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Study: Hospitals struggle to implement proven strategies for eliminating ED boarding, crowding

Hospital leadership needed to beat back resistance to innovative solutions

Emergency department administrators are well aware that crowding in the ED is associated with poorer patient outcomes, longer hospital stays, and decreased patient satisfaction. Yet a new study, published in *Health Affairs* makes the case that even in the face of steadily increasing demand for emergency care, EDs are failing to take advantage of proven strategies to ease crowding.[1]

Every ED has its own unique challenges, but **Elaine Rabin**, MD, the lead author of the study and an assistant professor in the Department of Emergency Medicine at Mount Sinai Hospital in New York, NY, suggests that one of the primary reasons for this failure is that patient boarding in the ED, one of the main drivers of crowding, is actually a hospital-level problem.

Patient boarding is the practice of holding admitted patients in the ED for long stretches of time, purportedly because inpatient beds are not yet avail-

EXECUTIVE SUMMARY

A new study suggests that proven strategies for eliminating boarding and crowding in the ED are being left on the table in many hospitals because leadership has not stepped forward to eliminate pockets of resistance. Further, there is new evidence that changes in practice intensity in the ED are contributing to crowding even though some of these changes were designed to do the opposite.

- Strategies that can ease crowding include smoothing out the schedule for elective procedures, moving boarded patients up to the hallways on inpatient floors, and appointing a bed czar to oversee bed utilization hospital-wide.
- Experts say such strategies are difficult to implement because they are hospital-level rather than ED-level problems.
- A new emphasis on physician satisfaction surveys is driving ED practice intensity along with changes in billing practices and technological innovations.

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able. Virtually no one approves of the practice, but boarding is nonetheless widespread, even though it adversely impacts an ED's capacity to care for new patients.

"The only way for boarding to be eliminated is for inpatient beds to open up more quickly for ED patients," explains Rabin. But actually getting the staff on inpatient floors to turn over the beds more quickly requires interdepartmental coordination, she adds. "It has been pretty clear from the people who have actually solved this problem that unless the leadership of the hospital is behind this, it doesn't happen."

Further, some hospital administrators appear to be more incentivized to address ED boarding than others, depending on the payer mix a hospital is accustomed to dealing with. "There are some hospitals where the majority of reimbursement comes from admissions through the ED, and there are hospitals where that is not true, so this will vary ... but there is a good amount of anecdotal evidence that hospital leadership is, in some cases, actively saving beds for better reimbursed patients."

Smooth out the schedule for elective procedures

What can hospitals do to reduce crowding? The *Health Affairs* study highlights several strategies that the authors suggest can remove admitted patients from ED hallways and facilitate throughput. For example, at many hospitals, scheduled catheterizations and elective surgeries are heavily booked in the early part of the week. The authors note that taking steps to smooth out this schedule so that procedures are evenly booked throughout the week can go a long way toward eliminating patient surges and the accompanying bottlenecks that can lead to boarding.

The strategy sounds like an easy fix, but Rabin suggests that hospital administrators often run into obstacles when trying to even out the schedule in this way. "There tends to be a lot of resistance up front, and certainly hospital administrators don't want to alienate surgeons who bring in a lot of money by trying to force them to operate on days when they don't want to operate," she says.

However, Rabin suggests that hospital leaders at Boston City Hospital, for example, have had success working closely with their surgeons to gradually smooth out the schedule so that elective procedures are not so front-loaded in the early days of the week. "It took a lot of gentle massaging of politics, but once it happened, the surgeons actually liked it better because without over-booking, the operating rooms actually ran on time and their schedules were more predictable," she says.

Move boarded patients to inpatient hallways

Another strategy highlighted in the study involves moving patients boarded in the ED up to inpatient floor hallways where they can wait for a bed to be

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opened. "**Peter Viccellio**, MD, [clinical director of the Department of Emergency Medicine at Stony Brook University Hospital in Stony Brook, NY] is a big advocate of this, and he has demonstrated that it is safe," observes Rabin.[2] "It would be hard to argue that being on a quiet hallway on an inpatient floor is going to be worse for patients than being in a loud environment in the ED where the nurses might have 10 other patients and the doctors have their attention spread thin as well."

Advocates of this approach, such as **Stephen Pitts**, MD, MPH, an associate professor in the Department of Emergency Medicine at Emory University in Atlanta, GA, say the approach should be a slam dunk. "The ED is the worst place [for these patients] because that is where you need the new beds to turn around, and yet that is where patients end up because that is the tradition. This is an underused strategy," says Pitts. "The concept of taking patients who are in [the ED] hallways and putting them in the hallways in front of a bed they are about to occupy, makes perfect sense from the standpoint of safety and quality and, in fact, when a patient does get up onto an inpatient floor, their bed is often cleaned and ready to go more quickly."

However, Pitts points out that the strategy often becomes difficult to implement because of resistance from inpatient staff. "This is an added burden for them with no benefit," he says. "It would be much easier for them if the patient stayed in the ED until the inpatient bed was ready." In light of this resistance, Rabin suggests this is another clear instance in which hospital-level leadership is required for successful implementation.

Put a bed czar in charge of patient flow

A third anti-crowding strategy that an increasing number of hospitals are gravitating toward is the creation of a new position, often referred to as a bed czar, to oversee bed utilization and take charge when bottlenecks occur. "Everyone who works in the ED knows that when there isn't someone looking at the big picture, things get lost," says Rabin, noting that you can have one patient waiting for a bed on an orthopedic service for a day and a half while there are 10 beds available on the renal service. "Having someone oversee all of that makes a big difference."

Pitts agrees, explaining that it is a full-time job to make sure patients are moving through the system efficiently. "It used to be common for us to have horrible congestion in the ED with no space to see new patients, and I would go upstairs to see all of these supposedly uncleaned beds … and I would see one bed after another open for business, so there was this huge disconnect over what was being told and what was actually happening up there," he says. "These bed czars are the people who can actually match supply and demand and ease some of the congestion in the ED."

The most effective bed czars tend to be people with clinical as well as administrative skills, says Rabin, because it is important to have an understanding of which patients can safely go to what services. "Their territory is the whole hospital," she says.

"The underlying concept behind the bed czar, and really all of these solutions, is that the ED operates 24/7, but the rest of the hospital traditionally has not, so that can cause a lot of inefficiencies where patients might stay half a day longer than they need to just because they are waiting for a certain specialist who doesn't come in until 3 o'clock in the afternoon," explains Rabin. "Having a bed czar and having services available more hours in the day can make throughput more efficient."

Consider impact of practice intensity

While the link between boarding and crowding in the ED is crystal clear, less well-understood is the impact that practice intensity has had on ED crowding in recent years. To look at this issue, Pitts and colleagues analyzed patient data for ED visits between 2001 and 2008. They found that visits to the ED increased 60% faster than population growth during this period, and that crowding grew even more rapidly, mostly because of diagnostic tests and treatment intensity.[3]

In fact, Pitts suggests that the front loading of blood work, X-rays, and other tests ordered during triage may well be bogging down patient flow rather than speeding things along, as the practice was intended to do. However, he adds that some of this intensity has been driven by research findings and technological innovations.

"If you were to come in with chest pain in 2000, the chances of having a CT scan of the chest were much lower then they are now just because CT scan of the chest is now viewed as a good test for pulmonary embolism, but it wasn't back in 2000," explains Pitts. Similarly, ultrasound, which used to be rarely used in the ED, is now used routinely in some cases, he says. "People get more stuff done to them these days, but they are also discharged from the ED much more frequently than they used to be, so it saves inpatient resources in a sense. However, this front loads the ED with all the work that used to be done in the hospital."

While changes in the practice of medicine have

driven much of this intensity, Pitts observes that it is also important to consider that the population of ED patients has also rapidly become older and sicker. During the study period, researchers found that Medicare patients aged 45 to 64 grew faster than all other age groups, and this group includes patients who tend to be poor, disabled, and cognitively challenged, says Pitts.

"In 2009, 38% of the Medicare patients under the age of 65 were also Medicaid recipients, but even patients who are not dual-eligible are sicker in general, and they are less able to manage their affairs," explains Pitts. "The character of patients [who come to the ED] has changed, so the input part of the equation has changed. The output — the ability to admit patients upstairs — has changed, but the throughput has also changed because we are doing more stuff to the same people who have arrived."

Pitts acknowledges that at least some of this increased practice intensity has improved care, but there have also clearly been consequences on patient flow. "I started practicing in 1980, and I used to see 30 patients in a shift not uncommonly because we discharged people without further ado," he says. "I am lucky to see 15 patients in a shift now because of the complexity of the workup."

Billing, satisfaction surveys push intensity of care

Pitts observes that there are two other "forces" that have driven up practice intensity and adversely impacted patient throughput. First, he points to Medicare's adoption of Evaluation and Management Coding (E/M) — the method of billing for services that was adopted in the late 1990s. "This really put a massive break on turnaround times and the ability to see a lot of patients, because in order to collect money, you had to do lots of stuff," explains Pitts.

The approach, which has become common practice among all payers, has led to over-documentation for relatively minor complaints, says Pitts, but he also stresses that E/M coding enables clinicians to collect more money from the same patients because more services are documented.

Also, while perception of legal risk is undoubtedly responsible for some overtreatment, Pitts suggests that a more important driver of utilization is the increasing practice of grading ED physicians on patient satisfaction surveys. "Patients are far more satisfied if you do a lot of stuff than if you don't; there is no doubt whatsoever about that," says Pitts. "It is clear that people think they get better care when they get more care."

While a massive expansion of primary care access could take some of the pressure off of EDs, Pitts suggests it is unlikely that the trend toward providing more care in the ED is going to reverse any time soon. "Skimping on care is nobody's favorite strategy; it is going to be very hard to do that." ■

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Slash diversion, improve care of boarded patients with an ED-based hospital medicine (HMED) team

Successful HMED intervention depends on strong ties between hospitalists and ED physicians

One of the problems associated with the boarding of admitted patients in the ED is that the practice inevitably leads to increased diversion when the ED's capacity to care for new patients is diminished. This is precisely the problem that Denver Health Medical Center (DHMC) in Denver, CO, was dealing with in 2009. Too often, incoming emergency patients had to be diverted to other hospitals because

the ED was backed up with boarded patients. And every hour on diversion was costing the hospital an estimated $5,000 in revenue.

Administrators were determined not only to reduce the amount of time the ED spent on diversion, but also to ensure that patients who were boarded in the ED were well cared for. The solution they came up with was the creation of an ED-based hospital medical team (HMED) that could divide its time between working with nursing supervisors to appropriately manage patient flow while also taking charge of the care of admitted patients who were still awaiting inpatient beds.

In a study that compared the results of this intervention, measured from August 1, 2009, to June 30, 2010, to a control period when the HMED team was not in place, from August 1, 2008, to June 30, 2009, investigators found that the HMED approach made a significant 27% dent in diversion, tied to lack of bed capacity. Also, discharges of admitted patients from the ED increased by 61% during the intervention period when compared to the control period.[1]

Researchers note that patient characteristics and ED volume were statistically similar during the control and intervention periods. The ED saw approximately 50,000 patients during the years, including both the pre- and post-intervention periods, explains **Smitha Chadaga**, MD, the lead author of the study, and associate chief, Division of Hospital Medicine, DHMC.

EXECUTIVE SUMMARY

To cut down on diversion time, Denver Health Medical Center in Denver, CO, decided to locate a hospital medicine team in its ED (HMED). The HMED team focuses on streamlining patient flow as well as caring for patients boarded in the ED. The approach has proven successful, slashing diversion by 27% while also increasing discharges from the ED by 61%, according to a pre and post study of the intervention.

- The HMED team includes a hospitalist and an allied health professional who are both housed in the ED during the daytime shift, from 7 a.m. to 5 p.m.
- The HMED team spends 75% of its time taking care of admitted patients who are boarded in the ED, and 25% of its time working on patient flow.
- Emergency department physicians say having immediate access to an admitting team streamlines the admitting process and helps to ensure that patients are sent to the most appropriate floors for care.
- A successful HMED intervention requires commitment to the approach from hospitalists, and a willingness among ED staff to have a hospitalist team located in the department, according to hospital sources. A productive relationship between ED physicians and hospitalists is key.

Involve stakeholders in a trial

Chadaga explains that the idea for an HMED team grew out of a four-day "rapid improvement experiment," one of the Toyota Lean processes that DHMC utilizes when it endeavors to make improvements. "We had emergency department physicians, hospital physicians, utilization management, social work, nursing, and we even had some people involved who didn't have any stake in the outcome just to provide some objective opinions," she recalls. "This solution was devised using input from everyone in the group so, therefore, a lot of the issues that would normally crop up, just in terms of territory or job descriptions, were ironed out during the experiment."

Each person who took part in the experiment then had the task of going back to his or her work environment to report, and then the intervention was deployed, notes Chadaga.

"The hospital medicine team is made up of a dedicated attending hospitalist and a dedicated allied health professional (AHP)," she says. "During the day shift, from 7 a.m. to 5 p.m., the hospitalist and the AHP are housed in the ED, but during the swing and night hours, the hospitalists on those shifts are covering the entire hospital, but the responsibilities of the HMED team are rolled into those duties."

What was required on the part of the ED to accommodate the HMED team? "The first piece of it was real estate. We built this ED with a nine-bed unit that we called a flex unit with the idea that it could be used for observation or for overflow or for surge capacity," explains **Lee Shockley**, MD, FACEP, clinical director of Emergency Medical Services at DHMC, and co-author of the HMED study. "We have repurposed that and made it essentially an inpatient unit in the ED to be run by the hospitalists, so we did lose nine beds of our capacity in the ED, but what we gained from it was the ability to keep boarded and observed patients in the same location."

There was virtually no resistance to the HMED team because the intervention was rolled out first on a trial basis to see if it would work, explains Shockley. "People were happy to give it a try," he says.

Consider patient care and patient flow

As a level 1 trauma center, there are times when DHMC runs at capacity and the medical floors cannot accept any more patients, observes Chadaga. "In those instances, admitted patients are housed in the ED and the HMED team provides ongoing care to these patients."

Chadaga notes that the HMED team spends about

75% of its time providing patient care to admitted patients in the ED. The team then devotes the remaining 25% of its time to optimizing patient flow. "We have access to the bed board and we work with our nursing supervisors to help get patients to the right floors the first time, especially when patients are boarding in the ED," she says. This is important, notes Chadaga, because in the past, nursing supervisors only had a patient's place in the queue as a guide for when to put patients on an inpatient floor.

"If a patient was in the ED the longest, that patient got put on the inpatient floor first, but patients who have been in the ED for the longest period of time have the greatest likelihood of being discharged," she explains. "Working with the HMED team, which is primarily taking care of admitted patients, we are able to better communicate who is ill and who is closer to discharge. This prevents people from going upstairs to the medical floors only to be discharged shortly thereafter."

Streamline the bed-designation process

From an operations standpoint, the clock starts ticking whenever the ED makes a request for a bed. "If the patient has not been assigned to a floor within an hour, that patient automatically is eligible to [come under the care of] the HMED team," says Chadaga. "ED staff will call that attending when they are ready to give a report, and unless a bed can be found by working with a nursing supervisor, the patient is then under the purview of the HMED team until the patient is assigned to a hospital floor, and then the HMED team will sign that patient out to the floor team."

While all the hospitalists rotate through the HMED team on the swing or night-time shifts, the responsibility of managing patients in the ED who have already been admitted, rounding on them, and then also admitting new patients represents "somewhat of a skill set," observes Chadaga. "All of our physicians are capable of doing it, but we do have a core group of about nine attendings who rotate through the day-time HMED shift just to develop the relationship with the ED and learn the ins and outs of hospital flow and ED inpatient management."

Shockley agrees that the ability of ED clinicians to establish a strong relationship with hospitalists has driven the success of the HMED team in improving patient flow. "Prior to the HMED team, we would make a determination on where a patient needed to be admitted, an admit form would go in, and there was typically a delay before we had a chance to communicate with the internists on the inpatient side of things," he explains.

Once the inpatient staff were consulted, the patient's destination would often change in a process that typically involved a fair amount of rework, adds Shockley. "Having one person to go through in this hospitalist service really streamlines the entire process where we can talk to one admitting team, and they can help in making determinations on where each patient can best be served," he says. "We work with [the HMED team] very closely. It is frequently a matter of a phone call where we ask if they can step over and take a look at a patient. It is much easier than trying to call someone down [from an inpatient floor] who has other things he or she is trying to attend to."

Establish close ties with hospitalists

Since the HMED team was first implemented in 2009, the objectives of the service have changed a bit to accommodate a physical expansion that included the construction of an observation unit in February of 2011. "The HMED team is still housed in the ED, but we now take care of patients in the observation unit, as well as patients who are boarding in the ED until a room opens up on a medical floor," explains Chadaga.

The observation unit expands the options available to ED clinical staff, observes Shockley. "We have the ability to not take an inpatient bed, but rather have the patient placed in our observation unit that is part of the ED, run by the hospitalist team," he says. "It makes transport a lot easier, and it makes disposition a bit easier."

While the HMED team has been a good fit for DHMC, Chadaga stresses that this doesn't necessarily mean it would work well in all ED settings where there are problems with throughput. "I think it depends on what your issues are. If ED physicians have questions about which service to send patients to, then perhaps establishing a full-consultation relationship with hospitalists could speed up flow. If the issue is that there is a lack of communication about which beds are open upstairs, perhaps opening up more dialog between nursing supervisors and hospitalists might work," she explains. "But if you have a lot of boarded patients in the ED who need care, then actually physically [having a hospitalist] located in the ED can work."

There are many different components to patient flow, observes Chadaga. She adds that the success of any particular intervention will depend on staffing levels, an ED's specific needs, and support from the institution. Another factor that can impact effectiveness is satisfaction with an intervention among clinical and administrative staff.

At DHMC, anonymous surveys were distributed to both nursing supervisors and ED attendings one

year after the HMED team was introduced. Results showed 87% of respondents felt that the intervention delivered a positive impact on clinical care for boarded patients, communication, and patient throughput.

The one critical requirement to making an HMED team intervention successful is commitment from both the hospitalists and the ED physicians, stresses Shockley. "You need to have a group of hospitalists who are committed to a project like this and committed to communicating with the ED physicians, and a group of emergency physicians who are accepting of having a hospitalist in their department," he explains. "Everything after that is fairly easy. It is just a matter of finding space available and finding the proper procedures to follow, but the foundation is the relationships." ■

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The Joint Commission reports high interest in new certification program for Comprehensive Stroke Centers

New certification program offers potential for improved recognition, reimbursement

More than 900 hospitals have been certified as Primary Stroke Centers since The Joint Commission (TJC) and the American Heart Association (AHA)/American Stroke Association (ASA) introduced the Primary Stroke Center certification program back in 2003. But now both TJC and the AHA/ASA believe the time is right to enable hospitals capable of treating the most complex types of stroke to seek designation as Comprehensive Stroke Centers, a higher level of certification that recognizes institutions with the advanced resources, technology, and personnel to care for patients with the most severe and challenging types of stroke.

The accrediting agency says the new program, which was launched September 1, has already attracted considerable attention and interest from hospital administrators who believe their centers could benefit from the higher level of certification. At press time, dozens of hospitals were in the process of seeking certification as Comprehensive Stroke Centers, explains **Jean Range**, MS, RN, CPHQ, the executive director of Disease-Specific Care Certification at TJC.

"We believe that this is really the next step in providing a mechanism to support organizations that are looking to provide state-of-the-art care for patients with stroke," says Range. "This [type of designation] is also being added to some state-based and county-based legislation as well, so it makes a lot of sense to move to comprehensive stroke certification at this time."

Expert panel calls for higher-level program

As with the move to establish a certification program for Primary Stroke Centers, the new higher-level certification program is in response to recommendations by the Brain Attack Coalition, a multidisciplinary panel that includes representatives from professional groups such as the American College of Emergency Physicians, the National Institutes of Health (NIH), the Congress

EXECUTIVE SUMMARY

Hospitals with the advanced resources and personnel capable of providing state-of-the-art care for the most complex types of stroke can now seek certification from The Joint Commission (TJC) as a Comprehensive Stroke Center. The move follows recommendations by the Brain Attack Coalition, an expert panel that established criteria for Comprehensive Stroke Centers. The concept is designed to strengthen a network of stroke care in the country similar to the system in place for trauma care.
The certification process includes a two-day, on-site evaluation by TJC reviewers.
• Experts anticipate that about 200 medical centers will become certified as Comprehensive Stroke Centers.
• Comprehensive Stroke Centers should serve as referral centers for the more than 900 Primary Stroke Centers as well as other hospitals that are not equipped to care for complex stroke patients.

of Neurologic Surgeons, the American Academy of Neurology, the Centers for Disease Control, the AHA/ASA, and other groups that are responsible for stroke care in the United States.

"We all convened over the course of several years under the auspices of the NIH, and we developed these criteria. We researched them, we vetted them, and got them published," explains **Mark Alberts**, MD, FAHA, a professor of neurology and chief of the Division of Stroke and Cerebrovascular Disease at Northwestern University in Evanston, IL, and a spokesperson for the AHA/ASA.[1]

Alberts explains that Primary Stroke Centers were designed and conceptualized to deal with the large number of stroke patients who have "relatively uncomplicated strokes." These are typically ischemic stroke patients who don't require a lot of emergency interventions, endovascular therapy, or surgery, he says.

"The elements, the processes, the personnel, and the infrastructure of a Primary Stroke Center would be perfectly capable of taking care of a run-of-the-mill, uncomplicated stroke patient," notes Alberts. "However, when you start talking about patients with large strokes, complicated strokes, hemorrhagic strokes, or strokes in the setting of multi-system disease or failure, then you really need the resources, personnel, and the infrastructure of a Comprehensive Stroke Center."

Which hospitals should consider becoming certified as Comprehensive Stroke Centers? Alberts says that many of the large academic medical centers that are referred have very sick, very complex patients who require advanced diagnostic and treatment approaches that fit the definition of a Comprehensive Stroke Center. However, he adds that some large community hospitals may have the resources and specialists to fit the definition as well.

"Getting certified might be advantageous in terms of increasing their recognition, increasing their profile, and, maybe even down the road, with government agencies and insurance carriers, perhaps supplementing their reimbursement because the elements of a Comprehensive Stroke Center should translate into better outcomes," observes Alberts.

Program builds toward a stroke system of care

However, Range emphasizes that it is clear that not all Primary Stroke Centers should even consider this advanced level of certification. "Our objective and our mission is to improve the quality of care for patients and safety, and so clearly we would like to see organizations that are appropriate for the designation of Comprehensive Stroke Center step up, and we would like to see organizations that are candidates for seeking certification as a Primary Stroke Center continue to come forward as well, and they are doing so," notes Range. "Ultimately what we would like to see is Primary Stroke Centers working collaboratively together with regional Comprehensive Stroke Centers in almost a system process."

Alberts agrees, explaining that an underlying concept behind the different levels of certification is to have a well-defined stroke system of care that has some similarities to the network of trauma centers in which there are different levels. With respect to stroke care, Alberts sees four different tiers of hospitals.

"At the very bottom would be hospitals that don't do stroke; they have no interest or expertise. A tier up from that would be hospitals that are acute stroke-ready hospitals that would be able to receive acute stroke patients, diagnose, and then stabilize them, and then very rapidly transport them to either a Primary Stroke Center or a Comprehensive Stroke Center," he explains. "These acute stroke-ready hospitals would typically be very small hospitals in small cities or rural locations, and they would network with a Primary Stroke Center if they had a patient with an uncomplicated, straightforward stroke, or a Comprehensive Stroke Center if it looked like the patient had a large stroke, a bleeding stroke, or something that was going to be very complex to diagnose and treat."

The Primary Stroke Centers are the foundation of the system, says Range, describing them as hubs with many spokes. While there are nearly 1,000 of these centers across the 50 states and Puerto Rico, most experts anticipate that there will ultimately be about 200 Comprehensive Stroke Centers. "This fits with the description that these will be referral centers that provide a different level of services," she says.

Certification includes two-day, on-site evaluation

The Comprehensive Stroke Center certification process includes a two-day, on-site evaluation by two evaluators from TJC, explains Range. "However, depending on the outcome of this evaluation, there may be corrective action plans that need to be developed," she says. "Certification is not awarded until those corrective action plans have been accepted, and any requirements for improvement have been cleared."

Since the time it takes to become certified can vary, it was not yet clear when the first Comprehensive Stroke Centers will become certified. However, there is high interest in the new program, according

to **M.J. Hampel**, MPH, MBA, the senior associate director of Disease-Specific Certification at TJC. "I am not quite as busy as I was back in 2003 when we launched Primary Stroke Center certification, but the questions we have been getting are very detailed around the requirements," she says.

For example, Hampel explains that many hospital administrators want to know what the case volume requirements are for institutions that are interested in becoming certified as Comprehensive Stroke Centers. She notes that the requirements state that hospitals must:

- receive a minimum of 20 subarachnoid hemorrhage patients per year;
- perform a minimum of 15 endovascular coiling or surgical clipping procedures for aneurysm per year;
- administer IV tPA to an average of at least 25 eligible patients per year.

Ultimate goal: Improved outcomes

In the next few months, Alberts anticipates that dozens of hospitals will become certified as Comprehensive Stroke Centers, and he believes that patients will ultimately benefit from a strengthened network of stroke care. "The bottom line for me has always been improving patient outcomes," he says. "At a Comprehensive Stroke Center, we are dealing with the sickest stroke patients, the most complex patients, the patients that require the most intensive care, and, in some cases, require surgery or other interventions. For those patients to have a better outcome in terms of reduced death or disability is a very good outcome for patients and it is a good outcome for the health care system in terms of using our limited resources in an efficient manner." ■

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SOURCES

• **Mark Alberts**, MD, FAHA, Professor of Neurology, Chief, Division of Stroke and Cerebrovascular Disease, Northwestern University, Evanston, IL. E-mail: m-alberts@northwestern.edu.
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"Yes Board" facilitates rapid sharing of key data, trims LOS in the ED by 40 minutes

Key developer is an emergency medicine physician with a computer engineering background

Sometimes home-grown solutions are the best ones. And if you happen to have an emergency medicine physician in your midst who is also a computer engineer, the pathway between a new idea and implementation can be especially short. It's an opportunity the Mayo Clinic in Rochester, MN, was able to take advantage of when the institution's own engineering department informed the ED that it was no longer going to support the antiquated locator board monitoring system that had been in place since the 1990s.

Powered through a single computer, the crude system in place at the time basically monitored the lights that were in place to indicate where patients were in the process of care. "It would monitor each one of the lightbulbs to see if there was power, and if there was, it would show up on a monitor," explains **Vernon Smith**, MD, an emergency medicine physician who was working at the Rochester, MN, clinic at the time, but spent the first 15 years of his professional life working as a computer engineer. "Basically, the monitor would show you whether the lights were on or off."

When Mayo's engineering department made it clear that the ED was going to have to come up with a different monitoring system, Smith and his colleagues concluded that they needed a customized solution. "We wanted to create a web-interface board so that people could get to it no matter where they were," he explains. This way, anyone

EXECUTIVE SUMMARY

A practicing emergency medicine physician who is also a computer engineer has helped Mayo Clinic sites in Rochester, MN, and Phoenix, AZ, develop a web-based ED monitoring system that is responsive to the needs of clinicians. Data suggest that the innovation, called a Yes Board, has sliced LOS by as much as 40 minutes, and it is constantly being tweaked with changes and new functionality.
• Data flows automatically into the Yes Board from as many as 15 different data systems the hospital is already using.
• The Yes Board conveys the status of tests and procedures, clinical results, vital sign information, and where patients are in the admissions or discharge process.

with access to the main network could click on the ED page with all the lights and get a rough feel for how busy the ED was, which patients had been seen by physicians, which patients had been seen by nurses, who was in X-ray, and so on, he says.

This formed the basis of what would come to be called the Yes Board, a web-based monitoring system that Smith designed with the help of his clinician colleagues. What's more, the Yes Board has continued to evolve since it was first launched in September of 2007.

Early tweaks trim LOS

Some of the first tweaks to the Yes Board were in response to the fact that ED staff were repeatedly going into the system to see whether labs and other tests were back. In fact, people checked on these issues an average of 12 times for every patient that they saw, explains Smith. "It was really time consuming, so the first thing we did was put up an indication to show immediately whether such tests were completed."

However, then the clinicians got to thinking that it would nice for the people who were cleared to access clinical information not only to know whether a patient's labs or radiology tests were back, but also what the results actually were. So Smith and colleagues built mechanisms into the system so that clinicians could not only drill down and actually retrieve the specific test results, but also observe icons that would indicate if a particular result was a bit abnormal or perhaps critically abnormal.

"I see patients all the time. That's really important because I know what it is that my colleagues are doing. I know what they have to put up with because I am having to put up with it just as much as they are," says Smith. "But I know how to fix it. I know how to make it better for them."

Early pre- and post-implementation data suggest the innovation shaved as much as 40 minutes off of length-of-stay (LOS), although Smith says it's tough to separate out all the factors that could have influenced the data. Today the Yes Board — a name that was chosen simply because developers wanted a moniker that was more appealing than "ED locator board" — has also been implemented at the Mayo Clinic in Phoenix, AZ, where Smith now works, and it will soon be implemented at other Mayo-affiliated hospitals as well.

Clinical input drives improvements

The rich trove of data that is available through the Yes Board is all the result of direct feeds that flow automatically into the innovation from as many as 15 different data systems the hospital is already using. "We made that the goal. We hate having to set up anything where you have to do something to get information out of it," notes Smith. "We have a direct feed from the lab system so that we know when a test has been ordered, we know when it is on the pending list, and we know when results are in. The same is true with radiology and vitals. We have an EMR [electronic medical record] that we enter the vitals into, and we just take the data right off of it."

With in-house expertise at the ready to make changes or add functionality based on clinical input, the Yes Board is almost continually in flux, even from week to week, notes Smith. "The board that you see today closely resembles the board of last week, but there are some differences," he says. "It is always changing by just a little bit."

For example, one recent enhancement in functionality gives ED staff more complete information about the admissions process. "We had already established a system where if a patient was being discharged from the hospital, a purple light would come on, and if the patient was being admitted, then the purple light would flash, so everyone knew that this was the case," explains Smith.

However, it became clear that there are about six different steps involved in the admissions process, and what was happening in some cases was that there would be a break in the chain somewhere, and the system would get bogged down.

"The service wouldn't get paged, and then the physician hand-off wouldn't occur, and people wouldn't know that the service had already been assigned because no one let anyone know about that," explains Smith. "To resolve the problem, what we did was break the purple light up into five segments, so it is almost like a battery meter. Each little square on it represents one more step in the admissions process, and you can watch the squares fill up as each one of the steps is completed. This way, everybody knows what it is that we are waiting on next, and if there is a break in the chain, we all know about it."

COMING IN FUTURE MONTHS

- Strategies to promote smooth care transitions
- New focus on reducing overused treatments
- Myths of non-urgent use of the ED
- Effective management of patient surges

Dialogue is key

While most EDs don't have a physician on site who is able to appreciate every problem both from the standpoint of the provider, but also as a problem-solving engineer, there is always the opportunity for clinicians to establish closer working relationships with in-house IT staff as well as outside vendors. Smith emphasizes that smart vendors will use the opportunity to take advantage of a clinician's knowledge and wisdom in patient care. In fact, it is a wonder that more such dialogue isn't taking place, given the impact that IT has on the way care is delivered.

"When you buy an EMR you think you are buying some piece of software, but what you are really doing is buying workflow; you are buying a process and the database behind it," observes Smith. "Everything else in that product is going to drive what it is that you do, whether it is how you take temperatures, how fast patients get placed in a room, or how you know when they get placed in a room." ■

SOURCE

• **Vernon Smith**, MD, Emergency Medicine Physician, Mayo Clinic, Phoenix, AZ. E-mail: smith.vernon@mayo.edu.

CNE/CME OBJECTIVES

1. Apply new information about various approaches to ED management.
2. Discuss how developments in the regulatory arena apply to the ED setting.
3. Implement managerial procedures suggested by your peers in the publication. ■

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CNE/CME QUESTIONS

1. **Elaine Rabin**, MD, says that the only way for patient boarding in the ED to be eliminated is:
A. to have ED clinicians and staff to work more efficiently
B. to have ED clinicians perform fewer tests and procedures on patients
C. to streamline triage
D. to have inpatient beds open up more quickly for ED patients

2. While perception of legal risk is undoubtedly responsible for some overtreatment, **Stephen Pitts**, MD, MPH, says that a more important driver of utilization is:
A. the practice of grading physicians on patient satisfaction surveys
B. technological improvements
C. new billing practices
D. the growing number of uninsured patients

3. The hospital medicine team (HMED) in the ED at Denver Health Medical Center (DHMC) in Denver, CO, divides its time between taking care of boarded patients and:
A. admitting new patients to the hospital
B. working with nursing supervisors to manage patient flow
C. tending to patients with non-urgent needs
D. taking care of patients on inpatient floors

4. According to **Lee Shockley**, MD, FACEP, what key factor has driven the success of the HMED team in improving patient flow in the ED?
A. the ability of ED physicians to establish a strong relationship with hospitalists
B. the commitment of hospital administrators
C. improved accountability
D. improvements to information technology

5. **Mark Alberts** MD, FAHA, says the underlying concept behind having different levels of stroke care certification is to:
A. give hospitals the ability to seek higher reimbursement levels
B. take the pressure for care off of Primary Stroke Centers
C. have a well-defined stroke system of care
D. all of the above

6. According to **Vernon Smith**, MD, some of the early tweaks to the web-based ED monitoring system were in response to:
A. confusion about where patients were in the admissions process
B. the fact that ED staff were repeatedly accessing the system to check on the status of labs and other tests
C. nursing frustration with delays
D. a problem with ED crowding