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Disaster Planning

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Synonyms and related keywords: disasters, natural disasters, catastrophe, cataclysmic episode, technological disaster, human-made disasters, tornadoes, hurricanes, earthquakes, fires, toxic spills, nuclear mishaps, war, terrorism, potential disaster, disaster planning, disaster preparedness, disaster response, disaster recovery, disaster relief, disaster aid, disaster assistance, disaster management, disaster mitigation, disaster prevention, disaster preparedness plan, disaster response plan, disaster recovery plan, disaster relief plan, disaster assistance plan, disaster management plan, disaster mitigation plan, disaster prevention plan, disaster preparedness, disaster response, disaster recovery, disaster relief, disaster assistance, disaster management, disaster mitigation, disaster prevention, disaster preparedness plan, disaster response plan, disaster recovery plan, disaster relief plan, disaster assistance plan, disaster management plan, disaster mitigation plan, disaster prevention plan

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INTRODUCTION TO DISASTER PLANNING: THE SCOPE AND NATURE OF THE PROBLEM

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A disaster occurs somewhere in the world almost daily; however, to most people, disasters of discussed in this chapter are unusual events. A recent group of disasters, starting with the Sep 11th terrorist attacks and continuing through the tsunami affecting countries throughout the Indian Ocean, the South Asia earthquake in Pakistan, and the 2005 Gulf Coast hurricanes have focused people's attention upon this topic.

Despite the increase in general awareness with recent events, the relative infrequency of major catastrophes affecting defined populations, leads to a certain degree of complacency and underestimation of the impact of such an event. The result of complacency is relative reluctance to devote the necessary resources for adequate disaster preparedness. Indeed, several authors believe the best time to propose major changes for disaster preparedness, including its funding, is immediately following a major disaster, even if the event has occurred in a remote location.

In the United States, large multiple-casualty events are exceptionally rare by world standards. More than 10 disasters in US history have resulted in more than 1000 fatalities (see Table 1). The vast majority of major events have resulted in fewer than 40 fatalities. According to data from the Centers for Disease Control, the September 11th attacks caused 2819 deaths. Compared with 44,065 from motor vehicle accidents in 2002, this number is small. However, the dramatic nature of disasters with a relatively large death toll and psychological impact for a short time period can overwhelm an unprepared health and response system.

Table 1. Major US Disasters (Deaths >1000).

Year	Event	Deaths
1865	Steamship explosion	1547
1875	Forest fire, Wisconsin	1182
1889	Flood, Pennsylvania	>2000
1900	Hurricane, Texas	8000
1904	Steamship fire	1021
1906	San Francisco earthquake	>3000
1928	Hurricane, Florida	2000

1941	Pearl Harbor Attack	2403
2001	September 11 Attack	2819

When a disaster strikes, the general population expects public service agencies and other branches of the local, state, or federal government to rapidly mobilize to help the injured and the community in general. Preservation of life and health are of paramount importance to those individuals injured in disasters. For this reason, medical professionals must be included in all phases of disaster planning as well as in the immediate response to these events. Adequate preparation has become particularly important following the problematic response seen during Hurricane Katrina.

CLASSIFYING DISASTERS

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Natural versus technological disasters

Disasters are classified in a variety of ways. A common system divides incidents into natural and technological (human-made) disasters. For planning purposes, this distinction provides little conceptual help as there are frequent crossovers. For example, artificial structures may collapse as the result of hurricanes or earthquakes. During Hurricane Katrina, emergency personnel had to contend with fires while rescuing people from flooded areas.

Certain generalizations, however, may be made about natural disasters. Tornadoes may be quite lethal but are generally short-lived. Hurricanes cut a wider swath than tornadoes, tend to last longer and have more long-term recovery effects. Tornadoes, hurricanes, and floods tend to occur in specific geographic locations. Volcanoes also may be quite lethal but have become more predictable in recent years. Until recently, the most devastating natural phenomena, with regard to numbers of fatalities, were thought to be earthquakes. However, the December 2004 tsunami affecting countries throughout the Indian Ocean, with an official death toll of 224,228 people, ranks as one of the most lethal disasters in recorded history.

Technological disasters tend to be more contained but can be quite lethal. Fires have caused the largest numbers of casualties in this country. Toxic spills (ie, release of cyanide gas in Bhopal, India) and nuclear mishaps (ie, Chernobyl) have caused short- and long-term havoc, death, and destruction.

War and terrorism

Other incidents with potential for mass casualties and disaster include war and terrorism. Since the 9/11 attacks on the World Trade Center in New York City, terrorism has become a major focus of disaster response and preparedness. Although the world has yet to experience a terrorist-related nuclear disaster, the raw materials and technology exist to develop nuclear devices as small portable units such as "dirty-bombs." No geographical location is immune from the devastating effects of terrorism. These activities have become more frequent and lethal in recent years with no forewarning as evidenced by the 9/11 attacks, the Madrid and London bombings, and the more distant, but tragic, Sarin nerve agent attack on the Tokyo subway system.

Classifying disasters

Disasters are often classified by the resultant anticipated necessary response.

- A Level I disaster is one in which local emergency response personnel and organizations are able to contain and deal effectively with the disaster and its aftermath.
- A Level II disaster requires regional efforts and mutual aid from surrounding communities.
- A Level III disaster is of such a magnitude that local and regional assets are overwhelmed requiring statewide or federal assistance.

Disaster preparation

Various methods have been developed to assist planners in disaster preparation. One such method is a modification of the Injury Severity Score. It is based on cause and effect, the area involved, the number of casualties, and other parameters. The potential injury creating event (PICE) system is designed to identify common aspects of a disaster and of response capabilities. Such systems are especially valuable tools in planning for disaster mitigation.

The PICE system uses 4 modifiers to describe a particular disaster (see Table 2). The first modifier describes the potential for additional casualties. The second identifies the degree to which local resources are disrupted. The third modifier identifies the geographic boundaries of involvement. The final modifier, crisis staging, indicates the likelihood of needing outside assistance to augment or replace local resources. It is important to note that in the PICE methodology, identical disasters have differing descriptors depending on the location of the event and the availability of resources.

Table 2. Potential Injury-Creating Event Algorithm

A	B	C	Stage
Stable	Static	Local	0
Dynamic	Disruptive	Regional	I
	Paralytic	National	II
		International	III

DEFINITIONS AND TERMINOLOGY

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Disaster medicine is difficult to conceptualize. It can be broadly defined.

The World Health Organization defines a disaster as a "sudden ecological phenomenon of sufficient magnitude to require external assistance." The American College of Emergency Physicians (ACEP) states that a disaster has occurred "when the destructive effects of natural or man-made force

overwhelm the ability of a given area or community to meet the demand for health care." Other definitions exist, but the common denominator calls for a disruption of such magnitude that the organization, infrastructure, and resources of a community are unable to return to normal operation following the event without outside assistance.

To further clarify the contrast between normal emergencies and disasters, ACEP states, "emergency medical services routinely direct maximal resources to a small number of individuals, while disaster medical services are designed to direct limited resources to the greatest number of individuals."

In contrast to disasters, multiple casualty incidents (MCIs) have as their primary effects morbidity and mortality to individuals, while the community infrastructure remains relatively intact. A passenger airplane accident with 500 injured or dead occupants is considered an MCI. However, if this morbidity and mortality were the result of the release of chlorine gas from a hazardous material accident, a much higher potential for additional casualties would exist. Normal operations and activities of daily life would be disrupted for a longer period, which would be considered a disaster by most experts.

PHASES OF DISASTER RESPONSE

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A disaster cycle has 4 phases, and all responses must pass through each: (1) mitigation, (2) preparation, (3) recovery, and (4) reconstruction. Pitfalls during transitions can occur throughout the phases. Generalized awareness, training, and contingencies may reduce the overall effect of any specific inadequacy in response.

Mitigation

In certain cases, some of the devastating effects of disasters can be reduced before the actual disaster occurs. Evacuations may be orchestrated before hurricanes or floods. Early warning allows residents to evacuate. Sprinkler systems in businesses and homes can reduce overall risk of total fire destruction.

Planning

Disaster planning is discussed more thoroughly in External and Internal Planning. It cannot be overstated that a disaster plan is not synonymous with disaster planning. Many communities have detailed disaster plans, but they are found to be either based on faulty assumptions or to be totally unworkable in the context of a real disaster.

Response

A number of events occur during initial response to a disaster. If there is forewarning, certain actions can be taken even before the event. Unfortunately, significant forewarning is rare.

Activation

Notification and initial response

During this phase, organizations involved in disaster response and the potentially affected population are notified. When an event that the disaster is anticipated, this phase takes place even before the disaster. Many local organizations have disaster response plans that are activated when a disaster is anticipated.

require more than 24 hours for full evacuation.

Organization of command and scene assessment

Once the activation phase has begun, the prearranged command and staff structure (for detail System below) for responding to the disaster should be arranged and initial communications n the most crucial steps to take once the disaster occurs. Historically, valuable time may be lost while the central system coordinating the response effort is being prepared. During this phase, overall scene assessment begin to arrive. For static disasters, required response assets may r the only initially known fact is that the disaster is an ongoing process. However, even this fact whether outside assistance is needed, leading to timely activation of those resources.

Implementation

Search and rescue

Depending on the structure and function of the incident command system (ICS), search and re direction of fire, emergency medical service (EMS), or police (security) forces. In contained, ge incidents, the search and rescue effort is fairly straightforward. In larger disasters, especially o involve terrorist activities, a cooperative approach is necessary and the very act of search and organized to ensure adequate and complete coverage of all areas.

Extrication, triage, stabilization, and transport

Extrication has evolved into a fire services function in most of the country. In addition to specie rescue teams, fire services have more experience with building collapse and secondary hazard organizations.

The concept of triage involves providing the most help for as many as possible. A complete de the scope of this review. Medical personnel are accustomed to providing extensive, definitive c confronted by numerous patients simultaneously in a disaster situation, it is easy to become o experienced disaster worker. Triage must occur at multiple levels, and patients must be reass process.

Transport must be both organized and orchestrated to equitably distribute victims to capable r recent civilian disasters and even in Operation Desert Storm, the majority of critically injured in one or two receiving facilities, which were almost overwhelmed. This occurred at a time when awaiting patients.

Definitive scene management

While scene control and containment may be relatively simple in a local, static disaster, dynam paralyze response systems may take several days to contain and stabilize. As the length of tin additional resources must be made available, as rescue crews reach exhaustion, supplies are hazards develop.

Recovery

The recovery phase is frequently underemphasized in disaster plans, but it is crucial for the aff

phase, some semblance of order is restored, public utilities are reestablished, and infrastructure effectively. Scene withdrawal and a return to normal operations usually occur simultaneously. is also vitally important during this phase for critical incident stress debriefing and other support for this purpose.

Debriefing

Valuable lessons may be learned during debriefing. It is of utmost importance to obtain as much from all parties involved in the disaster response effort. Without full disclosure, similar weak re efforts.

EXTERNAL AND INTERNAL PLANNING

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External planning

Disaster planning should to the extent possible incorporate formal disaster research findings. I on faulty assumptions that do not prove true in actual disasters. For example, planners may lo patients will be transported first during a disaster, when in reality this may not happen in many

A disaster plan encompassing both local and regional areas must focus on 3 possible scenari

1. The disaster occurs within the region and is confined and controlled with existing resourc
2. The disaster occurs in a neighboring region, and regional assets are requested through r
3. The disaster area is the region and requires state or federal assistance for an effective re

Incident command system

After a series of fires in California in the 1970s, the Fire Suppression Services developed the I effective response to major disasters. The ICS structure includes 5 functional units: command, planning, and finance (see [Image 1](#)). Most disaster plans include similar organizational structu depending on normal operations of the various agencies.

In developing a disaster plan, leaders should remember that it is impossible to plan for all cont must be relatively general and expandable. Most disasters that can be contained using local o fewer than 100 fatalities and fewer than 500 major casualties. If plans are developed for larger should focus on the first 48 hours of the disaster until state and federal assistance teams can ; initial fatality rates during the first 24 hours.

Rehearsal

All phases of the disaster response must be addressed in a disaster plan. Functional job descri all agencies and organizations involved should be delineated clearly. More importantly, these j rehearsed. The ideal exercise includes participation by all parties involved. Since these exerci disrupt normal operations and are costly in personnel and material utilization, disaster agencie exercise on the "tabletop." This is a simulation of an emergency situation for training and testir

does not involve movement of response resources. Tabletop exercises are good training tools leadership positions to work through major problems without the cost of running vehicles, using supplies. They can quickly highlight areas of weakness where additional support may be

Organization

As part of the Federal Response Plan, the National Disaster Medical System was developed in of Defense, the Veteran's Administration, the Federal Emergency Management Agency, and tl Human Services. The Federal Response Plan calls for the development and response of up to but not direct, the disaster response initiative on declaration of a state of emergency by a territ

Approximately 1000 stateside beds were identified in preparation for Desert Storm, although n performed, leading to criticism from the Government Accounting Agency. Disaster medical ass groups composed of volunteer physicians, nurses, EMS personnel, and others who are transp participate in the triage, stabilization, transport, and treatment of patients. As examples of use responded to the Oklahoma City Federal Building bombing, Hurricane Katrina, and have prest such as the Atlanta Olympic Games.

Internal planning

Hospital disaster planners must take into account the scenarios previously described, including disaster may involve the hospital. For such rare events, aspects of hospital involvement such : multiple triage and staging areas within the confines of the hospital, recall of critical personnel, supplies and resupply must be anticipated. The Joint Commission on Accreditation of Hospital to exercise disaster plans periodically and to form disaster committees. These committees shc within the hospital, including administration, nursing services, security, communications, labor: (including, but not limited to, Emergency Medicine, General Surgery, and Radiology), medical maintenance/engineering.

The hospital disaster plan should include protocols and policies that meet the following needs:

- Recognition and notification
- Assessment of hospital capabilities
- Personnel recall
- Establishment of a facility control center
- Maintenance of accurate records
- Public relations
- Equipment resupply

New, more stringent requirements for health care organizations were approved by JCAHO in 2 2001. Probably most significant are the requirements to integrate hospital disaster planning int that disaster programs address all phases of the disaster cycle, and to have the capability to e staff and patients and relocate and operate from an independent facility. Discussions are conti

strengthen requirements concerning decontamination, polices, and training in response to terr chemical, biological, radiological, nuclear, and explosive agents.

SUMMARY

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Disaster planning is a regional effort. Every jurisdiction should plan for MCIs and disasters. All based on normal daily operations of the various components involved in the disaster plan. Per must be familiar with the disaster plan. It should be exercised frequently, even if only by tablet plans for mutual assistance and state or federal response also must be considered and review

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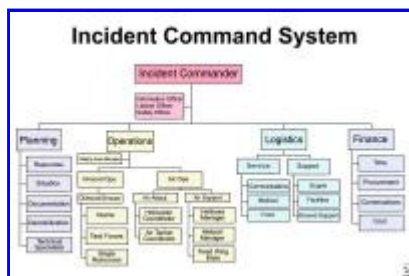
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Caption: Picture 1. Incident command system organizational chart.



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