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The Boston Marathon bombings: A post-event review of the robust emergency response

Lessons learned include the critical importance of hospital-wide drills, historical insight

Fortunately, terrorist attacks are not a common occurrence in America. But ever since the World Trade Center towers were struck down by extremists in September 2001 in New York City, hospitals around the country have been honing the way they drill so that they will not be caught off guard in the unlikely event that a terrorist act triggers mass casualties in their region.

By all accounts, such preparation paid off handsomely in Boston on April 15th when two bombs exploded near the finish line of the city's annual marathon. Three people died and nearly 200 others were injured in the blasts, but observers note that the loss of life and limb would have been much greater had there not been such a quick and robust emergency

EXECUTIVE SUMMARY

With as many as five level I trauma centers, Boston is well-positioned to mount an emergency response, but the two terrorist bombs that went off near the finish line of the city's annual marathon on April 15 put high levels of stress and demand on emergency personnel. In post-crisis reviews, hospital administrators say that all the emergency planning and drilling that they carry out on a regular basis was instrumental in helping them quickly care for nearly 200 victims while also securing their facilities at a time when the threat to the city was not well understood. Medical personnel working in tents on site at the marathon were able to respond to the injured quickly, while also giving area EDs a heads-up on what to expect. ED leaders report that a robust effort from the upper floors of their hospitals was critical in:

- helping them clear their EDs for incoming patients;
- establishing a security perimeter around the facilities to thoroughly check any people entering or leaving to guard against potential external threats; and
- focusing on improving how many extra staff show up to help during the crisis because it actually requires extra resources to manage the personnel.

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response. *(Also, see "Fertilizer plant explosion: Pre-planning makes the difference in meeting the needs of hundreds of injured victims in the ED," p. 78.)*

Indeed, Boston is well-equipped from a medical standpoint, with as many as five level I trauma facilities. And a number of medical personnel from these facilities were already working in tents at the site of the marathon to deal with marathon-related health issues, so immediate care was close at hand at the scene of the blasts. But it is also clear that while disaster response plans never work perfectly, all of the drilling that hospitals conduct for just such an event prepared the facilities to handle the incoming patient surge while also guarding the safety of patients and medical personnel. It is also notable that all this occurred in the midst of a threat that was not well understood for some time.

Hospital-wide response is crucial

Brigham and Women's Hospital had three residents working in a medical tent at the marathon, so the ED got an early warning that two explosions had occurred and that staff should be prepared to receive patients. An official call from the Central Medical Emergency Direction Center came at 2:54 in the afternoon, explains **Eric Goralnick**, MD, medical director of Emergency Preparedness and associate clinical director of the Department of Emergency Medicine at the hospital.

At this point, the hospital's incident commander and the other clinical leaders in charge issued a code Amber, which initiated a hospital-wide response. "Although our emergency center was already open [because of the marathon], the code Amber triggered a gathering of our command and general staff in the center and prompted a rapid decamping of the ED," says Goralnick.

The code Amber was communicated via both cell phone and pager messages, as well as through the hospital's overhead speaker system. It cued several different specialties from the upper floors of the hospital to make room for ED patients. "For example, internal medicine staff came down and identified patients who were admitted or in the midst of a workup, and they did a sign-out with the emergency medicine providers," notes Goralnick. In some cases, resident physicians transported the patients upstairs themselves, and in other cases, patient transport services handled the transfers.

Many different departments retrieved patients in this way to clear the ED for the anticipated victims. "This was the sort of team effort that occurred. Everybody took their patients and got them out of there, so it all happened very rapidly," says Goralnick. "Some of this was part of the process that we had drilled on, but some was spontaneous, and that is what we are trying to figure out now."

For instance, to care for eight patients who were

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awaiting psychiatric beds, the head of the hospital's psychiatry unit came down to the ED and arranged for four of these patients to be admitted to a surge pod that the hospital had opened to accommodate these patients, and he arranged for the other four patients to be transferred to another hospital. "That was very impromptu. He knew we had to clear the ED, and he found space for four of the patients upstairs, but there is no checklist for calling another facility to get this done," says Goralnick. "There are many lessons to be learned from this experience."

At the same time that the ED was being cleared, the code Amber triggered a halt to all elective surgeries that had not yet commenced. "We have a total of 42 operating rooms (OR), and 30 of them were active at the time, so staff continued with those operations, but they were aware that some of them might have to stop. That is part of the routine," notes Goralnick.

The OR prepared to take care of patients in eight beds, and began forming a labor pool of all of the different types of staff that are used in the OR so that this pool could be quickly tapped as needed.

Within a half-hour of the code Amber being issued, the hospital received 19 of the 39 patients it would ultimately receive from the marathon bombings. "There was one traumatic amputation, and there were several individuals who had open fractures," explains Goralnick. In addition, many of the patients had shrapnel embedded in their bodies, there were several different types of blast injuries, and there were multiple burn wounds.

"We did a rapid triage of these patients and determined which ones needed to go to the OR right away," says Goralnick. "In the first wave of patients, six were identified. Overall, nine patients went to the OR based on injuries that were life-threatening."

A leadership team consisting of an orthopedic specialist, a trauma surgeon, an ED manager, and an anesthesiologist took charge of balancing resources with availability, and the approach worked well, says Goralnick.

While the ED clinicians have certainly learned valuable lessons from colleagues who spent time in the military caring for soldiers with battle wounds, Goralnick says an experience that proved particularly beneficial for many of the staff was time spent volunteering in Haiti following the earthquake that occurred there in 2010. "We dealt with a lot of traumatic injuries there, so I think that was extremely beneficial," he says. "A lot of the triaging techniques that we used there were implemented here at Brigham and Women's."

Lack of clarity heightens concern

One issue that has been a problem in other homicidal bomb attacks is that there are sometimes third, fourth, or fifth bombs that are set to go off targeting first responders, and the ED can be in the line of fire as well, notes Goralnick. "There was that sense of urgency, but there was also a lack of clarity," he says. "We were worried about whether there were more bombs that were going to go off, and whether we were a potential target."

To guard against such threats, the hospital went into lockdown mode, a move that puts established protocols in place for the hospital's own security force to set up a perimeter around the hospital. "That force was augmented very quickly by local law enforcement," observes Goralnick. "They were in the ED with the first patients, and they were collecting evidence on site throughout the ED."

Already under extreme stress, the types of injuries ED staff confronted that day heightened the emotional toll on care providers. "To see patients coming in with traumatic amputations, active hemorrhaging, shrapnel and bones sticking out of the skin ... the impact on a provider is significant and shouldn't be lost in this," says Goralnick.

To deal with this aspect, administrators quickly assembled a team of psychiatrists, social workers, and peer counselors. "We were very aggressive about insuring that our staff had the resources, knew where to find the resources, and were able to meet the professionals who would provide those resources," explains Goralnick, noting that within a day of the bombings, several open forums were held so that all the different types of staff who were involved with the emergency response, from housekeepers to clinicians and technicians, could be briefed about the help that was being made available.

"We also set up a wellness committee that met on a daily basis with representatives from several different services to get updates [on how staff were doing] across the various different subspecialties," adds Goralnick. "That process continues, and I think it has been very beneficial for staff."

Quick action proves pivotal

The biggest immediate challenge facing the ED at Massachusetts General Hospital (MGH) when

it first got word of the bombings was the fact that it was already very crowded that day. "My ED has 49 beds, which is relatively large, but we had more than 90 patients who were active in the department at the time," explains **Paul Biddinger**, MD, chief of the Division of Emergency Preparedness and medical director of Emergency Operations at MGH. "The time between first notification of the bombings and the first arrival of patients was incredibly short. It was nine minutes. And that is typical of events like this."

To make room for incoming patients, leaders in the ED worked with hospital nursing directors and the admitting office to quickly identify available beds anywhere in the hospital so that the patients in the ED could be quickly transferred upstairs. "That worked even better than planned. What we found is that the nurses upstairs were not only willing to take patients, which was fantastic, but they actually, in many instances, came down and got the patients themselves," notes Biddinger. "The benefit of that was two-fold. It got patients out of the ED without having to wait for transport resources, but also the nurses were able to get a face-to-face pass off so that they could hear [first-hand] what were the active issues and concerns for the patients when they took them out of the ED."

Similarly, internal medicine staff came down to the ED and either held patients in the back of the ED until beds could be identified or promptly took the patients upstairs. "This kind of active pulling of patients out of the ED tends to be under-appreciated, but it is an important way to create capacity," says Biddinger.

Any delay in these actions to make room for incoming patients would have left the ED without the capacity it needed to handle the surge, says Biddinger, noting that the hospital received 31 patients in the initial wave. "In an event like this, patients are going to present very quickly with very little warning and with severe injuries," he stresses. "You have to be able to [activate] — not just the ED, but the whole hospital to muster the resources that the sickest patients will need early."

As things turned out, even with the sudden surge of bombing victims, some of whom were critically injured, the ED at MGH could have accommodated two to three times as many patients as it received, notes Biddinger.

Recent history provides valuable insight

While MGH has never dealt with a terrorist bombing incident before, there were security protocols in place to deal with this type of threat. "We actually talked about and trained for the possibility of terrorists coming to the ED disguised as victims or as actual victims," says Biddinger. "We have policies in place to check people as they are arriving."

Further, in the hospital's plans for hazardous materials, all items are routinely removed from patients and placed in a secured site until the hospital knows whether law enforcement wants to take charge of the items or not, explains Biddinger.

"One of the biggest reasons why our system worked well is because we practiced it a lot. I would say even in Boston most of the people who practiced these exercises didn't think that we would really face this challenge," observes Biddinger. "The reason we were able to make so many things that are relatively complex happen so quickly is because we had done it many times before."

Biddinger emphasizes that it is important for hospital leaders to continually review the literature and to stay current on what happens during mass-casualty events around the world. "We have spent a lot of time in the last decade retooling our emergency plans, learning lessons from the London subway bombings [in 2005], the Madrid train bombings [in 2004], and the series of terrorist attacks that occurred across Mumbai, [India in 2008]," he says, noting that the rate of patient presentations, the types of injuries that occurred, and the interventions employed during these incidents were not consistent with some of the old-school assumptions about what emergency plans should include. "You have to try to make sure your plans reflect reality."

Biddinger has no doubt that more lessons can be learned from the Boston bombings of 2013. "We are reviewing some of our data right now. Hopefully it will be helpful to others as we get a chance to publish from this event."

Extra help requires management resources

Beth Israel Deaconess Medical Center (BIDMC) received a total of 24 patients from the bombings, according to **Kirsten Boyd**, RN, MHA, associate chief nurse for Ambulatory and Emergency Services. Like MGH and Brigham and Women's, the hospital had to quickly clear the ED to make room for the surge of patients, but Boyd observes that one of the greatest challenges the staff faced

was dealing with all of the hospital employees who were not scheduled to work that day, but after hearing about the incident through social media and news reports, they showed up to lend a hand.

"This required us to organize [the extra staff] in a separate area so that we would be able to pull out a nurse, a physician, or a tech, as needed, depending on what their roles were," says Boyd. "We appointed one of our managers to be in charge of coordinating this group."

Whenever a clinician, tech, or another type of hospital employee showed up to offer services, he or she would be placed in the employee break room and given a scrub top to wear, explains Boyd. "They would write on their backs 'Nurse Judy' or 'Doctor Smith' just so we could identify them," she says. "Although many of these hospital employees were familiar faces, the majority of them did not work in the ED."

Whenever the ED needed assistance with transporting a patient or with clinical care, administrators would then pull from this group, but it did create some additional operational challenges, says Boyd.

There is always the challenge of having too many or too few staff. Hospital disaster planners are careful to write policies that don't discourage hospital personnel from responding spontaneously in major disasters, since formal communication systems are not timely enough or may be unavailable in disasters. But staff need to be prepared if a larger then needed group of personnel are onsite. Biddinger says that MGH faced a similar problem, with more people self-responding to the ED to help than the department actually needed. "Although we tried to manage it by creating teams of surgeons and emergency physicians and a couple of specialists that were posted outside of each empty room so that when patients came they could be matched up with a room and a team, we still had more [personnel] than we needed, and that ultimately ended up taking some management resources away from the ED," he explains.

Biddinger says this is one area where the hospital can make improvements going forward. "We are continuing to work on ways to manage the specialists and the early responders that we need. We certainly don't want to end up in a situation where we don't have enough trauma surgeons, vascular surgeons, or others, but self-responding before we know what we need also detracts from the response a little bit, so we are definitely working on this," he says.

Communications are challenging

One of Boyd's roles at BIDMC during the crisis was to serve as a liaison between the clinical staff and anything happening operationally outside of the department. "We were able to secure the environment and enable our clinicians to focus on patient care," she says.

This became particularly important a few days after the bombings when the prime suspect was apprehended and brought to BIDMC for care. The hospital's corporate communications department took charge of fielding all media inquiries while hospital social workers focused on meeting the needs of families who had loved ones being treated for injuries sustained in the bombings.

The teamwork between the different hospital departments at BIDMC was key to the hospital's success in dealing with the crisis, says Boyd. She emphasizes that the response worked well because it had been well practiced. "We are very focused on clinicians, emergency physicians, and emergency nurses and technicians, but there are so many other layers in the hospital to include in these drills," she says. "Have focused drills that really encompass all areas of the hospital," she advises colleagues. "I think that is really a key take-away."

Goralnick agrees with this advice, but he would add that it is important to pay particular attention to how your organization is going to handle communications during any mass-casualty event. "Actually walk through the drill and insure that there is a route of clear communication throughout," he says, noting that different organizations face different types of communications challenges.

Also, insure that all individuals who are identified as players in the Hospital Incident Command structure use identifying elements (hats, vests, or signs) so that they can be identified from across a busy, loud, crowded ED, advises Goralnick. "This way you will have clear, established leaders and point-persons that staff can go to when there is staff confusion," he says.

Goralnick further advises colleagues who are fine-turning their emergency plans to include procedures for streamlining their chain of command. "The whole purpose of a Hospital Incident Command structure is to go from a matrix organization — an organization that is very diffuse and has many senior leaders — and to streamline it into the format of an incident commander and general staff," he says. "Insure that the individuals placed in those roles have the accountability and

the authority to execute what needs to be done in a short amount of time."

Finally, whenever emergency plans have been executed, it is critical to go back and pin-point where changes could improve the emergency response the next time it is required. "Identify an action plan to follow up on those areas — not just with changes to your emergency operations plan, but with actual drills as well," says Goralnick. ■

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Fertilizer plant explosion: Pre-planning makes the difference in facilitating care for hundreds of injured victims

Two days after bombs went off near the finish line at the Boston Marathon, another horrific disaster rocked the tiny community of West, TX. In that incident, a reported fire at a fertilizer plant was followed by a huge explosion that leveled four blocks of the city. The blast killed 14 people, most of whom were emergency responders, and injured more than 200 others.

Unlike Boston, which is home to multiple academic medical centers, West is a small town of about 3,000, so most of the injured had to be transported to hospitals in Waco, 20 miles to the south. Hillcrest Baptist Medical Center received about half of the injured patients, including more than two dozen with serious injuries.

Providence Health Center, which is also in Waco, received 64 patients that night, and 23 additional patients the next day, explains **Eileen Bohannon**, BSN, CEN, the director of Emergency Services. "The initial phone call [notifying us that there was a fire] prompted phone calls to go out to key people, including myself and the medical director," she explains, adding that within 20 minutes, the hospital was notified that there had been a big explosion with an unknown number of injures. "That's when we initiated our code Green, which triggers our disaster plan."

Providence Health Center is not trauma-designated, but it has a busy 51-bed ED that sees roughly 84,000 patients a year, says Bohannon. And the staff had their hands full that night. "The crisis started at about 8 p.m., which is typically a very busy time for us," she says. "The charge nurse on duty at the time had already taken action by the time I arrived, which was within 15 minutes. She had moved all the patients who were already in the ED to one section, freeing up all of our resuscitation rooms and all of our bigger rooms for patients we could expect from the explosion."

The ED is divided into three zones, so it has the ability to increase or decrease in size when needed, says Bohannon. This gave staff the flexibility they needed to gear up for the patient surge. "The intensive care unit [was] emptied out, freeing up at least 12 extra beds," adds Bohannon. "We weren't doing any surgeries at the time, so we also took account of our surgical suites that we would have available."

As was the case in Boston, the ED had no trouble finding adequate staff. "Almost every employee in the department came in, and our physician response was phenomenal. We had surgeons, orthopedists, and intensivists, in addition to all of our emergency resident physicians," explains Bohannon. "Nursing staff and ancillary staff responded as well."

Fortunately, with many staff onsite, patient needs could be addressed and extra staff were still available. However, Bohannon stresses there is room for improvement in how these extra personnel are managed. "Even in our drills, it always seems to be a problem, so we will definitely be working on our process for crowd control," notes Bohannon. "In our response plan, we have a room set up for media as well as for family members to go to, so these groups did not contribute much to the crowding. Most of the problem was just due to

employees showing up and wanting to help."

Communications between staff also proved problematic. The hospital has always tested and drilled with walkie-talkies, but some of the batteries went dead in the midst of the disaster, complicating the flow of information. Consequently, this will be another focus for improvement going forward, says Bohannon.

The ED did get a heads-up on some of the patients who would be arriving from one of the department's emergency physicians who actually lives in West. "She responded immediately to the scene and called us to tell us what she was sending in," says Bohannon. Some patients also arrived at the hospital with instructions from the assistant manager of the ED, another West resident who responded to the scene of the explosion.

Be prepared for patient surge

It was a big challenge for the ED to just keep up with all the incoming patients, says Bohannon. However, staff managed to stay on top of the influx by relying on their preparations for this type of surge. "We had one nurse assigned to each of our 39 acute rooms, and we also had an assistant — either another nurse or a tech — assigned to stay with that nurse in that one room," explains Bohannon. "That really helped us to have everybody taken care of rather quickly."

One thing the ED did not anticipate, though, was two busloads full of nursing home patients who had been rescued from a nursing home that was destroyed in the blast. "All of their identifications and all of their medical histories did not come with them. They basically came with the clothes on their backs," recalls Bohannon. "Some of them were confused, and they did not know their names." Eventually, one of the employees of the nursing home arrived and was able to confirm the identities of most of the patients. "There were two patients who had their names mixed up, but that was fixed within several hours," says Bohannon, noting that ED staff worked through the problem by checking to see if there were any identifying materials in the patients' clothing, and searching through the hospital's records to see if any of the patients had been admitted in the past. If so, there would be medical information on file. "Our admitting staff did an excellent job of working with the people who brought the patients to the hospital to get accurate identifications," she says. "Ultimately, I think we only had one 'Jane Doe.'"

While Providence Health Center did not receive the patients with the most serious and traumatic injuries, many of the patients had just seen their homes destroyed and were emotionally distraught. "Some of them were amazed that they were alive because everything around them fell," says Bohannon.

The disaster also personally impacted a number of hospital staff members who either live in West or have family who live there. "We have several employees who lost their homes in the explosion, and we have many employees who now have family living with them because they lost their homes," adds Bohannon. "That has been the most emotional aspect of this — the impact this has had on the community and our employees."

Consider plans for security

Having successfully negotiated through the biggest challenge the ED has ever faced, Bohannon's advice to colleagues is to remember that there is no such thing as too much practice. "We drill within our facility and we drill with our region also. We were able to set up our ED very, very quickly because of those drills," she says. "We identified rooms that would take the most acute patients, so we had all of that planned out. You can just never do enough pre-planning."

Secondly, Bohannon advises that hospital leaders need to prioritize how they will handle security during such emergencies well in advance. "Security is not something that a lot of facilities have in abundance, so it is important to figure out who will handle this aspect and what their role will be," she says. "Our employees thought they should have the right to come back on site, but that did aggravate the situation to some degree."

Another lesson Bohannon has taken from this event is the importance of having alternatives in place when emergency plans call for any type care to be completed outside. The night of the explosion, it was very windy, and that did cause some problems, she says. "If you are going to do any outside care at all, designate alternative sites in the event of inclement weather," she says. "We have thought about this and talked about it, but it is not yet planned out enough, so we will be looking into this further."

Although this was the first time most of the staff at Providence Health Center have ever been

involved with a disaster of this magnitude, they handled the situation very well, stresses Bohannon. "We did an immediate debrief the next morning. They did well emotionally, and they were very proud of themselves and how they responded," she says. "But I think they are now motivated to learn more and be more involved [in disaster planning and preparations]. They are looking forward to doing more training." ■

Study: ED providers could be doing more to prevent injuries, deaths related to improperly restrained child passengers

Experts say child safety seats are complicated and commonly misused

The Centers for Disease Control (CDC) in Atlanta, GA, reports that every year more than 130,000 children younger than the age of 13 are rushed to the ED for treatment following motor vehicle accidents on the nation's roadways. As unfortunate as these incidents are, public health experts stress that they represent critical opportunities for emergency personnel to prevent future injuries by passing along information about the proper use of child restraints to parents.

However, research from the University of Michigan's CS Mott Children's Hospital in Ann Arbor, MI, suggests that too often ED providers are not taking the extra steps needed to prevent future collision-related injuries.[1] "Both general and pediatric-trained emergency providers aren't getting the information out to families on a consistent basis when they come to the ED for care," explains **Michelle Macy**, MD, MS, the lead author of the study and a clinical lecturer in the Departments of Emergency Medicine and Pediatrics at the University of Michigan.

This information is based on a survey Macy and colleagues mailed to a random sample of 1200 emergency physicians across the country. Fewer than half of the responding physicians indicated that the parents of a 2-year-old being discharged from their ED following a motor vehicle crash would be supplied with discharge instructions that include advice about the proper use of car seats. Further, while half of the physicians working in a pediatric trauma center indicated that they always recommend replacement of a 3-year-old's car seat after a roll-over motor vehicle crash, as recommended by the National Highway Traffic Safety Administration, only one-third of the physicians working in adult and non-trauma EDs said that they routinely make such a recommendation.

These are important omissions, says Macy, because child seats are complicated, and they are commonly misused. The study notes that 20% of 1 to 3-year-olds and about half of 4 to 7-year-olds are typically not restrained in the recommended restraint for their age. "Child passenger injuries in crashes are the leading cause of death for children who are older than age 3 years in the United States, and that persists up to the early driving years," says Macy. "They are the second leading cause of death among children aged 1 to 4."

Highlight resources

The researchers found that the parents of children who are seen in general EDs that do not specialize in pediatric cases are the least likely to

EXECUTIVE SUMMARY

Researchers from the University of Michigan's CS Mott Children's Hospital in Ann Arbor, MI, report that both general and pediatric-trained emergency providers are missing opportunities to get critical information about the proper use of child restraints out to the families of children when they are brought to the ED following motor vehicle crashes. In a survey sent to a random sample of 1200 emergency physicians across the country, fewer than one-half of the responding physicians indicated that the parents of a 2-year-old being discharged from their ED following a motor vehicle crash would be supplied with discharge instructions that include advice about the proper use of car seats.

- The study notes that 20% of 1 to 3-year-olds and about one-half of 4 to 7-year-olds are typically not restrained in the recommended restraint for their age.
- Child passenger injuries in crashes are the leading cause of death for children who are older than age 3 years in the United States, and they are the second leading cause of death among children aged 1 to 4.
- Researchers recommend that resources on child passenger safety be highlighted in discharge instructions, and that emergency providers tap into their own experiences when speaking with families about the importance of properly restraining child passengers.

receive information about child restraints, but these general EDs treat more than 85% of children requiring emergency care.

"We think if we could get higher use of restraints among the school-aged kids and older, we would be able to at least reduce deaths and injuries," explains Macy. "We know from other research that when kids are buckled up properly, we can reduce their risk of injury and death by 50% to 75%. We also know that when we just give families information, and then also provide them with a proper car seat, they are going to increase their use of the safety device."

While research has shown that recommendations from physicians carry a lot of weight with patients and parents, Macy stresses that the information does not necessarily have to come directly from emergency physicians. "We need to make it easy for clinicians, nursing staff, techs, and social workers to have the information at hand," she says.

For example, Macy notes that local resources where parents can obtain information about child passenger safety can be automatically included in discharge instructions. "That can be pitched as a simple solution to at least increase awareness of this issue," she says. "I don't think providers need to necessarily all go through child passenger training and to know all the ins and outs of the issue."

For starters, Macy would like to see every discharge instruction include the www.safecare.gov web address, a link that families can use to find local inspection stations and other resources on child passenger safety. The link could easily be included in electronic medical records as well as highlighted within the paper documents that families leave the hospital with when they are discharged. "Then it would fall back on the families to follow-up with those resources, but at least providers would be making some effort to impact the leading cause of death among children."

Beyond the simple solutions, however, Macy stresses that the issue can really resonate with medical personnel who have seen the consequences of motor vehicle accidents on improperly restrained children. She points out that this type of experience can be shared with others. "Physicians, social workers, medics, and nurses in the ED have all seen a child or family that has been devastated by a car crash, and I think they can speak from that personal experience in a powerful way," she says. ■

REFERENCE

1. Macy M, Clark S, Cunningham R, et al. Availability of child passenger safety resources to emergency physicians practicing in emergency departments within pediatric, adult and nontrauma centers: A national survey. *Pediatric Emergency Care* 2013;29:324-330.

SOURCE

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Team effort identifies opportunities to reduce wait times, improve safety for patients

Collaborative approach nurtures quality improvement

The fast pace of a busy ED can make it difficult to focus in on processes that could be improved, but leadership and commitment can move the needle in the right direction as long

EXECUTIVE SUMMARY

The ED at Avera Marshall Regional Medical Center in Marshall, MN, has been able to implement a number of improvements in its throughput process by holding monthly "quick hits" meetings aimed at identifying opportunities for improvement and potential solutions. Among the improvements that grew out of this process is a 12-minute dent in the ED's average decision-to-admit times. Administrators say a collaborative culture has been key to keeping the meetings positive and productive.

- The "quick hits" meetings typically included nurses, an ED physician, two representatives from the hospital's quality department, and representatives from lab or X-ray as needed.
- The ED director scheduled the meetings during the morning hours when the ED is typically not busy, and the physician has time to attend.
- Decision-to-admit times were reduced by giving charge nurses an earlier notification when patients presenting to the ED were likely to be admitted.

as emergency personnel understand why change is important. That, at least, is what **Erin Muck**, RN, the ED manager and trauma coordinator at Avera Marshall Regional Medical Center, a 25-bed hospital in Marshall, MN, has discovered. The ED treats about 7,200 patients annually, and 100 patients per month are admitted to the hospital from the ED.

When the ED at Avera Marshall began participating in a project aimed at improving throughput times toward the end of 2011, Muck utilized a collaborative process to identify steps that could be improved. Muck asked one of the ED's four physicians to participate in the effort by attending a monthly meeting in which ideas would be solicited and discussed. She also invited nurses to participate, and she brought in representatives from the lab and radiology departments as needed. Two representatives from the hospital's quality department participated in the meetings as well.

To make it convenient for the physician to participate, Muck says she always scheduled the meetings during the morning hours, when the ED is typically not as busy, generally around 9 a.m. The discussions typically lasted for 30-60 minutes, she explains.

Use data to drive improvement

Over a period of several months, the so-called "quick-hits" meetings produced a number of ideas to shorten wait times for patients while also improving safety. One of the biggest improvements that resulted from the process was a reduction of 12 minutes in the ED's average decision-to-admit time, bringing this metric from 44 minutes down to 32 minutes.

"It was hard to address the decision-to-admit times because a lot of people don't document them," explains Muck. "It took us a good six months just to get that piece of it done."

The "quick hits" team theorized that the admission process could be expedited if the charge nurses were notified earlier on that a patient was likely to be admitted. "That way they could be thinking about who they are going to assign the patient to, what room they are going to open up, and those kinds of things," says Muck.

Under this type of arrangement, charge nurses would be able to give the nurses on the inpatient floors a heads-up when they are likely to receive a patient. "It would just give them the time to wrap up whatever they are doing so that they are prepared for an admission," says Muck. Also, the charge nurses would be mentally prepared for our phone call when the decision to admit is made by the physician, she says.

One other reason why Muck felt the approach would work well is because she has a very experienced group of nurses manning the ED. "The nursing staff here average about 24 years of service, so they are very well versed in working the ED and estimating [which patients are likely to be admitted]," she explains. "They do a pretty nice job."

However, when the approach was first implemented, there was snag. "Most of the charge nurses were awesome about this," says Muck, but there was one charge nurse who was not acting on the early information. Consequently, Muck shared a report with the charge nurses showing the decision-to-admit times per charge nurse. "Then she stepped up her game," stresses Muck.

To sustain the improvement in decision-to-admit times, Muck acknowledges that she needs to keep her eye on it. "If I am not watching that constantly and putting the data out there for [the staff to see], then it is out of sight, out of mind, so then they aren't doing quite as well," she says.

A similar approach worked well in getting the physicians to pay attention to their throughout times. "Every month I would have a printout of our general throughput times, and then I would have it per physician," says Muck. "Occasionally, I still run those reports. We have some locum physicians [who work in the ED now], so I want to keep track of them and how their throughput times compare with our own physicians. It is a little friendly competition."

COMING IN FUTURE MONTHS

- A new approach to safer handoffs
- Peer referral for at-risk HIV patients
- Rapid respons to sepsis in the emergency setting
- Fully leveraging case managers in the ED

Get buy-in

Other ideas that came out of the "quick hits" process include the establishment of a goal for completing the triage process by the time a patient has been in the ED for 10 minutes. Also, blood is now routinely drawn during triage for patients who present with an issue that will likely require blood work, such as patients presenting with abdominal pain, explains Muck. "We figured out how to do triage quicker and better, and these were ideas that we got from the nursing staff, physicians, and sometimes lab or X-ray," she says.

While some organizations might struggle to prevent this type of team-driven process from turning into a blame game, Muck says hospital administrators have nurtured a culture in which it is not O.K. to get defensive or angry when discussing problems. "We don't have that problem here. It is always good to get advice," she says. "The managers work well together and we are always open for suggestions. If my suggestion doesn't work, then they will suggest something different that does."

Muck acknowledges that it can be more difficult to get physicians on board with any type of change. The key, she says, is making sure they understand what the benefits will be of a change in process. She adds that a team-driven approach can facilitate this type of exchange. "In order to problem solve, it is good to have the people involved because you can have better buy-in regarding how to fix things," she says.

While the formal monthly "quick hits" meetings no longer take place, Muck explains that she regularly uses the approach for quality improvement. For example, she is now engaged in an effort to identify ways to improve trauma care. "We have a trauma surgeon involved, trauma physicians, and sometimes orthopedics as well," she says. "Who we invite to the meetings just depends on what issue we are addressing." ■

SOURCE

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CNE/CME INSTRUCTIONS

HERE ARE THE STEPS YOU NEED TO TAKE TO EARN CREDIT FOR THIS ACTIVITY:

1. Read and study the activity, using the provided references for further research.
2. Log on to **www.cmecity.com** to take a post-test; tests can be taken after each issue or collectively at the end of the semester. *First-time users will have to register on the site using the 8-digit subscriber number printed on their mailing label, invoice, or renewal notice.*
3. Pass the online tests with a score of 100%; you will be allowed to answer the questions as many times as needed to achieve a score of 100%.
4. After successfully completing the last test of the semester, your browser will be automatically directed to the activity evaluation form, which you will submit online.
5. Once the evaluation is received, a credit letter will be sent to you. ■

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. ■

CNE/CME QUESTIONS

1. According to **Eric Goralnick,** MD, as part of its emergency response to the bombings in Boston on April 15, Brigham and Women's Hospital established a leadership team consisting of an orthopedic specialist, a trauma surgeon, an ED manager, and an anesthesiologist to take charge of:
A. communicating with EMS
B. balancing resources with availability
C. handling security
D. all of the above

2. Also, according to Goralnick, what experience proved beneficial in helping to prepare some of the staff for the emergency response to the bombings?
A. joint drills that were conducted with law enforcement
B. attendance at a conference on disaster response techniques
C. time spent volunteering in Haiti following the earthquake there in 2010
D. a visit with medical personnel who took part in the emergency response to the London subway bombings in 2005

3. **Kirsten Boyd**, RN, MHA, says that one of the management challenges the hospital faced the day of the bombing was:
A. having an organized process to manage the extra staff who showed up to help
B. coordinating with EMS and the other hospitals involved
C. coping with a shortage of surgeons
D. handling security

4. When two busloads of nursing home patients arrived at Providence Health Center in Waco, TX, the night that a fertilizer plant exploded in West, TX, what big problem did this present for ED personnel?
A. Some of the patients were confused and did not know their names.
B. There was not enough room in the ED to accommodate all the patients.
C. Physicians were in short supply.
D. All of the above

5. **Michelle Macy**, MD, MS, says that if children are buckled up properly in car seats, their risk of injury and death is reduced by:
A. 25% to 30%
B. 50% to 75%
C. 85% to 90%
D. 30% to 50%

6. According to **Erin Muck**, RN, the ED at Avera Marshall Regional Medical Center in Marshall, MN, has been able to reduce decision-to-admit times by 12 minutes by:
A. giving charge nurses an earlier heads-up on patients who are likely to be admitted
B. expediting the triage process
C. improving communications between charge nurses and physicians
D. implementing bedside registration