

Life in a Disaster Morgue

MASS DISASTERS MEAN TWO THINGS: MULTIPLE DEATHS AND DMORT DEPLOYMENT.

The call comes anytime jetliners go down, de-orbiting shuttles disintegrate, terrorists raze skyscrapers, or killer hurricanes roar ashore.

David R. Senn, DDS, a member of the Bexar County, TX, Forensic Dental Team, was in Colorado when his call came on Saturday, August 27, 2005, 48 hours before Katrina made landfall. The commander of the Region VI Disaster Mortuary Operational Response Team (DMORT) was calling. Katrina was a monster, growing to a Category 5 hurricane on the Saffir Simpson scale, and headed straight for New Orleans. Destruction and death was certain.

Senn, a veteran forensic DMORT odontologist, was to report to Baton Rouge, LA, where a temporary morgue was being set up in an empty brick warehouse in nearby St. Gabriel, a Louisiana town of 6,000, once home to a leper colony. There would be bodies to identify. Senn altered his plans, caught the next plane back home to San Antonio, cleared his teaching schedule, collected his DMORT grab-and-go bag containing enough gear, clothing, and personal items to last about two weeks, and was in Dallas on Sunday, where his team assembled before caravanning 370 miles overnight to Baton Rouge, arriving at 3 A.M. Monday, August 29, just as Katrina began pounding the Gulf coast.

“We took 30 people from Dallas to Baton Rouge, including the DMORT Region VI commander, deputy commander, and administrative officer,” said Senn, a diplomat of the American Board of Forensic Odontology (DABFO). Another deputy commander lived in Baton Rouge and was already on the job. Region VI covers Texas, Oklahoma, New Mexico, Arkansas, and Louisiana.

DOUGLAS PAGE

Last Responders

The National Funeral Directors Association (NFDA) is credited with conceiving the concept of

DMORT in the early 1980s. NFDA was concerned at the time about lack of standards handling the dead in mass casualty events. Protocols needed to be imposed on a process that had none. It was also soon apparent that the services of outside forensic professionals would be necessary to augment local resources during disaster response. The NFDA subsequently purchased the components of the first portable morgue, called a Disaster Portable Morgue Unit (DPMU).

DMORTs and DPMUs are now part of the National Disaster Medical System (NDMS), a section of Operations Branch of the Federal Emergency Management Agency’s (FEMA) Response Division. NDMS determines when to activate, which DMORTS to deploy, and where the DPMUs are to be dispatched - usually any incident in

which the number of casualties overwhelms local forensic or mortuary resources. The country is divided into ten DMORT regions, geographically similar to the ten Federal Emergency Management Agency (FEMA) regions.

In 1997, the Aviation Disaster Family Assistance Act was signed into law in response to several aircraft accidents. The Act directed the National Transportation Safety Board (NTSB) to coordinate federal resources to identify victims. The NTSB then signed an agreement with NDMS to provide DMORT support in such cases. In 1998, a DMORT team specializing in bio-chemical fatalities was created in response to increasing concern for the release of weapons of mass destruction by terrorists.

The DMORT idea has rooted. A small group of DMORT members is now routinely deployed in advance of situations where mass fatalities might

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result from terror attack, such as presidential state-of-the-union addresses, papal visits, or Olympic Games.

Since their 1993 formation, DMORTs have responded to about twenty incidents, from cemetery floods and plane crashes to train derailments and terror attacks. Senn, for instance, was part of the team called to attempt dental identification at the 2001 World Trade Center disaster and again at the 2003 STS-107 Columbia crash.

DMORTs usually cover disaster incidents in their own area, although four DMORTs were dispatched to New York City following September 11, three to Washington, D.C., and one to Somerset County, PA. Katrina was even more unusual. All ten teams were mobilized to the Gulf Coast.

“That’s unprecedented,” said Patricia Kaufmann, MD, commander of DMORT Region III (Pennsylvania, Maryland, Washington DC, Delaware, Virginia, and West Virginia).

Still, the nationwide DMORT response to the Gulf Coast was scarcely enough. Remains were still being recovered seven weeks after the storm. Brian Chrz, DDS, DABFO, a Perry, OK, forensic odontologist said six weeks after the storm DMORTs were using dental resources wherever they could find them.

“We used military and public health dentists if they were available,” he said.

License to Heal

During emergency response, DMORTs work under the direction of local authorities, providing technical assistance in recovering, identifying, and processing the deceased. DMORTs are truly traveling morgues - composed of medical examiners, coroners, pathologists, forensic anthropologists, funeral directors, medical records technicians and transcribers, fingerprint specialists, forensic odontologists, dental assistants, X-ray technicians, mental health specialists, as well as computer professionals, administrative support staff, and security and investigative officers.

DMORT members are required to maintain appropriate certification and licenses within their discipline, but when teams are activated customary regional licensing issues are suspended and all professional licenses and certification are legally valid in all 50 states. Team members are compensated for duty time by the federal government as temporary federal employees. Most take leave of absence from their regular jobs. Like National Guard personnel, DMORT members are given job security.

At the same time DMORTs were activated for Katrina, two DPMUs were also ordered south, to provide temporary mortuary services. FEMA’s Response Division maintains two of these forensic caches, staged at the two FEMA Logistics Centers; one in Rockville, MD, the other in San Jose, CA. Both were deployed for Katrina; one to Gulfport, MS, the other to St. Gabriel.

Depending on the incident, DPMUs can be dispatched by rail, truck, or air. Each unit contains over 10,000 individual items, ranging from exam tables, forceps, scalpels, and hemostats to high tech digital dental X-

ray devices and full body X-ray machines, as well as a full complement of office computers, faxes, and forms - all accompanied by a team of experts called Red Shirts.

“All DMORT members are cross-trained to help quell the initial chaos when setting up and getting started,” Senn said.

Then, as soon as possible, pathologists, anthropologists, and odontologists begin the solemn task of examining and documenting victims.

Death is Wet

Film critic Roger Ebert says every single movie depicting a morgue uses dripping or running water on the sound track. Katrina provided enough real water to make artificial moisture unnecessary. At St. Gabriel, heavy gauge plastic was spread over the warehouse floor to insulate the facility against the damp. Then, air-conditioned tents were erected for each station. The dental exam area, for example, was set up in an area about 14 ft. by 45 ft. housing three post-mortem bays so dental teams of three or four dentists each could work simultaneously.

There was much to do. Katrina killed over 1,250 people, nearly 850 of whom were taken to St. Gabriel. Fourteen more bodies were found the week of October 14, forty eight days after the storm.

“We preferred teams of four so one person can take a break for an hour or two without interrupting the identification process,” said Chrz, who previously worked the World Trade Center and the 1995 Murrah Federal Building bombing in Oklahoma City. Chrz also spent time in Thailand following the 2004 Indonesian tsunami. Forensic professionals work 12-hour 7-7 shifts, ideally rotating in and out of the disaster site every two weeks.

Inside, morgue operations are controlled by a regimented protocol, capable of processing up to 140 bodies a day.

The remains, which have been stored in body bags in refrigerated trucks, are first cleaned and decontaminated with a chlorine solution, assigned a number, folder, and escort, before being moved to forensic stations.

A forensic pathologist then examines, photographs, and X-rays the body at the first station. Personal items such as jewelry are inventoried. Fingerprints are taken when the condition of the body permits. When prints are not on file, FBI agents or local law enforcement may obtain latent prints from personal belongings in victims’ homes. Body identification in the aftermath of Katrina was made particularly difficult by the poor condition of corpses - some left for days if not weeks in contaminated flood waters. Visual identification was generally impossible.

Pathologists also look for other potential identifiers like tattoos, scars, orthopedic devices, and surgical implants. Pacemakers and orthopedic devices are particularly useful; newer units have serial numbers that can be tracked through manufacturer’s records.

Autopsies are sometimes necessary.

“We examine the bodies inside and out looking for any clues that will help us determine who this person is,” said Kaufmann, one of several forensic pathologists on

each team. Kaufmann, a Johnson & Johnson research physician in her other life, was previously deployed to the crash site of United Airlines Flight 93 on September 11, 2001, the 2002 Walker County, GA, crematorium incident, and the 2003 Providence, RI, night club fire.

DMORT autopsies are different than routine forensic proceedings because the primary focus is not on determining cause of death but rather on finding positive identification.

"In this case, we usually know how they died," Kaufmann said.

Forensic anthropologists help by creating a profile of the remains based on skeletal assessment of such things as age, sex, ancestry, and stature.

"We're trained to identify fragments of bones, which is what you get in plane crashes," said Mercyhurst College forensic anthropologist Dennis Dirkmaat, a diplomat of the American Board of Forensic Anthropology, and one of the first DMORT volunteers in 1994. "Even with X-rays, it's hard for a pathologist to determine what the bone is. Sometimes, we can feel a fragment and know that it's, say, a right proximal humerus. Pathologists are not trained to do that."

Forensic anthropologists are also adept at reading X-rays to determine bone age. "There is a relationship between the age of the individual and the amount of lip-ping—lip-like structures sometimes found at the articular end of an osteoarthritic bone," Dirkmaat said.

Forensic anthropologists now use computers to augment their fingers. Programs such as Fordisc (Forensic Anthropology Center, University of Tennessee) help classify unknown skeletal remains based on measurements.

"These are valuable in cases where you have significant decomposition," Dirkmaat said.

For the most part, Katrina victims were intact, though many were badly decomposed after so long in the water. There were also numerous cemetery remains to deal with.

"The storm hit cemeteries, too, sometimes destroying coffins, so skeletal remains and bone fragments were later found on adjacent properties or on the beach," Dirkmaat said.

To the Teeth

The dental examination and digital X-ray station is next, where Senn, Chrz, and other odontologists record dental characteristics. Dental records are the traditional gold standard of forensic identification.

A new addition here is digital imaging, which eliminates the need for conventional film-based dental X-rays. With digital technology, images are transferred directly into computer storage and can be viewed immediately on computer monitors, enabling easier, faster ante-mortem and post-mortem comparison. During the 1999 Bourbonnais, IL, Amtrak derailment, identification of a victim from Japan was facilitated by Internet transmission of dental radiographs sent from Japan to DMORT odontologists at the crash scene.

In the case of Katrina, however, the comparison process was aggravated by the almost total absence of

ante-mortem dental X-rays that were missing or destroyed by the storm. Normally, a DMORT unit called the Family Assistance Center (FAC) will collect all ante-mortem records from dental offices. FACs also serve as the buffers between temporary morgue operations and those searching for lost family members.

"Usually, families will come in and say so and so is missing, but there will be some sort of list like a flight manifest that we can work from," Chrz said. Hurricanes leave no manifest. In New Orleans, dental offices were flooded and everyone, including dentists, was evacuated. Initially there was no one even to report who was missing.

"The most difficult job was not actually doing post-mortem examination and charting, it was trying to get enough ante-mortem information together just to find out who's missing," Chrz said. Even where ante-mortem dental records survived the storm and existed intact, the dental offices were closed and the dentists and office staff nowhere to be found.

"First, we have to find the dentists, something we've never had to do before," said Kaufmann, who spent six weeks in Gulfport, MS, working at the pathology station, then, after a short break, was reassigned to the FAC at St. Gabriel.

Kaufmann said the family assistance process can be emotional because families have to answer detailed questions about the missing - describing any tattoos, surgeries, or previous bone fractures - all while grieving at the same time.

"Sometimes, they're not even certain there has been a death, making it all the more difficult," she said.

Gene Sweep

Mitochondrial DNA (mtDNA) is another important tool now included in the DMORT arsenal for positive identification and reassociation of remains. As with dental identification, mtDNA requires post-mortem samples to compare to ante-mortem or family reference samples. DMORT DNA specialists are trained to collect DNA samples from family and victims.

"Typically, we like to take it from the same bone," Dirkmaat said. "Currently, when possible, we take samples from the right tibia."

DMORT uses DNA protocols established by the Armed Forces DNA Identification Laboratory, which specifies that samples be treated as evidence, requiring chain of evidence documents.

Some have questioned whether traditional medical and dental radiographs and fingerprinting are still necessary in light of the accuracy of mtDNA identification techniques. The answer seems to be that DNA still takes too long to process and is too expensive to replace the more conventional, if less absolute, forensic methods. After the 1996 crash of TWA Flight 800, all 230 victims were identified through DNA, but it took 13 months.

After passing through all the stations, the remains are properly returned to the refrigerated trucks to await formal identification, at which time the body is embalmed either by DMORT or local morticians - at the choice of the family - then released for final disposition to a funeral home.

No Place Like Home

The turmoil in the first days following the storm invited a strange paradox at the DMORT camp in Gulfport. The convoy of refrigerated trucks brought in to store unidentified remains served as temporary housing for the living.

“When we first arrived, we slept in cars and inside the trucks that had been brought in to house the bodies,” said Richard A. Weems, DDS, DABFO, a DMORT odontologist and director of clinical operations at the University of Alabama School of Dentistry. Weems said during the first few days, the teams had to endure Spartan conditions, including scant food supplies, no running water or electricity, shortages of fuel, and lack of a communication infrastructure.

While DMORT’s needs were met in fairly short order by FEMA and units of the Mississippi National Guard, some were surprised that NDMS decided to establish the Gulfport DMORT operation squarely in the disaster area, presenting something of an unnecessary hardship for DMORT personnel whose job is already inherently stressful.

“The storm didn’t affect the entire state of Mississippi, so why not just move the operation and bring the bodies out to you and be comfortable?” Dirkmaat wondered. “Working in a morgue twelve hours a day is stressful enough, why make people sleep on a cot with thirty other people in a school room?”

Eventually, DMORT moved into air conditioned tents, and later still into hotels in Biloxi.

Conditions were similar in St. Gabriel, where dozens of DMORT people slept dormitory-style in an unused elementary school and on air mattresses in an unfinished condo unit.

“They house you wherever they can,” Chrz said. “You might have to sleep in tents.”

The Job as Tonic

Some physicians, dentists, and other forensic professionals are drawn to DMORT work in spite of the bleak, austere conditions at disaster scenes. The job itself is the lure, and the tonic.

“DMORT people consider themselves strangely lucky in that they actually get to go to disaster sites and do something useful,” Senn said.

Training accounts for their efficiency. Dirkmaat, for instance, teaches forensic anthropology year around.

Dirkmaat said DMORT work is not like routine civil cases, where you may have a day or two to do a forensic examination. “This is more like a MASH unit - the remains come to your table and you have to be quick. In ten to fifteen minutes, you’re moving the body on to the next station,” he said.

Senn said being prepared is a matter of being trained and ready to work as a team, yet remaining flexible enough to adjust to whatever the situation presents. When adjustment becomes a little more difficult, every DMORT has mental health professionals available to deal with special problems that arise, and every team member has an exit interview with the mental health unit.

“DMORT is very attentive to the psychological needs of their members,” Chrz said. Psychiatrists and psychologists are not only on duty at the site, they keep in regular contact with DMORT members for up to a year following an incident, looking for signs of unhealthy coping mechanisms.

Team members have evolved their own more informal means of dealing with stress. Many decompress after a shift by hanging out together, sharing experiences - all while keeping a learned eye on each other.

“Many of us have become friends over the years at previous deployments and training sessions,” Weems said.

Ultimately, the reward of performing a public service well is the greatest bracer. “The work itself is the psychological salve that helps us deal with disasters,” Senn said.

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