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D67 Morgue Operations in the Aftermath of Hurricane Katrina: A Radiology Perspective

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After attending this presentation, attendees will have a better understanding of the morgue operations conducted by the Disaster Mortuary Operational Response Teams (DMORT) following Hurricane Katrina.

This presentation will impact the forensic community and/or humanity by demonstrating the three generations of morgue operations and the contribution of radiology and the radiographer in victim identification, providing insight into the interactions between the morgue components, specifically radiography, pathology, and anthropology.

On August 29, 2005, the worst national disaster to ever strike the United States occurred at 6:10 AM when Hurricane Katrina made landfall along the Gulf Coast. In its wake, it left an area larger than Great Britain in ruins; over 90,000 square miles of total devastation stretching from Florida to Louisiana. Hundreds were dead or missing and 1.5 million people were displaced. In the aftermath of this historic event, the DMORT teams from regions 4 and 6 deployed to begin the search, recovery and identification of the victims left behind by this horrific storm.

In the days following the initial deployment, the DMORT teams had to set up operations and provide team members with basic life support under conditions never before encountered: no power, no running water, no toilet facilities, no lodging, and extreme heat and humidity. The first generation of morgue operations was set up utilizing the DPMUs (deployable portable morgue units); fully equipped morgues palletized and ready for deployment via rail, truck or air. Region 4 set up in tents inside a damaged hangar in Gulfport, Mississippi, while region 6 set up under similar primitive conditions in a warehouse just outside Baton Rouge, Louisiana. The Gulfport operation was designated DMORT East, and the Baton Rouge operation DMORT West. For the initial deployment, the Radiography section had to work with the old equipment from previous deployments. This included battery-operated portable units, and conventional film and processing. Since darkrooms were required for film development, black visqueen was duct-taped to walls and ceilings to provide the light-tight environment needed for image processing. The heat, humidity, lack of ventilation, and strong chemicals necessary for processing presented an additional hazardous environment for the technologists and personnel assisting with film processing. Radiation safety was another factor that had to be taken into consideration. The primary factor for safety was distance, requiring that the x-ray units were contained within a perimeter of at least 6 feet from any other area. This meant that the darkroom had to be established outside the 6-foot limit to prevent image fogging and to protect unexposed film, which entailed carrying heavy cassettes some distance for processing. Lead aprons were provided for personnel operating the equipment, but due to the working conditions, it was almost impossible to wear the aprons. Instead, improvised shielding using folding chairs with lead aprons draped over the back provided a means of protecting personnel. On September 14, 2005, the new computed radiography (digital imaging) systems were delivered and put into operation. These systems meant that the conventional darkrooms and the associated problems could be eliminated. It also meant that image storage was no longer a problem, as the digital images could be stored on CD or on backup computers.

The first generation morgue at Gulfport was disassembled and personnel evacuated on September 22, 2005 when Hurricane Rita headed for the Gulf Coast. Once Rita had passed through, the second generation morgue set up under much better conditions on the water park at Gulfport. The environmental conditions were much better, and DMORT personnel were housed in an area hotel that was able to provide accommodations. During this phase, radiography proved to be a valuable resource in the identification process, working closely with pathology and anthropology in evaluating ante- and postmortem images, and reproducing antemortem images for comparison purposes. In November, 2005, DMORT East completed its work and began to phase out operations. During this period, a new facility, to be called the Victim Identification Center, was constructed on the site of a former leper colony at Carville, Louisiana, near Baton Rouge. Destined to become the largest morgue in the world and called the finest of its kind by some experts, it provided the third generation of operations in the aftermath of the hurricanes.

The Victim Identification Center sits on a secure 37-acre compound. Included within the fenced facility are dormitory-style buildings capable of housing 300 personnel along with a huge tension fabric structure that contains a complete kitchen with dining area, recreational and laundry facilities, warehouse, administrative offices, and overflow sleeping accommodations for an additional 186 staff. The morgue, an 18,720 square-foot facility, contains ten separate analysis stations and is capable of processing up to 150 victims per day; however, the radiology section would need at least two units in operation if full-body x-rays are required. If the bodies are victims of an attack using explosives or ordinance, a portable C-arm unit, or perhaps an airport-type E scanner would be necessary for preliminary scanning to detect shrapnel or unexploded devices. The entire compound contains everything needed to perform up to 800 forensic examinations as well as casketing and re-casketing operations. In this final phase of operations, the radiology computer was interfaced with the pathology and anthropology computers, and all three sections were in adjacent bays, allowing the technologist to provide immediate images for viewing to the other areas. The pathologist and anthropologist had immediate access to the technologist for



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any assistance with image comparison or image manipulation. The configuration also allowed the technologist to provide training to the other sections on the features of the computed radiography software, including long bone measurement, magnification, annotation, image reversal techniques, and image retrieval. The computerized radiography system provided excellent quality images, whether the remains were soft tissue or skeletonized. In April, 2006, the third and final generation of morgues completed operations, and the facility went into stand-by status. Throughout operations, the radiology component proved its worth in both identification and cause of death.

Morgue, Radiology, Katrina