Acute care is dogged with waits and delays, particularly in the emergency department (ED). Events submitted to ECRI Institute PSO describe the effects on patients and staff as the ED confronts overcrowding: potentially compromised care as a result of delays in receiving needed care, delays in moving admitted patients from the ED to hospital beds, inadequate attention to patients in the ED waiting for a hospital bed, patients leaving the crowded ED to seek care elsewhere, and patient and staff frustration.

Some of the events related to ED crowding may contribute to serious patient harm. In one event reported to ECRI Institute PSO, a patient who had been triaged and was waiting for an ED bed was found unresponsive in the ED waiting room. The patient was taken to the operating room (OR) for emergency surgery and died a few days later.

Studies confirm that ED crowding can affect patient outcomes. One study found that patients who are critically ill who must wait six or more hours in the ED are at increased risk of a longer stay in the intensive care unit (ICU) and of dying while in the hospital (Chalfin et al.). Another study found that patients with pneumonia are less likely to get antibiotics within a recommended four-hour window if they are seen in a crowded ED (Pines et al.).

This issue of the national PSO Navigator reviews some of the events that are occurring as a result of ED crowding and provides an outline of strategies for tackling patient flow as a system-wide issue. By improving patient flow, hospital leaders can ensure increased access to care, shortened waiting times, reduced costs, and improved patient outcomes (IHI). Refer to “10 Steps to Better Patient Flow” for a summary of the strategies. While healthcare systems participating in accountable care organizations and other managed care arrangements are also evaluating ambulatory-based strategies to keep patients from requiring an ED visit or inpatient admission, this article is limited to inpatient initiatives to improve patient flow.

**Inpatient Capacity Affects Crowded EDs**

ED crowding is not simply an ED issue. In two reports on the crowded conditions in U.S. EDs, the U.S. Government Accountability Office said the factor most commonly associated with ED crowding was the lack of available inpatient beds, especially critical care and telemetry beds. When beds are unavailable, EDs must resort to boarding admitted patients in the ED until a bed becomes available. As ED beds fill up and ED staff are kept busy with patients waiting to be admitted, the department has even less capacity to manage incoming emergency patients. (GAO 2003; GAO 2009)

“One study found that a hospital’s ability to accommodate admissions from the ED may be compromised when the average bed occupancy rate exceeds 85%. If the average bed occupancy rises to 90% or more, the hospital is likely to face challenges finding inpatient beds for ED patients requiring hospitalization. (Bagust et al.)

“The size of the ED shrinks with every admitted patient [in the ED] who can’t get to their designated inpatient unit in a timely manner,” says
Linda Laskowski-Jones, RN, M.S., ACNS-BC, CEN, FAWM, vice president, Emergency and Trauma Services at Christiana Care Health System, a regional health system headquartered in Delaware that oversees EDs at Christiana Hospital and Wilmington Hospital and a free-standing ED in Middletown, Delaware.

System-Wide Solutions Needed
In a time of limited financial resources, hospital leaders are generally agreed that adding more capacity, at a capital cost of about $1 million per bed and $250,000 per bed in annual operating costs, is not a feasible solution to ED crowding and demand. (Litvak and Bisognano) What other options can they pursue?

Strategies focused on improving ED flow have had minimal success. At one tertiary hospital, where 50% of all admissions come through the ED, efforts to reduce length of stay in the ED led to reductions in the time it took an ED physician to see a patient, but the overall length of stay did not change, because patients admitted from the ED were still waiting for hospital beds (Resar et al.). Without improving the hospital’s capacity to receive admitted patients, the ED’s improvement efforts had limited effect. Another report of a five-hospital collaborative to reduce ED crowding found that the various strategies—ranging from expedited triage to a redesigned intake process for nonurgent patients—had “modest” effect because they did not incorporate larger efforts to improve hospital patient flow strategies (McHugh et al.).

The solutions to ED crowding require hospitalwide approaches. “If your goal is to move patients out of the ED faster, someone might ask, ‘What’s wrong with the ED?’ I say you need to look at the whole facility,” says Ken Rivers, FACHE, president and chief executive officer (CEO) at CHA Hollywood Presbyterian Medical Center, Los Angeles, who describes himself as “passionate” about the topic of patient flow because “I’ve seen that it can work.”

Patient flow management is the process of smoothing the peaks and valleys in patient demand for hospital resources to improve patient safety and care quality and to simultaneously reduce the stresses placed on staff and providers (Litvak et al.). Relieving congestion in the ICU, for example, can reduce the need to board patients in the ED and diminish ED crowding.

“You won’t solve the problem of ED crowding until the system looks at all the barriers to flow and has a system-wide approach to address them,” agrees Laskowski-Jones. “Avoid the bias that all evil is with one service. You have to look across the silos and connect the dots.”

Growing External Attention to ED Crowding
Outside the hospital, senior leaders confront growing pressure to address patient flow in their facilities. The Joint Commission has made patient flow management an imperative for hospital senior leadership by establishing a hospital accreditation standard for hospitals to manage patient flow throughout the facility (Joint Commission). The standard is part of the leadership chapter of the accreditation manual and addresses ED crowding as a hospitalwide concern.

The Medicare program is increasingly requiring hospitals to be more transparent about the effectiveness of their ED practices for managing patient flow. Under the Hospital Inpatient Quality Reporting program, the Centers for Medicare and Medicaid Services (CMS) includes seven measures related to ED patient flow (see “ED Patient Flow Measures”). The hospital-specific data is posted on the Hospital Compare website, which is publicly available. Not only is the data about a hospital’s ability to efficiently manage ED patients made public, but hospitals are penalized with a reduction in their Medicare payments for failing to report the quality measures.

As hospital leaders grapple with the consequences of ED crowding from a patient care and compliance perspective, they face additional pressures from their community peers. “They’re being approached by the fire chiefs . . . because the EMTs [emergency medical technicians] are spending hours in the busy EDs [waiting to hand off the patient] when they need to be in the community,” says Rivers.

The greatest challenge to improving patient flow may be getting started, says Rivers, who recommends tackling a piece of the patient flow puzzle, such as ED crowding, and “then start to unravel the rest of the puzzle pieces.” Refer to the discussion Lessons Learned for a summary of the essential 10 steps to help organizations begin to tackle patient flow improvements.
What We Are Seeing

ED WAIT TIMES TO SEE A PROVIDER CLIMB

The bulk of every hospital’s admissions are from the ED and OR. The ED is the source of up to 60% of all admissions, and elective surgery caseload in the OR is the source of up to 35% of all admissions. Only a small percentage of other admissions are from outpatient referrals and transfers from other facilities. (Litvak et al.)

When beds are unavailable for patients being admitted from the ED and OR, bottlenecks can occur. In the ED, one of the consequences of these bottlenecks is longer wait times to see a provider. The National Center for Health Statistics reports that the mean wait time in U.S. EDs increased 25% from almost 47 minutes to 58 minutes from 2003 to 2009 (see “Figure. Mean and Median ED Wait Time to See a Provider: United States, 2003 to 2009”). The number of visits to EDs is also increasing. From 1999 through 2009, the number of ED visits increased 32% from 102.8 million to 136.1 million. (Hing and Bhuiya)

As bottlenecks and ED wait times increase, there is a domino effect on ED patients and staff. EDs may be forced to board ED patients who are waiting to be admitted to a hospital bed. With more people boarding in the ED, its capacity to see patients is diminished, so the ED may need to divert ambulances away from the facility until it can adequately care for patients seeking emergency care. Patients who are waiting to be seen may leave without being seen, even though they are in need of care, or they may seek care at a competing facility. (GAO 2003)

Patient Safety Consequences

ED crowding can become a patient safety issue, says Laskowski-Jones. “The ED is good for stabilization, but it’s not an ICU.” The department and its staff cannot provide the same level of care as an ICU for patients who are waiting for critical care beds. Additionally, if patients must wait to see an ED physician, there is a greater risk to those...
patients who are medically fragile, such as a patient with sepsis who needs antibiotics on a timely basis to reverse the condition, she says.

One study reported that a hospital operating at or above capacity is at increased risk of experiencing patient safety events (Weissman et al.). The study found that at an urban teaching hospital with a 100% occupancy rate during much of the year, the adverse event rate increased 28% for every 0.1% increase in the patient-to-nurse ratio.

Reports of ED Crowding Submitted to ECRI Institute PSO

Events reported to ECRI Institute PSO confirm that these adverse consequences from ED crowding and longer wait times do occur. Refer to “Table. ED Patient Safety Events Reported to ECRI Institute PSO Reflect Patient Flow Challenges” for examples of these events occurring over the one-year period of May 1, 2012, through April 30, 2013.

ED Crowding’s Ripple Effect

ED crowding is a symptom of poorly managed patient flow as other hospital units face their own challenges to place patients in beds. These challenges are evident in reports submitted to ECRI Institute PSO and are also summarized in a report of a safe patient flow initiative at Yale-New Haven Hospital, New Haven, Connecticut. In addition to overcrowding in its adult ED, the hospital confronted the following before starting its patient flow initiative (Jweinat et al.):

- Delays in the postanesthesia care unit, which affected patient flow in its ORs
- Inability to admit patients to the first-choice unit where staff were trained to meet their disease-specific needs
- Increased handoffs as beds became available and patients could be transferred to the first-choice unit
- Caregiver inefficiencies when patients could not be geographically clustered by specialty service

One of the contributing factors was an imbalance between patient admissions and discharges.

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Event Description</th>
<th>Patient Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulance diversion</td>
<td>ED on diversion. More than half of the patients in the ED are awaiting an inpatient bed.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Care delay</td>
<td>Patient came to the ED with a nearly severed finger. Seen quickly in triage but did not see a doctor for several hours. Will extended wait time compromise reattachment of fingertips? Additionally, there were delays in providing the patient with pain medications and antibiotics.</td>
<td>Not provided</td>
</tr>
<tr>
<td>Handoff delay</td>
<td>ED holding multiple patients. ED nurse attempted to call unit nurse with report for patient admission. Nurse refused to take the patient, stating all the nurses on the unit were taking care of new admissions.</td>
<td>Adult (18 to 64 years)</td>
</tr>
<tr>
<td>Inadequate care while boarding</td>
<td>Multiple patients boarding in ED. Multiple medications, treatments, test orders missed or delayed. One patient had no skin check within a four-hour window after admission. Upon patient’s arrival to care unit, photographs were taken of a decubitus ulcer. No documentation to prove whether this is a preexisting condition. When ED must hold patients for an extended time, a nurse from the care unit, who is familiar with the required admit items, should be sent to care for them.</td>
<td>Adult</td>
</tr>
<tr>
<td>Left without being seen</td>
<td>Patient presented for treatment with cough, fever, wheezing, vomiting. Triaged within 30 minutes. After more than 9 hours of waiting, patient left without being seen. Only one physician available in ED. Almost 30% of patients have left AMA [against medical advice].</td>
<td>Child (1 to 12 years)</td>
</tr>
<tr>
<td>Patient safety event</td>
<td>Patient arrived in the ED and was triaged, but no ED beds were available. The patient was placed in the waiting room while the triage and charge nurses discussed the patient’s condition. Within an hour of waiting, the patient was found to be unresponsive and taken to an ED bed for a tracheotomy. The patient was taken to surgery and coded again upon arrival to the OR. The patient subsequently died.</td>
<td>Aged adult (85+ years)</td>
</tr>
<tr>
<td>Staff dissatisfaction</td>
<td>I was told that I would be working by myself in triage. I am concerned that this is very unsafe. When I am away from the desk, there is no body to watch for patients coming into the ED. At one point while I was triaging a patient, the security guard came to inform me that a person had arrived in the ED lobby with shortness of breath.</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
The hospital’s peak surge in patient admissions was in the central part of the day, yet discharges were not occurring until later in the day. There was no institution-wide coordination of patients. As a result, caregivers struggled to find beds for patients, resulting in long hours, fatigue, and reduced morale. (Jweinat et al.)

The hospital established its safe patient flow initiative with the goal to place “the right patient in the right bed at the right time, the first time.” (Jweinat et al.)

The end result from better patient flow is enhanced safety for the patient, says Rivers. “To have a patient not receive care timely at the right level of care can affect their overall length of stay and outcome,” he says. The discussion Lessons Learned summarizes how hospitals can get started to achieve a similar goal as Yale-New Haven Hospital’s goal.

Lessons Learned

OVERCOME THE CHALLENGE OF GETTING STARTED

1. Obtain Leadership Support
As with many improvement initiatives, leadership support is essential to the project’s success. Yale-New Haven Hospital’s patient flow initiative, for example, had executive sponsorship from the organization’s administrative and clinical leaders, with its president, chief operating officer, and physician senior vice president of performance management spearheading the project (Jweinat et al.). Christiana Care, with the support of its senior leaders, is conducting a system-wide patient flow improvement initiative, says Laskowski-Jones.

The goals of the project will capture leaders’ attention if they recognize that improved patient flow is not only better for patient care but also better for the organization’s overall capacity. If better patient flow management can reduce the average length of stay at a 400-bed hospital by one day from four to three days, “you’ve increased capacity by at least 25% without investing in more beds,” says Rivers. “That’s how you get the attention of the board, finance [department], and CEO.”

Just as important as leadership support is staff buy-in for the initiative. Leaders should identify project champions who can drive the successful execution of the project with frontline staff.

2. Identify the Project Goal
Get started by defining the organization’s goals, says Rivers. “What is the number one issue that you want to resolve?” Perhaps the organization’s goal is to decrease ED wait times or to improve the organization’s ability to discharge patients by 11 a.m. “Only after you establish your objective can you appreciate the different variables you need to tackle,” says Rivers.

Rivers recommends engaging medical staff members in defining the problems and setting objectives to achieve their support for a patient flow project. Medical staff support for the initiative is crucial because physicians and other professionals could be asked to change their behavior. For example, if the patient flow initiative seeks to establish better management of the OR schedule, physician support in staggering the elective surgery schedule is essential.

3. Approach Patient Flow System-Wide
Patient flow improvements depend on addressing the system-wide processes that cause breakdowns in moving patients through the facility. Examining departments in isolation to improve patient flow is ineffective. “It takes a village,” says Laskowski-Jones.

If the goal is to move patients through the ED faster, the initiative must still look at facility-wide processes, says Rivers. For example, how efficiently is laboratory testing and diagnostic imaging conducted in order to make a decision to treat, admit, or discharge the patient from the ED?

Because improved patient flow is a hospitalwide effort, Rivers emphasizes that the team overseeing the project must represent the multiple disciplines within the facility, such as physicians, caregivers, frontline staff, and environmental services. “You don’t need 50 people on the team, but you can seek input from these people in smaller groups.” Not only can the team members provide input on their area of
responsibility (e.g., environmental services staff have firsthand experience with the necessary steps to prepare a patient room), but staff will have ownership of any changes adopted to improve patient flow and will be more likely to accept the changes, says Rivers.

4. Gather Data
Data is needed to understand the peaks and valleys in patient flow. That means looking at utilization and census data as well as staffing levels to track any variation by day, week, and month. Where are there mismatches in capacity and demand? Say that the majority of patient discharges occur late in the day and that the ED census picks up in the afternoon. If the facility does not have sufficient housekeeping staff on hand late in the day to ensure that rooms that were previously occupied are ready for incoming patients, it has not done “demand-capacity matching,” says Laskowski-Jones.

In addition to utilization and census data, the organization will need other performance metrics. How much time do environmental services staff spend preparing a patient room? Once the room is ready, how long before the next patient arrives in the room?

Laskowski-Jones also recommends gathering observational data. If the organization is trying to improve patient flow in the ED, talk to the various individuals who are responsible for moving the ED patient to an inpatient unit. “Spend time with those in the ED who are responsible. What do they have to go through to get the patient out of the ED? Spend time with the person responsible for bed placement. What resources do they have? Then spend time on the inpatient unit and walk through the process of admitting someone.” Report these observations to the patient flow improvement team and begin to identify the barriers within the organization impeding patient flow, she recommends.

5. Learn from Others
Not long ago, the term “patient flow” would have yielded few results in a search of published literature on the topic. Today, with a growing interest in the topic, there is a wealth of published literature on patient flow (Litvak). Healthcare organizations reviewing their patient flow processes should consider strategies successfully adopted and described by others. Examples are as follows (see “Online Resources” for additional references):

Managing unnecessary variability in patient flow. While organizations do not have complete control over patients’ arrival at the facility, there are some peaks and valleys in patient flow that can be controlled. Variation that is random (e.g., patients arriving in the ED) cannot be controlled, whereas nonrandom variation in patient flow (e.g., elective surgery schedules) can be managed. (Litvak et al.) Cincinnati Children’s Hospital Medical Center, Ohio, used simulation models to determine the number of ORs it needed to set aside for urgent and emergent cases for weekdays, weekends, and nights. Scheduling of elective surgeries was also revised to take into account predicted need for ICU beds to smooth patient demand for ICU services. (Ryckman et al.)

Orchestrating patient discharges. The University of Pittsburgh Medical Center (UPMC) at Shady-side embarked on an initiative to better manage patient discharges because it found that its daily hospitalwide bed meetings were not producing a plan for accommodating patients each day. Additionally, it found that there was no consistency in how units defined discharges and available beds. As part of its patient flow improvement initiative, the hospital started by establishing definitions for terms such as “discharge,” available bed, and “admission.” Next, it developed a process to predict capacity by requiring units to have by 7 a.m. an accurate list of potential discharges for the morning. An early morning bed huddle for the unit, scheduled for 8:00 a.m. each day, reviews the list to decide how many patients could be realistically discharged that day. The information is conveyed in time for the hospitalwide bed meeting, with a goal of achieving 80% success in discharging patients by 2:00 p.m. To accomplish this goal, units assign someone like a patient flow unit manager responsible for ensuring that the necessary actions are in place to successfully achieve each patient discharge. The medical center also developed strategies for each unit to develop a plan if the hospital’s projections for bed demand on a particular day are greater than its projections for capacity. (Resar et al.)

Tracking bed availability. As part of its patient flow initiative, Yale-New Haven Hospital adopted
a bed management system to centralize the hospital’s bed management process and provide a central repository for information about bed availability. The system visually indicates whether a bed will be available the next day—red for “unlikely,” yellow for “possible,” and green for “very likely”—and also triggers the need for cleaning, establishing priorities based on when a patient will need the room. The hospital uses additional color displays to help the ED identify when a bed is available for ED patients waiting to be admitted. (Jweinat et al.)

6. Adopt Technology Wisely

While bed management systems to track bed availability have been used successfully by many hospitals, they cannot repair ineffective patient flow processes. “You need to understand your current state [with patient flow] and envision how the technology will help you achieve your goals for improvement,” says Laskowski-Jones. Christiana Care has adopted an electronic bed management system that is interfaced with a wireless patient, staff, and asset tracking system used in the system’s three EDs. The system tracks patient and staff movement and is used to manage workflow and to guide decisions on where to place patients in the ED. Laskowski-Jones says the tracking system was not adopted until the ED had examined its own processes to ensure they could benefit from the technology. Refer to “ECRI Institute Guidance” for information on ECRI Institute reports on asset tracking systems.

7. Standardize Processes

Wherever possible, organizations should standardize processes to improve patient management. UPMC at Shadyside’s approach to orchestrating discharges is an example of how a consistent approach to managing discharges can be used to better balance hospital capacity and demand. Yale-New Haven Hospital adopted a standardized process for room cleaning across all patient care units to better predict room turnover and availability. Other areas that might benefit from standardization to enhance patient flow include patient transport processes and laboratory and radiology results reporting.

To ensure patient safety, organizations should also have procedures in place for managing patients who are boarding in the ED. One of the events reported to ECRI Institute PSO found that a patient who was boarding did not receive a necessary skin check within an established time frame. Upon admission to the unit, staff noted that the patient had a decubitus ulcer, but because of the delay in conducting the skin assessment, they could not determine whether the skin condition was present before admission. The determination is needed because the Medicare program will not reimburse for the care to treat the condition if it is a hospital-acquired condition. Some facilities will send a caregiver from the unit where the patient will be admitted to the ED to assess the patient and to ensure that the same level of care is provided while the patient is in the ED.

8. Test Strategies before Full Adoption

When UPMC at Shadyside developed a plan for daily prediction of capacity and demand, the medical center tested the strategy on one of its units to see if it could achieve its goal to discharge the bulk of those patients identified for discharge by the early afternoon. Once it knew its goal could be achieved, it spread the initiative to other units. Pilot testing gives the organization an opportunity to modify the initiative based on any lessons learned or to go back to the drawing board if the pilot test fails. Pilot testing can also give the organization an opportunity to demonstrate to medical staff some of the benefits to their workflow from the initiative and to obtain their support for full implementation (Jweinat et al.).

Christiana Care is piloting several programs in its ED and inpatient care units that may improve patient flow, says Laskowski-Jones. For example, one test program provides case management for ED patients who can avoid admission, provided they can be directed to any necessary services within 24 hours. “If we don’t admit those patients, we have those beds for patients who need them,” she says. An initiative on the inpatient unit enlists the patient’s attending physician in using daily rounds to talk to the patient and family members about the resources the patient will need at home or the next level of care in order to be ready for discharge. By ensuring these resources are in place, the patient may be ready for discharge sooner.

Some organizations are also evaluating the impact of using clinical decision units in the ED to improve patient flow. The units are intended...
for ED patients who are not sick enough to require hospital admission but may need additional monitoring before they can be discharged to their place of residence. Possible candidates for these units include patients experiencing an asthma attack, dehydration, or chest pain after a heart attack is ruled out as the possible cause. The units should be housed in a dedicated space with the appropriate equipment, supplies, and staffing to meet patients’ needs. (ENA)

9. Establish Metrics to Monitor Progress
Once the patient flow improvement team has determined its goals and how they will be accomplished, it should establish a reasonable number of metrics to monitor its progress, says Rivers. He recommends keeping the metrics to a manageable number—about five metrics for each goal. “If you have more than that, all you will be doing is gathering data and not observing and learning.” The metrics can be used to monitor day-to-day performance and to keep senior leadership and the patient flow committee team members informed on a regular basis about the progress of the organization’s patient flow initiative.

For example, if the organization’s goal is to improve ED patient flow, CMS’s Hospital Compare measures for the ED can be used to track performance. If the goal is to improve the efficiency of the discharge process, one of the metrics to monitor, for instance, is the duration of time starting when a discharge order is made and ending when the patient is discharged.

As another example, if the organization’s goal is to improve patient flow in the OR, it might consider metrics such as the following:

- Percentage of first cases starting on time
- Percentage of cases completed within scheduled case time
- Room turnover time in minutes

With each metric, the organization might establish its own target. For example, for the ED patient flow measure for boarding time (average time the patient spends in the ED before being admitted to the hospital as an inpatient), the organization might set a goal for the boarding time to be less than four hours for 90% of the ED patients.

10. Plan for Surge Capacity
Despite an organization’s best effort to each day match its bed capacity with patient demand, it must have a plan in place for unexpected surges in patient numbers, such as peaks in demand during flu season. Simply operating in disaster mode is ineffective for managing these patient surges. “There are times when a disaster plan is appropriate, and it’s appropriate to have in place, but people should not live in disaster mode. It creates exhaustion,” says Laskowski-Jones.

The organization must have a plan in place to identify additional staff and resources to manage peaks in demand for services. “You can’t think this through in the middle of fighting a fire,” says Laskowski-Jones. For example, there may be staff members in management positions who previously provided patient care. The organization can identify in advance whether those individuals are qualified to handle certain patient care tasks if needed. To ramp up its available treatment space, Christiana Care’s largest hospital can convert a conference room near its ED into several bays for providing patient care.
REFERENCES


Drug Shortages Increased January 2007 through June 2013

Drug shortages are increasing, says the U.S. Government Accountability Office. The agency examined both newly reported and ongoing drug shortages from January 2007 through mid-2013 and found that while new shortages started to decline in 2012, the total number of shortages, both new and ongoing, has continued to climb each year. Many of the shortages are of generic sterile injectable drugs. The shortages force providers to ration some drugs in short supply or to find alternative drugs, increasing the risk of medication errors when they substitute an alternative drug. While the immediate cause for the shortages can be traced to manufacturers halting production of a drug, other underlying causes include manufacturers exiting the market for sterile injectable drugs because of their low profit margins. ECRI Institute has identified drug shortages as one of the top 10 patient safety concerns facing healthcare organizations in 2014. ECRI Institute PSO members can access a library of resources for coping with drug shortages on their PSO website.