

Disaster response: Physician assistant skills are an important asset

Recent experiences serve to reiterate the critical need for medical support during the aftermath of major disasters. PAs can help fill the inevitable shortfall of providers.

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The floods in the American Midwest in March 2008; the tornadoes that spun their way down the Virginia Peninsula on April 29, 2008; the tornadoes that struck the American Midwest on May 4, 2008; and Cyclone Nargis, which devastated Myanmar on May 4, 2008, reiterated how destructive Mother Nature can be. PAs were and are involved at some level in the responses to disasters in the United States, including the continuing efforts to recover from Hurricane Katrina (see Figure 1). Although some PAs may hesitate to volunteer their services following a disaster because they feel they lack proper skills, all PAs possess the basic medical skills that are needed during a natural disaster response. This article is a beginner's point of reference for exploring the vast and fascinating field of disaster medicine.

DISASTER EPIDEMIOLOGY

Natural disasters can occur in remote areas where medical care is already limited. Transportation infrastructure is often impaired or destroyed and inclement weather frequently hampers relief efforts. Affected communities may have to rely on existing resources for days to weeks before outside help arrives.¹ Injuries and illnesses will occur far more often than fatalities. For example, CDC data show that for every tornado-induced fatality, approximately 44 survivors require some level of medical attention.² This underscores the importance of medical support for both response and recovery operations. The incidences of respiratory and gastrointestinal illnesses may increase after a disaster. However, a disease needs to be already present in a community for it to appear in the aftermath of a disaster. A mass population movement after a disaster significantly increases the risk of enteric disease, which is exacerbated by poor sanitation and reduced public health services.^{3,4}

Many injuries occur during the recovery phase when people are repairing and rebuilding damaged infrastructure. Musculoskeletal injuries related to overuse, overloading, or trauma—usually incurred while using power tools—occur most often. In addition to physical injuries, health care providers must be sensitive to the psychological impact of disasters and include mental health professionals in patient care when indicated. Posttraumatic stress disorder and de-



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FIGURE 1. A PA (right) provides care for a patient in a portable disaster medical assistance team center in New Orleans after Hurricane Katrina.

pression are commonly found in disaster survivors, especially if they are displaced from their communities.⁵

Floods are the most common natural disaster. In the United States, floods cause more deaths than any other natural disaster, and most of these deaths occur during flash floods.⁶ Most flood-related injuries are lacerations and abrasions, which are frequently heavily contaminated with bacteria. The need for emergency medical care is rare and ranges from 0.2% to 2.0%.¹ A flood in Missouri during the summer of 1993 is a good example of the prevalence of flood-related injuries. In a 50-day period during and after the flood, 524 flood-related conditions were reported; 250 of them were injuries including muscle sprains or strains, lacerations, and abrasions or contusions.⁵ The 233 reported cases of illness included GI problems, rashes or dermatitis, and heat-related illnesses.⁶ Hypothermia can also be prevalent in flood-water immersed victims (see Figure 2).

Floods also increase the risk for both waterborne and vectorborne illnesses. Waterborne diseases may appear within

hours or days after the disaster and are likely to be diarrheas of varied etiologies. A waterborne disease that can manifest as late as 1 month after a flooding event is leptospirosis.

Caused by the bacteria *leptospira interrogans*, leptospirosis is associated with poor sanitation and the presence of rodents, dogs, cattle, and pigs. These animals can serve as reservoirs for the bacteria.²⁸ Outbreaks of leptospirosis were recorded after floods in Nicaragua (1995), Brazil (1996), Krasnodar, Russia (1997), Santa Fe, New Mexico (1998), Orissa, India (1999), and Thailand (2000).³ Leptospirosis should be in the differential diagnosis for all febrile illnesses in a flood-impacted population.

Vectorborne diseases such as mosquito-borne diseases (malaria, West Nile fever, yellow fever, dengue, Saint Louis encephalitis) usually begin appearing roughly 6 to 8 weeks after flood waters recede. The increased incidence of these diseases stems from the favorable breeding conditions for mosquitoes created by flood waters.⁹

Hurricanes and tornadoes cause damage with their high wind speeds (see Figure 3, page 38). Flooding causes most hurricane-related morbidity. Disrupted sanitation can lead to GI illnesses; mold and mildew growing on damp residential surfaces may cause respiratory complaints including asthma exacerbations. Carbon monoxide poisoning from gasoline-powered generators may also occur.

A tornado struck near Birmingham, Alabama, on April 8, 1998. The storm left a path of destruction 17 miles long and 1 mile wide at its widest point and caused 32 deaths. Of the 224 people who sought medical care at local hospital, 49% had upper extremity injuries, 45% had lower extremity injuries, 32% had head injuries, 26% had facial injuries, and 21% had thoracic injuries.¹⁰ Injuries caused by tornadoes can be quite severe. A level-one trauma center in Savannah, Georgia, received 11 seriously injured patients. Most of the injuries were orthopedic, with rib fractures being the most common fracture; however, significant soft tissue injuries that required surgical management were also treated.¹¹

Injuries and illnesses related to hurricane events in the United States are usually few. For example, a CDC rapid-needs assessment in North Carolina following Hurricanes Isabel and Charley showed that of 210 surveyed households, two reported hurricane-related injuries, 10 reported



Andrea Booher / FEMA

FIGURE 2. Flood recovery activities can lead to immersion-related injuries and illnesses.

hurricane-related illnesses, and 17 had a family member with medical needs.¹²

Hurricane magnitude and where it strikes affects the need for medical care. Hurricane Katrina created a significantly different medical environment than that noted in North Carolina. The CDC reported that 7,608 patients were seen by medical care providers from September 8 to 25, 2005, in New Orleans. Of these patients, 4,169 reported illnesses, 2,018 incurred injuries, and 1,321 had nonacute medical needs such as prescription refills and wound assessments. Of the reported illnesses, skin/wound infection accounted for 15% of patients; acute respiratory infections, 12%; diarrhea, 4%; skin rash, 13%; and heat casualties, 6%.¹³

Earthquakes can be one of the most frightening and damaging natural events encountered. Most earthquakes cause little to no damage, but larger ones, especially when they occur in heavily populated areas, can cause tremendous damage and numerous injuries. Crush injuries, contusions, fractures, burns, abrasions, lacerations, dust inhalation, and cardiac events are commonly associated with earthquakes.^{14,15}

An earthquake in Northridge, California, killed 33 people and injured 8,000 to 11,000 persons (see Figure 4, page 38). In a survey of 1,830 people, 8% of the respondents incurred an earthquake-related injury and only 10% of the injured re-

KEY POINTS

- PAs were and are involved at some level in the responses to disasters in the United States. Although some PAs may hesitate to volunteer their services following a disaster because they feel they lack proper skills, all PAs possess the basic medical skills that are needed during a natural disaster response.
- CDC data show that for every tornado-induced fatality, approximately 44 survivors require some level of medical attention. This underscores the importance of medical support for both response and recovery operations.
- In addition to physical injuries, health care providers must be sensitive to the psychological impact of disasters and include mental health professionals in patient care when indicated. Posttraumatic stress disorder and depression are commonly found in disaster survivors, especially if they are displaced from their communities.
- Emergency responders with pre-existing knowledge enable a more efficient and effective response—a very important commodity when a disaster-stricken community has been waiting several days for help.



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FIGURE 3. Devastation caused by Hurricane Isabel



FEMA News Photo

FIGURE 4. Damage caused by an earthquake in California

spondents sought treatment. Most of the injuries were soft tissue and involved the extremities, followed by head trauma and thoracic injuries.¹⁴ The Northridge quake significantly damaged eight hospitals in the area. The Veterans Administration hospital deployed four mobile clinics to help support the affected populace. These clinics treated 1,123 patients between January 25 and February 2, 1998. Of those treated, 35% had upper respiratory infections, 12% suffered stress reactions, 10% had otitis media, and 8% incurred physical trauma. Forty five percent of the patients seen were children.¹⁶

WHERE TO GO FOR TRAINING

Several educational avenues are available for those who wish to learn more about disaster response. Most training programs use an “all hazards” approach that covers both natural and man-made disasters. The Federal Emergency Management Agency offers free online distance learning modules through the Emergency Management Institute (see Table 1). These courses offer continuing education units that can be submitted to the AAPA as a Category II (elective) activity.

The National Disaster Life Support Foundation, in conjunction with the American Medical Association, offers Basic Disaster Life Support and Advanced Disaster Life Support courses. Some universities offer disaster medicine-related graduate degrees and certificates. The program at Saint Louis University School of Public Health offers a

TABLE 1. Emergency Management Institute online courses

IS-100	Introduction to incident command system
IS-100HC	Introduction to incident command system for healthcare/hospitals
IS-235	Emergency planning
IS-292	Basic disaster operations
IS-317	Introduction to community emergency response teams
Note: Information on these courses is available online at http://training.fema.gov/is .	

Master of Science in Biosecurity and Disaster Preparedness, and the program at the University of Philadelphia offers a Master of Science in Disaster Medicine and Management. On-the-job training obtained through membership with formal response groups such as the Disaster Medical Assistance Teams (DMATs) will also provide needed skills.

The CDC has useful information about many disaster-related issues on its Web site. The federal government has an excellent Web site devoted to pandemic influenza.

Disaster medicine-related articles in published literature are also helpful resources. Disaster medicine journals include *Prehospital and Disaster Medicine*, *Disaster Medicine and Public Health Preparedness Journal*, and *International Journal of Disaster Medicine*. *Disaster Medicine* (Lippincott Williams and Wilkins, 2002) is a textbook that covers many aspects of disaster responses at the various levels. A must-read for PAs is the AAPA’s position paper, “The Physician Assistant in Disaster Response: Core Guidelines.” Table 2 lists Web sites for all of the education and information resources discussed in this article.

EFFECTIVE DISASTER RESPONSE

The impulse to spontaneously go to a disaster and assist needs to be checked. Unrequested volunteers arriving at a disaster site only add to the confusion and logistical difficulties. PAs who live in the immediate disaster-stricken area should first see that their families are safe and secure and then go to their normal job, if possible. This provides a semblance of normalcy for disaster survivors.

PAs may want to travel to distant disaster sites to help; however, this may be legally problematic. Legal restrictions include varying individual state laws regarding licensing, physician supervision and delegation, and prescriptive authorities for PAs. Joining a federal disaster response organization solves these legal issues because members’ accreditation has federal status. DMAT teams deploy anywhere in the United States. Locally, citizen emergency response teams provide immediate assistance, including light search and rescue operations and first aid services, to their communities in the

immediate aftermath of a disaster. The federal Medical Reserve Corps offers interested persons the opportunity to augment existing local medical care in the event of an emergency. Nongovernmental organizations (NGOs) such as the American Red Cross and religious-based groups often provide support to disaster stricken communities. If a PA decides to work in a clinical capacity for an NGO, the PA is responsible for ensuring that the NGO has arranged for proper licensure in the area to which the PA is being sent.

PAs who become response-team members should be prepared to perform nonclinical duties such as logistics and administrative work for their team, as well. Knowledge on the proper use of radios (especially etiquette) will be beneficial. The American Radio Relay League offers self-study courses, including disaster radio communications.

The variances in state health regulatory laws can slow medical relief being sent to the disaster area. In an effort to streamline disaster response in general, Larry Gostin and colleagues at Georgetown University and the Johns Hopkins University developed a model legal document in the aftermath of 9-11.¹⁷ Similarly, the AAPA developed model language for states to use to facilitate PAs in the aftermath of a disaster.¹⁸

TABLE 2. Online sources for disaster response education and information

AAPA Position paper <i>The Physician Assistant in Disaster Response: Core Guidelines</i> www.aapa.org/manual/17-ThePAinDisasterResponse.pdf
Centers for Disease Control and Prevention www.cdc.gov
Community Emergency Response Teams www.citizenrcps.gov/cert
Disaster Medical Assistance Teams www.hhs.gov/aspr/opeo/ndms/teams/dmat.html www.dmat.org/teamlinks.html
Medical Reserve Corps www.medicalreservcorps.gov/findmrc.asp
National Disaster Life Support Foundation www.ndlsf.org/common/content.asp?PAGE=345
Saint Louis University School of Public Health Biosecurity and Disaster Preparedness Programs http://bioterrorism.slu.edu/DegreeProg07/IBS07index2.html
The American Radio Relay League www.arrl.org/catalog/lm/
University of Philadelphia Disaster Medicine and Management Program www.philau.edu/disastermed/theprogram.htm
US Government avian and pandemic flu information www.pandemicflu.gov/index.html

The emotional rewards for PAs who become engaged in disaster response are incredible. The feeling of having made a difference and the sense of camaraderie associated with working on a team providing humanitarian relief can be intoxicating.

CONCLUSION

Disasters happen, and medical personnel are critical assets during a disaster response. Most disaster-related illnesses and injuries are mundane but are exacerbated by disrupted community infrastructure. Emergency responders with pre-existing knowledge enable a more efficient and effective response—a very important commodity when a disaster-stricken community has been waiting several days for help. PAs have the basic medical skills necessary to effectively provide medical care to disaster survivors, but most need specific education about disaster medicine, disaster response, and disaster management. PAs can become leaders in disaster medicine and help guide the profession's growth into this aspect of health care. **JAAPA**

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- Model state legislation for physician assistants: participation in disaster and emergency care. American Academy of Physician Assistants Web site. <http://www.aapa.org/gandp/modelaw.html>. Accessed December 3, 2008.