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Hospice Patient Evacuation: A Case for Using a Checklist for Safe Disaster Response

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Abstract

This study was conducted to provide lessons learned from the experience of a small, rural hospice care organization to an actual crisis that required evacuation of the facility. A process improvement framework using the emergency response certification guidelines was used to first provide details of the incident, second analyze the effectiveness of disaster planning and response in response to an actual crisis, and third discuss the postevent review, lessons learned, and process improvement. This case study revealed 5 emerging themes—disaster can happen at the most inopportune times, facilities should focus on the most likely hazards, written agreements are needed even in small tight-knit communities, redundancy of resources is needed, and disaster planning and response is a process that should be continually improved.

Keywords

disaster planning, disaster response, evacuation, checklist, process improvement, hospice, long-term care

Introduction

What do you do in the face of an unanticipated disaster requiring immediate evacuation that strikes without warning—especially on a holiday weekend? Each disaster provides new lessons to minimize the effects. Documentation of how we planned, what happened, how we responded, and what we learned will assist all facilities to safely respond. Effective disaster response is a patient safety issue and a regulatory issue. Accrediting bodies require that health care organizations conduct continuity and disaster response planning, practice, and have specific criteria about evacuation.[1,2] Most long-term care facilities have plans, but do these plans and scenario exercises assist in dealing with a real crisis?

The diversity of long-term care facilities requires plans unique for each type. Previous research has begun to document the needs of disaster response in long-term care facilities in general with several emerging themes.[3-7] Many plans are not specific to the type of disaster experienced. Facility plans need to be closely integrated with the local emergency response system. Evacuation sites may not be available or have needed resources for the specific patient population and transportation is often an issue. Organizations that have experienced a crisis have a better understanding that response is an important operational issue and are more likely to focus on preparedness.[8] Facilities that have experienced catastrophic events report that plans are helpful in preparations and that training helps staff to respond more effectively. However, once a crisis hits, immediate responses are often needed and the plan stays on the shelf.[9] By documenting case studies of the real-life experiences of those organizations that have experienced a disaster, crisis, or incident, we can educate others on what to anticipate and how they might refine or focus their own disaster response plans.

Additional research is needed to explore the wide variations in long-term care organizations and the kinds of disasters that can and will impact these organizations. In this article, we utilize a case method to examine the evacuation of Caldwell Hospice and Palliative Care, Inc (CHPC) in response to a massive explosion at an adjacent chemical plant. We use the framework of the Center for Medicare and Medicaid Services (CMS) standards to first provide details of the incident, second analyze the effectiveness of disaster planning and response in light of an actual crisis, and third discuss the postevent review and lessons learned. This case study revealed 5 emerging themes—disaster can happen at the most inopportune times, facilities should

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focus on the most likely hazards, written agreements are needed even in small tight-knit communities, redundancy of resources is needed, and disaster planning and response is a process that should be continually improved.

Study Method

This community-based participatory case research used a regulatory requirement compliance framework to examine the incident and response, documentation of lessons learned, and details of how the organization could improve. The case research method is effective in detailing the specific characteristics of a phenomenon from a real-world situation to provide a holistic view on processes and outcomes, which promotes discovery and understanding.[10] The study participant selection qualification was a hospice organization that had recently experienced a disaster incident.

Data were gathered using both descriptive and reflective notes directly from the study participants using semistructured interviews and nominal group technique. Participants included the organization's executive director, facility coordinator, inpatient coordinator, quality coordinator, information technology coordinator, and the director of nursing services. The authors also reviewed the written after-action report, information about the organization, information from the literature, and the CMS survey and certification standards.

The Organization

The CHPC is located in the rural community of Lenoir in the foothills of North Carolina. It is a not-for-profit organization certified by Medicare and was licensed in 1982. The CHPC opened North Carolina's first free-standing hospice patient care unit in 1989. Services include residential, acute and respite inpatient care as well as home, support, and counseling services. The CHPC is accredited by the Accrediting Commission for Health Care (ACHC). The organization is housed in a beautiful home bequeathed by a local resident. The CHPC constructed a second location in the southern Caldwell County community of Hudson in 2010. This 15 135 sq ft facility houses a 12-bed patient care unit to provide both acute and residential hospice care, and an 11 845 sq ft professional center to house key direct care clinical and patient care support staff and to provide community education. This facility was the site of the disaster.

The Disaster

At approximately 3:00 PM on Saturday, May 28, 2011, explosions were heard by visitors and staff at the CHPC facility in Hudson. Per protocol, a staff nurse notified the on-call administrator who then notified the executive director who happened to be in the area shopping. Incoming telephone calls from various persons including off-duty staff indicated that RPM Wood Finishers, Inc. in close proximity to CHPC was on fire and numerous explosions were occurring.

Although the major roads leading to the facility were blocked by police, the executive director knew of a back route and arrived at the facility at approximately 3:50 PM. The power was out and the emergency generator had not automatically started. The director assisted staff in conducting a manual start of the generator. Staff and visitors were experiencing burning sensations in their eyes and could smell an offensive odor. It was necessary to shut off the heating, ventilation, and air conditioning intake valves to prevent outside air from entering the building, but staff was unclear as to how to accomplish this task. Due to the fact that it was a weekend, there was no maintenance staff on duty. With the potential of hazardous air infiltrating the facility, the registered nurse on duty contacted the facility coordinator to obtain instruction for shutting off intake air in the facilities.

The primary means of getting information was from incoming telephone calls from outside staff members and emergency radio announcements, including an announcement of a 1-mile radius mandatory evacuation. The CHPC was within the 1-mile radius, but they had not been officially notified by emergency management personnel that evacuation was necessary. Due to the complexities of evacuating patients, the executive director decided to wait. She and CHPC personnel relocated patients and visitors from patient rooms to the inside corridors. Although staff remained calm and reassuring and the patients compliant, all were extremely anxious.

The disaster response plan called for patients to be evacuated to the local county hospital—Caldwell Memorial Hospital (CMH). The hospital was not in the evacuation zone and would be safe. In preparation for a possible evacuation, CHPC staff contacted CMH. The hospital's initial response was that it did not have the capacity and resources to admit the 12 CHPC patients. After a second conference call between administrators of both facilities, it was agreed that the hospital would admit the patients.

At approximately 4:40 PM, radio announcements were made extending the evacuation zone to a 3-mile radius, yet still no external emergency management authorities had contacted CHPC directly. The executive director made the decision that the risk of the situation had escalated and it was time to evacuate. Staff began the task of organizing the patients for transfer from CHPC. Patients at the facility do not wear wrist identification bands and staff realized they needed a mechanism to identify patients by name for transport. Name tags were made of masking tape and affixed to the clothing of patients. Per their standing transport contract, staff contacted Caldwell County Emergency Medical Services (EMS) to request transportation. When EMS arrived, one EMT was designated to manage the transportation of patients. The EMS contacted the ambulance service of 2 adjacent counties to provide assistance as stipulated in their emergency plan agreements. Access to and from the facility remained difficult, as emergency personnel had blocked area roads.

The CHPC on-call staff members not at the facility were notified to meet patients at CMH, and the 2 certified nursing assistants who were currently on duty at the Hudson location

went to CMH to assist with intake. Night shift staff members were alerted to report to CMH to provide care to the patients. Staff triaged patient departures, according to the acuity level. The first patient left the CHPC building at 5:03 PM via a private car. The remaining 11 patients followed in ambulances. Two ambulance transports accommodated 2 patients per transport and the last patient departed at 5:48 PM. Hard copy charts and lists of medications for each patient were sent with the patients. On-duty CHPC dietary staff also went to CMH. Staff notified all family members, the CHPC medical director, and night staff of the transfers. All on-duty patient care units and on-call staff assisted with the hospital admission process and later providing meals to the patients. The CHPC night shift staff stayed with patients throughout the night.

Power was soon restored to the area and the emergency generator was manually shut off by the executive director. It was noted that a yellow jacket's insect nest was in the access door handle making it hazardous to open and close. Staff locked all doors and set the alarm at approximately 6:25 PM and placed a sign on the front door noting evacuation to CMH. The executive director then notified the Hudson Police Department that evacuation at CHPC was complete. The electrical contractor was contacted regarding the shut off valves and malfunctioning emergency generator. The electrical company personnel went to the facility that evening after the area evacuation was suspended and checked the shut off valves and tested the generator at around 9:00 PM. Although the generator started correctly during the test, it was further inspected by the manufacturer in subsequent days and was found to have a leak in the radiator. Once the water level got slightly low, it would not start. This was repaired.

The executive director contacted EMS on Sunday morning to schedule transportation of patients back to the Hudson facility. They agreed that transport would begin at noon. Staff spent several hours that morning cleaning and preparing rooms for the patients' return so it would smell clean and they would feel the facility was not contaminated with the chemical smoke. The first patient arrived via private car at 12:05 PM. The EMS transported the remaining 11 patients, with the last arriving at approximately 5:00 PM. The crisis and response lasted 26 hours and cost CHPC approximately $10 000, a significant sum for the organization. The CHPC was repaid this expense by the chemical plant.

The Response

The CHPC's emergency preparedness plan complied with the standards of CMS, which are indicated by the categories listed below. The standards are used to analyze the organizations response and make prescriptive suggestions for improvement.

The Plan—Develop, Test, Review, and Revise

Although disasters cannot always be anticipated or avoided, risk to patient safety can be mitigated with thoughtful planning and continual process improvement. The act of planning improves readiness.[11,12] The CHPC had a written, tested, and updated emergency response plan in compliance with its accrediting body ACHC that incorporated CMS standards. The CHPC conducted an annual test of the plan. The plan had been revised as key elements changed and those dates were documented in the plan. New employees were oriented to the plan as part of their initial training. The plan utilized the recommended all-hazards approach, although it did reference a list of possible emergencies including fire, earthquakes, floods, and tornados. The potential hazards were not prioritized, though there was some disaster-specific information for fire and earthquakes.

Certain hazards such as hurricanes and ice storms allow time for preparation, and a plan can include lists of resources to be stockpiled and needed equipments such as phones and generators.[13] Other hazards such as tornados can unexpectedly and quickly impact the organization. In debate is whether an all-hazards planning approach (as recommended by Federal Emergency Management Agency [FEMA]) is preferable to scenario planning. In smaller organizations, it is difficult to commit resources to complex planning that identifies and prioritizes multiple threats and the vulnerability of each resource. Identifying the key vulnerabilities of the organization for more frequently occurring disasters in the organization's locale will help to prioritize needed response actions while not in the heat of the crisis.[14]

In general, fire and explosions less frequently interrupt operations than power outages, computer system failures, lightening storms, and floods[11]; but if your facility is located adjacent to a chemical plant, an explosion may be most likely. The CHPC had a written all-hazards disaster plan, but, as is often true, the plan itself did not include information of a specific nature to provide guidance during a specific incident. In this incident, key administrators that had constructed the plan and were the most knowledgeable and authoritative were available to manage the incident even though it was a holiday weekend. The improved response plan needed to be specific, yet simple enough that any administrator on call or staff at the facility could implement it properly.

As part of the after-action process improvement effort, the management team agreed to focus specifically on the evacuation response planning. They discussed the type of hazards that would most likely result in the need to evacuate. Due to the geographic location of the facility, the team assigned the highest hazard probability requiring evacuation to storms including tornados, ice storms, and even remnants of hurricanes. A major fire in the facility was the second ranking hazard; and due to the proximity to the chemical plant, explosion was third. Although the participants recognized other hazards such as power outages and disruptions were more likely to occur, these hazards would not result in the need to evacuate patients. With these more likely hazards in mind, the team constructed an evacuation checklist detailed later in this article.

Improvement.

1. Identifying most common hazards likely to occur for this specific facility;

2. developing a checklist that could be initiated and followed by any staff at the facility in relation to the explosion hazard or a hazard requiring evacuation; and
3. posted the checklist in the office.

Immediate Response

The staff was quick to respond to the crisis. The first response per the plan and training was to notify the administrator on call who then notified the executive director. But disaster can strike at any time, and operating staff need to be prepared and trained to lead in an emergency without administrative support. Staff knew to shut off the intake air valve to minimize intrusion of contaminants but could not determine how to accomplish a shut off. No maintenance staff was on duty because it was a weekend, however, there was an on-call maintenance staff who instructed the nurse on the procedure. The emergency generator malfunctioned and a yellow jacket's nest delayed access to the manual panel though it had been tested and inspected monthly.

As is often the case in a crisis, staff medical personnel react with their training, skills, and compassion for their patients. Referencing a planning document on the shelf is not an initial or intuitive reaction. Per compliance requirements, CHPC did have an emergency disaster kit that contained the full list of patient names and numbers, portable radio, flashlight, batteries, cellular phone, paper, and pens, but the staff did not utilize it.

Improvement.

1. Post operating manuals for key equipment in a central, known location;
2. refresh training on use of disaster kit, annually; and
3. have duct tape on hand to seal windows and doors from chemical contaminants when sheltering in place is the better response option.

The Evacuation Decision

The CMS standards require that the organization identifies who is responsible for determining whether the facility should be evacuated. The standard recommends that the frail and elderly patients should not be evacuated unless sheltering in place is deemed a greater risk. Coastal communities have made significant strides in integrating long-term care facilities with community emergency preparedness plans in response to recent hurricanes and document the risks and rewards of sheltering in place versus evacuation.[3,4,5] Hyer[3] describes nursing home patients evacuated from predicted hurricane landfall sites only to be transported to a new site that did experience a direct hit. The need for evacuation is dependent on the type of hazard and how much advanced warning is given. In the Joplin, Missouri tornado, St Joseph's Medical Center had 30 minutes warning that a tornado was in the area. They suffered a direct hit that destroyed the facility and had to evacuate immediately afterward.[15] Long-term care facilities had days to prepare for Hurricane Sandy but decided to shelter in place, after evacuation the prior year from Hurricane Irene resulted in disruption and expense.[16]

A challenge for inpatient hospice facilities is that they are smaller, value privacy, and strive to create a home-like setting. Many of their patients are home dwelling so emergency response authorities do not think of need to evacuate the facility. It is important that these facilities emphasize their needs with local authorities and participate in community-wide planning but not depend on notification for evacuation by authorities.

In the case of CHPC, the executive director was available immediately by phone, able to reach the facility within the hour, and made the evacuation decision. The source of information of the status of the crisis was the local radio station that relayed the information about the 1-mile evacuation zone. In the face of the media broadcasting that the evacuation zone was expanded to a 3-mile radius, the executive director made the decision that patient safety was at risk and they needed to evacuate. This highlights that disasters are evolving situations; and while a plan may include general criteria as a guide, the decision is ultimately going to be a judgment call. The facility decision maker must ultimately make the decisions for this population as to whether staying or leaving is the safest choice even when authorities recommend evacuation of the area.

The CHPC disaster plan described a means of triaging patients for evacuation, and the staff set about the task of preparing patients for transfer.

Evacuation Level.

Low: Ambulates without assistance and has available transportation to safety. Patient should immediately evacuate to safe area.

Medium: Ambulatory with assistance or assistive devices and access to willing and able caregiver to transport to safety. Can have a caregiver to assist to safety or call 911, if caregiver is unavailable.

High: Not ambulatory and have no caregiver to transport them to safety; must call 911 for evacuation to safety.

While criteria for sheltering in place versus evacuating should be developed and all staff could be trained in the protocol, the reality is that this decision is dependent on the known variables that exist at the time of the decision.

Improvement.

1. Educate local authorities about the patient population and emphasize their needs;
2. participate in community-wide planning; and
3. develop evacuation decision criteria and authority as part of plan.

Determine Evacuation Site

The CMS standards recommend that facilities have written contracts or agreements with multiple sites that are able to

provide "like" services including space, support, security, and sanitation for the type of patients to be served. One of the backup facilities should be at least 50 miles away. The CHPC had relied on verbal agreements for support services as was a common practice in this small community where most people knew each other. Best practices recommend prior written agreements with external collaborators including when and how they will be contacted. In addition, all evacuation information should be placed in a designated location in the facility in the event administrators are not available.

In the CHPC incident, the facility targeted to receive the evacuees initially responded that it was unable to accept the surge of 12 additional patients. In rural settings as few as 10 patients can exceed surge capacity.[17] The incident happened on a holiday weekend, and the issue was not only the availability of beds but also the availability of staff necessary to care for the patients. The 2 organizations had a good working relationship and when the executive director contacted the administrator on call with a plan as to how CHPC staff could augment the staffing at the hospital to safely care for the patients, the hospital agreed to accept the transfers.

The transfer site was not impacted by the disaster but that may not always be the case if the disaster site had encompassed a greater area. While a facility located in the general area of the facility requiring evacuation is a more desirable location for logistical reasons and for family members and referring medical staff, best practice requires a backup site at least 50 miles away and preferentially multiple options.

Improvements.

1. Transfer agreements should be made in writing; and
2. a second transfer site at least 50 miles away should be arranged.

Transportation

Transportation has been an issue for facilities during massive disasters such as coastal hurricanes.[3,6] The bus crash that killed 23 nursing home evacuees in advance of Hurricane Rita served as a cautionary tale in which the transportation used in the evacuation became the disaster.[18] The CMS standards advise that transportation resources be scrutinized to ensure that the vendor can provide services needed by the specific patient population and that they do not overbook their services with multiple facilities.

A written transport agreement was in effect between CHPC and the county EMS. As CHPC was the only facility requiring evacuation, there was not a problem with the availability of EMS ambulances however, the EMS had to obtain additional help from 2 other counties to evacuate 12 patients expeditiously. Had the disaster been a mass casualty incident, the EMS most probably would have been diverted to provide emergency response services. In this incident, the EMS was able to provide the medical services needed for the patient population and was attentive and caring in the process.

Improvement.

1. A second source of transportation should be identified and a written agreement obtained.

Determine Evacuation Route

The CMS standards require identification of an evacuation route and that the route be described and mapped as part of the plan. The incident at CHPC demonstrates how the disaster can dictate the need to improvise the plan. The most direct route was blocked off by civil authorities as part of the evacuation, and it was difficult for both staff and transportation to reach the site indicating the need to map multiple routes.

Improvement.

1. Map multiple evacuation routes and place the maps in the disaster plan.

Provisions

In compliance with the CMS standards, CHPC documented in their plan that each patient's medical record would include information on individual needs in the event of evacuation including medicines, durable medical equipment, supplies, and transport needs. This plan is discussed with each patient and a family member at the time of admission. This helped staff prepare each patient for transport. The standards also require that a registered nurse accompany patients who are transported with medications. A list of medications was sent with each patient.

The standard also recommends that adequate food and water should be included. In the CPHC incident, this was not an issue due to the short duration of the transport and because they were transported by medical personnel and were going to a medical facility. However, it is important to note that if an alternate form of patient transport is needed in the future by CHPC, then that resource has to be included in the plan. Depending upon the location of the evacuation site (such as a shelter), it is important to also include in transport personal needs and assistive devices and equipment such as wheelchairs, walkers, and incontinence supplies.

Improvement.

1. Develop a list and stock supplies needed by patients during emergency evacuation.

Medical Records

The lack of availability of medical information about evacuated patients was a key lesson learned from Hurricane Katrina. People were relocated to distant cities such as Houston and Dallas and medical personnel caring for them in the evacuation sites had no information to guide in the care. The standards require that facilities develop procedures for protecting and transporting patient medical records. The CHPC patient medical information was sent with them to the evacuation site via

the ambulance. In a more emergent or chaotic evacuation, such as St John's Medical Center in Joplin, Missouri, which was hit by a F5 tornado, this manual transmission of medical information may not be possible or withstand the chaos of the evacuation. In the Joplin incident, patient information was accessed through off-site storage of the electronic medical record.[15] In preparation for a possible evacuation, hard copy medical information should be placed in a water-resistant pouch with a strap that can be placed around the neck of the patient being transferred but a redundant off-site electronic storage should also be arranged.

Improvement.

1. Develop a redundant electronic version of the health record that is stored securely off-site but accessible from remote sources.

Communication and Notification

Consistent with the CMS standards, the CHPC plan was executed and patients notified by staff that the facility would be evacuated. Staff notified patients' emergency contacts of the evacuation by telephone and also notified the patient's primary caregivers. The key contact list was a written document housed in the emergency kit. This list was updated on a regular basis as information changed.

Best practices dictate that the key contact list should also be stored in an alternate off-site location or method in the event that the information is inaccessible onsite. For example, the place where the list is located in the facility could also be the site of a fire or an area of the building destroyed by a storm. In the case of a fire at the administrative offices of the Texas Visiting Nurses Association, a list of key contacts were stored in a rolodex which was destroyed by the fire.[19] Additionally, the administrators who assume administrative call should keep a copy with them at all times.

The CHPC facility was secured and the Hudson Police Department notified of evacuation. A sign was written and attached to the front door of the facility describing where the patients had relocated.

Improvement.

1. The key contact list should be located in multiple places in hard copy in the facility and also stored electronically and available by remote access such as a secure computer file.

Care During Evacuation

The CMS standards require that the plan contains information on how the evacuated patients will be cared for during the evacuation and at the evacuation site. Individual patient transport needs were identified and documented in the medical record. The EMS was available and capable of providing care during transport. The CHPC staff assisted with expediting the hospital admission process at the evacuation site. The hospital receiving the patients agreed that CHPC staff could assist with care including dietary. Off-duty CHPC staff members had been called to go to the evacuation site to provide assistance with receiving the evacuated patients. The CHPC staff members scheduled to work in the night shift were notified to report to the hospital.

An issue that had not been anticipated was patient identification. The CHPC patients did not routinely wear patient identification bracelets in an effort to deinstitutionalize the environment. While the existing staff members knew the patients, the EMS personnel did not. To facilitate organization and tracking of the patients, their names were written on tape and adhered to the front of their clothing.

Patient identification during a disaster can be challenging in different ways. Previous disasters requiring evacuation of long-term care patients documented special needs in this population. For an evacuation requiring prolonged displacement in a non-medical setting such as a shelter, the CMS standards recommend that each patient has either a laminated card or a water-proof pouch that can be worn around the neck, which had the details including name, social security number, photograph, payer information, date of birth, diagnosis, medication list, dietary needs, and contact information regarding next of kin.

Improvements.

1. Include as part of the emergency kit, prenumbered wrist bands. Patient names could be written on the bands and numbers and names recorded in a log. The band could also be color coded to match the 3 triage levels. The triage levels should be color coded as high—red, medium—yellow, and green—low;
2. include in the emergency kit water-proof pouches to hold patient information.

Checking

Standards require that there is a method to account for all individuals during and after the evacuation. During the CHPC incident, the staff corralled patients and visitors into the common areas of the facility to facilitate communication. While staff conducted informal searches of the premises to account for all patients, the process was not systematic and there was not a mechanism to ensure each room had been checked.

Improvement.

1. Conduct a check of every room and mark the room as evacuated by placing a pillow in front of the door in the hallway.

Patient Reassurance

All crisis situations are best served when staff and patients remain calm. The infirmed and elderly patients in particular benefit from reassurance. The staff at CHPC remained calm and reassured patients, and the EMS personnel responsible for transporting patients also made a particular effort to be reassuring. Having CHPC staff stay at the hospital with the evacuees

not only assisted the hospital staffing during the holiday weekend but also provided a face familiar to the patients. Another tactic used by CHPC staff was to thoroughly clean the facility the following morning prior to the patients being transported back to the facility. There was no evidence of lingering harmful chemicals in the facility but the fresh, clean smell provided psychological reassurance. If the evacuation had been more disruptive or prolonged, the CHPC social workers should be provided additional counseling.

Improvement.

1. No improvements identified.

Reentry

In compliance with the standards, the CHPC plan authorized the executive director or their designee to inspect the facility and authorize reentry. Later in the evening of the crisis, the local emergency management announced that the hazard from the explosion and fire had been contained and the evacuation order rescinded. The executive director decided to not disrupt the patients again that day and to wait until the next day to transport the patients back to the facility. The EMS was contacted and scheduled transportation for each patient back to the facility and the process reversed.

Improvement.

1. No improvements identified.

Follow-Up

Best practices and accreditation and licensing standards require after-action analysis and documentation after key disaster events. The CHPC managers conducted such an assessment and documented what went well, what did not, and discussed how to improve processes in the future. Several observations included the following:

1. include shut off air intake instructions in the maintenance log and inspect for access monthly;
2. test the generator weekly; and
3. request Hudson police and fire departments to conduct on-site notification of evacuation in future emergencies.

The CHPC management also decided to use a process improvement approach to focus specifically on planning for evacuation. The team decided to develop a checklist to clarify the key steps and a systematic progression. The team used a nominal group technique to independently record on a form their checklist items. A facilitator compiled all of the submissions and then the team met to consolidate items, prioritize those that should be included, and list the items in the order they should be completed. The following was the list identified:

1. identify the person in charge on site;
2. determine the level of urgency and immediate dangers;
3. call 911;
4. notify administrator on-call;
5. notify facility coordinator;
6. shut off air/heat, air handlers, oxygen, electricity, gas as dictated by the situation;
7. determine whether evacuation is necessary and delegate responsibilities;
8. get emergency kit;
9. alert and reassure patients;
10. prioritize patients by acuity and what type of transport they need;
11. notify each patient's primary caregiver;
12. determine the mode of transportation for patients and contact them;
13. prepare patients with chart, medication administration record, and supplies;
14. identify each patient by last name, first initial, and room number using tape or wrist band;
15. assess the need to direct visitors out of building and prevent visitors from coming in;
16. evacuate patients and staff if necessary;
17. conduct a check of every room and mark the room as evacuated by placing a pillow in front of the door in the hallway;
18. assign staff to meet patients at new site;
19. secure building (medical records, lock doors and windows, and set security alarm);
20. notify oncoming staff—where they will be caring for patients; and
21. notify emergency personnel that the building has been evacuated and place a note on the front door.

The recommendation was for the checklist to be printed, laminated, located in multiple sites in each facility, and distributed to administrators on call.

Discussion

Disaster planning research is expanding to detail the specific needs of specific populations. Formation of a plan in compliance with the standards of an accrediting body as an external benchmark is a good first step. But effective disaster response requires more than just planning; and while practice drills provide some insight, process vulnerabilities can be exposed from response to an actual incident. Case examples from the field document what was not anticipated, what worked, and what could be improved.

The FEMA recommends an all-hazards approach to planning; but as more experiences and information are documented from the field, plans can be improved by detailing response to more likely hazards. A hazards and vulnerabilities analysis should be conducted to tailor response to specific likely events. From a specific risk perspective, the first question about CHPC is why would a health care facility locate in close proximity to a chemical plant? The simple answer is that the location offered the setting and infrastructure desired for the project. The area is

heavily wooded, with rolling hills providing an idyllic setting for patients and the benefits were thought to outweigh the risks.

The CHPC learned multiple lessons from the incident, which in turn provides evidence on how to improve disaster response. Their plan was in compliance with the general guidelines of CMS and licensing and accrediting bodies. In part, their experience mirrors that of many other organizations that have experienced disasters—it is impossible to anticipate all of the variables likely to be experienced during the chaos of a disaster, but the act of preparation seems to help with effective and safe response.

A challenge in responding to disasters is that they can happen when administrative staff is not available. This reinforces the need for training by all staff including assumption of leadership roles. Each staff member must know the contents and location of the disaster kit. Plans should also include written agreements with each vendor, not just verbal agreements. Detailed agreement activation criteria and explicit roles and responsibilities will assist both parties. Requiring written agreements as criteria for licensing will provide a basis for explanation that the request is not a matter of distrust, just a required practice particularly in communities used to informal agreements.

Long-term care facilities have made great strides in clarifying key planning elements and drafting plans. Continued improvement requires taking the basic plan to the next level. In past evacuations, frail and vulnerable patients have been at risk by not being properly identified, not having actionable medical record information about diagnosis and medication, being placed in locations without familiar caregivers, and without information about next of kin. Another needed improvement is planned redundancy of resources including evacuation sites, modes of transportation, and off-site and electronic access to information including key contact list, medication and medical information, dietary needs, and contact information regarding next of kin. This information should also be contained in a manner that it can be transported with the patient in a secure and private way such as a waterproof pouch with a strap that fits around the patient's neck.

Both disaster preparation and response require a series of steps to be executed. These steps are best considered in advance as opposed to that in the midst of a crisis. Checklists can be used to ensure that all steps are taken. In emergency preparedness, a checklist can be used to make sure that supplies and resources are in place before an impending disaster such as a hurricane or ice storm where several days' preparation are often available. The HFMA Hurricane Relief Task Force developed a 24-point checklist to assist in disaster preparation where there is advance warning.[20]

In quickly developing disasters, a brief checklist could ensure that key steps in the plan are taken in a deliberate and timely manner. The airline industry has modeled the use of checklists during emergency incidents. The airline industry utilizes notifications from the Federal Aviation Administration of the previous incidents to assist airlines in anticipating most likely incidents based on a hazards and vulnerabilities assessment. A short and specific type of checklist is constructed for specific incidents. In the health care sector, Gawande's field research[21] clarifies that for a checklist to not be intrusive and actually used, it must be simple, measurable, transmissible, cheap, effective, clear, brief, precise, practical, and clarify priorities. It should not be impractical, vague, too long, or hard to use. It should have no more than about 20 items. These were the guidelines used by the CHPC team. While study findings are mixed about the ability of checklists to change outcomes in safety, the studies did find that the use of checklists helped with adherence to protocol.[22-25] The development and posting of a checklist to be activated in the face of disaster ensure that the cool thinking predisaster can more readily be applied in the heat of the crisis.

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