

DISASTER MEDICINE: A History

By Geoff Williams

In 1937, after a natural gas explosion destroyed a high school in New London, Texas, near the end of a school day, nearby oil workers ran from the fields to find a pile of smoldering rubble. Underneath the debris, they could hear the screams of teenagers and teachers.

In the hours after what was then the second worst disaster in Texas history—the actual death count was never determined but approximately 300 lives were lost—President Franklin Roosevelt put out a request for medical aid over the radio, and by that evening, doctors and nurses had descended on the town, coming as far away as Dallas, 134 miles away, and Shreveport, Louisiana, 75 miles away. Hundreds of vials of anti-tetanus serum were driven to the scene of the blast. Help was certainly needed. The oil workers pulled out over 200 victims, flagging down passing cars that hauled the injured and dying to the nearest sickbay.

The Associated Press reported, “The hospitals were jammed, but it seemed that those who needed medical attention were getting it.”

That hasn’t always been the case. From earthquakes to wars to floods and hurricanes, the history of disaster medicine is replete with success and failure when it comes to the results of the physicians and nurses and medical administrators who assist during and in the aftermath of a crisis. And it’s a long history. “Really, when you look at where disaster medicine started, it goes back to the Civil War battlefields, and even pre-dating to Roman times,” says Gary M. Klein, M.D., MPH, MBA, who practices acute care medicine in Atlanta.

As a general rule, it’s never been a lack of willingness of the medical profession to help as a tragedy unfolds, but the execution has sometimes been lacking, notably during some high-profile catastrophes in the last few years.

For instance, there was the case of a delegation of 30 doctors who showed up in a city, prepared to help thousands of victims in the wake of a natural disaster, but the police authorities turned them away. Later that day, another contingent of physicians was informed their services weren’t needed. As it turned out, each medical team returned to their respective communities to read in the newspapers that there were at least 52 towns in the area that hadn’t yet received medical help.

That was in southern Italy, after an earthquake on November 23, 1980, but without those details, one might have easily assumed this was a tale concerning New Orleans after Hurricane Katrina passed through the city on August 29, 2005.

Disasters are, by their nature, chaotic, and the medical community hasn't been immune to getting caught up in the turmoil. But history is repeating itself, and the repetition is welcome: Just as in previous eras, physicians examined their techniques when responding and treating victims in disasters, this latest generation of healers is adapting to new, varied and horrific threats.

As any student of history knows, for centuries, physicians were mostly concerned with minimizing pain and suffering. Before the days of anesthesia, that often meant amputating a limb and hoping for the best, and because germs and proper hygiene were little understood, the doctor was often something of a walking disaster himself. But that began to change during the Napoleonic Wars. "The concept of triage was coined by, I believe, a French military physician with Napoleon, and then you had Clara Barton, during the American Civil War, creating the American Red Cross. All of that's a part of disaster medicine, and then during each of the wars that the United States has been involved in, disaster medicine has been ramped forward," says Captain James W. Terbush, MD, MPH, of the U.S. Navy Medical Corps, and a NORAD-USNORTHCOM Command Surgeon at Peterson Air Force Base in Colorado.

Indeed. During the Napoleonic Wars, Dominique-Jean Larrey was a surgeon in the French emperor's army, who not only conceived of taking care of the wounded on the battlefield, he also created the concept of ambulances, collecting the wounded in horse-drawn wagons and taking them to military hospitals. Until that time, the wounded were generally cared for near the end of the day, or whenever the battle paused or ended. By the time the Civil War began, Clara Barton learned that many wounded soldiers were dying not from lack of attention, but the need for medical supplies, and she began her own organization to distribute medicine, bandages and other life-saving tools.

By the twentieth century, *preventative medicine* was a concept championed during the late nineteenth and early twentieth centuries among doctors, such as Dr. Andrew Taylor Still, also known as the father of osteopathy, and organizations like the Anti-Tuberculosis Society labored to better understand the causes of disease. Meanwhile, government health centers came into vogue, overseeing everything from child welfare departments to hospitals and clinics. The idea

was that long before an epidemic settled into a community, physicians and nurses should be prepared for battle.

But disasters were sometimes self-inflicted. One turning point was the raging fire that was accidentally ignited and engulfed the Coconut Grove nightclub in Boston on November 28, 1942. It was a devastating experience for the rescuers and Massachusetts General staff who were involved in the apocalyptic aftermath. As *Time* magazine reported, "Firemen broke down the revolving door, found it blocked by bodies of the dead, six deep... One hard bitten fireman went into hysterics when he picked up a body, and a foot came off his hand. They found a girl dead in a telephone booth, a bartender still standing behind his bar." Ultimately, 484 dead were counted.

Massachusetts General issued a report to understand how to better manage a tragedy unfolding. "Catastrophe organization might well include experts assigned to the scene of the disaster to determine the nature of the trauma, the presence of noxious fumes and so on, not solely to fix responsibility from a legal standpoint, but to aid in the treatment of casualties," the lengthy study suggested.

Other recommendations included the idea of having an immediate examination of the dead by competent pathologists and keeping casualties in one group for concentrated medical treatment. The report concluded with some timeless wisdom, "An emergency anticipated and prepared for ceases to be an emergency."

But the actual term *disaster medicine* begins cropping up in the newspapers with some regularity during the 1950s when medical associations had begun to truly adopt the idea of anticipating an emergency. They were frequently hosting seminars trying to gauge how doctors might fare in a post-nuclear attack.

This was grim stuff. Colonel and physician Karl H. Houghton spoke to a convention of military surgeons in 1955, telling them, "You won't have sufficient drugs or surgical materials to handle all the casualties and will have to decide rapidly and without hesitation who will receive this perhaps life-saving material. This is not always simple. Do you save the banker or the truck driver? Do you go right down the line of casualties taking them as they come, or do you pick out those individuals who might be the most valuable in terms of the rehabilitation period to come?" Houghton imagined a world in which physicians would, like it or not, be forced to play God.

Another colonel and physician, Joseph R. Schaeffer, MD, imagined that in a massive atom bomb attack, in which the United States was virtually destroyed, the medical community might almost become obsolete. "We have 200,000 doctors to take care of 176,000,000 people in

this country," he told a medical staff at a Texas hospital in 1959. "Therefore, the people must learn how to survive for themselves in case of an emergency."

Schaeffer lamented that so few Americans had any proper first aid instruction when Russia required its citizens to take 22 hours in first aid education—every year.

Even though Schaeffer's call to civilians educating themselves largely went unheeded, his life's work is a good example of the type of disaster medicine planning that was taking place during the 1960s. Dr. Schaeffer was the director of medical education at Santa Rosa Hospital in San Antonio, Texas, but he was also a consultant on disaster medicine and planning for the American Medical Association—as well as the American Hospital Association, the American College of Surgeons, the United States Public Health Service, the United States Office of Civil Defense and the Department of Health, Education and Welfare. He was also the editor of the official disaster medicine manual of the North Atlantic Treaty Organization and was responsible for the care of 20,000 residents during Hurricane Carla, a category 4 storm in 1961 that only killed 43 people thanks to a massive evacuation. By the time he died in 1966, at age 73, he had amassed quite a legacy in the field of disaster medicine.

When Oklahoma City suffered a terrorist attack almost thirty years later, with 168 dead and 914 people injured, Dr. Schaeffer would have been pleased by the response. This was a world, after all, in which the Emergency Mobilization Preparedness Board had been created in 1981, which began the National Disaster Medical System, which has teams of first-responders around the country. This was also a country that had the Association of American Physicians and Surgeons' group, Doctors for Disaster Preparedness, had been flourishing since 1982.

The hospitals in Oklahoma City were naturally overwhelmed with patients, but the consensus was that the system worked—and almost immediately, a team of epidemiologists and medical system analysts gathered at the site of the explosion to examine how to even better improve the treatment and care given patients in the aftermath of the disaster. They wanted to study issues such as how long it took to get the gravely wounded to the hospital and how many rescue workers visited the psychological debriefing centers set up around the site.

In short, individual doctors, nurses and hospital administrators were shaken up by the homegrown terrorist attack, but the medical infrastructure seemed prepared for just about anything.

Then two airplanes crashed into two towers.

Disaster medicine as a specialty and mindset was not only a reaction from September 11, 2001, but to the numerous subsequent events that seemed to all too quickly follow: random anthrax attacks in the weeks afterwards, the SARS outbreak in pockets of the world, the blackout in the summer of 2003 that took the power out in New York City and surrounding cities and states, the December 26, 2004 Indian Ocean tsunami, the Pakistan earthquake of 2005, a tumultuous hurricane season in 2005 culminating with the arrival of Hurricane Katrina, and, of course, terrorist attacks throughout the world including Spain, England, Bangladesh and Bali—all against a backdrop of conflict in Afghanistan and Iraq.

As Cincinnati-based internist John Andrews, MD, who spent 20 years as a Commissioned Corps physician in the U.S. Public Health Service, artfully puts it: “It’s not just that the disasters seem to be coming more frequently, they’re more varied. In the old days, you had natural disasters like hurricanes, floods, tornadoes, and maybe occasionally a chemical spill. But now, somebody’s actually *trying* to make a disaster.”

A lot of people saw it that way, and while the disaster climate of the last several years has had a profound impact on many individuals, it’s affected numerous doctors, who, of course, are prone to have a few opinions on preventing suffering and dying. Dr. Klein, who was a pharmaceutical executive in New York City, when the 9-11 attacks occurred, spent around 24 hours at Ground Zero, initially insisting with dealing “with the worried well,” people he describes as being “absolutely devastated, wandering around in a daze, acutely traumatized.” Klein then assisted colleagues in the gruesome task of trying to identify bodies at the coroner’s office. From then on, Klein has dedicated much of his time toward disaster medicine; in fact, he’s now a contractor with the Department of Defense.

The terrorist attacks also had an acute effect on Paul K. Carlton, M.D., the director of Homeland Security at Texas A&M Health Science Center.

He believes disaster medicine should be board certified, and he has some personal experience as to why he feels that way. As the surgeon general of the Air Force, he had been practicing disaster training with medical students three months before an airplane hit the Pentagon. They had, eerily enough, come up with a similar disaster scenario to practice for, only they imagined an aircraft having an unsuccessful take off or landing and crashing into the Pentagon. In their exercises, they did quite poorly, admits Carlton, but because of the drills, on September 11, when Dr. Carlton rushed into the Pentagon as a first-responder, he and his team were understandably pleased by their performance. He led a rescue group into part of the

building where the landing gear had crashed into it, they pulled three people to safety, “and we all got out alive.” No small thing, since Dr. Carlton himself caught on fire. That he’s alive is at least partially due to his fire-retardant vest that he was wearing.

For Dr. Philip Merideth, M.D., J.D., a psychiatrist in Jackson, Mississippi, his evolution in thinking came after Hurricane Katrina. He spent two weekends in Mississippi and Louisiana, doing what he could, prescribing medicine and simply listening to people pour out their grief. “Everyone had a story of what happened in the hurricane, and they wanted to tell it,” says Merideth, who offers one chilling example—talking to a little boy who had been the only survivor of his household, and that had been because he had swam out the second story window.

In the last several years, as disasters have seemed to be on the increase, careers have been created and defined, government plans were put into action, and first-responders such as police and firefighters began crafting plans on how best to handle a disaster. In 2003, long-time internist and a specialist in infectious diseases, Robert Cox, MD, of Englewood, Colorado, had just started his company, Bioforecasts, with the idea that he would talk to medical groups and non-medical organizations about what we can expect in the future in relation to our health. For instance, we may want to live to be 100, but we are financially prepared to? However, Dr. Cox has since expanded his talk to include disaster medicine topics, like bioterrorism and how to inoculate your business from the avian flu.

“I had been thinking about those topics from the beginning,” says Dr. Cox, “but after awhile, there was no way I couldn’t not discuss them.”

That’s how everyone seemed to feel. Certainly the medical establishment in North America began forming study and discussion groups in disaster medicine, much more frequently in the past. In some cases, the medical schools were already on the front lines of this movement—they just accelerated their growth, such as the University of New Mexico Center for Disaster Medicine, which was established in 1989. Meanwhile, elsewhere in the world, there have been disaster medicine for-credit courses at universities in London, Paris, Brussels and Bordeaux since at least the early 1980’s.

Frederick Slone, MD, a visiting assistant professor at the University of South Florida College of Nursing, is one of the new pioneers in disaster medicine. Within two years after the terrorist attacks, as part of their required curriculum as well as continuing education, the USF College of Nursing began offering a disaster and bioterrorism training program, featuring eight one-day classes and an intense two-day program. One class focuses on working with people

subjected to chlorine gas. Another educates health professionals on patients who are suffering from blast trauma. Yet another: anthrax, smallpox and plagues.

In determining whether it would be a worthy offering, they did a survey of 179 healthcare professionals, asking if they felt they had the necessary equipment to handle a biological attack related to terrorism. Forty-seven percent replied that they were ill-equipped to handle a biological attack; forty-five percent gave the same answer for a chemical attack.

“There’s a lot of confusion in the beginning,” says Dr. Frederick Slone, referring to when students are practicing clinical scenarios using human patient simulators. “But everyone seems to come away feeling like they’ve benefited from the program.” He adds that a number of their students have gone onto assist with caring for victims of natural disasters, including Hurricane Katrina.

Much of what needs to be taught is a mindset, says Dr. Carlton, who cites an example of a suicide bomber who attacked a cafeteria on an American military base in Mosul, Iraq. “The kids there had a small team, where they did nine operations in the operating room and 10 in the hallway. That’s the kind Plan B operation that stands us in good stead when we need it. Our medical students need to realize that we’re not always going to have technology they’ve become accustomed to. I think of Hurricane Katrina, where a woman was in labor, and all of the lights went out. The doctors performed a C-section—by flashlight. It’s not an ideal circumstance, but they did a beautiful job.”

The education that Carlton is discussing and that Slone is a part of is a big movement. New York’s Columbia University, for instance, soon offered two classes that, as their web site explains, “bring the events of Sept. 11 into the classroom.” The first course is Public Health Consequences of Forced Migration; the second is Emerging Infectious Diseases, the manmade germ warfare as opposed to a natural occurrence. In Pennsylvania, the Albert Einstein Medical Center developed, “A Primer on Bioterrorism for Physicians,” giving medical students an overview of anthrax, smallpox, botulism and the plague, including how to recognize the symptoms in patients, as well as containing the disease, managing and treating it. Vanderbilt University Medical Center in Tennessee now offers a course called “Weapons of Mass Destruction Awareness and Treatment” for physicians, nurses and staff. The UCLA Medical Center organized a Task Force on Bioterrorism Preparedness. The list is seemingly endless.

In 2003, the American Medical Association partnered with four medical centers and three national health organizations, establishing the National Disaster Life Support (NDLS)

training program. The American Medical Association (AMA) also formed a Center for Public Health Preparedness and Disaster Response (CPHPDR), and about this time, the American Osteopathic Association and the American Association of Colleges of Osteopathic Medicine formed the AOA/AACOM Task Force on Bioterrorism. The AOA also opened an AOA Office of Emergency Response.

Of course, at this point, some five years after September 11, 2001, medical schools, organizations, associations and hospitals that aren't forging credentials in disaster medicine are something akin to a hotel that doesn't offer its guests an Internet connection in every room: they are behind the times. It helps explain why disaster medicine is a field that is growing exponentially, more than any time in history. Physicians are addressing the topic on blogs and are forming groups like the Texas Medical Rangers, which aims to respond to natural disasters and weapons of mass destruction attacks inside Texas. In Washington state, Robert Cross, M.D., is a retired physician, a 77-year-old who for several years has been toiling to create an organization of retired doctors who can respond to disasters in his home state. He, like many doctors, wanted to do something constructive in the wake of the terrorist attacks, and suddenly he could see how shortsighted the medical community had been when closing hospitals left and right, thanks to outpatient care centers. "In any disaster, surge capacity is a common problem in the hospitals," says Cross, knowing that while he may not be able to replace the hospital buildings, he can a cadre of newly trained retired physicians and nurses on call to help the state when needed.

In the midst of all of this change, what once seemed improbable now seems inevitable: the creation of a medical board certification in disaster medicine. It's an idea being championed the American Board of Physician Specialties.

Nodding in approval is Dr. Andrews, board certified in internal, preventative and occupational medicine. "Most of us have many patients in a day, but we don't handle a disaster, say, once a week. They come every so often, and to be trained in disaster medicine, and updated, I think is a neat idea."

And necessary, says F. Matthew Milhelic, M.D., who is an assistant professor at the Center for Homeland Security Studies at the University of Tennessee's Graduate School of Medicine. "I think the way that this board has proposed this idea, making it an inclusive board, will do two things—raise the level of competency among physicians to deal with problems in a disaster, and it will also raise awareness across the medical community for the need of

preparedness... and I think this board is looking at disaster medicine as much broader than just a brief medical response over a short period of time, and that all medical providers, all medical disciplines, specialties, subspecialties, and so on, will have a role in any major disaster."

"The majority of physicians are in primary care, family practice, general medicine, and, of course, there are pediatricians and ob-gyn," concurs Dr. Terbush, who was in the thick of things after Hurricane Rita and Hurricane Katrina. "It would be exceptionally helpful if primary care physicians were experts in disaster medicine."

Some critics think board certifying disaster medicine is too much. Eric Grosch, MD, based in Fort Meyers, Florida, is no fan of board certifying—*any* specialty. He feels that there's no evidence that suggests that a board certification makes anyone a better physician, equating the certification to another age: "Long ago, doctors did things to patients that had no evidence-basis and harmed them as a result, such as bleeding them to 'remove evil humors' or putting leeches on them for much the same purpose."

He feels that excluding qualified physicians who aren't board certified does a disservice to the patient, and any slight toward the patient can simply pile on more potential tragedy during a disaster scenario.

Right or wrong, one question is almost begging to be asked: Could the American medical community be doing too much? Are we creating layers of bureaucracy, ensuring that when a crisis comes, there will be hundreds or thousands of organizations mobilizing but not within the same framework as everyone else? Dr. Cox agrees that it eventually could be a problem, that we could have, "lack of coordination and communication among the agencies, like the 9/11 experience. There could also be a dilution of resources being spread out rather than concentrated. This applies to both people as well as finances."

But Cox doesn't think the medical community or country should slow down yet. "I think this is all part of the organizational evolution, and only time will tell what the correct number is." He also points out that there are some efforts at coordinating disparate groups, citing his home state of Colorado's "Governor's Expert Epidemic and Emergency Response Committee," which includes representatives from the medical community, military, public health, agriculture and many others, so the next time a disaster strikes, no group will feel as if they're on their own.

But however this most recent history of disaster medicine is written, there seems to be one indisputable upside, according to Dr. Slone, who says, "The reality is that the more teams that are formed, the more people will be trained for a response, and in the long run, this is what

we need." Across the generations, from those who define their times by an incomplete New York City skyline or a mountain of bricks and blood in a tiny Texas town, few people are likely to argue with that.

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