

## Evacuation

**Abstract:** Evacuation planning is governed by Joint Commission on Accreditation of Healthcare Organizations standards and Occupational Safety and Health Administration regulations. This Analysis reviews the components of an evacuation plan and discusses evacuation considerations for major disasters, such as establishing a chain of command, transporting patients, determining patient destinations, handling patients with special needs, defining staff responsibilities, conducting training and drills, and planning for recovery. Evacuations will vary depending on whether they are horizontal (on the same floor) or vertical (between floors) and whether the evacuees are moved to another area of the building, leave the building, or shelter in place.

Planning for the evacuation of a healthcare facility can seem overwhelming because of the number of evacuation scenarios that are possible and the level of detail that is required when organizing a mass departure. But when a natural or man-made disaster strikes a healthcare facility, an organized and efficient evacuation effort can mean the difference between survival and tragedy. A detailed disaster plan is critical to a successful evacuation. Staff must be well trained on their responsibilities, and management must steer the process with a steady hand.

Traditionally, healthcare facility evacuation plans have focused on shelter-in-place strategies (also called defend-in-place strategies), but events in which buildings were destroyed or rendered unfit for use, such as the September 11, 2001, terrorist attacks or the more recent flooding of New Orleans and surrounding areas after Hurricane Katrina, have revealed the need to have alternative strategies in place.

It is important to envision worst-case scenarios and tailor the evacuation plan to each situation. A well-written plan provides accurate information about the specific situation, includes steps for protecting employees and others at the facility during and after the incident, and lists procedures for minimizing damage and downtime.<sup>1</sup> The plan should include separate steps for each department.

### Rules and Regulations

Evacuation plans for accredited facilities must cover items detailed in Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards and

Occupational Safety and Health Administration (OSHA) regulations. As the aftermath of Hurricane Katrina revealed, poor execution of an evacuation plan may lead to citations and even criminal charges, especially if errors lead to preventable deaths.

### JCAHO Requirements

In its Environment of Care (EC) standards, JCAHO specifies provisions for evacuation that accredited healthcare facilities must include in their emergency management plans. Standard EC.4.10 states that accredited hospitals<sup>2</sup> and long-term care facilities<sup>3</sup> (other accredited facilities may have different requirements) must have plans that include the following:

- Processes for evacuating the entire building (both horizontally and vertically) when the environment cannot support adequate care, treatment, and services
- Processes for establishing one or more alternate care sites able to meet the needs of patients when the environment cannot support adequate care, treatment, and services, including processes for the following:
  - Transporting patients, staff, and equipment to the alternate care sites
  - Transferring patient necessities such as medications and medical records to and from the alternate care sites

For more information about this topic and other related topics, go to HHC Members' Web site at <http://www.ecri.org>.

- Tracking patients
- Maintaining interfacility communications between the healthcare facility and the alternate care sites

In addition, JCAHO standard EC.5.10 states that each accredited hospital or long-term care facility's fire response plan must address area-specific needs, including evacuation routes and the specific roles and responsibilities of staff, licensed independent practitioners, and volunteers in preparing for building evacuation.<sup>4,5</sup>

### **OSHA Regulations**

OSHA regulates evacuation planning for the safety of healthcare staff under the emergency action plan standard (29 § CFR 1910.38). An employer must include the following in an emergency action plan:

- Procedures for emergency evacuation, including the type of evacuation and exit route assignments
- Procedures to be followed by employees who remain at the facility to conduct critical plan operations before they evacuate
- Procedures to account for all employees after evacuation
- Procedures to be followed by employees performing rescue or medical duties
- The name or job title of every employee who may be contacted by other employees who need more information about the plan or an explanation of their duties under the plan

In addition, the standard specifies the following:

- An employee alarm system must be maintained that uses a distinctive signal for each purpose (e.g., fire) and complies with OSHA regulations on these systems.
- An employer must designate and train employees to assist in the safe and orderly evacuation of other employees.
- An employer must review the emergency action plan with each employee covered by the plan
  - when the plan is developed,
  - when an employee is initially assigned to a job,
  - when an employee's responsibilities under the plan change, and
  - when the plan is changed.

### **State and Local Enforcement**

Besides complying with JCAHO and OSHA requirements, healthcare facilities and their workers should

be aware that they could be cited or found negligent for a poorly executed evacuation plan. In the wake of Hurricanes Katrina and Rita (which struck the Gulf Coast within weeks of one another), state and local governments proved their willingness to prosecute individuals allegedly responsible for preventable deaths during evacuation.

In the aftermath of Hurricane Katrina, the Louisiana attorney general charged the two owners of a nursing home in Violet, Louisiana, just east of New Orleans, with 34 counts of negligent homicide for the deaths of nursing home residents who drowned in rising floodwaters. The charges stemmed from the alleged failure to evacuate the nursing home, contrary to the facility's own evacuation plan and in violation of a mandatory evacuation of the local government. Although the owners had an agreement with an ambulance company to evacuate special-needs patients, they did not do so.<sup>6</sup> The owners also allegedly declined an offer from authorities to provide two buses to evacuate the residents.<sup>7</sup>

In another case, the driver of a bus evacuating residents of a Houston nursing home before Hurricane Rita was charged with criminally negligent homicide for the deaths of 23 passengers. The charges were subsequently dropped, although the company that owned the bus remained under investigation as of late 2005. A fire began in the brakes and spread throughout the bus, causing residents' oxygen tanks to explode. The driver and some passengers escaped, but many others were trapped by the flames.<sup>8</sup>

### **Developing the Plan**

In addition to anticipating fire emergencies, healthcare facility evacuation plans must be developed to address other, unexpected circumstances. The facility's emergency management committee should apply the hazard vulnerability assessment process to identify risk factors likely to lead to evacuation. (See the Analysis "Emergency Preparedness Management: Overview" and the Self-Assessment Questionnaire "Emergency Preparedness Hazard Vulnerability Assessment" in the *Emergency Preparedness and Disasters* section of your *Healthcare Hazard Control [HHC] System*.)

The committee should consider the likelihood of an evacuation after an external natural disaster such as an earthquake, tornado, hurricane, flood, storm, or fire; an external man-made disaster such as a terrorist attack or a transportation or chemical/radiation incident; or an internal disaster such as a power failure,

flood, loss of water service, chemical accident, uncontrolled spread of chemical or other fumes, radiation accident, incident resulting in fire or smoke, loss of medical gases, violent incident, bomb threat, inadvertent or deliberate explosion, inability of staff to reach the hospital, or loss of communications.<sup>9</sup>

The evacuation plan should account for factors in the local community or region and geographic features that increase the likelihood of one of these disasters triggering an evacuation. For example, does the healthcare facility lie below sea level or in a flood plain? Is the facility in a region that experiences severe weather-related disasters such as tornadoes or floods? Is it located in a large urban area or near an airport that could be the target of a terrorist attack? The evacuation plan should account for these factors and should also reflect the impact of these potential risks on the community's infrastructure, which will affect plans for patient evacuation outside the building. Assessing these factors and features will also help to determine the types and volumes of disaster supplies the facility should have on hand and the need to develop backup plans to transport additional supplies as needed during the emergency.<sup>10</sup> Once completed, the evacuation plan may be distributed for review to the departments and organizations that will carry it out, including the medical staff, nursing safety committee, nursing administration, support units, administrator-on-call staff, hospital safety committee, and county or regional emergency operations group.<sup>11</sup>

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To read about one Florida facility's hurricane evacuation plan, see "A Successful Evacuation Plan."

Risk factors will vary among facilities. However, history provides some insight into the likelihood that any given type of disaster will lead to evacuation. A study of 275 reported hospital evacuations that occurred from 1971 to 1999—including horizontal (on the same floor), vertical (between floors), evacuations of a ward or wing, and total hospital evacuations—found that the following incidents triggered evacuations: (The study did not link the incident with the type of evacuation it triggered [see Figure 1].)<sup>12</sup>

- A fire in the facility (23% of cases), including false alarms or smoke caused by smoking in bed, misuse

of a welding torch, or combustion in a kitchen or electrical switchbox

- A HAZMAT (hazardous materials) incident (18%), defined as fumes or spills suspected of being hazardous
- A hurricane (14%), including flooding accompanying a hurricane
- A human threat (13%), such as a bomb threat, actual bomb detonation, armed intrusion, or hostage event
- An earthquake (9%)
- A fire external to the facility (6%)
- A flood (6%)
- A utility failure (5%), including electrical, medical gas, natural gas, sewer, or water systems
- A HAZMAT event external to the facility (4%)

Among 143 facilities conducting any type of evacuation and reporting the number of evacuees, 60 facilities (42%) evacuated  $\leq 49$  people, 27 facilities (19%) evacuated 50 to 99, 51 facilities (36%) evacuated 100 to 499, 2 facilities (1%) evacuated 500 to 999, and 3 facilities (2%) evacuated  $\geq 1,000$ . Among 43 reporting facilities, the duration of evacuation was  $< 2$  hours in 7 cases (16% of evacuations), 2 hours to 11 hours and 59 minutes in 19 cases (44%), 12 hours to 23 hours and 59 minutes in 5 cases (12%), and  $\geq 24$  hours in 12 cases (28%).

Thirty of the 275 incidents included reports of injuries or fatalities. A fire at a Virginia medical center accounted for the highest number of fatalities (4) from a single incident, and a fire at a New York City hospital accounted for the highest number of injuries (70) from a single incident.

The study also highlighted the prevalence of internal incidents and natural disasters as causes of evacuation. Overall, more than half the reported hospital evacuations occurred because of an incident internal to the facility or a human intruder in the facility. On the other hand, a single natural disaster often led to the evacuation of more than one healthcare facility. For instance, 15 of 26 evacuations in 1992 were caused by Hurricane Andrew and 14 of 33 in 1994 were caused by the Northridge, California, earthquake. High numbers of hospital evacuations also occurred after California's Loma Prieta earthquake in 1989, after Hurricanes Bonnie and George in 1998, and after Hurricane Floyd in 1999. Because they account for a large share of the total number of evacuations, such events suggest that hospitals may often find themselves evacuating at the same time as other local

## A Successful Evacuation Plan

The following is an outline of an evacuation plan used by Cape Canaveral Hospital, Cocoa Beach, Florida, for responding to hurricanes. The facility has had to test the plan on several occasions, as hurricanes regularly reach the Florida coast. The outline breaks the evacuation process into six steps, or levels. The actual plan lists the activities in each level in much greater detail.

### **Level 1 (72 to 48 hours before landfall)**

Level 1, considered to begin at 72 hours (or less) before landfall, is defined as a warning level in which danger is possible. The purpose of this level is to evaluate, update, and prepare for implementation of department-specific action plans and agreements and to ensure that adequate supplies, materials, and resources are readily available if a natural disaster occurs.

The weather situation is monitored through the Brevard County Emergency Operations Center (EOC), and all emergency sheltering facilities and community response agencies are notified. Hurricane plans and procedures should be reviewed by all agencies.

The chief executive officer, chief operating officer, corporate director of safety and security, and security and preparedness coordinator are notified by the EOC. The hospital core team and hurricane-preparedness group are activated. This team includes the following members:

- Plan operations director
- Nutritional services director
- Materials management director
- Pharmacy director
- Environmental services director
- Nursing supervisor

Procedures at this stage include assessing overall hospital preparedness, reviewing individual department plans, triaging inpatients for possible transfer or discharge, transferring and discharging elective and stable

patients, and continuing mandatory meetings between the department director and managers.

### **Level 2 (36 to 30 hours before landfall)**

The purpose of level 2 is to promote an appropriate and adequate response by associates in the event that personnel are called to duty or retained for an extended period. Provisions for continuous or extended schedules are made at level 2.

Level 2 begins when the National Weather Service declares a tropical storm watch or hurricane watch. According to the Brevard County EOC, danger is probable within 30 to 36 hours. EOC activation occurs with activation of the emergency department staff. All personnel are briefed, and family responsibilities are addressed. Coordination with the county and all municipalities is addressed. Special-needs notifications are initiated; special-needs client evacuation is initiated at the 30-hour mark. Public notification via radio and television is initiated.

When the evacuation order is received from emergency medical services sources, the office of patient care services becomes the central location for all outgoing phone calls to facilities receiving evacuated patients. A list of all patients requiring transfer to other facilities is forwarded to the office.

The following are some of the steps taken during the evacuation:

- Nursing units will initiate calls to physicians to obtain discharge or transfer orders and notify families of patient discharge or transfer.
- A patient transfer checklist must be completed and signed by a medical records manager; discharged-patients' charts must be broken down and transported to the medical records department.
- A patient staging area will be set up in the emergency department for both patient evacuations and receiving patients after the disaster is over.

hospitals and when emergency services are already under strain. Such a scenario will reduce the options for patient transfer.

Although the study does not report whether evacuations caused by an earthquake or hurricane were confined to a specific state, 26 of 27 evacuations reported in California were caused by an earthquake, and 18 of 29 evacuations reported in Florida were the result of a hurricane. Among other states with high numbers of evacuations, internal fire was the top cause in Texas (5 evacuations among a total of 15), while the most common evacuation-triggering events

in Louisiana were internal fire, human threat, and hurricane (4 evacuations each among a total of 14). The most common causes of evacuation were not specified for Massachusetts (12 evacuations) or New Jersey, South Carolina, and Washington State (10 evacuations each).

More recent examples underline the danger from natural disasters. Hurricane Katrina resulted in the closure of 15 hospitals in the metropolitan New Orleans area in 2005;<sup>13</sup> in at least 2 cases, the closures were permanent because flooding led to pervasive

- The nursing evacuation liaison will complete the patient transfer master sheet before the patient is transferred to the receiving facility.
- All evacuation personnel are to remain on duty until evacuation procedures are completed and/or employees are released by their department directors.

The anticipated time necessary for complete evacuation of the facility is six to eight hours.

During this period, the facility makes provisions to permit its staff to take care of their own homes and families. Some workers go home. When each one returns, another staff member is able to leave for home, return, and so on.

### **Level 3 (24 to 12 hours before landfall)**

The purpose of level 3 is to mobilize all departments for deployment of planned responsibilities as described in the disaster plan located in the command center.

According to the EOC, danger is possible within 12 to 24 hours. All response activities are coordinated with the EOC. Evacuation of at-risk populations is initiated, and the special-needs evacuations are completed. Public notifications continue and are more frequent.

Materials management personnel are responsible for securing and preparing the building 24 hours before landfall. Command center directives continue to be issued and followed. Twelve hours before landfall, all entrances are locked down. The storm team is stationed at receiving facilities 8 to 12 hours before landfall.

### **Level 4 (6 hours before landfall)**

The purpose of level 4 is to ensure that the facility and grounds are evacuated. The safety and security department will proceed in securing the facility and moving to secure shelter. Emergency communications with the office of emergency management and other hospitals are established, and security and other personnel are

dispatched to entrances and key locations as necessary to facilitate traffic control, both vehicular and pedestrian.

Danger is imminent, and estimated time and location of landfall are being tracked. All preventive emergency actions should be complete, and all service personnel are to take shelter in accordance with agency plans. Level 4 of the plan will go into effect when hurricane warnings for Brevard County are issued.

### **Level 5 (landfall)**

The purpose of level 5 is to continue to monitor the progress of the storm and to monitor the integrity of the building. Plant operations associates monitor the integrity of the facility.

### **Level 6 (12 hours after landfall)**

The purpose of level 6 is to restore all functions to pre-storm levels in a timely and orderly manner and to assess damages and stabilize critical incident-stress reactions.

Plans to reopen Cape Canaveral Hospital depend on several factors at this stage, including access to the hospital, the amount of damage sustained by the building and equipment, the availability of personnel, and the condition of support systems, including electricity, water, and telephone service.

Once the hospital is restored, police, fire, and/or county officials will announce when personnel can return to the hospital. A preliminary planning meeting will be held with all members of administration who are able to get to the hospital.

Level 6 goes into effect when the threat of a hurricane and weather-related conditions has passed and Brevard County officials begin reentry for search and rescue. Plans for reentry of the facility are established.

**Source:** ECRI. Planning and training are keys to successful evacuations. *Health Hazard Manage Monit* 2003 Feb;16(6):2-4. ◆

mold, left the air in the buildings unsafe to breathe, and destroyed mechanical systems.<sup>14</sup>

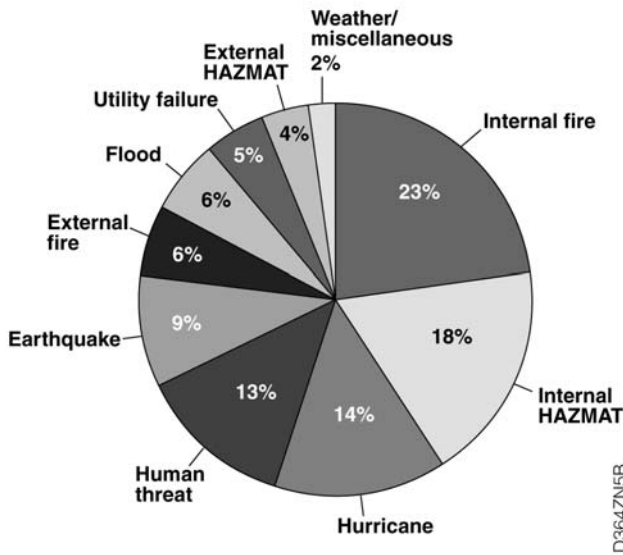
## **Chain of Command**

An evacuation plan must initially establish a chain of command for deciding whether an emergency situation will require horizontal, vertical, or partial (to an area in the building) evacuation or total (to an area outside and away from the building) evacuation. This involves granting one or more individuals the authority to make a final decision that, once announced, will

set procedures in motion throughout all departments.<sup>15</sup> The plan should also specify a primary and backup location for the incident command center, as well as staffing needs, staff responsibilities, and individual authority.<sup>16</sup>

If more than one person is granted authority to order an evacuation, the plan should specify whether a decision by one of these individuals is sufficient to order an evacuation and, if so, whether all designated individuals have equal authority or whether decisions by certain individuals take precedence. For example, at one

**Figure 1. Types of Incidents Triggering a Hospital Evacuation, 1971-1999**



Source: Sternberg E, Lee GC, Huard D. Counting crises: US hospital evacuations, 1971-1999. *Prehospital Disaster Med* 2004 Apr-Jun;19(2):150-7.

facility, the decision is made by the executive director or a designee.<sup>17</sup> At another facility, seven individuals have equal authority to order an evacuation: the director, deputy director, clinical director, deputy director for administration, director of quality assurance, director of nursing, and chief safety officer. If none of these individuals are present, the nursing supervisor and doctor on-call jointly make the decision to evacuate.<sup>18</sup>

The National Fire Protection Association recommends the RED—react, evaluate, and decide—decision-making model, which involves the following:

- Take any indication of smoke, fire, or other potentially threatening situation seriously (react).
- Judge the level of threat (evaluate).
- Make one of two decisions (decide): either
  - follow the evacuation plan immediately or
  - choose to defend in place (for instance, moving to the other side of a fireproof barrier, such as a fire wall, and taking protective or defensive actions, such as alerting the fire department to your location and sealing doors, windows, and vents).<sup>19</sup>

Establishing a link between the healthcare facility’s command structure and the community emergency command structure, as specified in JCAHO standard EC.4.10,<sup>20</sup> is particularly vital in making decisions about whether to evacuate the facility during an external disaster. (JCAHO requires this link for accredited organizations, except home care organizations or office-based surgery practices.)<sup>21</sup> In an actual disaster situation, incident commanders at the facility would have to consult with the community command structure to determine whether conditions in the area would support safe evacuation of patients and staff. It may be helpful to provide an internal staff member with disaster management training that overlaps the training received by outside disaster management organizations. For example, one facility reported that a physician who had taken a basic education course (“Incident Tactics in Mass Casualties”) facilitated incident command during a fire-evacuation exercise because he understood the terminology used by the fire authority’s officer-in-charge.<sup>22</sup>

In addition to establishing the chain of command to determine when an evacuation must take place (see the discussion Evacuation or Sheltering in Place), all evacuation plans must identify communication systems and backups for evacuation announcements, the sequence in which patients should be evacuated, specific evacuation routes and exits, a system for accounting for patients and staff following an evacuation, processes for relocating building occupants, and sites where patients will be transferred. “Components of a Healthcare Facility Evacuation Plan” outlines specific components that the plan should cover. A number of sample policies are available online, such as those at <http://www.med.umich.edu> and <http://www.nyspi.org/jcho/NYSPI/emergencyprepare/emergencyprepradness.htm>.

Areas of assembly outside the facility, where building occupants can gather following an evacuation, should be designated so that patients and staff can be accounted for; from there, patients can be triaged and transported accordingly. Color-coded disaster tags that identify critical care patients should be readily available for staff members to use. The tags should be kept with the patient not with his or her medical chart.<sup>23</sup>

OSHA requirements also include designating which, if any, employees will continue or shut down critical operations during an evacuation. These employees must be capable of recognizing when to abandon operations and evacuate themselves.

## Evacuation or Sheltering in Place?

Evacuation is the most common response to fire and smoke hazards in a facility. Systematic and orderly departure from the immediate area to a safer place in the facility along designated evacuation routes and exits is usually considered to be the best option, when conditions permit, for the protection of patients and staff. In a non-fire-related situation (e.g., involving airborne or chemical hazards), however, horizontal evacuation, combined with other methods to protect the building, may be the best route. The following questions should be addressed:

1. Is the source of the hazard internal or external?
2. Will total evacuation lead to other risks?<sup>24</sup>

“Figure 2. Skilled Nursing Facility Disaster Evacuation Decision Tree” can be used to determine whether evacuation of a facility is indicated following a disaster event. Although the decision tree was developed for the long-term care environment, the decision-making logic is applicable to hospitals and other healthcare facilities.

Deciding whether to evacuate patients to another location in the facility or to leave the facility entirely is rarely clear-cut. For instance, some patients may not be able to be evacuated because the process would pose too great a health risk; they must be defended in place. Even for the likely larger number of patients who could be evacuated, the decision may depend on factors such as the time available for evacuation and the road and weather conditions in the immediate surrounding area.<sup>25</sup> If conditions permit, it may be helpful to consult an individual with knowledge of the hazard to determine the best course of action.

Even if time, weather, and other factors permit a full building evacuation, evacuating to a safer area in the facility may be more protective to patients, visitors, and staff under certain conditions. For example, after the release of chemical or radioactive materials, patients evacuated from a building to an outdoor area nearby may be at risk of exposure to windborne particles and may have received lower exposure by evacuating to an area inside the facility tightly sealed against the fumes.<sup>26</sup>

Risks associated with the evacuation process need to be assessed in advance and addressed in the disaster plan. For example, planned evacuation routes can become contaminated, posing an exposure risk for those who must use them to exit the area. During planning, the facility should consider alternate routes and protective measures to minimize these risks.<sup>27</sup>

## Components of a Healthcare Facility Evacuation Plan

A facility evacuation plan should include the following components:

- Designation of employees responsible for making the decision to evacuate vertically or horizontally within the building or to exit the building
- Establishment of a sequence in which floors/departments will evacuate their patients, including provisions for evacuating elderly, disabled, or otherwise immobile patients
- Predetermination of assembly sites outside the facility for building occupants to report to immediately following evacuation
- Development of plans for patient triage
- Predetermination of facilities or community buildings to which patients will be relocated for care
- Predetermination of system for emergency response transportation
- Coordination with partnering facilities to track patients' medications and medical records

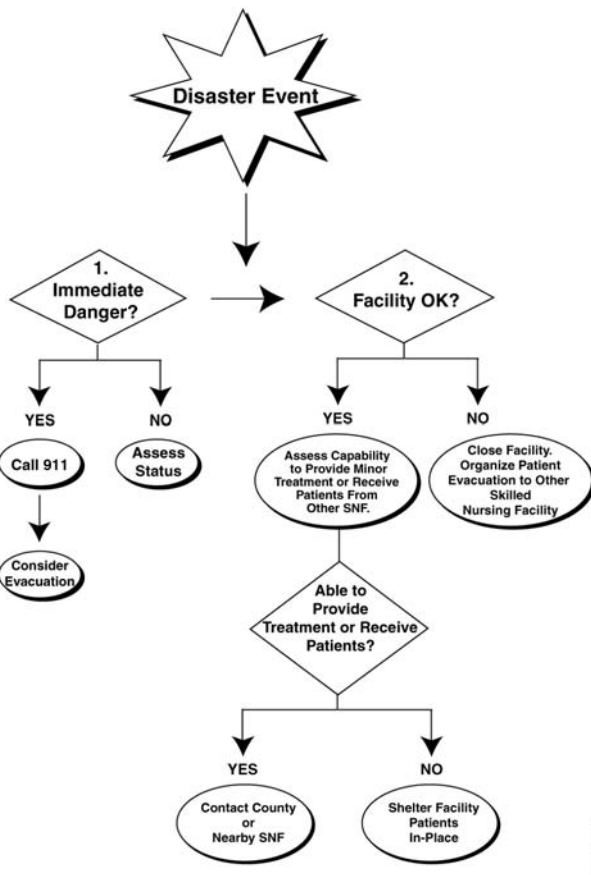
**Source:** University of Michigan Hospitals and Health Centers. Disaster program: facility evacuation [policy online]. [cited 2005 Oct 17]. Available from Internet: <http://www.med.umich.edu>. ◆

Emergency plans should outline procedures for building protection if indications call for sheltering in place. For example, a cloud of hazardous materials may develop after an external disaster. If the facility is downwind of the cloud, the building's air-exchange rate must be managed to minimize contamination. Before the cloud reaches the facility, all windows and doors should be closed. Fans, air conditioners, and combustion heaters should be turned off to reduce the building's air-exchange rate. Once the cloud has passed, the building should be ventilated as thoroughly as possible.

## Patient Transport

Transporting patients during an external evacuation is a challenging yet key issue to address in any evacuation plan, particularly in disaster scenarios, in which there may be damage to the community infrastructure. The goal remains the same—to provide an acceptable standard of care without further depletion of local emergency resources.<sup>28</sup> The facility should consider

**Figure 2. Skilled Nursing Facility Disaster Evacuation Decision Tree**



Source: Adapted from: Santa Clara County: Operational area disaster medical/health plan [online]. 1999 Jun [cited 2005 Dec 6]. Available from Internet: <http://www.emsa.cahwnet.gov/dms2/sccdmhp.pdf>.

the following when developing a plan for patient transport:

- Establish a means of tracking where patients are taken.
- Use basic and advanced life support ambulances and vehicles that can accommodate wheelchairs.
- Staff alternate vehicles, such as passenger vans or buses, with at least one qualified medical attendant (e.g., emergency medical technician, nurse).<sup>29</sup>
- Ensure that all vehicles have a means of communicating with a central dispatcher.
- Provide drivers with maps and directions.<sup>30</sup>

- Establish a time-frame requirement (e.g., within one hour of declared evacuation) for emergency transportation to arrive.
- Establish a staging area for ambulances or other vehicles if a large number of patients are expected to arrive at once.
- Put a plan in place to let family members know where a patient was taken.

The following two techniques are commonly used to lift patients by hand, although these methods carry a risk of patient and healthcare worker injury.<sup>31</sup>

- Blanket drag: the patient is wrapped in a blanket, and the worker squats at the patient’s head, grasps the blanket behind the patient’s head, and “drags” the patient.
- Two-person carry: one worker squats at the patient’s head, reaches under the patient’s arms from behind, and grasps the patient’s forearms across the midsection. A second worker squats between the patient’s knees, facing either toward or away from the patient, and grasps the outside of the patient’s legs at the knees. Then both workers rise to a standing position, keeping their backs straight and lifting with their legs, and walk the patient to safety.

Other manual lift techniques include the one-person carry (the worker’s arms are under the patient’s back and around the knees), the one-person pack-strap carry (the patient’s arms are placed over the worker’s shoulders from behind, and the worker holds the patient’s hands and bends forward until the patient’s feet are clear of the ground), the two-person chair carry (one worker faces the back of a chair holding the patient and grasps the back uprights, while another worker squats facing away from the patient and grasps the two front legs of the chair), and the blanket carry (the blanket is used as an improvised stretcher); the patient may even be dragged by the shoulders or feet, if no other option is available.<sup>32</sup>

Manual lift techniques may injure both workers and patients and are unlikely to be useful when evacuating immobile patients over long distances (e.g., from a high floor of a hospital through stairwells to the ground outside). A number of devices are available to assist workers in carrying a patient down flights of stairs (e.g., when elevators are not operating). These include flexible stretchers that can be rolled or folded, scoop stretchers that can be slid under a patient without rolling or lifting the patient, basket or Stokes stretchers, wheeled stretchers, backboards,



and stretcher chairs, evacuation chairs, and stair chairs able to navigate steps.

To avoid worker injury, it may be advisable to place, in advance, patients who require transport by stretcher near access points for helicopters, buses, or other transportation used for evacuation. After Tropical Storm Allison flooded Houston's Texas Medical Center in 2001, there were deaths among the employees who were trying to carry a stretcher patient down five flights of stairs. The workers suffered heart attacks and other injuries.<sup>33</sup>

A copy of the patient's medical records, or at least a brief summary, should accompany any patient being evacuated. If conditions preclude a copy from being made, it may be necessary to send the original record with the patient to the accepting facility. Military and some other evacuation services may require the attending physician to fill out a special form with information from the medical record. If the patient is evacuated without an accompanying medical record, physicians and other clinical staff at the accepting facility will need to reconstruct the medical record through communications with the patient, the transferring facility, and their own observations and testing.

If the facility is in danger of physical destruction, moving medical records may become a priority. Storing medical records or copies at an off-site location can facilitate this process, although in-use medical records will still require evacuation or reconstruction after the event.

For instance, during Tropical Storm Allison, patients evacuated from Memorial Hermann Hospital in Houston, Texas, were sent to the accepting facility accompanied by their medical records. The evacuating facility could not send a copy because flooding had disabled its copying machines and information systems.

Testing patient transport arrangements can provide valuable lessons. For example, a Pennsylvania hospital that tested a plan in which a nonmunicipal, non-911 emergency medical services company was contracted to provide transportation in the event of a facilitywide evacuation found that its experience working with the company could be expanded into a comprehensive plan. Facilities should coordinate with emergency transportation providers within their community and specify in the evacuation plan the services that are to be engaged. Public and private transportation services should be contacted and contracts negotiated in advance, when possible. Arrangements can also be made

with local police to barricade streets or direct traffic near the healthcare facility.<sup>34</sup> It is crucial for facilities to determine, in advance, how patient transport will be accomplished in a variety of disaster situations that may affect local transportation systems and evacuation routes. In these scenarios, roads may be impassable or vehicles may be destroyed or commandeered by the government for other evacuation uses. Ensure that transportation service providers have their own contingency plans for these situations, including alternate transportation routes. In addition, facilities may wish to require transportation service providers to confirm that they are able to fulfill their contractual obligations during mass evacuations and, in particular, that they are not overcommitted.

Facilities should plan to have several levels of redundant communications (e.g., ham radios, cell phones, satellite phones, GETS [government emergency telephone system] phone cards) available in case landlines stop functioning and should ensure that everyone who needs to use these systems knows how to access them.

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Steps should be taken to make the best use of available vehicles if outside providers, such as ambulance companies and government organizations, are overwhelmed or otherwise unable to provide planned-on vehicles during disaster response. For instance, before a foreseeable disaster affects the facility, it may be useful to have all the facility's available vehicles brought near the incident command center and dispatched from a central location.

Security is another important aspect of planning for evacuation in disaster situations. Security plans should address evacuation scenarios and include procedures to mobilize local law enforcement support for the safe transit of patients, staff, and visitors during external evacuations. In addition, the plan should address the control of access and egress, facilitation of parking and transportation, lockdown of doors, and use and inspection of identification badges. The facility may wish to consider locking down the building early on to avoid being swamped with disaster victims, visitors, and the "worried well." The evacuation plan should also include provisions to handle new patients presenting to the facility for treatment during the evacuation. For instance, such patients could be

triaged, stabilized, and evacuated to a facility unaffected by the disaster.

### Where Will They Go?

All evacuation plans must identify predetermined sites to which patients will be moved for care. This aspect of planning requires an “end of the world” mentality to envision where patients could be transported in disaster situations resulting in massive physical damage to or destruction of structures in the immediate vicinity of the facility. If not already in place, a mutual aid agreement with other area facilities for evacuation planning in disaster situations that strike within the community should be considered.<sup>35</sup>

A mutual aid evacuation plan involves a prearranged agreement among member facilities to accept a number of patients (usually 10% of their licensed bed capacity).<sup>36</sup> It also establishes “stopover points” where triage can be safely carried out if it is not possible at the facility that experienced the emergency. Critical, surgery, and emergency patients, however, should proceed directly to another trauma center. Arrangements should be made in advance to use buildings with large assembly areas, such as churches or schools, as stopover points.

Mutual aid plans can also include provisions for press coverage, designating an area where media can safely congregate. The media is an important outlet that permits facilities to communicate information to the community and family members. Offering the media a pressroom and providing frequent updates will minimize problems and facilitate communications with the community.<sup>37</sup>

Community disaster-relief agencies, such as the local chapter of the American Red Cross, can be sources of valuable assistance in evacuation planning, as well as in providing shelter, food, and clothing in disaster situations. The Red Cross also provides a link to Federal Emergency Management Agency relief services in the event of a disaster affecting the entire community.

### Patients with Special Needs

All evacuation plans must include provisions for moving immobile or otherwise disabled patients, the elderly, and children. Planning for the evacuation of groups with special needs is not much different from the normal planning process, but someone familiar with the groups’ limitations must be involved, and specific problems must be identified so that solutions can be created.<sup>38</sup>

Facilities should enlist volunteers in advance to assist in evacuating such patients and should offer special training and issue photo identification cards to all prospective volunteers.<sup>39</sup> When establishing where to take patients upon evacuation, the facility should include special-needs shelters that have the resources to accommodate disabled patients (e.g., wheelchair access, larger restrooms). If the healthcare facility has a unit that requires patients to wear restraints, workers should practice evacuating patients under restraint. This may involve removing the restraints before moving patients to the designated assembly point.<sup>40</sup>

Signs or closed-captioned videos with evacuation instructions can be prepared for hearing-impaired patients; instruction sheets in Braille can be provided to patients with visual impairments. (See “Evacuating the Elderly or Immobile Patient” for tips on assisting disabled patients during evacuations.) In addition, OSHA requires that evacuation procedures include measures to assist staff members who do not speak English.

### Evacuating the Elderly or Immobile Patient

Staff members and volunteers should be educated regarding how to handle some of the challenges they will face while assisting special-needs patients during a building evacuation. The following tips can help in evacuating disabled or elderly patients:

- Understand that elderly patients respond more slowly and may not initially grasp the magnitude of potential dangers.
- During a rescue, allow the patient to give instruction, if possible, on how he or she can best be assisted.
- Assess the patient’s disability, and adapt rescue techniques accordingly. If a patient has difficulty hearing, rescuers should find out if he or she has an operational hearing aid; if a patient is visually impaired, rescuers should identify themselves and have the patient hold onto a rescuer’s upper arm; and if a patient has dementia, rescuers should turn off the lights, speak slowly in a low-pitched voice, and maintain eye contact.
- If possible, evacuate companion dogs with their disabled owners.

**Source:** State of Missouri. State Emergency Management Agency. Evacuation considerations for the elderly, disabled and special medical care issues [press release online]. [cited 2005 Nov 7]. Available from Internet: <http://www.sema.state.mo.us/elderly1.htm>.

Healthcare facilities must have methods in place for moving immobile patients. The blanket-drag and two-person-carry methods described earlier are traditionally accepted but may result in patient or caregiver injuries and would be difficult to perform over a long distance (e.g., from a high floor of the facility to the ground outside). If some staff members have difficulty performing these maneuvers, facilities may wish to consider investing in devices that can assist staff in moving bedridden patients during evacuations. Some products can be permanently stored under the bed mattress and have casters that allow swiveling and gliding after deployment.<sup>41</sup>

A recent study found that it took 3.75 minutes for a team of three or four firefighters, plus an accompanying nurse and resident or intern, to vertically evacuate a mock patient (a local high-school student) one floor. This average was based on the simulated evacuation of a healthcare facility using Stokes stretchers, which have padded wire baskets with an iron frame, to carry mock patients from the fourth floor to the ground. The entire trip took an average of 14.7 minutes for a single patient. Although teams were asked to rest no longer than 10 minutes between each evacuation, they rested an average of 16.8 minutes (with a range of 9 to 26 minutes).

### **Consider investing in devices that can assist staff in moving bedridden patients during evacuations.**

During the drill, each patient was transferred from a patient bed to a Stokes stretcher and then carried down three flights of stairs. The nurses and doctors performed various tasks during the evacuation, such as ventilating intubated patients with a bag-valve-mask, monitoring vital signs, and ensuring that intravenous lines remained intact. The firefighters preferred the three-person team because it allowed for more agility in stairwells and better access to the patient by medical personnel. However, the weight of the high-school students serving as mock patients probably does not reflect the weight of the typical nonambulatory evacuee from a healthcare facility; actual evacuees would likely require four firefighters to carry and keep the patient, as well as any equipment, stable.

Comments from drill participants generally highlighted the difficulties of providing medical care to a stretcher-bound patient in a confined area. For example, nurses and firefighters were unsure how to

manage intravenous line pumps and chest-drainage bottles on the stretchers, communication between nurses and firefighters was lacking, there was only enough room for one medical staff member to assist the patient, the stairwells were too narrow, and ventilation of intubated patients using a bag-valve-mask was difficult. However, participants also felt that improvements occurred as the drill progressed and that the Stokes stretchers worked well.<sup>42</sup>

### **Staff Responsibilities**

Evacuation plans should clearly define responsibilities for all staff members in the event that the plan needs to be activated. Personnel in all departments are responsible for notifying building occupants of the need to evacuate and should be aware of the evacuation plans for their work area. They should provide assistance and assurance to those who need it, use the stairs rather than the elevators, report to the predetermined assembly location outside the building, and follow the directions of the emergency response team.

In addition to following these basic procedures, staff members in specific departments should be trained in their various responsibilities, as required by JCAHO and OSHA. For example, business-office employees should secure and remove cash and receipts. If safety permits, nurses should lock drug cabinets and radiology personnel should turn off equipment. Switchboard operators should redirect calls and give accurate information to emergency response personnel; receptionists should redirect patients and post signs warning arriving patients and visitors not to enter the building. Surgical staff must determine whether it is safe to continue performing surgery and whether patients need immediate transportation to another facility.<sup>43</sup>

Disaster situations often bring out the best in a community, and volunteer organizations and other individuals may arrive on the scene to provide assistance. In addition to specifying staff responsibilities in evacuating the facility, the emergency management committee should consider including in the evacuation plan a list of activities that community volunteers can be assigned to perform, such as helping move or escort patients to designated safe areas. When feasible, volunteers should be enlisted and trained in advance to assist in the evacuation of disabled patients.

### **Training and Drills**

Thorough training of all staff is the next step after an organization's plan has taken shape. Regular disaster

drills provide an opportunity for healthcare facilities to find the flaws in their disaster plans early enough to correct them. For an evacuation plan to run smoothly, individual staff members must know their responsibilities ahead of time so that they can attempt to anticipate what the situation requires. This is critical in any emergency situation, especially a disaster such as a terrorist attack, in which events are unpredictable and panic can easily erupt. Ongoing training programs and drill exercises are essential in reinforcing the necessary procedures to follow. Working through disaster scenarios in advance during evacuation drills with police and fire departments can help ensure that employees know not only their responsibilities, but also those of emergency services personnel.<sup>44</sup>

Employees should be given specific instructions about what to do, when and where to go, and how to get there. After the above information has been given and any questions have been answered, drills should be conducted. As with fire drills, order—not speed—should be emphasized in evacuation drills.<sup>45</sup> However, evacuation times should be verified.

After a drill, planners should evaluate it. For instance, planners could host a meeting to give everyone involved the opportunity to discuss any problems they encountered. Facilities should appoint drill coordinators in each department to assess how drills are executed and how well staff members demonstrate knowledge of their responsibilities. Staff should be designated to critique drill exercises, and all staff should be asked to provide a self-assessment of their performance in an evacuation drill to identify gaps in knowledge or procedures.

After the initial drills, it is important to conduct drills regularly to ensure that employees remember their training and to verify that the plans will work in an emergency.<sup>46</sup> In fact, JCAHO requires accredited facilities to test the response phase of their emergency management plan twice a year, either in connection with an actual emergency or in planned drills.<sup>47,48</sup>

## Recovery

After the evacuation is over and conditions in the facility have stabilized, the facility should be surveyed for damage, as specified in the evacuation plan, and a determination should be made as to which areas, if any, may safely accept patients. The evacuation plan may specify a time and location for department

management personnel to meet to discuss how to deploy staff and maintain limited operations if the facility will be closed while repairs are made. Healthcare facility staff should be recalled before patients are admitted to ensure that the building is fully operational when patients return.<sup>49</sup> For more information on recovery, see “Emergency Preparedness Management: Overview” in the *Emergency Preparedness and Disasters* section of your *HHC System*.

## CHEM RECOMMENDATIONS

Evacuating a healthcare facility, particularly in the midst of a disaster, may seem like a remote and daunting possibility. Planning in advance allows time to consider the range of situations that may require total or partial evacuation of a healthcare facility and time to test and determine the best methods in each situation. It will also enable healthcare facility staff to identify evacuation alternatives should the community infrastructure be seriously affected in a disaster situation. While it is impossible to anticipate all the specific conditions under which evacuation of a healthcare facility could take place, the emergency management committee must do everything possible within the scope of its job responsibilities to ensure that the facility has a plan in place for safe evacuation of all building occupants. CHEM recommends the following:

- Ask a team or committee consisting of staff representatives from areas throughout the facility to brainstorm and develop an evacuation plan. The plan should cover a number of issues, including the following:
  - Designation of employees responsible for making the decision to evacuate vertically or horizontally within the building or to exit the building
  - Establishment of a sequence in which floors/departments will evacuate their patients, including provisions for evacuating elderly, disabled, or otherwise immobile patients
  - Predetermination of assembly sites outside the facility for building occupants to report to immediately following evacuation
  - Development of plans for patient triage
  - Predetermination of facilities or community buildings to which patients will be relocated for care
  - Predetermination of a system for emergency response transportation

- Coordination with partnering facilities to track patients' medications and medical records
  - Development of procedures for contacting families to tell them where patients are taken
  - Coordinate in advance with community emergency medical services and fire and police departments.
  - Become familiar with JCAHO EC standards and OSHA regulations dealing with evacuation.
  - Use a "worst-case scenario" approach to anticipate and address evacuation needs and to minimize the number of unforeseen circumstances.
  - Establish "alternate care site" agreements with other area hospitals and community buildings such as churches and schools.
  - Enlist and train volunteers in advance to assist in the evacuation of disabled patients.
  - Develop a training and drill program that will ensure that staff members know their specific roles and responsibilities during evacuation.
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