

**Medical News & Perspectives .....p1031**

Expanding the Health Care Response to Mass Violence

**The JAMA Forum .....p1033**

Determining Value and Price in Health Care

**Capitol Health Call .....p1035**

Congress to Address Shortage of General Surgeons

Republicans Critical of White House for Zika Reaching the United States

Cancer Moonshot Stalls on the Launch Pad

Giving Police Alternatives to Lethal Force

**News From the CDC .....p1036**

Infants at Risk of HCV Infection

Salmonella in Backyard Poultry

**Medical News & Perspectives**

## Expanding the Health Care Response to Mass Violence

Jennifer Abbasi

**F**or Joseph Ibrahim, MD, the first wake-up call came last year at an Orlando Magic basketball game. The trauma medical director of Orlando Regional Medical Center (ORMC) was sitting in the stands at the Amway Center when he looked around at the crowd of thousands and imagined a mass casualty incident. "Being the only level I [Trauma] Center in this area, we're responsible for every single person in here," he recalled thinking to himself. It later struck him that Orlando—with its proximity to Disney World—was a prime target for a mass shooting or bombing.

Ibrahim's fears were realized when the deadliest mass shooting in modern US history unfolded in the early morning hours of June 12 at Orlando's Pulse nightclub, located 2 blocks from ORMC. But by then, the hospital's trauma and emergency staff were prepared.

Three months before this real-life tragedy, ORMC staged its annual community-wide mass casualty drill. In prior years, the drills have simulated scenarios including a bombing, a rally that became violent, and an airplane crash. This year's mock disaster—an active shooter incident at a local school with 500 injuries—included all of central Florida's 15 hospitals, the Federal Bureau of Investigation (FBI), local law enforcement, emergency medical services (EMS), fire personnel, and ORMC's Air Care Team, which provides transportation and in-flight stabilization for trauma patients. Ibrahim recently pushed to add trauma simulations on a more regular basis, and these smaller drills have been taking place 3 times a month.

As 44 injured patients streamed in during 2 waves on the night of the Pulse nightclub shooting, these and other preparations undertaken by the hospital for mass casualties paid off, Ibrahim said: "For the most part, the big needs—anesthesia, operating rooms [and other] space, blood, and people to care for [patients]—were taken care of, and I think it was in large part due to the drills that we had performed."

**Model of Preparedness**

Jay Kaplan, MD, vice chair of emergency services for Ochsner Health System in New Orleans and president of the American College of Emergency Physicians (ACEP), called the hospital's response "amazing." "Within a very short period of time they had 6 trauma surgeons [and] 8 emergency physicians caring for patients," he said. Surgeons performed 28 operations on Sunday alone. Thirty-five patients survived and, as

reported in the media, the 9 patients who did not survive died soon after reaching the hospital, indicating that they had arrived with fatal wounds. Ibrahim said that local EMS reached out to express gratitude for being included in the hospital's drills. "I've had a lot of feedback saying they're really happy that we did those drills because they knew how to step in and how to best help," he said.

By all accounts, ORMC is an example of how trauma centers and communities should prepare for mass shootings and other intentional mass casualty events. The 2013 Boston Marathon bombing, after which only 3 of 264 patients died, has been cited as another well-coordinated and highly successful response.

But experts in emergency and trauma medicine say concerning gaps in preparedness for large-scale acts of violence still remain in many communities.



"Right now there's unevenness in both emergency medical services and hospital-based trauma responses across the country," said Donald M. Berwick, MD, president emeritus and senior fellow at the Institute for Healthcare Improvement. "Orlando and Boston were particularly well-prepared, but the next [incident] may not be in a place so well-prepared."

Discussing Orlando, Kaplan echoed this concern, "I want you to imagine this happening in a city where you don't have a level I trauma center within blocks. Then it would be a very different situation."

### Legacy of 9/11

After the events of September 11, 2001, hospitals across the United States took a hard look at how they were set up and prepared to respond to mass casualty disasters, said Ronald Stewart, MD, chair of the department of surgery at the University of Texas Health Science Center at San Antonio and chair of the American College of Surgeons Committee on Trauma. "Since 9/11 we've worked on integrating disaster response more tightly into trauma centers and trauma systems," he said. "We encouraged everyone to look at their own plans, to exercise and drill those plans, and then we made those part of our criteria for trauma centers."

The 9/11 disaster also led to a massive increase in spending on preparedness training by federal agencies like the newly developed Department of Homeland Security, which launched the Homeland Security Grant Program for national preparedness.

"Grant funding allowed for preparedness training across the spectrum of responders from fire, EMS, [and] law enforcement to public health and hospital personnel," said Gina Piazza, DO, associate professor of emergency medicine at the Medical College of Georgia at Augusta University and cochair of ACEP's High Threat Emergency Casualty Care Task Force.

Most of the initial training after 9/11 focused on chemical, biological, radiological, nuclear attacks and explosives, Piazza said. But in recent years, an all-hazards approach has been widely adopted, in which emergency planners and managers tailor preparedness training to the most likely and impactful events that could occur in their area.

A Texas State University and FBI study identified 160 active shooter incidents between 2000 and 2013, and the average number of incidents increased from 6.4 to

16.4 between the first and second half of that period (<http://1.usa.gov/29akUbr>). Active shooter incidents—defined by one or more individuals actively engaged in killing or attempting to kill people in a populated area using a firearm—occurred "in small and large towns, in urban and rural areas, and in 40 of 50 states and the District of Columbia," the report stated. A follow-up analysis found 40 active shooter incidents in 2014 and 2015 (<http://bit.ly/29QLigW>). Between 2000 and 2015, 79 of these incidents qualified as mass killings, with 3 or more deaths.

"With the increase in mass shootings over the past several years, I think we're now seeing more active shooter drills," Piazza said.

### Room for Improvement

Although hospitals and communities are far better prepared for disasters and mass casualties today, organizations are pushing for additional improvements. One sign of shortcomings: In 2014, the US emergency care environment received a C– for disaster preparedness on an ACEP report card, a drop from a C+ in 2009 (<http://bit.ly/29IgmAC>). Piazza said one reason for this is that emergency departments are often operating at or above capacity, limiting their ability to surge at a moment's notice to deal with mass casualties.

In January, Kaplan launched ACEP's High Threat Emergency Casualty Care Task Force to understand and track violent incidents such as mass shootings and bombings and improve health care responses to them. Typical hospital disaster planning still prepares for events like bus accidents and plane crashes, which produce mainly blunt trauma. After multiple mass shootings in the United States and overseas, which primarily cause penetrating trauma, "it became clear to me that the kinds of injuries that people were sustaining were of a wholly different character than what we've prepared for," Kaplan said. The task force aims to collect data on wound patterns and causes of death for victims of mass violence to create evidence-based guidelines for treating them.

Another key goal is to work with fire, EMS, law enforcement, and trauma professionals to validate best practices for response to mass violence starting in the pre-hospital setting. "Responsiveness cannot just be at the hospital level," Kaplan said.

The sentiment that earlier care saves lives underlies the landmark Hartford Con-

sensus, the collective recommendations of an ACS-led collaboration with the medical community and representatives from the federal health agencies; the National Security Council; the US military; the FBI; and police, fire, and emergency medical organizations (<http://bit.ly/29EISzC>).

The committee formed after the Sandy Hook Elementary School shooting in Newtown, Conn, to improve survival after active shooter and other intentional mass casualty events. Because uncontrolled bleeding is the most common cause of mortality from these events, the Consensus recommendations focus on hemorrhage control training for law enforcement and civilian bystanders and earlier access for EMS to victims on scene.

The ACS and the National Association of Emergency Medical Technicians recently introduced a bleeding control course to train nonmedical first responders and bystanders in external hemorrhage control (<http://bit.ly/29f61oZ>). "In many communities, law enforcement [is] now carrying equipment to provide basic hemorrhage control before the scene is secure for paramedics to enter," Stewart said.

As communities adapt to intentional mass casualty events, bystander training in bleeding control—much like cardiopulmonary resuscitation training—is increasingly seen as a critical element of an integrated response. In 2015, the White House announced the "Stop the Bleed" bystander bleeding-control training campaign, which grew out of the Hartford Consensus (<http://bit.ly/29JgRkv>). The American Medical Association's House of Delegates adopted new policy at the 2016 Annual Meeting to encourage state medical and specialty societies to promote bleeding control training for the public and professional responders.

A fully integrated trauma response to mass violence may end in the hospital, but it starts with civilians on the scene. "Since the large-scale events such as the Boston bombing and Orlando have happened, we have seen that the folks who are there on the scene at the time of the injury will act," Piazza said. In fact, in a nationally representative survey commissioned by the Hartford Consensus committee, more than 90% of respondents said they would be likely to help someone they didn't know who was bleeding (Jacobs LM et al. *J Am Coll Surg*. 2016;222[5]:948-955).

"If they are equipped with knowledge and the skills to improvise and provide proper care, we have perhaps a better chance of saving more lives," Piazza added.

On the other end of the continuum of response, an ambitious push for a single unified military and civilian trauma system in the United States could make a difference for victims of mass violence, Berwick said. "There are a lot of overlaps between the kinds of burdens in trauma that are seen on both sides," he said. "The methods for evacuation, stabilization, blood product management, fluid management, tourniquet use, pain control—they all can map from the military to the civilian experience."

Berwick chaired a committee of the National Academies of Science, Engineering, and Medicine that found that up to 20% of trauma deaths in the United States—30 000 deaths in 2014—are preventable with better care (<http://bit.ly/29gWb3w>). To shore up trauma response, the committee's report recommended a White House–led initiative to integrate military and civilian centers into a national trauma care system. The report also recommended that the White House set a goal to achieve zero preventable deaths after injury.

Berwick also emphasized the importance of investment in trauma research, pointing out that, compared with 26 other conditions, injury receives the least National

Institutes of Health research funding in proportion to its disease burden. The coauthors of a recent opinion piece reiterated this, writing that "[a]dequate trauma research funding by governmental agencies, the military sector, and private industry should become a priority at a time when trauma has claimed so many lives and is unfortunately destined to claim more" (Knudson MM et al. *Trauma Surg Acute Care Open*. doi:10.1136/tsaco-2016-000023 [published online July 7, 2016]).

In the meantime, Ibrahim has a message for all hospitals—including those that are not trauma centers: "Do the drills, look at your mass-casualty incident protocols, [and] don't think that you're immune." ■

## The JAMA Forum

# Determining Value and Price in Health Care

Austin B. Frakt, PhD

Paying for value is all the rage in health care, and recently the spotlight has been brightest on prescription drugs (<http://bit.ly/2a0Oy5E>). It's hard to argue with the notion that how much we pay for a drug should be related to the value it provides. Hard to argue, that is, until you try to pin down whose value counts, what *value* means, or how much to pay for it.

Expressions of a drug's value are implicit in current norms and policies. For example, insurers cover some drugs more generously than others. Many patients prefer to switch from a less-covered brand-name drug to a more fully covered generic version. This also communicates the drug's value to the insurer in terms its manufacturer can well understand: (<http://brook.gs/29B12vK>): "Produce more and we will pay for it."

But insurers rarely link the extent to which they cover a drug to the value it provides to patients (<http://bit.ly/1HQoMeV>), a value-based insurance design. (<http://bit.ly/1ohymvi>). They more typically use a price-based design in which a cheaper drug is more generously covered than a more expensive one, even if the latter would provide greater health improvements. This privileges the insurer's value (to spend less) over patients' (to pay less for more effective drugs).

The US Food and Drug Administration also communicates value when it grants a certain number of years of market exclusivity to a drug. It's during those years that a manufacturer can charge the highest price, which is clearly of great value to it. Price, in this case, may not be an accurate expression of a drug's value to patients, insurers, and health systems.

That raises the question, How should a drug's value be assessed and reflected in its price?

## Value Frameworks

Several US organizations have developed "value frameworks" to answer that question. Late last year, Peter J. Neumann, ScD, and Joshua T. Cohen, PhD, of the Institute for Clinical Research and Health Policy Studies at Tufts Medical Center, in Boston, summarized the methods of 5 of them (<http://bit.ly/1QWajQJ>). Reflecting the fact that value means different things to different stakeholders, the frameworks' goals vary, as do their methods. (Similar frameworks exist in other nations (<http://bit.ly/29SKfqk>), with perhaps the United Kingdom's National Institute for Health and Care Excellence being the most familiar [<http://bit.ly/1EtB2fV>].)

The American College of Cardiology and the American Heart Association issued a



Austin B. Frakt, PhD

statement (<http://bit.ly/1RIDkHI>) in 2014 about including cost-effectiveness, value assessments, and recommendations in practice guidelines and performance measures "to facilitate the achievement of the best possible health within the constraints of available resources." Its proposed framework follows a textbook definition of cost effectiveness, measuring the cost of therapies relative to the number of quality-adjusted life-years (QALYs) (<http://bit.ly/29KCq7G>) that they provide.