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DECEMBER 2017 Vol. 29, No. 12; p. 133-144

INSIDE

AHC Media
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How Las Vegas Hospitals Responded to Nation's Deadliest Mass Shooting

Patients continue to present to EDs in the region with PTSD-like symptoms and anxiety related to the mass shooting

Sunday evenings tend to be relatively quiet in the ED, but on Sunday, Oct. 1, hospitals in Las Vegas were tasked with responding to the worst mass shooting in U.S. history when a gunman using automatic weapons opened fire on a large crowd attending a must festival on the Las Vegas Strip. Fifty-nine people were killed and more than 500 injured, many of them with severe gunshot wounds.

At first unclear on the extent of the injuries, hospitals in the region had to ramp up emergency operations quickly as patients began arriving by the truckload, many of them in private vehicles. Sunrise Hospital and Medical Center, a level II trauma center located just a few miles from the festival, first received notice of a mass casualty event at 10:20 p.m.

"Once our incident command was stood up, we mobilized staff and supplies within the ED, operating room, inpatient units, and in [our] pharmacy and supply warehouse," explains **Jeff Murawsky**, MD, FACP, the hospital's chief medical officer. "We also used the incident command structure to ensure protocols were enacted for managing security, visitors, and family of those impacted by the tragedy."

> HOSPITALS IN THE REGION HAD TO RAMP UP EMERGENCY OPERATIONS QUICKLY AS PATIENTS BEGAN ARRIVING BY THE TRUCKLOAD.

With such close proximity to the event, Sunrise Hospital received 180 patients, more than any other hospital in the region, 124 of whom had sustained gunshot wounds. Dozens of physicians,

Financial Disclosure: Physician Editor **Robert Bitterman**, Author **Dorothy Brooks**, Editor **Jonathan Springston**, Relias Manager of Accreditations/Director of Continuing Education **Amy M. Johnson**, MSN, RN, CPN, Executive Editor **Shelly Morrow Mark,** and AHC Media Editorial Group Manager **Terrey L. Hatcher** report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

ED MANAGEMENT®

ED Management®,
ISSN 1044-9167, is published monthly by
AHC Media, a Relias Learning company
111 Corning Road, Suite 250
Cary, NC 27518
Periodicals Postage Paid at Atlanta, GA 30304 and at additional mailing offices.

POSTMASTER: Send address changes to:
AHC Media, LLC
PO Box 74008694
Chicago, IL 60674-8694

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SUBSCRIPTION PRICES:
Print: U.S.A., 1 year with free *AMA PRA Category 1 Credits™*: $519. Add $19.99 for shipping & handling.
Online only: 1 year (Single user) with free *AMA PRA Category 1 Credits™*: $469
Outside U.S., add $30 per year, total prepaid in U.S. funds

Back issues: $82. Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue's date. GST Registration Number: R128870672.

ACCREDITATION: Relias Learning LLC is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. Contact hours [1.25] will be awarded to participants who meet the criteria for successful completion. California Board of Registered Nursing, Provider CEP #13791.

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This activity is intended for emergency physicians, ED nurses, and other clinicians. It is in effect for 36 months from the date of the publication.

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nurses, and support staff were called in to manage the influx, and staff essentially tripled the size of the ED, explains **Scott Scherr**, MD, FACEP, Sunrise's medical director of emergency medicine.

To organize care, arriving patients were tagged to go to designated areas. "We used the Sunrise Children's Hospital pediatric ED for the 'green'-tagged patients, the chest pain observation area for 'green- and yellow-' [tagged patients], and the PACU [post-anesthesia care unit] for 'yellow' patients," Scherr notes. "I was able to assign one to two providers per station with a scribe. We moved all 'red' patients to the trauma bays and station one."

Prepare for Non-local Patients

When yellow-tagged patients began to decompensate, they were moved to the trauma bay or station one, Scherr explains. "Since we had four neurosurgeons in house on Sunday night, we sent all isolated gunshot wounds directly to the neuro ICU. Orthopedic surgeons were following patients on the PACS [picture archiving and communications system] machines and admitting isolated surgical patients," he says.

A radiologist followed patients with a portable X-ray machine to give clinicians instant "wet" reads, Scherr observes. In addition, transporters were assigned to each station so they could help move injured patients to radiology for CT scans, upstairs to the ICU, or to the operating room, he says.

With so many patient arrivals, the hospital quickly bypassed standard registration processes, moving instead to a system it uses in mass casualty situations to capture an alias on every patient treated. "After the emergent stabilization was completed, we were able to establish and verify the identity of every patient who was evaluated and treated," Murawsky notes. "Those who were treated and released did not necessarily complete the evaluation process."

Because Las Vegas is a prominent tourist area, it is not unusual for the hospital to treat patients from other regions, and this often requires coordinating with hospitals in other states. However, Murawsky notes that this was an added challenge in the wake of the mass shooting because so many patients were not local. Nonetheless, Murawsky explains that the hospital regularly practices for mass casualty events that may involve a large number of tourists.

"We do both table top preparedness exercises on MCI [mass casualty incidents], simulating a large [number of] casualties, and also annually plan for and execute a New Year's Eve emergency preparedness response to meet the influx of emergency issues among revelers each year," he says.

Murawsky anticipates that there will be many lessons to incorporate into these exercises from the massive response to this unprecedented event, but that will take some time. "At present, we are focused on the healing of our patients and staff," he says. "A structured review will be completed and coordinated across the community to ensure that others benefit from our experience."

Consider Geographic, Travel Challenges

University Medical Center of Southern Nevada (UMCSN), the state's only level I trauma center, received 104 patients the night of the shooting, creating multiple challenges

EXECUTIVE SUMMARY

Hospitals in Las Vegas scrambled to respond to the deadliest mass shooting in U.S. history after a gunman opened fire on a large crowd attending a music festival on Oct. 1, which left 59 people dead and more than 500 injured.

- Sunrise Hospital and Medical Center received 180 patients, including 124 with gunshot sounds. The incident command structure was used to mobilize staff and supplies and to ensure protocols were enacted to manage security as well as the visitors and family affected by the tragedy.
- With so many patient arrivals, the hospital quickly bypassed standard registration processes, moving instead to a system it uses in mass casualty situations to capture an alias on every patient treated.
- University Medical Center of Southern Nevada (UMCSN), the state's only level I trauma center, received 104 patients from the shooting, creating multiple challenges for staff. The hospital maintains a separate, freestanding trauma center, which offers advantages in expediting care to critically injured patients. However, patients arriving by private vehicle presented to both the trauma center and the adult ED, necessitating triage operations in both locations as well as continuous travel between the two buildings as patients were transferred to the appropriate location.
- Providers rushing to work to care for victims of the shooting ran into roadblocks set up by law enforcement, in some cases delaying their arrival to UMCSN.
- Providers emphasize the importance of developing a versatile emergency response process that can be deployed in any type of mass casualty event.

for staff. For instance, **David Obert**, DO, the assistant medical director of the ED, immediately headed to work when he heard about the shooting by phone from a colleague, but he ran into obstacles related to law enforcement's response to the incident.

"The biggest issue was that they were setting up roadblocks throughout the city, so it was actually very difficult for me to get to the hospital," he recalls. "I had to go through several roadblocks, show them my ID and tell them where I was going, and I was able to get through." However, traveling to the hospital took extra time, and other staff faced similar challenges, Obert notes.

Other difficulties stemmed from the unique organizational layout at UMCSN. "We have a freestanding trauma center, which is in a completely separate building," Obert explains. "It has 11 trauma bays, and then attached to that is a CT scanner, an angio suite, three operating rooms, and then the trauma ICU."

Separate from the trauma center is an adult ED with 55 beds. Three floors up is a pediatric ED. Although the resources are plentiful and state of the art, the layout was confusing to arriving patients, many of whom had to be transferred between the trauma center and the ED, depending on what their needs were.

"The medics know where to go, but it is different for people coming in private vehicles," Obert observes. "They just see an ED and don't differentiate because most places don't have their own separate trauma center."

Familiarize Staff With Resources

The night of the shooting, the initial patients were triaged through the adult ED, and then if needed, trauma then was alerted. However, it wasn't long before truckloads of people began arriving at the trauma center. To manage the influx, there needed to be an immediate operative intervention on both ends to ensure that patients were directed to the right facility for their needs, Obert explains. "Patients were crisscrossing back and forth, and, unfortunately, there is some geographic distance between these departments."

Patients with local extremity wounds showed up to the trauma center, and the majority of these patients would get transferred to the adult ED.

"We set up a receiving area in the PACU to do secondary triage on people who just showed up on the doorstep so that we could find out who needed to go straight to the operating room and who could be delayed and then transferred [to the adult ED] and get an extremity evaluation and management," Obert explains.

When Obert arrived at the hospital at 11:15 p.m., he went to the trauma center.

"At that point, a car load of four or five patients showed up. They all had extremity wounds, so I basically followed all of those patients, went over to the adult ED with them, and then assisted in the care of all of them," he explains. "I then found another eight patients who had extremity wounds that I helped to manage [in the adult ED]."

Another challenge of operating separate trauma and ED buildings is that staff members tend to be familiar with one area or another, but not

necessarily with all areas. This became evident the night of the shooting.

"We had an onslaught of help, but there was a lack of familiarity with where resources were," Obert observes. "There is not much crossover between the nurses that work in pediatrics or work in the adult ED or work in trauma. They typically focus on one of those three areas."

As a result, when clinicians ran out of chest tubes or other needed supplies, staff didn't necessarily know where those resources were stored, so it would take added time to track them down.

"That was a bit of an issue because we had a lot of people to help, but they didn't have familiarity with what was there."

Take Advantage of Military Training

Another issue that arose was a lack of some basic supplies such as tourniquets and chest seals, things that typically are not used in the ED. "It is very rare that we put a tourniquet on in the department. We will put a blood pressure cuff on, but when you have 20 people with arterial extremity wounds that are all heavily bleeding, you don't have 20 blood pressure cuffs," Obert notes.

Consequently, a lot of the equipment emergency staff members were using was coming from first responders. "Our physicians who support the police department have actually built kits for [first responders] to use on scene, so we ended up using a bunch of those kits," Obert recalls. It is one issue that definitely will be addressed in the post-event analysis, he adds.

Given the fact that patients were triaged to two separate buildings, good communication between the ED and the trauma unit was important. In fact, the hospital's emergency planning calls for the availability of two-way radios, but this aspect did not go as smoothly as intended, Obert observes.

"Once they set up the incident command center and started going through the equipment, they discovered some technical issues," he explains. "The equipment is checked every once in a while, but some of it was not properly charged."

Clinicians were able to work around the problem by using telephone communications, but it is an area that clearly can be improved, Obert adds.

FURTHER, IN THE MIDST OF THE CRISIS, IT WAS UNCLEAR HOW MANY PATIENTS WOULD BE ARRIVING, WHICH MADE DECISIONS ON HOW TO REGISTER PATIENTS DIFFICULT.

While the distinct geography of the trauma center presented some obstacles, Obert stresses that the center is uniquely designed to respond quickly to patients with severe injuries, which certainly proved advantageous for the seriously wounded the night of the shooting.

"You have proximity to a CT scanner, you have proximity to an angio suite and to the operating rooms," he says. "Someone can be offloaded from a rig, get an evaluation, and get to the operating room within a few minutes, which is a pretty phenomenal process."

As is often the case, military training proved invaluable in the hospital's emergency response. In particular, a physician assistant's military instincts kicked in and he took charge of the triage process, labeling patients with their injuries when they arrived. The approach deviated a bit from the hospital's mass casualty training process, but it worked, Obert notes.

"He actually did probably 90% of the triage and he was phenomenal because he was just very focused," he says. "He was the one directing who was going to stay in trauma if they were shot in the chest or the belly or had a significant wound that required tourniquets and things of that sort. If not, he was directing patients to the adult ED or the PACU."

Consider Paper Registration

While mass casualty practice drills certainly make a difference when the need arises to activate emergency plans, the magnitude of this event was overwhelming, Obert notes.

"You can drill for anything, but it is not the same when it is real time and there is real emotion and stress," he says. "And of course it happened when [we were] not expecting it — 10:30 on a Sunday night, which isn't characteristically a big trauma night."

Further, in the midst of the crisis, it was unclear how many patients would be arriving, which made decisions on how to register patients difficult.

In the end, staff used electronic medical records (EMRs) to register patients throughout the night, which wasn't necessarily the best option.

"They didn't know how many patients to expect, so they went from a few patients to 50 patients within an hour," Obert relates. "They actually pulled in registration people from all over the place, and they were out there meeting patients on the curb and were doing bedside registration as soon as the patients arrived."

Switching to paper registration might have been more expedient, Obert observes. The hospital maintains preprinted packets for this purpose, but it was not prepared to intake 50 patients at once.

"We use paper registration for people who are suffering from a stroke or a heart attack, so some of our post-event [analysis] is that we need to have at least 100 pre-printed labels, tags, and charts," he says. "To me the biggest issue was the fact that we were bouncing patients from department to department and having them followed. And, unfortunately, EMRs aren't that user friendly, so no matter how good they are, when we have three separate locations, it becomes a challenge of patient tracking."

Despite all the challenges, Obert gives the staff high marks for their emergency response.

"They handled the incident very well," he says. "I felt comfortable leaving at 3:30 a.m. because most of [the patients] had already been there, people were taken care of, and we were discharging a lot of people," he says. "The patients that needed to be there emergently were there, and the rest had already been admitted or seen by consultants."

However, even a day or two after the incident, patients from the incident continued to present to the ED.

"We were getting transfers later on, and people eventually turned up who had injuries sustained from the stampede," Obert notes. "People were stomped on and people hit their heads and had skull fractures, so there were some secondary effects from [the mass shooting]. And then we started getting influxes of people with degrees of PTSD [post-traumatic stress disorder] and anxiety."

Even people who were not at the festival where the mass shooting occurred were developing symptoms, Obert explains.

> "IT IS A MATTER OF PREPARING FOR A PROCESS THAT IS GOING TO WORK IN ANY CIRCUMSTANCE, AND NOT JUST MASS CASUALTY SHOOTINGS."

"We are still seeing people who are extremely traumatized by some relation to the event, the location or something else that happened in their life. This has reactivated something," he says. "We are seeing those kinds of patients all over [Las Vegas] Valley now."

Develop a Versatile Process

Some members of the hospital staff are experiencing a degree of emotional fallout from the event.

"We still have counselors [on site], and there are some people where there has been more of a delayed impact," Obert explains. "We see things on the news all the time about patients that we have taken care of, but this has been of such great magnitude that it is overwhelming." However, the gratitude shown by the community has been a huge positive, Obert stresses.

"We are getting deliveries of food and gifts every single day still," he says. "I have been in Las Vegas for 12 years, and I have never seen an outpouring from the community like anything close to this, so it's pretty phenomenal. They have done a lot to support the nurses and the physicians and the first responders throughout the city."

While the shooting event on Oct. 1 was unprecedented in scope, mass casualty events are not uncommon in Las Vegas, Obert says. He recalls one recent incident in which a woman who apparently had some type of psychiatric issue drove down the side of the street, running over several people.

There also have been several deadly fires in recent years. Hospital staff members know they need to be prepared.

"Unfortunately, something like this is going to happen again in Las Vegas. We just don't know to what degree, and that is the challenge," Obert laments. "It is a matter of preparing for a process that is going to work in any circumstance, and not just mass casualty shootings." ■

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