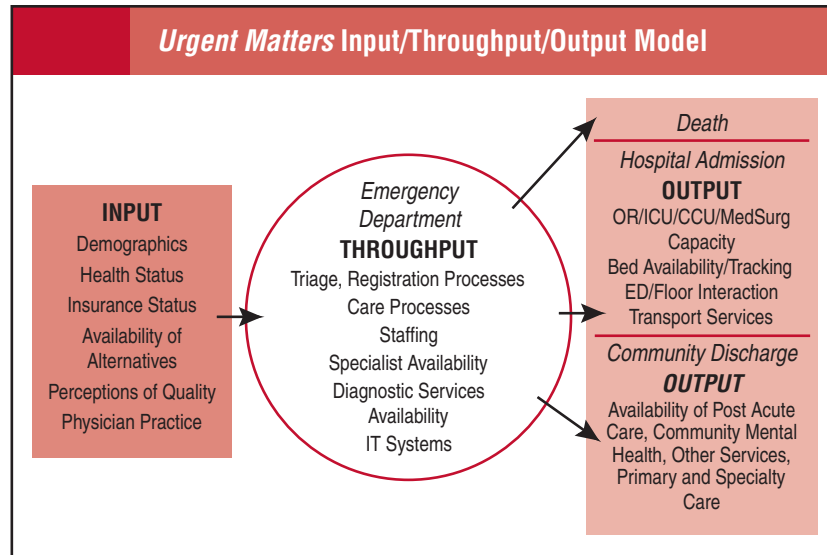
The Input/Throughput/Output (I/T/O) model of patient flow provides a structure for examining the factors that affect ED access, quality, and outcomes (see Figure 1). Input factors include why people present to an ED (e.g. aging and morbidity), availability of alternative sites of care, insurance status, perceptions of quality, physician referral practices, and other variables. Throughput refers to the actual operations of the ED: How are ED processes designed? Are medical specialists and ancillary services available in a timely fashion? Is clinical information accessible? Output factors address the ability to move an ED patient to his/her next disposition: Is there subsequent care available in the community? Does the hospital have the systems and capacity to move sicker ED patients to critical care and other inpatient units?

A hospital can use the I/T/O model to create a work plan for systematically addressing patient flow problem areas throughout its facility. By focusing on ED throughput and output in the form of admissions, the hospital can develop strategies that specifically target the problem areas over which it has the greatest influence and control.

⁷ Additional information about *Urgent Matters* can be found in Appendices A and B.

Figure 1

The Input/Throughput/Output Model of Patient Flow



Key Performance Indicators

Because hospitals cannot fix what they cannot measure, metrics are a critical element in improving patient flow. Collecting data on a routine, ongoing basis is essential to measuring patient flow and improving system performance. The Learning Network hospitals collected data for 17 metrics, or key performance indicators (KPIs) (see Table 1). The KPIs included 10 measures of ED throughput,⁸ three measures of inpatient flow, one measure of clinical process, and three additional ED metrics.

Hospitals tracked ED throughput and inpatient flow KPIs weekly; the clinical processes and other ED KPIs were tracked monthly. Tracking KPIs enabled participants to establish a baseline for understanding the current state of patient flow through their hospitals. These same metrics could be used to measure and provide immediate feedback on the impact of specific changes to patient flow while the hospital experimented with different strategies or initiatives.

Hospital data collection capabilities vary widely with some hospitals unable to extract information from every ED patient. If collecting data for 100 percent of the ED patient population is not feasible, then appropriate sampling can be used. The ED can elect to collect data on randomly selected patient records during each of the three work shifts over several days. Whether or not sampling was used, the data extracted should be representative of all patients arriving at the ED for treatment.

Rapid Cycle Change

Rapid Cycle Change (RCC) is a quality improvement technique that allows hospital staff to initiate and test a large number of small changes related to patient flow very quickly by monitoring the effectiveness of those changes using small data samples. (These small changes are known as Rapid Cycle Tests or RCTs.)

⁸ In addition to total ED throughput time, time from arrival to bed placement, time from bed placement to examination, and time from disposition decision to departure were tracked separately for admitted patients, Fast Track patients, and other ED discharged patients for a total of ten KPIs.

Table 1

Urgent Matters — Key Performance Indicators

| Factor | Indicator | Reporting Interval | |
|---------------------------------|--|--------------------|--|
| ED Throughput | 1. Total ED throughput time — time from patient's arrival in the ED → time of patient disposition* | Weekly | |
| | 2. <i>By treatment path:</i> Admitted/Fast Track /Other ED Discharged | | a. Time from arrival to bed placement — patient arrival in the ED → time the patient is first placed in a bed for exam and treatment |
| | | | b. Time from bed placement to examination — time patient is first placed in a bed → time the patient is first seen by a physician |
| | | | c. Time from disposition decision to departure — time physician issues a discharge or admit order → time patient has left the ED |
| Inpatient Flow | 3. Time from inpatient bed assignment to bed placement — inpatient bed available and assigned → patient arrives in unit and placed in bed | Weekly | |
| | 4. Time of day of discharge — average time of day that inpatients are discharged** | | |
| | 5. Bed turnaround time — time that a bed becomes empty → time that the bed is reported as cleaned and available for use by a new patient | | |
| Clinical Processes (Choose one) | 6. Time to heart treatment — patient arrival at the ED → time thrombolytic medication is administered or a vessel is opened | Monthly | |
| | 7. Time to pain management (fractures/dislocations) — time of arrival → 1st administration of pain management, e.g., medication or ice packs | | |
| Other ED | 8. Hours on diversion — if hospitals are allowed to go on diversion, total number of hours on diversion | Monthly | |
| | 9. Percent incomplete treatment — percent of patients that leave prior to completion of treatment (left without being seen, against medical advice, or for any other reason before medical treatment is completed) | | |
| | 10. Patient Satisfaction — use existing measures of patient satisfaction | | |

* Disposition is when the physician's orders have been written to admit or discharge the patient and the patient has left the ED.

** Time of discharge is when the physician's discharge orders have been written and the patient has left the hospital.

Combining RCC with the ongoing use of metrics, such as KPIs, provides hospital staff with immediate feedback on the impact of any changes initiated.

Using RCC as a quality improvement method requires answering three essential questions:⁹

- What are we trying to accomplish? (The aim statement)
- How will we know that a change is an improvement? (The measures used)
- What change can we make that will result in improvement? (Strategies or tools adopted)

Answering these questions requires creating an aim statement that indicates what needs to be changed, determining which measures to use in evaluating any changes, and deciding which tools or strategies should be implemented. This section provides a brief example of how these three questions and RCC can be combined to improve patient flow.

For example, a hospital determines that it would like to improve patient flow in the ED and that its goal is to reduce ED length of stay by 25 percent in nine months. This chosen goal is “SMART” — Specific, Measurable, Actionable, Relevant, and Time specific. One of the possible strategies to reduce ED length of stay is expanding the ED Fast Track¹⁰ by opening the Fast Track earlier each day, thus reducing the backlog of patients waiting to be seen in the ED. The hospital elects to open its Fast Track four hours early every day for one week and staffs the Fast Track with one doctor, one nurse, and one secretary. Any changes resulting from this initiative are measured by the total ED throughput time for Fast Track patients and by the rate of patients who left without being seen. The metrics provide immediate feedback regarding any improvements in patient flow, and this feedback can be used to modify the chosen strategy if necessary.

RCC as a quality improvement method offers a number of advantages for addressing issues of patient flow including:

- The method allows testing of multiple, small changes over a short timeframe.
- Changes are considered “pilots” or “experiments” and do not typically require approval from a committee, such as the hospital committee responsible for approving changes to policies and procedures.
- Most changes do not require large financial investments.
- Early successes encourage staff buy-in and generate enthusiasm regarding additional changes.
- When combined with metrics, RCC contains a feedback loop to determine if changes were successful.

9 Stoecklein, M. (2004). “Quality improvement systems, theories, and tools.” In: S.B. Ransom, M.S. Johsi, & D.B. Nash (Eds.), *The Healthcare Quality Book: Vision, Strategy, and Tools*. Chicago, IL: Health Administration Press (63-86).

10 The Fast Track is a dedicated area in or next to the emergency department specifically for patients who are less urgently ill. Identifying these patients allows the emergency department to treat them more quickly.

- Small changes, such as RCTs, only require small data samples for measuring change.
- The short timeframe for testing RCTs facilitates obtaining buy-in from all employees, even those who may be skeptical about the likelihood of successful changes.

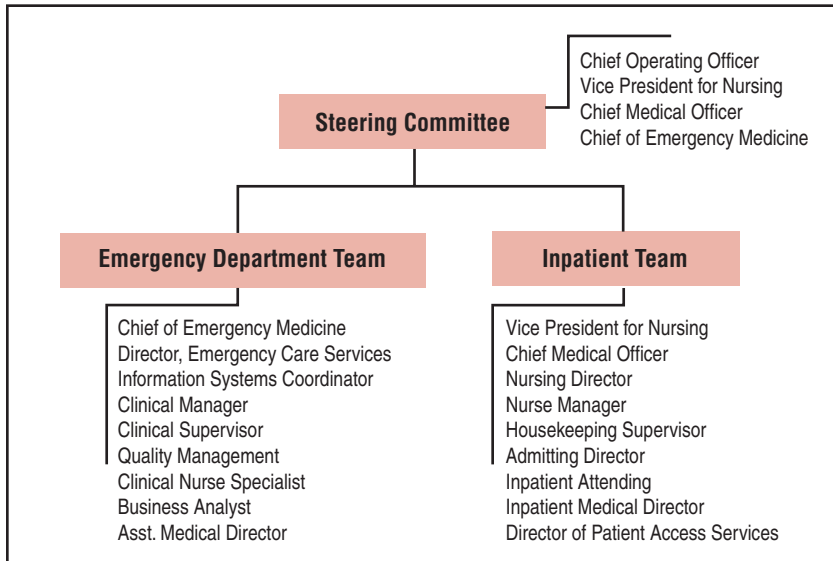


Figure 2
Sample Team Structure

Creation of a Hospital-Wide Patient Flow Team

Creating hospital-wide teams to participate in decisions and guide changes is a critical factor for improving patient flow. Figure 2 shows one model for constructing such teams. In this model, a steering committee of senior hospital leadership is responsible for overseeing all change efforts and provides high visibility for those efforts. Separate teams are created to focus on problems in the ED and on the inpatient side. Each of these teams has broad representation from departments throughout the hospital including ancillary services, housekeeping, and patient transport. Equally important is ensuring that the ED and inpatient teams include members from each side to foster an understanding of the problems and issues that each team faces. Teams include both managers and front-line staff to encourage the generation of new strategies or initiatives and to engage all levels of employees in the change process.

Case Studies of the Safety Net: Three Hospitals' Stories

This report focuses on the experiences of NAPH member hospitals that participated in the Learning Network: The Regional Medical Center at Memphis (The MED), Boston Medical Center, and Grady Health System.¹¹ All three are major safety net hospitals that realized the need for change and improvement. But each started in a different place and has its own history and culture. The experiences of these hospitals as they undertook projects to improve patient flow and reduce ED crowding offer valuable lessons.

The Regional Medical Center at Memphis, Tennessee

The MED is a safety net teaching hospital that has been serving the region since 1829. Among the key services at the 310-bed hospital are a Level I trauma center, a burn center, a high-risk obstetrics center, a wound center, and a Level III newborn center. The ED at The MED is divided into three areas: medicine (ten beds), trauma (eight beds), and labor and delivery (ten beds). Between the three areas, the ED treats 70,000 patients annually. Psychiatric patients are referred to a psychiatric facility in the hospital. The Level I trauma center is the only one of its kind in the region serving a 150-mile radius that includes five states.

Where They Started

In 2002, The MED faced increasingly severe ED crowding. Patients lined up in the halls and waited an average of nine hours to be seen. Although ambulance diversion was not an issue due to a region-wide ban on diversion, the long wait times in the ED resulted in many patients — as high as 16 percent — leaving before treatment could be completed.

One major cause of ED crowding was the unavailability of inpatient beds. High census within the hospital resulted in some patients spending 48 hours in the ED waiting to be admitted to an inpatient bed. ED nurses cared for new patients coming to the ED as well as for patients waiting to be admitted. This environment was causing burnout among staff, evidenced by a high turnover rate for both nurses and physicians in the ED. The *Urgent Matters* project presented an opportunity to utilize change processes throughout the hospital in order to improve patient flow.

Tools/Strategies:

- Discharge Resource Room for inpatients
- “Bed huddles” for briefings on bed availability
- Faxing admission orders to the floors
- Color coding ED patients by priority
- Implementation of a bed tracking system for inpatients

Results:

- Average total ED throughput time – nine hours to five hours (44 percent decrease)
- Bed turnaround time – 150 minutes to 47 minutes (69 percent decrease)
- Inpatient bed assignment to bed placement – 157 minutes to 55 minutes (95 percent decrease)

¹¹ See Appendix C for organizational contact information.

Gaining Momentum for Change

At The MED, support for the change process came from the top. When the project began, The MED CEO set the tone for the project by making it a high priority and strongly supporting the initiative. According to Rhonda Nelson, MPA, Vice President of Patient Care Services, “Our CEO’s strong support was the key to our success.” The medical staff was introduced to the project from the beginning. Additionally, several physicians — including the ED medical director, the trauma medical director, and a medicine physician representing inpatient medical staff — were involved throughout the project.

Project teams were created for both the ED and the inpatient side of the hospital to review the KPIs and implement the RCTs. The ED and inpatient project teams were co-chaired by physician and nursing champions, a very successful arrangement for The MED. Each team included multidisciplinary representation, such as staff from the laboratory, housekeeping, transportation, pharmacy, and others. The teams looked at each KPI and associated data, decided what changes to try using the RCT methodology, and then reviewed the data to measure improvement.

Over the course of the project, the ED and inpatient teams met weekly. (The teams now meet twice a month.) Both teams reported to a steering council comprised of hospital executives including the CEO, COO, and vice presidents. The steering council assisted with barriers and provided ongoing executive support. There was also a demonstration grant team whose work is described in this report (see Special Demonstration Project on p. 18).

Implementation

The MED set up a process to collect baseline data on key performance indicators and implemented rapid cycle tests to initiate small changes and measure their impact. The MED initiated approximately 60-70 rapid cycle tests during the year-long project.

For example, The MED found that the average ED time from arrival to bed placement was driven by triage and registration times. In order to reduce the time from arrival to bed placement, the triage and registration processes needed to be evaluated. The hospital discovered a number of interventions they could pursue. In one intervention, the hospital made the relatively simple change of color coding patients arriving in the ED according to the priority in which the patient needed to be seen. This became a major benefit because the triage and registration staff were then able to communicate the color-coded priority to other team members, speeding up the entire process. The priority of each patient was known to all staff in triage and registration, and staff no longer worked in an information vacuum.

“The ‘prescription for success’ for The MED was to break down patient flow into small components and then examine each component individually.”

Rhonda Nelson, MPA
VP of Patient Care Services
The MED

Overcoming Barriers

Support from top management was essential to making the necessary changes. The teams gained momentum as they were “empowered” by the senior leadership to implement change. In those cases when a barrier could not be overcome by the teams alone, they could turn to the steering committee. For example, although it is generally difficult to increase staffing, the teams demonstrated to the steering

committee that ED registration was understaffed. As a result, the hospital hired additional registration clerks.

Not every barrier encountered could be overcome initially. For example, patients were often discharged around 2 P.M., which meant that many patients did not leave until 3 or 4 P.M. The teams had hoped to move the discharge time to 11 A.M. They were not able to accomplish this change but recognized that even though every RCT would not be successful, the process of continually implementing new RCTs would ultimately ensure that successful ones would be found. While the teams failed to move up the average discharge time, they succeeded in reducing the average bed turnaround time, which allowed ED patients to move into an inpatient bed more quickly.

Tools/Strategies

The MED developed many tools that improved their patient flow. Two of the most significant are described in the following sections.

Discharge Resource Room

The Discharge Resource Room (DRR) has a mission of providing discharge instructions and resources in a comfortable setting for inpatients, helping prepare them for their home care after discharge. The DRR occupies an eight-bed area located on the ground floor of the hospital, with easy access to a circular drive for patient pickup. A registered nurse and a nursing assistant staff the DRR. The registered nurse provides reinforcement of patient education, homecare instructions, and follow-up phone calls to discharged patients. The nursing assistant helps transport patients from the inpatient floor to the DRR, helps with wheelchair transport to the patient's vehicle, and delivers pharmaceuticals and other discharge materials to patients as needed.

The DRR is open from 8 A.M. to 10 P.M. and provides care to ambulatory adolescent, adult, and geriatric patients. Upon presentation to the DRR, the patient is considered discharged from the hospital. If an emergency should arise, the patient is transported to the ED. Approximately 60 percent of all medical/surgical patients are discharged from the DRR, an average of 15 patients per day, or one-third of all hospital discharges. An average of 17 follow-up calls are made each day to patients using the DRR; calls are also made to approximately 10 percent of other discharged patients.

The DRR provides a comfortable, aesthetically pleasing environment for patients as they wait for family members; it maintains adequate medical records for continuity of patient care; and it collects and maintains data for continuous improvement of the quality of patient care delivery. Additionally, efforts are made to ensure that the discharge teaching is individualized, discharge medications are available, and the provider contact information is identified. The DRR provides television, magazines, sandwiches, and juice. Patients are given a letter expressing gratitude for using hospital services, along with a patient satisfaction survey to obtain feedback on the care given by The MED's staff.

The MED offers the following strategies for successful implementation of a DRR concept:

- **Top-down support from executive staff is a major asset.** Hospital leadership must believe that the DRR concept can enhance discharge instructions (thereby reducing return visits), expedite the discharge process, and improve ED throughput.
- **Collaboration and support of the DRR among staff is important.** This collaboration should include the vice president of patient care services, the vice president of support services, the chief financial officer, the medical staff, and ancillary staff such as case management, the pharmacy, and medical records.
- **Nurse buy-in is critical.** To establish nurse buy-in, The MED had staff nurses rotate through the DRR and displayed the improvements resulting from DRR use (e.g., DRR satisfaction results, ED throughput results, and average discharge times).
- **Internal communications about the importance of the DRR facilitate buy-in and acceptance.** The MED held a grand-opening ceremony for the DRR, which allowed ancillary staff, executives, and nursing staff to become familiar with the DRR amenities.

The DRR at The MED has a significant impact on ED throughput time. “The DRR really does offer a great benefit to the patient and to the ED. I would encourage every hospital with a throughput problem to create a Discharge Resource Room,” Ms. Nelson said. The results of implementing the DRR and other initiatives at The MED can be seen in Figure 3, which shows average ED throughput time over the course of the project. When The MED began the project, patients spent an average of 6.8 hours in the ED with the average ED throughput time increasing to 11.5 hours. Eventually, The MED was able to decrease this time to 5.2 hours through a combination of initiatives that included the DRR.

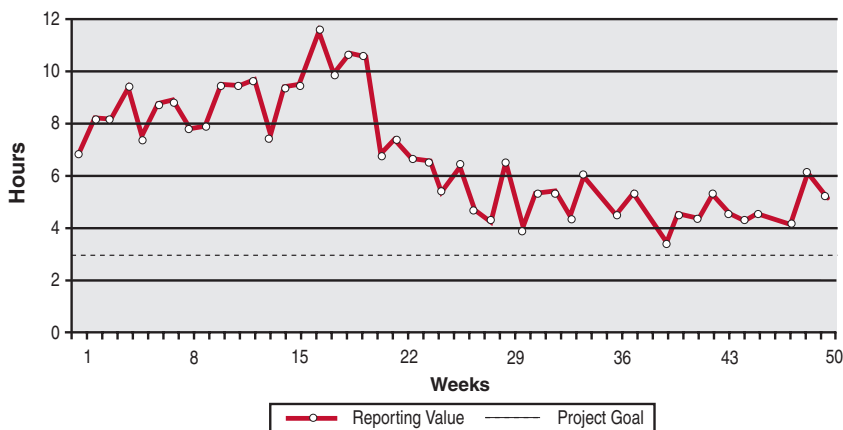


Figure 3
Average Total ED Throughput,
The Regional Medical Center
at Memphis

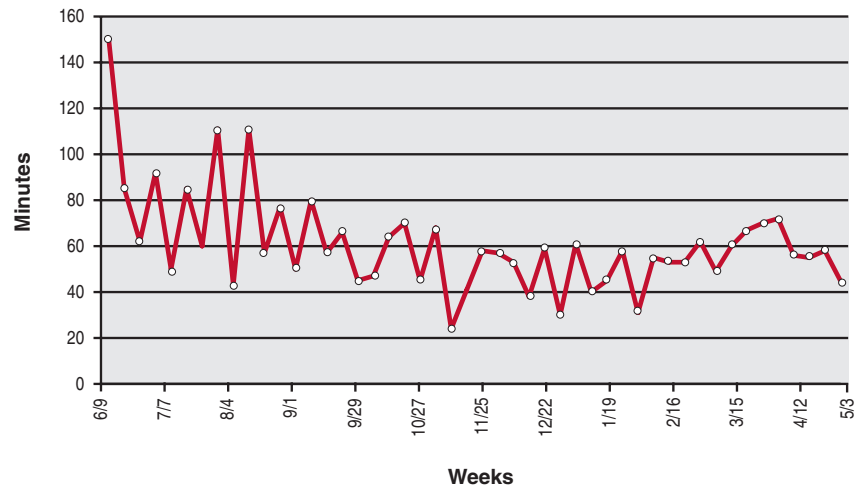
Bed Turnaround Time Improvement

Another example of efforts to improve flow at The MED was the initiative to reduce inpatient bed cleaning turnaround time. The inpatient team set a goal of a routine turnaround time of 60 minutes and a “stat” cleaning time of 30 minutes. Prior to these goals being set, the average bed cleaning turnaround time was 150 minutes.

The inpatient team studied factors causing slow bed turnaround times. They discovered a series of barriers, such as equipment and specialty beds not always being removed in a timely manner. The communication process was overly complicated, with no tracking system to promote accountability. Under the old system, a nurse would call housekeeping when a bed needed to be cleaned. The housekeeping supervisor then paged a housekeeper to notify him/her that a bed needed cleaning. The housekeeper would call the supervisor back to find out which bed needed to be cleaned. After the bed was cleaned, the housekeeper would call and notify the housekeeping supervisor that the bed was clean. The supervisor would let the staff know the bed was ready.

Figure 4

**Average Bed Turnaround Time
by Week, 6/9/03 – 5/3/04,
The Regional Medical Center
at Memphis**



One major step towards overcoming these barriers was housekeeping’s implementation of a new bed tracking system that could report turnaround times. The improved technology was used to redesign the housekeeping communication system. Since implementing the tracking system, the bed cleaning times have improved significantly. Under the new process, all housekeeping staff are equipped with pagers. When nursing staff indicate a discharge on their computer, a notification is sent throughout the housekeeping system, which automatically pages the area housekeeper with information about which bed needs to be cleaned. The housekeeper then cleans the bed and enters the completed status into a computer. This information is automatically made available to the nursing staff, thus completing the communication loop.

With this new system, time-consuming phone calls have been taken out of the process, and the housekeeping supervisor is no longer required to act as a messenger. The new system also tracks when a bed is ready to be cleaned, when it is done, and by which housekeeper. Now that data are available and being reviewed, accountability has increased. One notable challenge was integrating

the housekeeping computer system with the main hospital computer system. “Once the system was up and running and providing valid data, we could see an immediate and significant change in bed turnaround times,” Ms. Nelson said. Figure 4 demonstrates the impact that these changes have had on average bed-cleaning turnaround time. The MED reduced its average bed turnaround time from 150 minutes to 47 minutes, a 69 percent decrease.

Strategies such as the DRR and the new bed cleaning tracking system have resulted in improvement in other areas as well, such as the average time from inpatient bed assignment to bed placement, as shown in Figure 5. Time for inpatient bed assignment to bed placement was reduced from 157 minutes at the start of the project to 55 minutes by week 9, and this improvement held steady throughout the project.

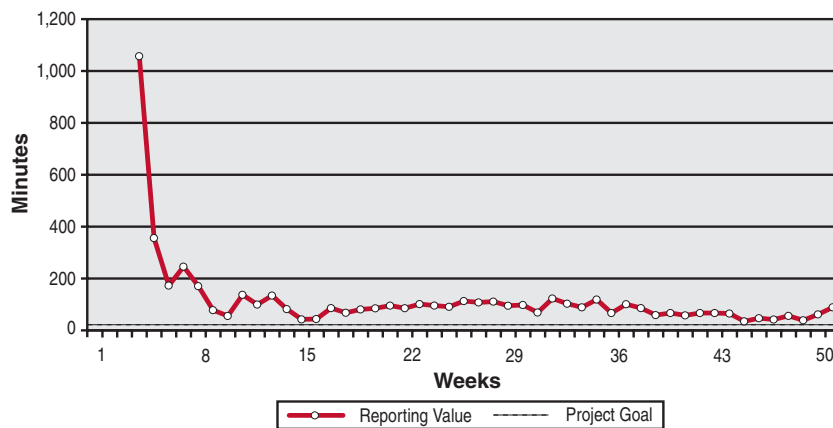


Figure 5
Average Time from Inpatient Bed Assignment to Bed Placement, The Regional Medical Center at Memphis

Additional Strategies

Additional strategies that have improved patient flow or patient satisfaction at The MED include stationing a clerk in the ED waiting room to update patients on the status of bed availability, having admission orders faxed rather than phoned to the inpatient floor, and holding short daily meetings on inpatient bed management. This last strategy, known as the “bed huddle,” is used to brief key staff on current and pending bed availability and waiting admissions. Bed huddles are conducted early in the morning and again in mid afternoon and are attended by the house supervisor, admitting staff, case managers, and other key staff as circumstances dictate.

Results and Next Steps

Because the medicine area of the ED had been facing significant challenges, with patients experiencing long waits, this area experienced the greatest improvement. For example, the average wait time¹² decreased from nine hours to five hours, though this is not their final goal. When patients go to the ED, they want to be seen

¹² The Key Performance Indicator was Total ED Throughput Time, which measures the interval between a patient’s arrival in the ED and the patient’s disposition.

quickly, and patients do not view five hours as quick. However, a five-hour wait is approximately 44 percent faster than a nine-hour wait, making the reduction in time a major achievement for The MED.

The executive steering committee meets only when needed, but the inpatient and ED teams continue to meet on an ongoing basis. The two teams meet twice a month, once together and once separately. They continue to focus on some of the more difficult changes, such as improving discharge times and diagnostic (lab/radiology) times. They also continue to look at the KPIs and strategies that will allow them to trim additional hours from wait times. According to Ms. Nelson, “The staff have become experts.” This expertise is helping to sustain ongoing improvement at The MED.

Lessons for Other Safety Net Hospitals

The factors that led to improvements in patient flow at The MED include the following:

- Obtaining executive support of the project
- Engaging medical staff in project efforts
- Utilizing multidisciplinary teams
- Promoting collaboration between the ED and inpatient areas of the hospital
- Sustaining and monitoring the success of interventions
- Analyzing which changes had the greatest impact and why
- Empowering project teams
- Providing executive intervention to overcome barriers
- Promoting awareness of new initiatives throughout the hospital
- Improving communication processes to improve clarity and reduce complexity.

Special Demonstration Project: Using Emerging Technology to Measure Patient Flow at The MED

One of the lessons of the Urgent Matters project is that it is difficult to change something that is not accurately measured. For example, if a hospital does not know how long ED patients spend on each step of their treatment (e.g. triage, registration, waiting for a bed, etc.), then it is harder to identify bottlenecks and opportunities for improvement.

Addressing this concern, a special demonstration project was undertaken by The MED in conjunction with the University of Memphis FedEx Center for Supply Chain Management. The goal of the project was to examine the feasibility of an emerging technology called Radio Frequency Identification (RFID) to track trauma patients. RFID tags contain small integrated circuits with attached antennas, and each RFID tag announces its location whenever it is in the proximity of a tag reader. The hope was that trauma patients could wear RFID tags to track their location throughout their stay in the trauma center.

Previous efforts to track patient location in the trauma center were limited by incomplete participation and “missing times” during many patients’ stays. In contrast, RFID has the advantage of being a “passive” solution, capturing data without requiring any manual recording or scanning.

To judge the feasibility of using RFID to track trauma patients, the researchers needed to verify that the RFID tags would work on the human body and that the demonstration system would integrate with the existing technology infrastructure. To do this, tag readers were placed strategically throughout the trauma center and patients wore the RFID tags on ankle bracelets.

The demonstration was a success. The technology was found to be technically and financially feasible and, as hoped, allowed determination of patient location at all times with minimal staff involvement in the tracking process. For example, a patient could be tracked as he/she moves from the main door area to trauma CT scan II to the CT/MRI entrance area and on to trauma x-ray I and the primary enrollment station. It is possible to determine how long the patient spends in each area. Using RFID to track trauma patients provided valuable information regarding how much time the patient spent in each department, a critical step in addressing issues of patient flow.

The critical success factors for this project were its clearly defined goals and the collaboration between different areas of expertise. However, the researchers caution that there is a general lack of experience with long-term implementation of this technology. Future goals include developing data filtering and user interface capabilities as well as improving the system’s ability to provide information for real time management.

Boston Medical Center Boston, Massachusetts

Tools/Strategies:

- Creating metrics for key cycle times and having managers accountable for them
- Creating the position of Bed Czar, who oversees patient flow in real time
- Matching ED physician/nurse practitioner capacity to patient demand
- Implementing “zone nursing” in the ED
- Converting from a “push” system to a “pull” system for inpatient admissions from the ED
- Developing “scripts” for communicating with patients to increase patient satisfaction
- Smoothing the elective surgery schedule
- Separating the flow of urgent/emergent surgeries from scheduled surgeries
- Eliminating block surgical scheduling

Results:

- Average total ED throughput time – 4.8 hours to 3.8 hours (17 percent decrease)
- Average bed turnaround time – 120 minutes to 66 minutes (45 percent)
- Reduced “bumped” surgical cases from 337 in three-month period to three
- Reduced ambulance diversion hours by 40 percent while increasing inpatient volume by 4 percent

Boston Medical Center (BMC) is a private, non-profit academic medical center with 567 licensed beds. It is the primary teaching affiliate for the Boston University School of Medicine, and it is the largest safety net hospital in New England. BMC houses a wide range of services, including a Level I trauma center, full service acute care, pediatric care, rehabilitation, and cardiothoracic surgery. The ED at BMC sees 121,000 patients per year.

Where They Started

In 2003, BMC faced ED crowding, significant ambulance diversion, and high rates of patients leaving without being seen. Structurally, the hospital lacked key performance indicators and a scientific methodology for managing hospital operations and improving patient flow.

Gaining Momentum for Change

Even before the project started, Elaine Ullian, CEO of BMC, was concerned about ED crowding and related patient flow problems. The CEO’s early involvement gave the hospital a jump-start, and the CEO, chief medical officer, and other senior management staff made up a core team of stakeholders that acted as a guiding coalition. This leadership buy-in, from the very beginning of the project, proved to be a major asset. The chief of surgery and the chief of anesthesiology were also involved as were nursing leaders who were concerned about the lack of scientific management and its negative impact on the nursing staff.

In addition to the leadership group, the hospital formed an inpatient team, an ED team, and a demonstration grant (surgical smoothing) team (see Special Demonstration Project, p. 24). Initially, all of the teams met weekly with the leadership group. These meetings became bi-monthly sessions towards the end of the project. One important characteristic of the project teams was that they were not committees that met to think about the problems but to ask, “What can we try today?”

Implementation

The hospital used a rapid cycle change model for improvement. The team first identified a specific aim or goal, e.g., reducing ED throughput time. They tested strategies on a small scale, and based on the results, extended or rejected them. For example, ED nurses historically had been assigned to patients randomly, which meant that nurses cared for patients in different areas of the ED. Nursing staff, led by the ED nurse manager, became interested in the concept of zone nursing, where nurses are assigned to patients in a particular area. Zone nursing is based on the engineering concept of “co-location;” because a nurse’s patients are located in a single area, the nurse does not have to run back and forth across the ED to treat them.

Nursing staff discussed zone nursing at their bi-monthly meetings and decided to test the concept using rapid cycle testing. The aim of zone nursing was defined as decreasing throughput and cycle times. During an RCT, one nurse was assigned to three to four stretchers in the ED. A week-long sample showed a reduction in throughput time of 70 minutes using the zone-nurse concept. Based on this success, the process was extended to the entire ED. Under the zone system, the non-acute section of the ED is divided into two parts, with nurses assigned to only one of the parts. BMC recently rolled out a team version of this concept in which there is co-location of the ED residents as well as the nursing staff.

This is one of many examples at BMC where staff involvement was essential to effecting change. The impact of changes such as this one can be seen in Figure 6, which shows the ED's average throughput time decreasing from 4.8 hours in July 2003 to 3.8 hours in April 2004, a 17 percent decrease.¹³

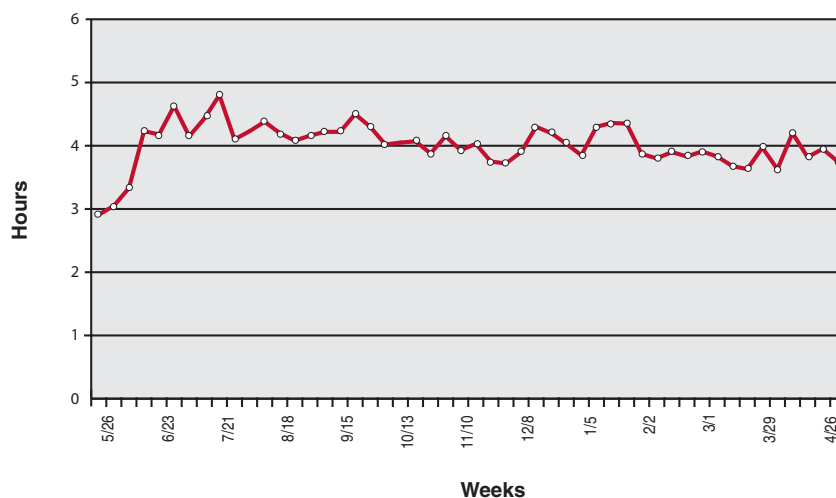


Figure 6
Average ED Throughput Time by Week, 5/26/03 – 5/3/04, Boston Medical Center

Overcoming Barriers

According to BMC chief medical officer, John Chessare, MD, MPH, the biggest barrier to improving patient flow is a lack of preparation by hospital managers for scientific management. Other service industries manage by specific cycle time goals, but people in healthcare are not schooled in that concept. BMC involved and prepared hospital staff by showing them how they would benefit from goal-oriented change.

Information technology is another issue. Software vendors have not been required to make throughput measures part of the capabilities of hospital computer systems. Dr. Chessare strongly believes that hospital staff must make throughput measures a priority and create technological solutions to measurement and data challenges. Since BMC was unable to capture all throughput measures using the existing computer systems, they had to create manual systems for tracking KPIs. In some cases, manual tracking of KPIs proved to be too cumbersome. For example, the time from bed assignment to the patient arriving in the bed took too much nursing time to collect, so BMC elected to stop collecting that statistic. Data collection was much easier in the ED, where the hospital had recently

“We were not measuring what we should be, and we didn’t know what we didn’t know.”

John Chessare, MD, MPH
Senior Vice President
and Chief Medical Officer
Boston Medical Center

¹³ According to BMC, some of the earlier data for this KPI in May and June 2003 may not have been accurate due to sampling issues.

implemented EDITs, a public source ED tracking system, which the hospital set up with the help of an ED physician. BMC will soon switch to an electronic documentation system (IBEX) for the ED that will include patient tracking capabilities.

Dr. Chessare believes the biggest learning experience of the project came from efforts to move inpatient discharge times to earlier in the day. A common assumption was that physician rounding patterns were restricting discharge times. However, the hospital successfully changed rounding times with almost no effect on discharge times. Moving up physician rounding times did not result in earlier discharge times. When staff investigated further, they found that the nurses had to finish their work before the patients could be discharged. Even when physicians began doing the work of discharge early in the morning, discharge times remained the same because nurses did not finish with the patients until mid-afternoon. From this experience, staff realized that making changes, such as modifying the time of patient discharge, would be an iterative process.

The problem with discharge times was more complicated than initially thought, and trying to change this process led to an increased understanding of all the bottlenecks in patient flow. Strategies for changing discharge times included making changes in the doctors' rounding times as well as re-organizing the nurses' work flow since both factors affected discharge times. Once these two constraints had been addressed, the hospital recognized other constraints in discharging patients earlier, such as arranging transportation for patients. Although BMC is still working to move up the discharge time for inpatients, they have a much better understanding of the issues involved in making this change and can systematically design strategies to facilitate the necessary changes.

Tools/Strategies

Pull System

One critical step taken by BMC was converting from a “push” system to a “pull” system for inpatient admissions from the ED. Under the old system, ED nurses repeatedly called to the floor asking if a bed was ready. Now there is a “bed-ahead” concept; as soon as a bed is assigned and cleaned, an inpatient nurse calls the ED to find out the estimated time of arrival for the ED patient. Dr. Chessare believes this system is better than admitting the patient to the floor before the floor is ready to accept the patient. The idea of moving ED patients waiting for admission onto the inpatient unit before they are ready puts patients at greater risk than when they wait in the ED.

Bed Cleaning Turnaround Time

Like The MED, BMC also needed to reduce the time for cleaning a bed. Since this process could take over an hour and meant that ED patients waited longer to be admitted, bed cleaning was identified as a bottleneck. To address this issue, Dr. Chessare met with the private contractor that provided bed cleaning services to the hospital to discuss a Bed Cleaning Turnaround Improvement Process. The contractor had been measuring the time it took to clean a bed, using a start time

of when the contractor's employee arrived in the room. When shown the much longer time between when the bed actually became available and when the bed was clean, the contractor understood the need for improvement. Given that bed cleaning services were provided by a private contractor, the contractor had an incentive to improve performance to secure the hospital's ongoing satisfaction and to ensure a continuation of their contract with the hospital.

As hoped, the concerted effort to reduce bed cleaning time succeeded, and the average bed turnaround time was reduced from 120 minutes to 66 minutes (45 percent). Once a bottleneck had been identified, it was possible to make changes to reduce or eliminate the delays it caused. In this case, the key was using the appropriate measure — looking at bed turnaround time when the bed first became available and not when the cleaning person arrived in the room. Measuring the right data and making it available to key stakeholders is essential to ongoing process improvement.

Scripting

Communication between the ED staff and patients can be a challenge, especially with 121,000 patients per year. By and large, BMC found patients were happy with their care but less satisfied with their communication with staff about that care. The ED team, eager to provide the additional patient attention needed to improve patient satisfaction, discussed improving customer service through the use of scripting. Scripting is a method of standardizing communications with patients, families, physicians, or other departments. By developing a set of statements with key words to be used in specific circumstances, such as discussing care with the patient, staff can ensure that communications include a consistent message and that all important messages are conveyed.

According to the ED vice chair, the team looked at the results of patient satisfaction surveys and determined several areas where standardized scripts would have the greatest impact. The committee developed scripts that were implemented to help improve communication between patients and all staff. To confirm that the scripts were being used, management checked with patients during administrative rounds. Initially, some staff felt that by implementing scripting the department was artificially telling them how to be nice. However, since the implementation of the scripts, the consensus has been that scripts helped promote a higher level of standardized patient care. Lessons learned while implementing the use of scripting include the importance of: (1) not trying to change everyone's behavior all at once; (2) finding champions to facilitate the acceptance of scripting; and (3) getting a first-hand view of patient satisfaction through management rounds.

Results and Next Steps

According to Dr. Chessare, the impact of BMC's surgery schedule smoothing initiative (see Special Demonstration Project, p. 24) was profound. One result was that BMC reduced the average nursing hours per patient per day in the surgical step-down unit from 8.66 hours to 8.16 hours, meaning the limited number of nurses was being used more efficiently. Many of the other efforts also contributed to reduction of the hospital's ambulance diversion rate. BMC addressed most

Scripting — Lessons Learned

- Behaviors don't change all at once
- Champions can facilitate acceptance
- Rounds help assess patient satisfaction

elective surgery issues and the majority of issues that the ED could control. They now admit patients as soon as clean beds are available.

Looking to the future, a major priority is working on smoothing discharge times over daylight hours (e.g. 9 A.M. to 8 P.M.). Ideally, the hospital would like the distribution to be fairly smooth, with an average discharge time of 1:30 P.M. That would benefit the ED, where the number one problem is late discharges from the hospital. BMC also is looking at a significant redesign of case management toward geographic case management.

When the project ended, the inpatient team took a hiatus and has since reconvened reinvigorated. The ED team is still meeting, and the leadership team has been reinvented.

Lessons for Other Safety Net Hospitals

BMC found that the following were key elements in their success:

- Implementing scientific management techniques
- Leading the way with top executive support
- Acting on challenges with teams, rather than merely discussing options in a committee format
- Utilizing techniques such as zone nursing — assigning nurses geographically within a particular area in the ED (co-location) to reduce inefficiencies
- Managing goals as an important outcome measure
- Measuring the right data and making it available to key stakeholders
- Involving staff in the change process
- Obtaining IT capabilities that allow efficient data collection
- Addressing multiple levels of constraints or bottlenecks in a single process
- Maintaining momentum for long-term process improvement.

Special Demonstration Project: A Surgery Schedule Smoothing Initiative to Improve Patient Flow at BMC

Boston Medical Center's elective vascular surgery schedule was becoming too concentrated on Tuesday, Wednesday, and Thursday. This created a bottleneck on those days while the schedules for Monday and Friday were fairly open.

In response to these bottlenecks, BMC initiated a project in collaboration with Boston University. On the BMC side, the Chief of Surgery and Chief of Anesthesiology led the process by implementing a Surgery Schedule Smoothing Initiative. They conducted a rapid cycle test, which revealed its potential benefit to the hospital. Subsequent meetings were held with the vascular surgeons to further discuss the concept.

It was a challenge to have surgeons change their clinic schedules in light of the new operating schedule, but they were promised that if they agreed to a maximum of two elective vascular surgeries per day, they could schedule more surgeries over the course of the week (e.g. ten rather than seven or eight).

As a result of the limit on daily surgeries, schedules are now much more evenly distributed Monday through Friday. That smoothing has, in turn, shortened the amount of time ED patients wait for an inpatient bed from about three hours to about two hours, ten minutes. This has been an important change. Due to the success of this initiative for vascular surgery, it has been expanded to cardiac elective surgery and other surgical specialties.

Additionally, the scheduling system was redesigned for one of the operating room areas. BMC's Menino Pavilion contains eight of the hospital's 20 operating rooms, and surgeries include pediatric, gastric bypass, obstetrics, and trauma cases. Previously, half of the schedule was set aside for block utilization, there was a 15-20 percent cancellation rate, and a third of the daily schedule consisted of add-ons. As part of the OR smoothing efforts, BMC aimed to smooth out this schedule and minimize urgent case waiting times and the bumping of elective cases.

A prioritization scheme was developed which called for emergent cases to be seen within 30 minutes, urgent cases from 30 minutes to four hours, semi-urgent cases from four hours to 24 hours, and non-urgent cases in more than 24 hours.

Under this scheme, one of the operating rooms was dedicated to emergent cases, and the other seven used block scheduling; but the surgery leadership proposed that open scheduling might result in further improvement. Open scheduling would improve flexibility, grant equal access to all surgeons, and promote booking well in advance. On the other hand, it would mean that a desired time might be taken if not reserved early enough, and cases would be less likely to be scheduled sequentially.

The open schedule system, with one OR dedicated to emergent patients, has been in effect since April 2004 and has been a success. As hoped, the number of elective cases bumped by emergent cases has dropped substantially. The only caveat is that one service has been unhappy about not getting the desired time because they did not schedule early enough. This success marks an important step in improving efficiency and reducing variability.

Grady Health System Atlanta, Georgia

Tools/Strategies:

- Centralized order entry in the ED
- Implementation of a discharge nurse position
- Care Initiation Unit for patients previously directed to the ED from the clinics
- Centralized Admissions and Transfer Center

Results:

- Time from arrival to bed placement (Fast Track patients) – 219 minutes to 94 minutes (57 percent decrease)
- Time from disposition decision to actual disposition (other ED patients) – 17 percent decrease
- Average total ED throughput – 6.8 hours to 5.3 hours (22 percent decrease)

Grady Health System is the largest public hospital-based health system in the Southeast and includes Grady Memorial Hospital, Hughes Spalding Children's Hospital, and 10 neighborhood/airport health centers. Grady Memorial Hospital (Grady) houses the Level I trauma center for the northern part of Georgia, as well as one of only two burn centers in the state, the state's poison control center, and the state's first Cancer Center of Excellence. Grady is licensed for over 1,000 beds of which 750 to 800 are in operation at any one time. Grady also has more than 100,000 visits annually to the main ED.

Where They Started

In 2002, ED patient satisfaction levels for Grady hit an all-time low in terms of patient perception of care and wait times. In addition, Grady faced several challenges related to ED crowding.

- Holding admitted patients in the ED while waiting for an inpatient bed was a consistent problem.
- The average patient throughput time in the ED sometimes exceeded seven hours and had gotten as high as 10 hours for Fast Track patients.
- ED crowding led to increased ambulance diversions. The hospital was on diversion for 2,000 hours (over 20 percent of the time) in 2003, a dramatic increase from just a few years before.
- The rate of patients who left without being seen increased. The number was estimated at approximately 200 patients per month or roughly 2.4 percent, although hospital reporting of this metric grouped these patients with patients who were not charged.

Gaining Momentum for Change

Grady identified major bottlenecks in the throughput and output stages of the I/T/O model of patient flow. In terms of throughput, patients presenting to the ED waited to be seen for many hours, which the hospital considered unacceptable. Additionally, problems such as an excessively long order-entry process extended patients' time in the ED. In terms of output, many patients waited a long time to be admitted following treatment in the ED. As a result, Grady undertook initiatives to address both areas of patient flow.

One critical component of Grady's ability to address these bottlenecks was the involvement of senior management in the hospital. According to Chief of Emergency Medicine Leon L. Haley, Jr., MD, MHSA, FACEP, a key lesson to others is that "these issues will not get solved without senior administration involvement." An overall steering committee was established; led jointly by the CEO and COO. This committee included broad leadership representation including the CNO, CFO, CMO, vice presidents, the chief of internal medicine, the chief of the children's

hospital, and others from the pharmacy, radiology, and other areas. This committee was responsible for understanding the overall impact of ED and hospital patient flow by addressing the patient's throughput time throughout the entire health system.

Separate teams focused on ED and inpatient issues. The ED team, which included the key ED leadership, had begun meeting before the project started. The inpatient team focused on initiatives for inpatients that ultimately would help decongest the ED. Another group, formed later, worked on smaller scale, more detailed interventions. This group was chaired by the CNO and comprised primarily of front line staff. Throughout the project, all of the groups met either twice a month or weekly.

With the assistance of the *Urgent Matters* faculty, the teams that had been established at Grady clarified their project goals and objectives. To establish targets, the hospital took a snapshot of their throughput data using the KPIs and set a goal of reducing all throughput measures by 25 percent.

“It was not unusual for the ED to have 120 patients, and for 30 of them to be admitted patients waiting for an inpatient bed.”

**Leon L. Haley, Jr., MD,
MHSA, FACEP**

**Chief of Emergency
Medicine and Deputy
Senior Vice President
Grady Health System**

Implementation

Even before beginning the *Urgent Matters* project, ED leadership at Grady had been meeting regularly and had been implementing changes to address problems with patient flow. However, adopting the principles of Rapid Cycle Change resulted in a dramatic increase in the number of changes being implemented. The existing teams met weekly to brainstorm about the focus for the upcoming weeks, to discuss possible initiatives to implement, and to identify possible resource requirements, such as moving a nursing position. The committee then selected a target start date and determined how long the test would last, e.g., one day, several days, one week. The duration of the test was determined primarily by the resources needed. If baseline data were not being collected regularly, sample data were collected prior to implementation of the rapid cycle test.

As a result of each team's brainstorming sessions, a new initiative was implemented almost every week under rapid cycle testing. When the team came up with a change, they put it in place on a pilot basis and tested whether it worked. When a change did not work, it was relatively easy to try a different initiative the following week.

Setting the expectation of developing a new initiative every week was a challenge. Dr. Haley reports that it was easy to keep the changes going early in the process, but, as more changes were introduced, it became difficult to keep up the momentum. Some interventions were given back to the staff for further testing, while other interventions quickly became part of the hospital's standard operating procedure. Not all changes succeeded nor could all changes be sustained. “Roughly 25 percent of changes don't work, 50 percent of the changes have potential, and the other 25 percent just become part of what you do,” Dr. Haley said.

Overcoming Barriers

Data collection was a significant challenge at Grady, but staff recognized the importance of the ongoing measurement of KPIs. The data collection process, largely a manual process, required chart review and collection of other data elements. However, Grady addressed this challenge with a variety of measures. The hospital used grant funds from *Urgent Matters* to hire a student part time to gather data. Volunteers and residents also helped with data collection efforts. A data coordinator funded by Grady managed the overall data collection process.

At the beginning of the project, the level of engagement required of inpatient staff had not been clearly communicated. Inpatient staff was unaware that they would be participating on teams and asked to work on new initiatives every week. As a result, inpatient staff saw the project as adding to their existing workload. Ultimately, the separate inpatient team was eliminated, and inpatient staff participated on other groups. Integrating inpatient staff with other committees led to significant gains in connectivity and collaboration and proved to be a more effective system for initiating change. The process of prioritizing changes through combined committees has since gained momentum on the inpatient side, particularly with the addition of a new chief nursing officer, who is highly engaged in the process.

A number of challenges were encountered in trying to quantify the effects of every change; the hospital found that certain changes were not completely quantifiable. For example, some of the changes helped the staff, but the impact or extent of the change could not be measured. Another challenge was that sometimes the data would show a change so small that it would be hard to push it forward. However, some of these changes still had long-term benefits.

Another challenge Grady addressed was the difficulty in spreading their innovations throughout the hospital. For the second half of the project, staff engaged in the change efforts worked on improving communication about the initiatives undertaken throughout the institution. A newsletter published by the ED highlighted the changes being made and facilitated internal communications regarding its efforts.

Tools/Strategies

Centralized Order Entry

ED staff had several concerns about the diagnostic test order entry system at Grady. The then-current system resulted in an inconsistent sequence of patient orders, poor prioritization of patient issues, a lengthy time to process orders, and related increases in ED throughput time. Under that system, lab and radiology orders were dropped in a box for the area charge nurse. As a result, as many as three or four orders were often held up until they could receive attention.

The ED team held brainstorming sessions to discuss potential improvements. The committee elected to test a new system in which orders would be placed in a rack on the unit clerk's desk. The clerk would be responsible for order entry with the assistance of nursing staff to ensure that all orders were entered in a timely manner.

“As a physician, you placed your order into the box. If the nurse was standing right there, great. If not, the order sat there until he or she returned. Many times, nurses would be working with patients and not even know that physician orders were waiting to be processed.”

Leon L. Haley, Jr., MD

Two phases of data collection were conducted. In the first phase, the old system was used and data were collected in one area of the ED over the course of three days, for a total of approximately 24 hours, with a sample size of 41 patients. In the second phase, the new system was used and data were collected in the same area of the ED over a course of 24 hours with a sample size of 38 patients. For both the old and new systems, the data collected included the following times: when the order was written, when the order chart was placed in the rack, when the unit clerk entered the order into the computer, and when the order was completed.

The benefit of using the new system was significant. Figure 7 compares the time from when the test order was placed in a rack to the time the order was entered under both the old and new systems. Implementing the new system resulted in a significant reduction in the time spent waiting for laboratory and radiology tests to be ordered. Under the old system, the wait times for this metric fluctuated greatly and sometimes meant a wait of 100 minutes or more, while under the new system, the wait time was typically 5-20 minutes.

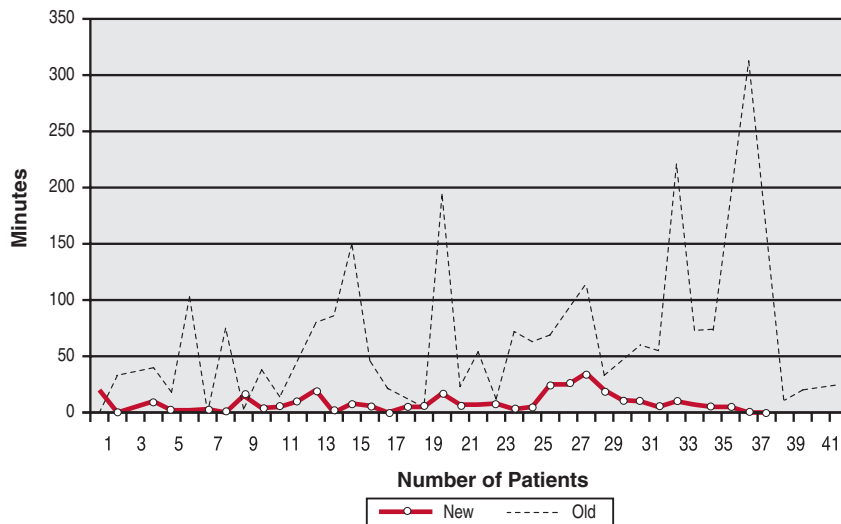


Figure 7
 Time from Test Order at Rack to Order Entered, Grady Memorial Hospital

Fast Track Improvement

In 2002, wait times soared to over 10 hours for patients in the Fast Track. Providers did not have a clear understanding of how long patients waited to be seen or how many patients were in the waiting room. Several modest initiatives were undertaken to improve Fast Track wait times.

First, the patient chart in-basket was moved from the information desk to the Fast Track in order to give the Fast Track staff greater ownership of the patients waiting to be seen.

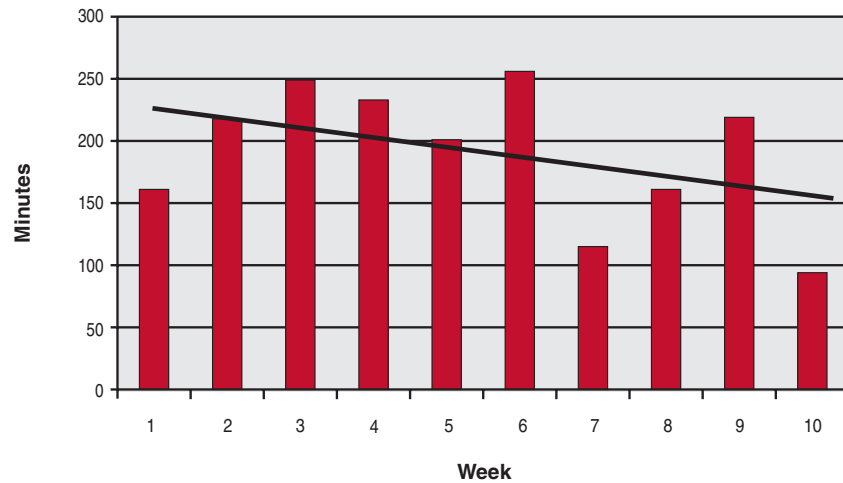
Second, staff members were counseled to proactively assess patients triaged to the Fast Track for ancillary services.

Finally, wait time goals were established and published, which provided high visibility of goals among staff. These efforts were rapid-cycle tested for two weeks, specifically weeks 9 and 10 of the project. The change in wait time during these weeks was substantial.

During the period in which the changes were implemented (weeks 9 and 10), the time from arrival to bed placement decreased from 219 minutes to 94 minutes, as shown in Figure 8, and productivity increased by 33 percent, from an average daily volume of 51 to 67. During this same period (weeks 9 and 10), overall throughput decreased from 5 hours, 40 minutes to 3 hours, 31 minutes for all visits for fast-track patients (data not shown).

Figure 8

Fast Track Average Time from Arrival to Bed Placement, Grady Memorial Hospital



Discharge Nurse

The discharge nurse audits charts to see which patients are ready for discharge and works with physicians to expedite the disposition process. Grady's ED added this position on a temporary basis and tested this change during three different weeks. During these times, there were significant decreases in average throughput times. In particular, the average time from disposition decision to actual disposition for those discharged from the ED decreased by 17 percent. Based on the success of the testing, funding has been secured to make the position permanent. The ED is now staffed with a discharge nurse approximately 8-12 hours per day.

Care Initiation Unit

The Care Initiation Unit (CIU) is a spin-off of the Care Management Unit (CMU) discussed in the Special Demonstration Project on p. 31, which officially opened in August 2004. The hospital converted the one remaining area capable of taking inpatients that was not already being utilized and designated the area as the CIU. This was largely the work of the new chief nursing officer, who arranged to have the beds staffed. The unit has a capacity of approximately 24 patients and typically houses 20 patients. The unit also has ICU capability (eight beds) as well as isolation and telemetry capabilities. The ED previously received patients from clinics that had closed and were redirected to the ED for completion of their care. With the implementation of the CIU, these patients rarely need to be seen in the ED.

Centralized Admissions and Transfer Center

Timely admission is a major issue given the frequent difficulty in finding an available bed. Grady considered the so-called “bed czar” concept that has been adopted by many hospitals and involves giving one person authority over many admission and discharge decisions. Grady did not choose to use the bed czar concept but instead created a centralized process for admitting patients. Now the Centralized Admissions and Transfer Center is responsible for facilitating admissions throughout the hospital and finding needed inpatient beds for patients as quickly as possible.

Results and Next Steps

As a result of efforts by all staff involved, Grady reduced the average time from disposition decision to actual disposition (non-Fast Track system). The hospital also realized the need for a new CT scanner and is continuing to monitor the performance of the lab after implementing a new lab system. The hospital’s efforts continue to reflect that ED crowding is not just an ED problem but a hospital-wide problem, and that solutions require hospital-wide collaboration including the involvement of senior leadership.

Lessons for Other Safety Net Hospitals

Grady’s success was based on strategies such as the following:

- Using the I/T/O model to identify bottlenecks in patient flow
- Leveraging senior management involvement to build project momentum
- Establishing specific, measurable targets early in the change process
- Involving inpatient staff in flow initiatives to gain their perspective, expertise, and collaboration
- Publicizing successes throughout the hospital
- Centralizing processes such as physician order entry to improve throughput
- Empowering staff to make decisions that improve patient flow.

Special Demonstration Project: A New Unit to Combine Observation Medicine and Case Management at Grady Memorial Hospital

Grady Memorial Hospital has implemented a unit called the Care Management Unit (CMU) to care for patients with specific diagnoses. The goals of the CMU are to improve access to primary care, decrease relapse rates, decrease admission to telemetry beds, decrease short stay admissions, and decrease cost.

The CMU is a seven-bed unit with four dedicated CMU nurses and four dedicated case managers. Admission criteria are chest pain (low to intermediate risk) (53 percent), heart failure (11 percent), asthma (33 percent), and hyperglycemia (3 percent).

Case manager duties include patient/family disease-specific education, primary care follow up (after 48-72 hours), direct phone follow-up, and database management.

The CMU has been especially beneficial at Grady, which has more patients requiring admission than do most EDs in the U.S. For example, from January through July 2002, the admission rate was 22 percent, whereas it was 13 percent nationwide. Patients waiting for admission from the ED often must be cared for by ED resources when an inpatient bed is unavailable, which impedes the movement of all other patients in the ED. The CMU is an excellent resource for improving that “output” bottleneck.

Following their stay in the CMU, 85 percent of the patients are discharged home, while 15 percent are admitted. The average length of stay in the CMU is approximately 19 hours. For congestive heart failure, the average length of stay is 19 hours, 49 minutes.

Additionally, the CMU has improved access to primary care. Data collected from September 2003 through February 2004 indicate all patients were given an appointment within 48-72 hours of their CMU visit. Forty-one percent of patients kept their appointment for the diabetes clinic, 44 percent kept their appointment for the dobutamine stress evaluation, and 44 percent kept their appointment for the medical clinic.

Going forward, the CMU plans to continue as a Center of Excellence, improve nurse staffing, improve documentation and compliance, include additional diagnoses, and consider expanding and obtaining additional funding. Additionally, the CMU plans to re-evaluate protocols to decrease the subsequent hospital admission rate, and to continue analysis of data points including a decrease in telemetry admissions, decrease in short stay admissions, decrease in the relapse rate, increase in patient satisfaction, and increase in cost savings.

Non-anticipated events have been a change in trauma volume, a change in staffing, a change in administrative support, data-gathering complications, and a patient tracking system not implemented.

However, overall, Grady has found the CMU to be a successful combination of observation medicine and case management. The multidisciplinary approach has worked well with coordination and support from hospital administration, nursing, the pharmacy, and outpatient clinics. Other gains have included physician billing for observation care, a positive impact on residents (in terms of compliance with Accreditation Council for Graduate Medical Education guidelines and workload), and research database creation.

Several specific goals have been accomplished by the CMU. There has been a decrease in the number of short-stay admissions, a decrease in the number of admissions to telemetry beds, a decrease in cost, a decrease in the relapse rate, and an increase in patient satisfaction. Grady is hoping to secure additional funding to move forward with expanding this concept.

The Bottom Line

For each of these institutions, improving patient flow was a process with different challenges. Yet it was also something they found they could fix without investing significant resources. While each hospital initiated different strategies to improve patient flow, several overarching themes emerged that drove success in each hospital's change efforts.

- **Hospitals must recognize that ED crowding is a hospital-wide problem, not an ED problem.** Hospitals that treat this simply as an “ED problem” do not understand or recognize the nature of the problem, and will achieve modest improvement at best.
- **Multi-disciplinary, hospital-wide teams are essential to overseeing and implementing change.** Given that this is a hospital-wide problem, the solutions need to be managed as such, breaking down the organizational silos that often block hospital innovation.
- **A “champion” for change must be identified or cultivated in the institution.** Someone with energy and leverage must lead the way and be willing to advocate tirelessly for improvement.
- **Senior leadership must send a clear and consistent message that improving patient flow is a priority.** Without support from senior management, the rest of the organization will not be able or willing to cut across the organizational barriers that pose an obstacle. The CEO should publicly support these efforts and set expectations for his/her team.
- **Hospitals must learn and use formal improvement methods, like rapid cycle change, on a daily basis — and track results.** These quality improvement methods should be simple and straightforward and aim to achieve results quickly in defined, limited areas. Otherwise, organizational attention will dissipate.
- **Institutions must commit themselves to using rigorous metrics, because “we can’t fix what we can’t measure.”** Most hospitals collect a limited amount of useful patient flow data.
- **Transparency around initiatives and data must become an organizational value, so that all stakeholders have the information they need to do their jobs.** Transparency means open sharing. Improvement becomes possible once staff know how things are now, and can see objective evidence of positive change.

All these factors work together to create sustainable improvement. If hospitals do not recognize that a crowded, backed-up ED is a symptom of broken processes across the house, they will find themselves continually frustrated by the failure of purely ED-centered initiatives. Similarly, they will fail to form the institution-wide teams needed to improve flow. Without a champion who has senior management's support, no one will be “minding the shop,” and the constituency for change will be weak at best.

The need for metrics is pressing; we found that many U.S. hospitals collect data on few measures relevant to patient flow. Such data needs to be available and transparent to all; it cannot serve one organizational silo. Further, it must be used to promote collaboration, spark healthy competition, and in the end, celebrate success.

While this approach may seem daunting, it will support the safety net in its honored mission of caring for those most in need.

Appendix A

Urgent Matters Overview

Urgent Matters is a \$6.4 million initiative of The Robert Wood Johnson Foundation to help hospitals eliminate emergency department (ED) crowding and help communities understand the challenges facing the health care safety net.

The program has three specific goals:

1. To improve the ability of safety net providers to respond to increasing ED volumes
2. To assess and highlight the state of local safety nets in select communities
3. To publicize the program's findings to local and national audiences.

To meet these goals, the initiative provided resources to 10 communities to increase understanding of the safety net and improve the timeliness and availability of ED care. Ten hospitals in those same communities worked as part of a Learning Network to develop and implement best practice strategies to maximize patient flow and relieve ED crowding. Of those 10 hospitals, four also received \$250,000 in grant funding for a special demonstration project to lessen ED crowding. All sites participated in a safety net assessment and community education process in conjunction with identified "community partners," helping to raise awareness about the state of the local safety net.

Urgent Matters communicates its lessons learned to a variety of local and national audiences, providing valuable management tools to America's hospitals while helping local communities craft solutions to the problems faced by their health care safety nets.

In its second phase, which began in February 2005, *Urgent Matters* is spreading innovation in patient flow through webinars, conferences, and a new Learning Network. To learn more, sign up for a free E-newsletter, which provides important tools and program updates. Also, download reports on improving patient flow and assessing the health of the safety net.

Urgent Matters is housed at Center for Health Services Research and Policy (CHSRP) at The George Washington University Medical Center's School of Public Health and Health Services. Program staff can be reached at info@urgentmatters.org.

Appendix B

Urgent Matters — National Advisory Committee, Program Staff, and Advisors

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 Hilo Medical Center (Hilo HI)
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Hennepin County Medical Center (Minneapolis MN)
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 High Desert Hospital (Lancaster CA)
 Martin Luther King/Drew Medical Center (Los Angeles CA)
 LAC+USC Healthcare Network (Los Angeles CA)
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 Rancho Los Amigos National Rehabilitation Center (Downey CA)
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 Bogalusa Medical Center (Bogalusa LA)
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 Memorial Hospital West (Pembroke Pines FL)
 Memorial Regional Hospital (Hollywood FL)
Memorial Hospital at Gulfport (Gulfport MS)
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 Bellevue Hospital Center (New York NY)
 Segundo Ruiz Belvis Diagnostic & Treatment Center (Bronx NY)
 Coler-Goldwater Memorial Hospital (Roosevelt Island NY)
 Coney Island Hospital (Brooklyn NY)
 Cumberland Diagnostic & Treatment Center (Brooklyn NY)
 East New York Diagnostic & Treatment Center (Brooklyn NY)
 Elmhurst Hospital Center (Elmhurst NY)
 Gouverneur Nursing and Diagnostic & Treatment Center (New York NY)
 Harlem Hospital Center (New York NY)
 Jacobi Medical Center (Bronx NY)

Kings County Hospital (Brooklyn NY)
 Lincoln Medical and Mental Health Center (Bronx NY)
 Dr. Susan Smith McKinney Nursing and Rehabilitation Center (Brooklyn NY)
 Metropolitan Hospital Center (New York NY)
 Morrisania Diagnostic & Treatment Center (Bronx NY)
 North Central Bronx Hospital (Bronx NY)
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 Broward General Medical Center (Fort Lauderdale FL)
 Coral Springs Medical Center (Coral Springs FL)
 Imperial Point Medical Center (Imperial Point FL)
 North Broward Medical Center (Pompano Beach FL)

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Santa Clara Valley Health & Hospital System (San Jose CA)

Stony Brook University Hospital (Stony Brook NY)

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