

When Disaster Strikes, Humanity Becomes our Patient

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Introduction

I volunteered at a hospital in Haiti for one week in the month following the disastrous earthquake of January 12, 2010. This article discusses natural disasters in general with a focus on earthquakes, and the geography and timing of patient presentation. I will also discuss the role of family physicians in disaster response, and share my own experience as a resident family doctor.

Background

Natural disasters affect millions of people worldwide each year. A disaster, as defined by the International Federation of Red Cross and Red Crescent Societies, is an event negatively impacting 100 or more people, 10 or more deaths, or an appeal for external aid.¹ Improved technology has allowed the population to expand into disaster-prone areas. In Southern California, the shift from an agricultural society has concentrated populations in large centers. The impact of disasters is expected to increase in the future. Disasters overwhelm the resources of the community in which they occur. When large-scale disasters affect nonindustrialized countries like Haiti, these developing countries do not have reserves to respond to the pursuing devastation. Recent events such as Hurricane Katrina remind us that even developed

countries, like the US, are not immune to such tragedy.¹

It has been said that the difference between a disaster and a catastrophe depends on the response of the community. As physicians we are likely to be part of the response to a local disaster. The general public expects that physicians will be the first to respond in disaster situations. The American Medical Association's (AMA's) Declaration of Professional Responsibility² commits that physicians will "apply our knowledge and skills when needed, though doing so may put us at risk." This duty to treat has been a longstanding ethic seen in the AMA code, which reflects the ethics of our profession, and overrides our autonomy as physicians to choose whom and how we serve in nonemergent times. Our special abilities create a unique obligation to assist during a greater level of need. Assisting, in turn, can have a rewarding and liberating effect on the clinician.

Disaster Geography and Timeline

Proximity to the "total impact zone" of a disaster, such as an earthquake epicenter, will affect the severity of injuries seen. Physicians must be prepared to serve in the "total impact zone," the "marginal impact zone," which may have some destruction, and the "filtration zone" in which patients

from the directly affected area seek refuge.

Disaster victims present in a cycle with three distinct but overlapping stages. The first stage presents in the first few hours after an event. This group of patients usually has mild physical injuries and are commonly called the "walking wounded."³ Though life-threatening injuries occasionally present in this group, most are well people searching for information about the disaster. It is important to triage this group in preparation for the next group.

The second stage may contain more critically ill patients. These patients typically take hours to days to be extricated and require transportation to medical facilities. During this stage, following the Haitian earthquake, the overwhelming need was for intravenous rehydration, narcotic analgesia, wound care, and fracture management.

The third phase includes patients who eventually present for care of untreated acute or chronic medical conditions. This group tends to present days to weeks after the initial event. Generally, this group requests treatment of chronic diseases and prescription medication refills. Disasters are known to increase primary health care use for 12 months or more following a disaster.¹

Although medical and surgical issues are addressed immediately,

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as physicians we know that not all wounds are visible. Symptoms of acute stress are normal in both the general population and in responders in the first days following a disaster. Although patients should be assured that many recover without intervention, new onset psychiatric disorders as well as exacerbations of preexisting psychiatric conditions and substance abuse are especially common. It is important for the physician to remember that post-traumatic stress disorder (PTSD) cannot be diagnosed immediately following a disaster, because an acute stress reaction may be normal for up to one month following the event. One useful screening tool is provided by the Department of Veterans Affairs (www.oqp.med.va.gov). A comprehensive resource for treating patients with PTSD following emergencies is the IASC Guidelines on Mental Health and Psychological Support in Emergency Settings.

In one recently published retrospective study of the survivors of the Greek earthquakes in August 1953, 49% of the interviewees recalled symptoms of PTSD in the first 6 months post-quake. This statistic is consistent with rates reported elsewhere. Three decades after the Greek earthquakes, about one third of the survivors still suffered from PTSD.^{1,3,4} Survivors of the Haitian earthquake are expected to follow this course as well. Groups at higher risk for development of PTSD after an earthquake include women, those with prior psychiatric disorders, those who were indoors during the event, and those who settled in temporary residences (tents) afterward. In view of the fact that close to half of the population may be affected, therapy for PTSD should be a priority.

Traditionally, debriefing after a disaster has been the standard of care for prevention of PTSD. One effective model that uses debriefing techniques is Critical Incident Stress Debriefing (CISD). Soon after a disaster, specially trained practitioners of this model lead groups of patients that discuss the event and their emotional and physical reaction to it. The model then uses relaxation methods and coping skills to deal with the emotions and symptoms.

Organizations such as the Trauma Resource Institute (TRI) work to ensure that effective, culturally sensitive care is easily accessible to those who desire it without forcing participation. TRI is currently involved in the Haitian relief effort. The group trains physicians, nurses, community leaders and aid workers in the Trauma Resiliency Model. This model is biologically based and grounded in Mind-Body Theory. In short, the model uses eight skills to release energy from blocked sympathetic reflexes. This reduces the risk of emotional flooding and retraumatization that can occur with traditional talk therapies such as CISD or Cognitive Behavioral Therapy (CBT).⁵

Physicians with strong skills may be called to work with highly distressed survivors. The role of the physician is to encourage the patient to minimize the helpless victim mindset, and reestablish pre-disaster routine. This is often best done in a community rather than office setting. Counseling should focus on relaxation techniques, learning effective coping skills, and healthy grieving. It is during the early stages of disaster response that rapport is built with patients that may go on to develop PTSD and require further treatment.

Family Physicians in Disaster Relief

Many of the acute and chronic physical and mental health issues that commonly occur following a disaster are within the scope of practice for family physicians. During residency, family physicians receive training in adult and pediatric medicine, minor surgery, nonoperative orthopedics, mental health, and obstetrics. However, one recent study found that while 80% of primary care clinicians would be willing to assist, only 20% consider themselves well prepared to respond to a disaster.^{6,7} Though disasters are “low-probability, high-impact events” we must commit to preparing for such events so that we are not caught off-guard. Whereas an infinite number of disaster scenarios are possible, it is important for physicians to have knowledge about the threats specific to their region. In Southern California, the most likely natural disaster is an earthquake, but floods and fires are also common. Family medicine physicians, are well suited to respond in the event of an earthquake given their training in medical, minor surgical and psychological care for all ages.

Disasters cause a wide variety of physical and mental health pathology. Family physicians receive formal training in both of these broad areas. Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) courses are standard curricula for residency programs. The AMA has developed a similar training program called the National Disaster Life Support course that residency programs might consider to better prepare their residents. Specific training in treating PTSD might also be appropriate additional preparation in residency.

Physicians at all levels of training may participate in the Medical Reserve Corps (MRC). The MRC is a nationwide network that organizes multidisciplinary teams of health care professionals who are committed to improving health in their communities and responding to disasters. MRC volunteers are trained to respond to local and national disasters as needed.

There are several other such organizations that physicians may join such as Doctors Without Borders. It is important for physicians to become involved with these groups before a disaster scenario because the credentialing process is a time factor. Relief groups are more likely to select health care professionals with previous relief experience. Volunteers should be positioned to integrate with the coordinated response effort. Untrained volunteers may occasionally be needed, but can overwhelm a response system, turning a disaster into a catastrophe.

Physicians are also responsible to prepare themselves personally for disasters. This includes making preparations for the physician's family safety, which will be subject to the same physical and mental health risks as other victims in the community. Physicians should make preparations for their families so that they may continue to balance the care of both family and patients. Examples include maintaining portable survival kits, designated meeting places, and back-up communication methods. These should be reviewed on a regular basis. Physicians should equip their offices with the necessary supplies in the event of a disaster. Those interested in assisting abroad should ensure that their travel documents and immunizations are current and take appropri-

ate prophylactic medications. The Centers for Disease Control and Prevention Web site (www.cdc.gov/travel) is a helpful resource for health requirements.⁸

Although medical outcomes in disasters are poorly documented, in one follow-up study of the victims of the 2001 Gujarat earthquake, 10% of orthopedic injuries were missed, 19% became infected postoperatively, 12% were noted to have restricted range of motion, 23% suffered nonunion, and 30.5% of patient's required reoperation. Only 14% of compound fractures were treated conservatively in plaster. The amputation rate was considerable at 12%.⁹ Whereas these statistics may be due to the nature of the injuries after an earthquake, it is thought that aggressive surgical management and poor follow-up led to these exceedingly high rates. Surgical management is essential in many cases following the trauma of an earthquake. However, this study does argue for conservative management when possible. Family physicians with fracture management training could play an integral role as part of an orthopedic team.

In the wake of Hurricane Katrina, family physicians have been an integral part of the response. Primary care physicians are best equipped to deal with the long-term recovery stage of disasters. When designated emergency personnel become overwhelmed, family physicians will be called to assist. Family physicians must be prepared to care for patients in all three zones of a disaster. Given that family physicians are present in most communities, they will be the first responders in areas ranging from rural to metropolitan. Family Medicine trainees receive longitudinal training in the diagnosis and management of psychiatric disor-

ders in children and adults, which also equips them to treat patients suffering from PTSD, acute stress, and other mental health conditions following a natural disaster.

My Experience in Haiti

I have witnessed poverty while working in hospitals in rural Uganda and Belize. Port-au-Prince was equally impoverished before the earthquake. Neither my time abroad, nor the news reports had prepared me for the enormity of the devastation in Haiti. I have worked with the Medical Reserve Corps in San Bernardino County for the last 2 years. The training proved helpful in my trip to Port-au-Prince 45 days following the 7.0 earthquake that struck on January 12, 2010. As I was arriving during the recovery phase, I was unsure what type of pathology to expect. As a second-year family medicine resident, I was worried that my limited experience could make me a hindrance rather than a help. Many of the relief organizations that I approached had rejected my application. Most of these groups were requesting surgeons with prior disaster experience. After much searching, I connected with a group from my alma mater, Loma Linda University, which was sending residents to a sponsored hospital in Port-au-Prince.

Upon initial descent of our somber flight into Haiti, I saw no destruction. The roofs on all of the buildings looked intact. However as we approached the runway, I could see that many buildings had lost their roof-support structure causing them to fall straight down. As my driver took me from the airport to the hospital, such scenes were commonplace. Though I speak no French, my driver spoke enough English to convey the

death tolls for which several of the cinder-block structures were responsible. We drove past the fallen palace and the remains of what was one of the country's few medical schools. The language barrier continued to be problematic, with very few volunteers speaking Creole or French, and fewer trained interpreters. The one piece of graffiti written in English was ubiquitous: "WE NEED HELP." Through the crumbled streets, past tent cities, we continued to make our way to Hôpital Adventiste d'Haiti.

When I arrived at the hospital, the Medical Director greeted me and asked where I felt comfortable working in the hospital. Thanks to my diverse family medicine training, I was able to reply, "Wherever you need me." The facility has a 70-bed capacity. However, more than 1000 people were staying on the hospital grounds. Most of these patients required close follow-up. The hospital had a primitive laboratory, x-ray and three operating rooms. In the Haitian earthquake, children accounted for approximately 30% of the casualties.¹⁰ As a family medicine resident, I was the volunteer physician with the most inpatient pediatric experience. Therefore, the Medical Director placed me in charge of the 7-bed pediatric ward and clinic. I would eventually act as a pharmacist reconstituting medication, a radiologist reading all of my own films, and assist in multiple surgeries.

As I rounded on the ward that first night, the predominance of the cases was pneumonia, asthma exacerbation, and viral gastroenteritis. This was the "bread and butter" of inpatient pediatrics at the community hospital where I am training. However, some problems were very foreign to me. Throughout my stay we saw

multiple cases of presumed malaria, which is endemic to Haiti. Thankfully, it is a region of relative chloroquine sensitivity. I quickly gained the simple but novel skill of treating malaria.

In talking with volunteers who had preceded me, other acute issues seen following the Haitian earthquake included respiratory distress from presumed fat emboli after fractures, gangrene, sepsis, compartment syndrome, and tetanus.¹⁰ The lack of ventilators complicated the use of general anesthesia.¹⁰ Most patients were treated in field hospitals consisting of tents and damaged buildings, because of the devastation of the country's medical infrastructure.^{7,10} In many cases, there were too few tents and tarps to cover all patients.³ Anecdotally, many of the local obstetricians and midwives reported an influx of laboring patients immediately following the earthquake. In the absence of an obstetrician, I had the training to deliver several Haitian babies.

Many of the problems we saw could have been prevented with better education. It is customary in Haiti to warm children who are having fever and Tylenol is a rare commodity in a typical Haitian household. Multiple children presented with febrile seizures. We did our best to teach the parents about cooling measures.

When I first arrived, none of the problems seemed to be directly related to the earthquake. Then a baby boy, age two months, presented to our tarp-covered makeshift clinic. The boy's grandmother told us that he had begun having blood-tinged stools. His mother had died in the earthquake. As his grandmother could not afford formula, she had fed the boy only sugar water since. On exam, he

had generalized edema and looked like the Kwashiorkor babies I had seen in children's fund commercials. He was admitted and slowly fed with formula as we had no parenteral nutrition. Gradually, the bleeding resolved and his edema improved. I felt a sense of accomplishment when we were able to discharge him four days later. His grandmother was instructed to return every three days for follow-up and to restock on formula. The local nurses informed me that if given a large supply of formula, many parents will sell it. Just like at home, we needed to discharge our stable patients to make room for the steady influx of new patients, some of whom had to travel six hours via public bus to be seen. The boy's grandmother, like many others, was hesitant to leave, as the hospital ward was the only permanent shelter she had experienced since the earthquake. Although many were hesitant to leave, others were resistant to entering the building. One sign of acute stress that I witnessed was that patients requiring admission for acute medical problems were resistant to staying under the hospital roof even after engineers had deemed it undamaged by the quakes. Many patients even left the hospital against medical advice during the aftershocks.

Occasionally I worked in the Emergency Department. Here again, I saw many with similar complaints to the patients in my clinic. I relied almost entirely on history and physical examination for diagnosis. However, there were very few physical findings to substantiate the complaints of the patients. Pain out of proportion to physical findings can be one of the signs of acute stress reaction. One afternoon, we had a woman walk past the line of patients to be seen

and collapse just inside the room. She began to convulse erratically, not in a typical tonic-clonic pattern. She was also screaming incoherently. I examined her and as I pulled up her eyelids, watched as her eyes looked briefly at me then rolled backward. After a small crowd had gathered around her, the movement and screaming stopped. I was suspicious for pseudoseizure. Though I had to pass off her care to another physician to return to the pediatric ward, I later obtained further history that she had lost her whole family in the earthquake and had several similar episodes since then. I wish that I or someone even more skilled in psychiatry had been able to further evaluate and treat her for possible PTSD as the possible underlying etiology for her likely stress response.

One night I assisted in a cesarean delivery of an abrupted gravida 8, para 0 lady at 27 weeks. I scrubbed out immediately and assisted in the resuscitation of the newborn. He was so premature that he was not breathing spontaneously. However, his heart was beating well, and oxygen saturations were adequate with bag ventilations. We had trouble finding a mask small enough, let alone an endotracheal tube that would properly fit. We worked without speaking as the expressions on our faces said it all: we did not have the staff to keep ventilating this patient indefinitely. We knew we would have to stop and the mother would lose her 8th baby. We were able to keep him alive long enough that his mother held him after waking from anesthesia. He died in her arms. The obstetrical ward was down the hall where I slept on a cot. The wailing of the woman penetrated my earplugs and I could not sleep thinking that the baby would likely have survived

had it been born in a facility like the one I work in at home.

I arose and found one of the physician assistant volunteers. We shared with each other the emotional fatigue that we were experiencing while surrounded by such dire need. I am usually reserved with my feelings, but found myself sobbing to this person I had met only days before. All over the hospital, I saw instant bonds formed between volunteers and patients. Being able to express stress is very important to clinicians in disaster situations. Also, provision must be made for relaxation time including eating, showering, and sleeping.

One of the most restoring moments occurred after my last long day of work. I sat on the hospital's front steps listening to a choir of Haitian children sing a local children's song. When they were finished, a game of "keep-away" broke out. The object of desire was a latex glove that I had inflated and given to one of the children earlier that day. It landed at my feet, and I snatched it up. Suddenly I was attacked by a swarm of 30 children clambering for the prize. Three of the smaller ones managed to scale the height of my frame and regain the glove. Even after the mob had retreated with the object, 4 or 5 children stayed and hugged my legs.

Conclusion

Natural disasters are common threats both at home and abroad. Medical aid will continue to be required at all stages of disaster recovery. Family physicians with their broad medical training are well equipped to provide a unique combination of whole person care to the diverse array of patients in the aftermath of an earthquake. I hope to continue to prepare for and serve in times of such great human need. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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