

Disaster Management

Objectives

Upon completion of this course, the student will be able to:

1. Discuss the challenges and complexities posed by the most common natural and technical hazards
2. Discuss the tenets of comprehensive emergency management as they apply to medical response organizations
3. Describe the roles of local medical responders in the wake of a disaster or catastrophic event
4. Identify the roles and jurisdiction of federal agencies that would support medical operations following a disaster or catastrophic event

Case Study

On a balmy afternoon in rural Alabama Jerry and his partner, Paul, are preparing their ambulance for what they hope will be a routine, quiet afternoon. In a few short moments, their hopes evaporate as they are dispatched to the intersection of Routes 77 and 144 for a motor vehicle collision. According to the report, a logging truck has clipped the back end of a slow-turning car as it attempted to enter the parking lot of a local strip mall. Reportedly, a woman and her daughter have minor injuries and need to be stabilized and transported to the Regional Medical Center about 20 miles away. The adrenaline begins to flow as they take their seats. Jerry slaps the shift lever into drive and steps on the gas. Paul engages the sirens and lights. They were on their way.

The National Weather Service has issued severe thunderstorm warnings and watches for this afternoon. The sirens have sounded several times. Neither paramedic can remember how many times or when was the last time they'd heard their high-pitched squeal. It is all too typical for this part of the country to have warnings and watches throughout the summer. Like most people in this community, they have siren fatigue.

As they turn on to Route 144 and head toward its intersection with Route 77, Jerry notices that a wall cloud has formed on the horizon and is towering over the landscape in the direction they are heading (Figure 1). At the same moment, Paul's smart phone alerts him that a tornado watch is in effect for their county. Despite the danger, Paul and Jerry move at a high rate of speed toward the woman and child who need their services.

Jerry drives the ambulance through the intersection and up to the rear of the damaged vehicle. In the vehicle is a woman with her little girl. Neither shows signs of severe trauma. The mother seems to be concerned about her child, and the little girl complains of a sore neck and shoulder where the seat belt has come across her chest. Several bystanders look on, but their attention is quickly averted to the funnel cloud that has descended from the ominous-looking wall cloud. Yes, there is no mistaking it, the characteristic sound of a freight train and eerie feeling of pending doom is upon them all. Moving quickly, Paul scoops up the slightly injured girl from the front seat of the car, and Jerry motions to the girl's mother to follow them. Paul and Jerry give a shout out to all the onlookers, and they move swiftly across the parking lot into a nearby convenience store. Paul moves the small crowd quickly to the cold storage locker in the back of the store and gets everyone into the one safe area that he sees. Within seconds, the windows in the front of the store explode inward, and much of the building comes down. There is no time to think, just act. It all happens so fast.

It is several hours before a search and rescue team from a neighboring county pulls these 7 lucky people from the rubble of the totally destroyed convenience store. Fortunately for Jerry, Paul, and the others, they had occupied the only space where they could have survived unharmed the impact of this devastating F4 tornado. Many others in the town are not so lucky. In fact, the remains of 11 victims are recovered from the total destruction in the small town.

The tornado's swath was nearly a half-mile wide and stretched for several miles. One city was hit hard by the tornado. Its primary hospital, Regional Medical Center, took a glancing blow that leveled the parking deck and damaged the pediatric wing. Two small towns were virtually wiped off the face of the earth. The county has suffered a major blow. Within hours of the incident, the governor declares the county a disaster area, clearing the way for regional, state, and federal assets to participate in the response.

Unfortunately, the county didn't have a good emergency operations plan to help coordinate the multilevel response. Convergence of all the responding agencies, public and private, turned into mass confusion. Confusion turned to chaos. The alphabet soup of state and federal agencies took days to sort out. A coordinated medical response was greatly delayed. It was difficult for Jerry and Paul to work effectively in a dysfunctional command structure. When the after action reports were written, much was said about making certain that the next time disaster pre-incident planning include stakeholders at all levels of government. Catastrophic events, regardless of their cause, require that.

Introduction

Medical first responders and first receivers are an important asset to any community. According to the Emergency Management Roundtable Project, "Emergency managers consider and take into account all hazards ... relevant to disaster."² Dealing with hazards



Figure 1. Ominous looking wall cloud as seen through the windshield of a vehicle¹

is a fundamental part of emergency management. McEntire categorizes hazards into 3 categories: natural, technological, and civil/conflict.³ Hazards can further be subdivided within these categories.

Types of Hazards

The first, and likely the broadest category, is natural hazards. McEntire defines natural hazards as "events originating from the physical environment, typically because of radiation from the sun, heat flow within the earth, or the force of gravity."³ Essentially, natural hazards are caused by natural sources of energy that have spun out of control to a point that they are destructive. Natural hazards include atmospheric phenomena such as tornadoes, hurricanes, and lightning. In addition, they include seismic phenomena such as fault ruptures, ground shaking, and tsunamis. Also, natural hazards include geologic and hydrologic phenomena such as landslides, rock falls, drought, flooding, and storm surge. Finally, we can add volcanic phenomena such as gas releases, lava flows, and mudflows and fire phenomena such as brush fires, grass fires, and forest fires.⁴

Technological hazards are "hazard agents related to industry, structures, hazardous materials, computers, and transportation system."³ The 2 common elements of all technological hazard agents are they are meant to improve life, and they can become detrimental to life if used incorrectly. Technological hazards include industrial hazards, structural collapse hazards, nuclear hazards, computer hazards, and transportation hazards.³ Technological hazards can create a threat to people and the environment through accidents, manipulation, and interaction with other hazards.

The final category of hazard is the civil/conflict hazards. These are defined by McEntire as "violent events that have the potential to produce mass casualties."³ Unlike technological hazards, civil/conflict hazards are always created intentionally. McEntire lists mass shootings, panic, riots, terrorism, and war as the primary hazards in this category.³ Civil/conflict hazards are always caused by people. However, they can sometimes occur from an area's or a population's interaction with natural or technological hazards. For example, riots could occur after a major natural hazard if aid is being unequally distributed. It is often thought that panic is common before, during, or after a disaster. However, extensive research suggests that people do not panic but tend to cope well in the face of disaster.⁵

Complexities and Challenges

Hazards of all kinds challenge emergency responders, health care facilities, and local resources. As an example brought forward by our case study, consider the threat of a tornado to your community. Tornadoes create numerous challenges for an incident commander because of their damaging winds. They also have the potential to affect wide swaths across the ground and generate a large number of victims and logistics problems. Some of these include communications, resource allocation, and the tracking and treatment of the injured citizens. Medical planners should take advantage of anticipating hazards and plan for an event or incident. Planning helps to ensure coordination and cooperation in the event of an incident.

Many areas of a response can be planned for. The actions of search and rescue teams, the response of law enforcement agencies, and the provision of medical care in a mass-casualty incident (MCI) contribute to the overall event plan. This section of the lesson focuses more intently on our scenario and its inherent challenges.

General and Medical Challenges for the Incident Commander

An incident like the one described in our case study presents numerous medical challenges to the person charged with orchestrating the response: the incident commander (IC). Because of the potential for a large number of people injured, the IC must seriously consider evacuation options and strategies for removal of the injured and dead. The IC could also be faced with the challenge of determining who, when, and how to evacuate citizens and responders or sheltering people in place. Medical aid must still be considered for victims instructed to shelter in place, and this must also be coordinated by command.

A large-scale evacuation could result in injury and exposure to dangerous conditions for many people. The removal of injured patients from the devastated area, concurrent with search and rescue (SAR) operations also presents a challenge. This requires the IC to ensure cooperation and communication with SAR and receiving emergency medical personnel.

Victim tracking also presents a challenge when patients are transferred from the tornado's epicenter to triage to transport areas. Because of the nature of the incident, victims are treated and evaluated by different personnel throughout the phases of the response, adding to the tracking and records management challenge.

Medical standby must be coordinated and provided for the responders on scene. The IC must ensure a designated unit in a designated area that is known to the responders. This unit must remain available, despite the needs of other sectors and divisions operating around it.

Communications in and around the devastated area are often challenging. Cellular phone towers could be down; power is likely to be out; and radio systems have not always proven to be reliable given the expected increase in the amount of radio traffic. The incident commander must ensure communications are maintained or use backup communication strategies to coordinate the medical response required.

Scene security is also challenging for the IC. In such an interconnected world, families and loved ones, spontaneous volunteers, and curious onlookers respond to the scene hoping for information about the event. It is critical for the IC to ensure areas around the incident site, triage, transportation, and medical aid areas are secure from the public. This security allows personnel to easier fulfill their required roles. The request from the IC for a family assistance center and media reception area in a nearby facility greatly reduces this challenge.

The IC must consider victim triage and transport. The appropriate resources need to be on site to manage the triage of patients. Transportation coordination needs to be in place to transport patients while maintaining their designated triage priority.

The high potential for large numbers of traumatic-injuries patients is also challenging for the IC. The IC must consider issues of surge capacity and capability when requesting and directing the overall incident action plan. Surge capacity refers to the ability within a health care system to rapidly expand beyond normal operations to meet the medical needs resulting from natural disasters and public health emergencies.⁶ As a dramatic example of this, consider the devastating supercell tornadoes that affected Alabama on April 27, 2011. According to David Wallace, Alabama's health care system was impacted significantly on that day. In fact, more than half of Alabama's 120 hospitals received and treated patients from the tornadoes. In the 2 large cities affected by the event, Birmingham and Tuscaloosa, there were more than 1500 injured. The dead numbered more than 250. Some emergency rooms received in an 8-hour period 5 times the number of patients they normally see in a 24-hour cycle. Because of the strength of the storms, serious trauma was seen by everyone. Some hospitals had the capability to better manage these patients than others did. The severity of the trauma was compared to blast and explosive injuries or high-speed car crashes.⁷

Pre-incident Plan

A pre-incident medical plan allows the IC to deal with many anticipated challenges in advance. Planning puts all stakeholders, including responders from different organizations (and at different levels of government), on the same page. The plan results in conversations and can lead to education and training opportunities before an event occurs.⁸ The specific details of the pre-incident medical plan should be captured on ICS Form 206 (see Appendix A).

Pre-incident planning is a tenet of comprehensive emergency management and compliance with the National Incident Management System (NIMS), something that every community must do. But, before we go on, what is comprehensive emergency management and what tenets of comprehensive emergency management are important to emergency medical responders? The next section of this lesson attempts to answer this question.

What Is Emergency Management?

Emergency management is a developing science and an unusual field in that it has varied definitions. Selves views it as "the managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters."² Waugh states, "In simplest terms, emergency management is the management of risk so that societies can live with environmental and technical hazards and deal with the disasters that they cause."² Drabek and Hoetmer see emergency management as "the discipline and profession of applying science, technology, planning, and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life."⁹ All 3 definitions emphasize the response phase of emergency management, which is likely the most visible stage.

These are just 3 different perspectives on what emergency management is. Many other perspectives exist, which makes it somewhat hard to visualize what an emergency manager does. This is a challenge that emergency managers must overcome. If researchers have difficulty concurring on what emergency management is, then it is virtually a given that most policymakers have little idea of the true concept of emergency management. The challenge comes in getting these policymakers to fund and support ideas of which they have little knowledge.

The following section of the lesson seeks to clarify exactly what the profession of emergency management is all about. The ultimate goal is to be able to define emergency management. To do so, this lesson examines the foundations of emergency management, the phases of emergency management, and the impacts to stakeholders.

Evolution of Comprehensive Emergency Management

To define emergency management, it is useful to look back at the historical evolution of the profession. Most of the progression has come through the creation of laws or agencies by the federal government. The National Emergency Management Association (NEMA) cites the following as important milestones in the progression of emergency management:¹⁰

- Congressional support for Portsmouth, New Hampshire, in 1803 following destructive fires
- Creation of the Office of Civil Defense in 1941
- Passing of the Federal Civil Defense Act of 1950 and creation of the Federal Civil Defense Administration
- Passing of the Disaster Relief Act of 1974
- Establishment of the Federal Emergency Management Agency (FEMA) in 1979
- Creation of the Emergency Management Assistance Compact (EMAC) in 1993
- Passing of the Homeland Security Act of 2002 and creation of the United States Department of Homeland Security (DHS)



Figure 2. The 4 phases of comprehensive emergency management fit together to make for a viable and functional program. Comprehensive emergency management evolved in the United States over several decades. (Image courtesy of FEMA.)

Phases of Emergency Management

Mitigation, preparedness, response, and recovery are the 4 phases of emergency management (refer to Figure 2). These phases allow the emergency manager to have perspective on what needs to be done and what has been done relative to disaster management. This section comprehensively addresses the 4 phases of emergency management.

Mitigation is sometimes referred to as the cornerstone of emergency management. FEMA defines mitigation as “the effort to reduce loss of life and property by lessening the impact of disasters.”¹¹ Essentially, mitigation attempts to eliminate or reduce vulnerability to the aforementioned hazards.

If an ounce of prevention is worth a pound of cure, then how much is mitigation worth? Research indicates that for every dollar spent on mitigation, society saves \$4.¹² Mitigation is accomplished through structural and nonstructural measures. Examples of structural measures include building levees, elevating surfaces above flood level, and retrofitting buildings to withstand earthquakes. Examples of nonstructural measures include zoning laws that move people out of floodplains, buying property in vulnerable locations, and building codes that work to make structures more resistant to wind and earthquakes.

Preparedness involves engaging in activities before an event that establishes a state of readiness to deal with the impact and aftermath of the event.¹³ Preparedness activities are essential for response and recovery. The preparedness phase is all about planning, equipping, training, and exercising.

To prepare, a community must first plan on what actions it will take in response to an event. Plans should be comprehensive and take into account all relevant hazards. The planning process should carefully consider what resources are available and what is needed. Shortfalls in resources should be addressed by equipping through purchases or mutual aid. When plans are made and equipment is acquired, communities should train and exercise. The purpose of this is to familiarize responders with the new equipment and plans, and to reveal any problematic issues with either.

Response activities are those that occur in the aftermath of a disaster. Response priorities are to protect life then property then the environment.¹⁴ A community engaged in preparedness activities is able to respond to and recover from disasters and catastrophes in a more effective and efficient manner.

Disasters involve responding to needs created by agent-generated demands and response-generated demands. Agent-generated demands are needs made evident by the event itself. For instance, a tornado will generate the need to activate warning systems. Response-generated demands are needs made evident as entities attempt to meet agent-generated demands. For instance, response to a terrorist attack involving the release of the *Bacillus anthracis* bacterium will require the acquisition and use of personal protective equipment (PPE).

Phillips and Neal view disaster recovery as “a social process in which the local government manager creates crucial partnerships to guide the affected community toward a multifaceted recovery from disaster.”¹⁵ Clearly, recovery involves more than just the local government. State, federal, private, and nonprofit resources are often needed to supplement local resources.

Recovery, like response, is more effective if it is planned for before a disaster. Recovery must take into account the social and psychological conditions of people, housing reconstruction and household recovery, economic recovery, environmental recovery, infrastructure and lifelines, debris management, and donations management.¹⁴ Recovery offers opportunities for communities to become more resilient. Mitigation measures should be implemented as part of the recovery process.

Emergency Management Stakeholders

According to the Emergency Management Roundtable Project, “Emergency managers consider and take into account ... all

stakeholders and ... all impacts relevant to disaster.”² Emergency management stakeholders are individuals impacted by decisions made by emergency managers (to include response plans) in their community.¹⁶ This encompasses everyone in an emergency manager’s community. So is everyone really a stakeholder in emergency management?

Stakeholders can be broken down into households, emergent groups, nongovernmental organizations, businesses, and governments.¹⁵ Households are the basic unit. Emergent groups are individuals who form together temporarily to serve a purpose. Nongovernmental organizations encompass organizations such as the Red Cross, Salvation Army, and the United Way. Businesses are a large and very important group of stakeholders. They can be small local businesses, large corporations, public utilities, and the media. Finally, governments can include local, state, and federal entities. While each of the aforementioned stakeholders can have input into decisions, the governments often have the largest say.

Emergency managers must be cognizant of how each type of hazard and the decisions they make about facing these hazards affect their stakeholders. Hazards pose little problems as long as they don’t interact with these stakeholders, the environment they live in, or their property. When hazards affect these things, then vulnerability is present. The emergency manager’s job is to lessen vulnerability as much as possible in a manner that takes into account everyone affected.

Incident Command System Structure

The use of a typical incident command system (ICS) structure enables communities to manage any incident (emergency, disaster, and catastrophic event) in an efficient manner. ICS helps to ensure greater efficiency, coordination, and communication at an incident site. ICS allows a scalable command structure to grow and shrink with the needs of the incident.¹⁷ First responders and many first receivers should be trained in the use of this command system. As a result, there is an expectation that there would not be many challenges with the implementation of ICS.

As part of the overall incident action plan, the medical plan serves to coordinate the medical response. For an example of a detailed medical plan, refer to the ICS Form 206 (Appendix A), which is normally completed by the ICS planning section. The operations section chief has 2 branch directors, one dealing with search and rescue and the other dealing with the medical needs of the victims. Normally, during any MCI, the medical branch is established to enhance medical management of the incident through triage, treatment, and transport of patients. The medical branch director implements the medical plan within the objectives of the overall incident action plan. Within the medical branch are a medical supervisor and a transportation supervisor. The medical needs of the responders are handled by the medical unit leader reporting to the logistics section chief, as shown in Figure 3.

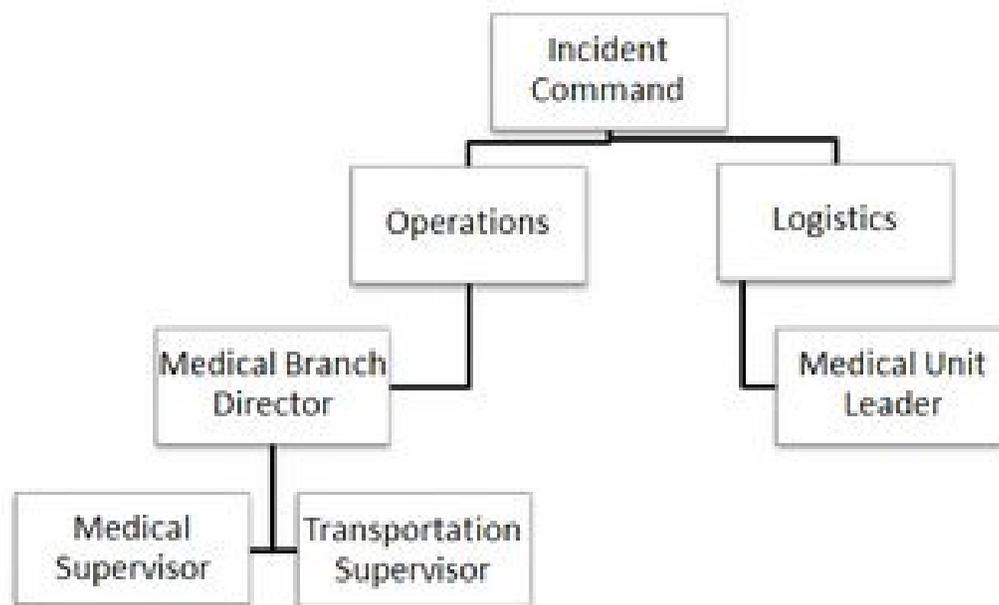


Figure 3. Typical ICS structure as it relates to essential medical operations.

Evacuation Management and Patient Removal

As mentioned earlier, evacuation management and patient removal pose challenges for the incident commander. The decision to evacuate or shelter in place must be considered. Evacuation takes place on a case-by-case basis, assisted by search and rescue personnel who transfer care to the EMS triage system. First responder personnel channel displaced citizens through an evacuation corridor so as not to impede rescue efforts. Emergency medical services receive evacuees as they are brought out of the affected area, beginning the triage, treatment, and transportation process.

Victim Tracking

Victim tracking presents a significant challenge to the incident commander and ultimately the responders on scene. The confusion that results from MCIs cannot be understated. Some patients transport themselves to the hospital and as a result are not recorded in the tracking of the incident. In fact, in some MCIs, self-reporting patients quickly overwhelm a medical care facility.¹⁸

Tracking is an important piece to ensure family reunification and appropriate documentation of patient treatments. Gidley and Ciruolo suggest that MCIs result in tracking challenges from the various numbers of ambulance companies on scene and the number of receiving medical facilities that might be utilized.¹⁹

Incident command should consider the use of premade triage tags, each with a unique identifier (e.g., bar code²⁰) to ensure patient information is tracked and recorded. In the event patients are coherent, these identifiers will be linked to their names and personal information. Through these steps, the data records, treatment records, and family reunifications are easier to handle following the event.

Medical Standby

One of the initial goals for the IC is to mobilize the appropriate number of medical units within the first few minutes following the event.²¹ Following the arrival of initial paramedic units, a medical standby unit should be initiated (see Figure 4). This unit operates under the logistics section with a medical unit leader. The unit is responsible for staging in a designated assembly area and providing care to the emergency responders on scene, if required. This unit is not involved in the triage and transportation of victims.



Figure 4. Ambulances line up for assignment in a medical staging area for Hurricane Gustav Relief in Beaumont, Texas. (Image courtesy FEMA.²²)

Victim Triage and Transport

Appropriate triage is an important component of an effective response. Quality on-scene triage helps to alleviate the surge of patients at medical treatment facilities.²³ Triage considers the relative needs of a patient with the needs of others in a rapid, effective manner.²⁴ The principles of triage allow the EMS responders to treat the sickest patients first by maximizing the use of resources and allowing for priority transportation to nearby medical facilities.²⁵ Responders must be trained in triage techniques because incidents of errant triage could increase the mortality and morbidity rates of an incident while ineffectively allocating resources.²⁶

To alleviate some of the medical challenges of triaging the patients, the response personnel should utilize the Simple Triage and Rapid Treatment (START) system. START triage allows for the evaluation and treatment, with airway positioning or direct pressure only, of patients within 60 seconds.²² Patients are classified as black, red, yellow, or green. Black patients are deceased or expectant (near death) and no further action is taken. Red patients require the most immediate transport to a medical facility that is possible under the circumstances. Yellow patients include patients who are not ambulatory but can withstand a treatment delay. Green patients are patients who are ambulatory with minor injuries and can endure potentially lengthy treatment delays. As discussed previously, the coordination of triage occurs in the medical service branch of operations, with a triage supervisor.

The transportation of patients is coordinated by the transportation supervisor in the medical service branch. Every effort is made to transport patients to the most appropriate care facility that meets their specific needs.¹⁹ Priority is given to red patients whose condition requires their immediate transport to medical care. The transportation supervisor coordinates this transport via available ground or air ambulance. Yellow patients are kept in a secure area receiving treatment, as it is available, by on-scene personnel. Once transportation of all of the red patients has occurred, yellow patients are transported by ground or air ambulance as required. Green patients are usually placed on buses or other forms of mass transit where they are sorted by their needs. Patients able to be seen and treated at alternate care facilities are taken by transit to these locations. Patients who require treatment in an emergency room are taken to the hospital as medical transport becomes available. The careful and purposeful coordination by the transportation division ensures that the surge capacity of the receiving hospital is not surpassed.¹⁹

During a large-scale emergency, it is normal for some patients to fall through the cracks of the system. Some patients self-transport or are transported by laypeople to a medical facility. As a result, communication of the event to all medical facilities in the area occurs as soon as possible. Every effort is taken to ensure tracking and containment of the incident site and victims.

Medical Surge

Any disaster has the potential of large number of people requiring medical care. The resources of the community will be stretched, and a strategy of best outcomes must be implemented. The concept of medical surge is an important planning consideration. Surge capacity refers to the ability for all components of the health care system to manage an influx of patients. It is usually measured through the availability of current resources at a given time.²⁷ Medical surge represents the ability of the health care system and all its components to deliver adequate medical care during an unusual event.²⁸ A large-scale event will likely cause a critical shift from individual-based care to population best outcomes.²⁹ Members of the population must be educated to understand that planning for these events does not ensure that the standard medical care will be available.²¹

Surge capacity is often examined from the evaluation of the 3 S components: *staff*, *stuff*, and *space*. Adams argues for the inclusion of a fourth S: *systems* in use.³⁰ A balance must be struck to ensure enough stuff is stocked while making the most of the resources that are available before outside assistance is requested.²⁵ In any event, there must be adequate staff available to provide the needed medical assistance. Stuff represents the medical supplies necessary to deliver care and can include a range of things from expensive equipment to inexpensive consumable supplies.²⁸ These resources need to have their own triage-based system for allocating the supply delivery.²⁷ Space represents the physical area available to treat patients. Systems include everything in use to link departments.²⁸ This includes the ability of the ambulance units to communicate with dispatch, the receiving hospital, and the incident command structure in the needed manner. Medical surge can be further examined considering both capacity and capability.

Medical Response to Catastrophic Events

When a major incident occurs, a community readily establishes an emergency operations center (EOC). Many emergency operations plans (EOPs) call for EOCs to be established consistent with how the nation organizes its response and recovery actions in a command center. These are detailed in the National Response Framework (NRF) as emergency support functions (ESF). There are 15 ESFs; public health and medical falls under Emergency Support Function 8 (ESF 8). According to the NRF, the Department of Health and Human Services (HHS) is the lead agency for ESF 8. Through the HHS secretary's operations center, HHS coordinates all federal resources related to public health and medical services, which are made available to assist state, local, and tribal officials during a major disaster or emergency. Under ESF 8, HHS is responsible for the coordination of assets, such as:

- The secretary's emergency response teams
- The surgeon general's deployable health care professionals from the US Public Health Service Commissioned Corps
- The CDC's public health experts and its Laboratory Response Network
- The Strategic National Stockpile of pharmaceuticals and medical equipment³¹

The National Disaster Medical System

The National Response Framework, released in 2008 by the Department of Homeland Security, directs HHS to lead the government in providing public health and medical services during major disasters and emergencies. HHS manages the National Disaster Medical System (NDMS) and coordinates much of the federal health, medical, and mental health response to major emergencies, federally declared disasters, and terrorist incidents. HHS also is responsible for the federal health and medical response to domestic terrorist incidents involving weapons of mass destruction (WMD).

The NDMS is an asset-sharing partnership designed to provide emergency medical assistance to states following a catastrophic disaster or other major emergency.³² The system is designed to care for victims of any incident that exceeds the medical care capability of the affected local and state resources. Started in 1984, NDMS is now a partnership between HHS and the Department of Defense (DOD), Department of Veterans Affairs (VA), Department of Homeland Security, state and local governments, and the private sector. The system includes 3 major components: direct medical care, patient evacuation, and the nonfederal hospital bed system.

The NDMS has 3 primary objectives:

- To provide health, medical, and related social services response to a disaster area in the form of medical response units or teams and medical supplies and equipment
- To evacuate patients who cannot be cared for in the affected area to designated locations elsewhere in the nation
- To provide hospitalization in federal hospitals and a voluntary network or nonfederal acute care hospitals that have agreed to accept patients in the event of a national emergency

During times of emergency, HHS also coordinates medical resources from all other federal agencies, including NDMS assets, use of VA facilities and health care professionals, and DOD medical resources.

NDMS has 3 major components: deployable medical response, patient evacuation, and definitive medical care. Medical Response in NDMS includes 2 primary areas: medical (disaster medical assistance teams, DMAT) and mortuary (disaster mortuary operational response teams, DMORT). Patient evacuation is coordinated by DOD in concert with HHS and FEMA. Definitive medical care is provided by DOD and VA to the extent authorized by NDMS as emergency care related to the specified public health emergency or for injuries, illnesses and conditions requiring treatment that is not available as a result of the public health emergency.³³



Figure 5. Louisiana DMAT members tend to patients being treated in this acute care tent equipped to handle most medical emergencies. This DMAT site was equipped to provide resuscitation, minor surgery, intensive care, observation recovery, and acute care. It had 2 pharmacies. It was federal assistance to those injured by Hurricane Katrina. (Image courtesy of FEMA.³⁴)

DMATs are mobile NDMS teams composed of professional and paraprofessional medical personnel designed to provide medical care in response to a disaster or other major emergency. DMATs have the ability to provide medical triage, treatment, and preparation for evacuation.³¹ DMAT members provide emergency medical care and augment local medical capabilities during times of disasters. Teams usually have between 100 and 150 members and deploy in teams of between 30 and 40 personnel.^{31,35} DMATs are designated as basic, burn, crush injury, mental health, and pediatric specialty teams. DMATs have been activated in response to hurricanes Katrina and Rita (see Figure 5), presidential inaugurations, and assisting Haitian earthquake patient care at Homestead Air Force Base, to mention only a few deployments.

DMORTs are deployed to emergencies and work under the guidance of local authorities and provide technical assistance and personnel to identify and process deceased victims. There are 3 specialty DMORTs: disaster portable morgue units set up and operate and maintain the disaster portable morgue units; family assistance center teams set up the family assistance center and assist state and local authorities with the collection of antemortem data utilized in the process of victim identification; and DMORT-WMD for processing of contaminated human remains in response to a WMD or other hazardous situation.³⁶

The second mission of NDMS is patient evacuation. In the event medical systems within a domestic disaster area are overwhelmed or are expected to be overwhelmed, the state can request federal medical evacuation assistance. The Air Mobility Command and Federal Coordinating Centers activate to receive the identified patients who will be transported to preidentified nonfederal acute care hospitals that are NDMS member facilities, if possible.³⁰ Patient movement within NDMS includes patient evacuation, medical regulating, en-route care and patient tracking/in-transit visibility.³⁰ Patient movement is by air, by sea, and by ground. NDMS Federal Coordinating Centers have been activated for Hurricane Katrina patient movement and most recently for patient movement from the 2010 Haiti Earthquake.

The third mission of NDMS is definitive medical care. DOD and the VA may provide, to the extent authorized by NDMS, in the particular public health emergency, medical treatment or services beyond emergency medical care initiated upon inpatient admissions to an NDMS hospital and provide for injuries or illnesses resulting directly from a specified public health emergency, or for injuries, illnesses, and conditions requiring nondeferrable medical treatment or services to maintain health when such medical treatment or services are temporarily not available as result of the public health emergency. Definitive medical care for victims is rendered by a network of voluntarily participating preidentified nonfederal hospitals, which also provide back-up to the available military and VA medical services for military beneficiaries.³⁰

The National Disaster Medical System in place today is one of our nation's greatest medical assets serving to protect our citizens from disaster whether natural, manmade, or technical in design.

The Centers for Disease Control and Prevention

The responsibility of the Centers for Disease Control and Prevention (CDC) is to provide national leadership in the public health and medical communities to detect, diagnose, respond to, and prevent illnesses, including those that could occur as a result of bioterrorism. This task is an integral part of the CDC's overall mission to monitor and protect the health of the US population.

The CDC has developed a stockpile of pharmaceuticals, the Strategic National Stockpile, to be able to reach victims of an incident anywhere in the continental United States within 12 hours. This system was proven for the first time when tons of medical supplies reached New York City within 7 hours following the attack on the World Trade Center.

State Public Health Agencies

State public health agencies have the ultimate responsibility for their state's public health programs, including enforcement of public health laws. This authority is delegated to local health departments in many states. Actual day-to-day public health operations and

implementation of routine disease surveillance and epidemiological investigation is the responsibility of local public health departments, with support by the health agencies as needed. The states work primarily through these local agencies to coordinate and integrate public health programs and information statewide. State health agencies are normally the lead state agency in planning and managing the state's health and medical response to major or catastrophic disasters.

Public health departments have long been able to respond to outbreaks of infectious diseases; however, with the growing threats, new initiatives have been implemented to assist local, state, and federal agencies in responding to a large-scale event. Guided by HHS and the CDC, health agencies are increasing their preparedness capabilities. Communication systems are at the forefront of preparedness plans, allowing state and local agencies to communicate more rapidly with each other and the federal agencies. As state and local agencies prepare for disasters and catastrophic events, the emergency medical responder may be called upon to provide assistance in nontraditional ways, working with hospitals and public health to provide continuing care for the victims.

Conclusion

Emergency managers take into account all hazards, all phases, all stakeholders, and all impacts relevant to a disaster. It is a broad field. An emergency manager may or may not be an expert in one of more parts of the field; however, it is imperative that he or she have a general knowledge of everything that goes into the field of emergency management. As a primary stakeholder in preincident planning, emergency medical responders must work closely with emergency managers to develop functional response plans.

The health care system's surge capacity and capability to respond is critical to planning how the events will unfold. The opportunity to plan for events provides a unique opportunity to identify necessary resources, discover challenges in interoperability, and create a response plan that ultimately saves lives and provides a coordinated response. Through planning, education and training can be realized.

Although disaster plans have been used by communities and hospitals for decades, mass-casualty incidents caused by catastrophic natural and technical disasters have recently been added to the preparedness plans. Responding to a large-scale event may prove overwhelming for most emergency medical responders. Typically, these medical response agencies may lack the equipment, personnel, training, and structure to respond to an MCI. We are all strengthened by embracing the tenets of comprehensive emergency management and working cooperatively, which will enable us to plan for the worst while we hope for the best.

Case Study Conclusion

Now, let's get back to Paul and Jerry, our once beleaguered medics, now disaster-worn medical professionals. You see, their scenario is not far from what actually has occurred in numerous communities all over the United States. When disaster becomes personal and tragedy strikes your community, your relatives, and neighbors, it dramatically changes your attitudes toward preparedness and planning. Five years after the tornado struck, Jerry moved on to become a senior medical planner for his region, and Paul is now working for the state EMA in charge of ESF 8 activities. Their tornado experience and the confusion that followed became the incentive to learn more about emergency management principles and apply them toward medical planning for mass-casualty events. They understand what Winston Churchill meant when he said, "He who fails to plan is planning to fail." They both lead efforts at the state and regional level to develop intricate but functional medical operations plans for catastrophic events. They engaged all stakeholders needed to make those plans all-inclusive and comprehensive. Furthermore, they designed tabletop and full-scale exercises to test those plans.

Appendix A: ICS Form 206: Sample Medical Plan

MEDICAL PLAN	1. Incident Name Tornado Command	2. Date Prepared August 22, 2012	3. Time Prepared 1300	4. Operational Period 4 hours	
5. Incident Medical Aid Station					
Medical Aid Stations	Location			Paramedics Yes No	
Level 1 Staging	Located at Intersection 144 and 431			X	
Level 2 Staging	Located at Intersection 144 and 73			X	
Rehab	Empty lot corner of Main St. and 144			X	
Triage Station	Corner of 144 and 77 (Joe's Café)			X	
6. Transportation					
A. Ambulance Services					
Name	Address	Phone	Paramedics Yes No		
Anniston EMS	14 ambulances throughout the county	(256) 555-1212	X		
B. Incident Ambulances					
Name	Location			Paramedics Yes No	
Medic 1	Level 1 Staging			X	
Medic 2	Level 2 Staging			X	
Medic 6	Triage Station			X	
Medic 7	Rehab			X	
7. Hospitals					
Name	Address	Travel Time Air Ground	Phone	Helipad Yes No	Burn Center Yes No
RMC	1403 29 th Street, Anniston	5 min 20 min	(256) 555-1213	X	X
Stringfellow	7007 14 th Street, Anniston	5 min 20 min	(256) 555-1214	X	X
UAB	3500 26 th Ave NE, B'ham	12 min 50 min	(256) 555-1215	X	X
St Vincent's	231 Main Street, B'ham	15 min 60 min	(256) 555-1216	X	X
8. Medical Emergency Procedures					
In the event of an emergency, immediately notify supervisor who will communicate with Operations Section Chief. Notification can occur through direct contact or activation of the emergency button on radios with CAN report. Supervisor will ensure:					
<input type="checkbox"/> Clear traffic on TAC channel in order to facilitate needs, move other operations to additional channel <input type="checkbox"/> If safe, bring medical team to location of injured, if unsafe facilitate the delivery of the injured party to a medical aid station <input type="checkbox"/> Communicate nature of emergency, resources required, and extenuating circumstances <input type="checkbox"/> Remove unnecessary personnel from the area <input type="checkbox"/> Secure the scene <input type="checkbox"/> Provide medical care to the injured <input type="checkbox"/> Arrange for transportation, by appropriate method to appropriate facility <input type="checkbox"/> Organize patch with receiving medical facility <input type="checkbox"/> Notify CISM teams and notification through chain of command <input type="checkbox"/> Log & Document Incident					
9. Prepared by (Medical Unit Leader) Paul LeMedic			10. Reviewed by (Safety Officer) Jerry Docteur		

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