

ARRIVE WITH:

Your fellow volunteers // Few supplies // A sense of mission //

And a clear idea of what to do...

When Disaster Strikes

■ BY LINDA KESLAR //



W

hen you work in disaster medicine, no two disasters are like, which means that every day is an exercise in improvisation. Consider what

Miriam Aschkenasy, a physician and deputy director of global disaster response at Massachusetts General Hospital, encountered when she arrived in the Philippines last November. Typhoon Haiyan had killed and injured thousands of people and displaced millions more, and the first challenge she and her team of six faced was making their way over severed roads, downed power lines and remnants of buildings. Then, for three weeks, they headed out from their base camp each morning, sometimes by boat, toting backpacks full of medicine and supplies. One day they would work out of a tent, the next in an ad hoc clinic set up in a wrecked school. Long lines snaked outside, and once they saw nearly 200 patients in an hour and a half. Much of their work was standard primary care, treating comparatively minor wounds suffered during the storm and its aftermath, or providing medication for chronic conditions. “We also offered a lot of reassurance, which is what people largely need after such a trauma,” says Aschkenasy, an emergency physician who has graduate training in global health.

But with other catastrophes, the drill may be entirely different. After the earthquake in Haiti in 2010 that killed more than 220,000 people, physicians and other volunteers had to try to function in an environment of extreme poverty, a crippled infrastructure, and overwhelming numbers of other rescue and medical teams. In the United States, hurricanes Katrina and Sandy, both devastating, posed distinct challenges, and the emergency response to Sandy in fall 2012 was helped by lessons learned from Katrina seven years earlier. Similarly, preparedness plans and

training programs put in place after the terrorist attacks of September 11, 2001, helped save many lives after the 2013 Boston Marathon bombings.

That's the thing about disaster medicine—there's no clear consensus about what it is or what training can best equip physicians to practice it. Delivering this care has traditionally been considered an extension of emergency medicine and trauma surgery, and even now it typically involves teams of emergency personnel taking time off from their usual jobs. Still, disaster medicine has begun to emerge as its own field. To become certified in the specialty—a controversial designation that some physicians consider unnecessary—doctors must know how to deal with problems that go beyond what they would normally see in an emergency room—including injuries caused by explosions, earthquakes or biochemical attacks—and also have a knowledge of public health, emergency management and epidemiology, among other fields.

In the Philippines, for example, Aschkenasy and her team had to coordinate with other disaster responders, including the Philippine government. And because infectious diseases such as diarrhea and measles often surge in the wake of a natural disaster, every evening the team reported surveillance data on the illnesses they saw to the Philippine Department of Health and the World Health Organization.

Each new disaster, and the unique challenges it poses, underscores the need for additional study that could help shape

future efforts, says David Marcozzi, an emergency physician who directs National Healthcare Preparedness Programs (NHPP) at the U.S. Department of Health and Human Services. Yet research quality remains a major challenge. “The science of disaster medicine is in its infancy,” says Kristi L. Koenig, director of the Center for Disaster Medical Sciences at the University of California-Irvine.

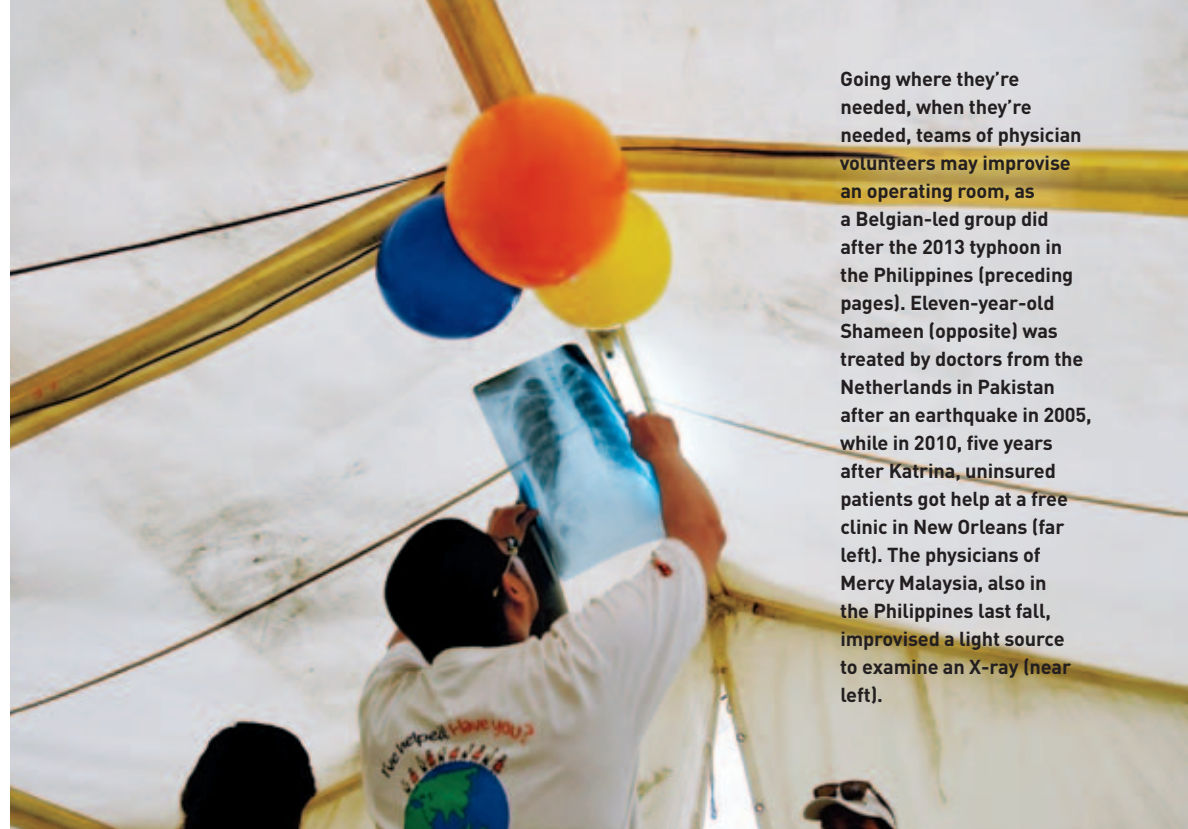
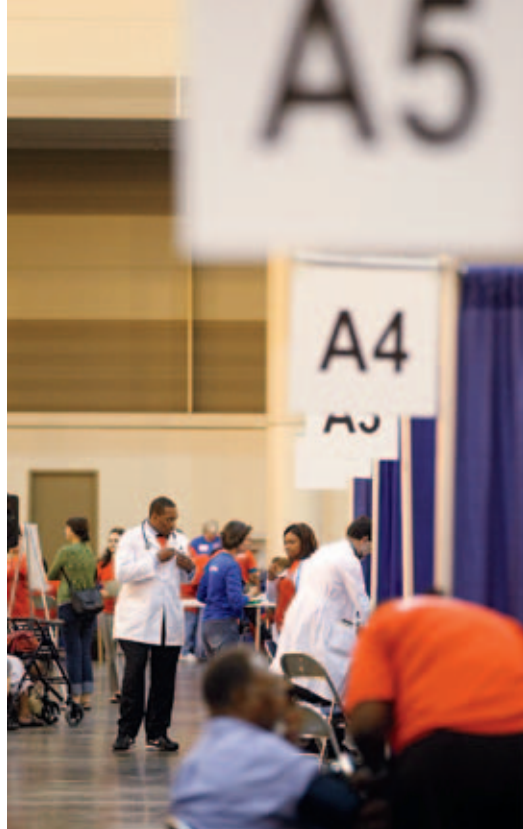
Koenig notes difficulties in reaching consensus about terminology and metrics, developing standardized training criteria and dealing with the reality that disasters are by definition unpredictable and infrequent. Still, says James J. James, executive director of the Society for Disaster Medicine and Public Health, which publishes a journal devoted to the field, “I think people are realizing how much we need disaster medicine and that a lot more should be done.”

Disaster medicine has roots in diverse settings, including the Napoleonic wars of the early 19th century. An essential concept, triage—from the French *trier*, meaning “to sort”—emerged there as a tool to make sure that soldiers who most urgently needed care, regardless of rank, were attended to first. “It is, psychologically, the most difficult mission of disaster medical response,” says Susan Briggs, a trauma surgeon at MGH and an expert in the field. “The objective is to do the greatest good for the greatest number of patients, instead of treating every individual with a maximum level of care, which is what we've always been trained to do.”

The Cold War, with its threat of nuclear conflict, was another milestone. Joseph R. Schaeffer, a Texas physician, was an advocate for physician and civilian training to prepare for an atomic attack, and in the early 1960s, he wrote the first official disaster medicine manual of the North Atlantic Treaty Organization. Then, during the 1980s, the National Disaster Medical System was established. The system included dozens of federally coordinated disaster medical assistance teams of trained volunteer physicians, nurses, paramedics and other providers.

In the wake of 9/11, legislation in 2002 provided federal funds for the Hospital Preparedness Program (HPP), originally designed to bolster hospital readiness to respond to bioterrorism. Four years later, the focus shifted to “all hazards preparedness” that would also encompass pandemics and natural disasters. That change came in the wake of Hurricane Katrina, which decimated the Gulf Coast, killed nearly 2,000 people and exposed large gaps in readiness when hospitals and nursing homes lost power, communications, and water and sewer services. Unable to resupply drugs, blood, linens and food, the facilities were blamed for the deaths of more than 200 patients.





Going where they're needed, when they're needed, teams of physician volunteers may improvise an operating room, as a Belgian-led group did after the 2013 typhoon in the Philippines (preceding pages). Eleven-year-old Shameen (opposite) was treated by doctors from the Netherlands in Pakistan after an earthquake in 2005, while in 2010, five years after Katrina, uninsured patients got help at a free clinic in New Orleans (far left). The physicians of Mercy Malaysia, also in the Philippines last fall, improvised a light source to examine an X-ray (near left).

Disaster medical assistance teams (DMATs) deployed to the region weren't prepared for the numbers of patients they encountered and were hampered by poor coordination with local providers and a lack of training and equipment. "Katrina taught us what a natural disaster could do, and we weren't well prepared," says Toby Clairmont, director of emergency services for the Healthcare Association of Hawaii, who led a post-Katrina DMAT. "We were literally stacking up dead people, which is not something a normal health care worker will see."

During the years since 9/11 and Katrina, there has been no shortage of catastrophes to test the progress of disaster medicine. In October 2012, Superstorm Sandy submerged parts of New York City and washed out numerous hospitals, forcing them to evacuate patients and staff. The 15-hour mission to move patients led rescue workers and other staff at New York University Langone Medical Center to personally carry 20 newborns in intensive care and immobile patients on gurneys down darkened stairwells.

Six months later, the week of April 15, 2013, brought two horrific events, the bombings at the Boston Marathon and the explosion of a fertilizer plant in West, Texas. In Boston, every victim who made it to one of eight Boston hospitals—a total of more than 170 patients—survived. It helped that the explosions, near the finish line, happened in a place filled with emergency medical personnel who were there to aid runners, and that six hospital trauma centers were within two miles of the bombing site. But all of the hospitals had also been training for years to respond to a Boston catastrophe.

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Past joint training drills had given hospitals a chance to evaluate their individual response plans as well as their ability to communicate with other facilities, coordinate care for a large number of victims and work with other emergency responders. Paul Biddinger, medical director for emergency preparedness at MGH, attributes much of the success to the fact that all of the city's hospitals and health groups had gone through exercises to prepare for something like this. "We knew each other's capabilities and we trusted our plans," Biddinger says.

That same week, a fire and subsequent explosion at the West Fertilizer Co. plant in Texas killed 15 people and injured more than 200 while destroying dozens of buildings. The nearest hospital trauma centers were nearly 20 miles away, which put the spotlight on local doctors who had to jump in to help. George N. Smith, one of just three physicians in West, rushed to a nursing home to help evacuate its 130 residents who had to escape the fire's noxious fumes. Twenty minutes later, when the plant exploded in a blast so powerful that it knocked down part of the nursing home, Smith was injured by falling debris. He used a medical helicopter's satellite radio to call for



Rising to the challenge of disaster medicine's worst-case scenarios, from left, instruments had to be sterilized after an earthquake in 2001 in western India; workers raced to save equipment in a hospital in Taiwan flooded by a typhoon in 2012; patients awaited further treatment in a hospital in Tacloban, the worst-hit city in the 2013 Philippines typhoon; and a baby boy was delivered in Sichuan Province, China, four days after an earthquake in 2013.

additional help because the explosion had destroyed local cell towers. He asked emergency dispatchers to notify the county disaster manager, the governor, urban search and rescue, and every ambulance, fire truck and helicopter that could be made available. "If I hadn't had disaster training, I wouldn't have known what to do or who to contact," he says.

In the aftermath of both events, Biddinger and Smith have shared their experiences with groups of health care providers around the country. Biddinger, in a push led by Marcozzi's organization, NHPP, has been encouraging institutions to join coalitions that connect hospitals, EMS responders, nursing homes and others. Smith, meanwhile, is urging physicians to seek out disaster training. "This is something every single physician, especially in small towns, needs to know," he says.

Since 9/11, by conservative estimate more than 200,000 people, about a third of them physicians, have taken courses addressing what to do in the wake of everything from fires and floods to nuclear attacks. The American Medical Association, the National Disaster Life Support Foundation, the Federal Emergency Management Agency and the American College of Surgeons, among others, have sponsored training, while many hospitals offer in-house courses for their own workers.

But many of these courses haven't had any uniform curriculum or focus, and a study on their effectiveness published in the 2008 *Annals of Emergency Medicine* found that many programs lack clarity and consistency. Medical schools, meanwhile, have also been slow to embrace disaster medicine. A pilot survey by researchers at Johns Hopkins University School of Medicine published in 2012 found that only a small percentage of schools include disaster medicine in their core curricula.

Several medical schools, however, now offer postgraduate fellowships in disaster medicine. "Academic institutions are starting to look at disaster medicine in a much more serious way," says Gregory Ciottone, an emergency physician at Beth Israel Deaconess Medical Center in Boston who directs a disaster medicine/emergency management fellowship program there. Still, those who complete such fellowships will find few choices if they want to make the specialty their life's work. "You can have a career as a professional emergency manager, but doing solely disaster medicine is rare," he says.

Meanwhile, the American Board of Physician Specialties and the American Academy of Disaster Medicine have created a certification program for disaster medicine that 70 physicians have completed since 2006. The credentialing process includes a written exam and real-time disaster simulations. But the American Academy of Emergency Medicine opposed the certification of the disaster medicine specialty, and others say having physicians become board certified in disaster medicine isn't the right step forward. "A lot of us feel that disaster medicine should be an integral part of everyone's training, whether in nursing, medical or dental school," says Briggs at MGH.



Although UC-Irvine's Koenig does believe disaster medicine should be a separate specialty, she sees many hurdles slowing its development. One is a lack of standardized methods and terminology. There are no national guidelines for mass casualty triage, for example, and that can result in confusion and miscommunication among the many groups that may respond to an emergency. "Even something as basic as the terms 'disaster' and 'casualty' don't have standard definitions, which makes it very difficult to have a science in which you can compare apples to apples," Koenig says.

Efforts to add science and systems to disaster medicine could be undermined in the United States by federal budget cuts. The Hospital Preparedness Program, for example, has seen its funding decline from \$515 million a year in 2003 to \$331 million today, a reduction that could endanger the sustainability of efforts to improve hospital responses to disaster, says Dan Hanfling, an emergency physician and professor at George Washington University. He worries that full-scale drills for emergency incidents, which may cost up to \$200,000 to stage—and that depend on HPP for funding—may be replaced with inadequate "tabletop" exercises. "Our emergency response programs are only going to be as good as the people who are expected to make them work," says Hanfling, who also serves as a special advisor for emergency preparedness and response for Inova Health System in northern Virginia. "We can't simply rely upon equipment, supplies and pharmaceuticals. Without trained and experienced staff, those materials won't be put to effective use."

"Haiti highlighted what most of us who have been in the disaster field have known for years: There's a need for people who know what they're doing in these environments and who aren't putting themselves or others at additional risk," says Aschkenasy, who served there with the Harvard Humanitarian Initiative. "Before we allowed any medical responder in our field hospital, we sat them down at the security tent and checked their credentials."

In contrast, Aschkenasy saw a small sign of progress in the Philippines. When she and her team arrived at Cebu City last year, she says, they were asked to register immediately as a foreign medical team in a book right at the airport. "That's the first time I've been asked that in 15 years of disaster work," she says. ■

→ DOSSIER

1. ***Advanced Disaster Medical Response Manual for Providers, Second Edition, edited by Susan Miller Briggs, Ciné-Med, Inc., January 2014.*** Briggs, a trauma surgeon at Massachusetts General Hospital and global expert in disaster medicine, enlisted more than three dozen contributing authors to create a comprehensive handbook that reviews medical and public health response to disasters.
2. **"Disaster Medical Sciences: Towards Defining a New Discipline," by Kristi L. Koenig, *Health Affairs Blog*, Dec. 19, 2013.** Koenig, a leading scholar in disaster medicine, provides a succinct review of the challenges under way as the field evolves as a science.
3. **"Health Care Preparedness Funding: Are We Inviting Disaster?" by Dan Hanfling, *Health Affairs Blog*, Dec. 31, 2013.** Emergency preparedness expert Hanfling addresses the potential domino effect of federal funding cuts for hospitals and other stakeholders in the emergency response system and the risks, such as potential lives lost and loss of public confidence, should a catastrophe take place.