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HARVARD | SCHOOL OF PUBLIC HEALTH
Emergency Preparedness and Response Exercise Program

MDPH HOSPITAL EVACUATION TOOLKIT

III. EMERGENCY SHELTER-IN-PLACE GUIDANCE

Table of Contents

INTRODUCTION 49
EMERGENCY SHELTER-IN-PLACE GUIDANCE 50
REFERENCES 55

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INTRODUCTION

Purpose of the Shelter-In-Place Guidance

The creation of detailed Shelter-in-place plans is an essential component of overall emergency operations planning for hospitals and other healthcare facilities in order to be prepared for both incidents where advanced warning is possible, and for no-notice events. For a no-notice event where the external environment threatens to pose a significant danger to patients, staff, and visitors (for example, a chemical, biological, or nuclear event near the hospital), sheltering in place can offer a safer alternative to traveling through hazardous conditions. Additionally, for an event that occurs with advanced warning, such as an impending hurricane, sheltering in place may be appropriate as a choice to care for some or all patients within the hospital and minimize the need to evacuate, if the risks and benefits are adequately considered. In making the decision whether to shelter-in-place, hospitals should consider the degree of known or anticipated community infrastructure damage and/or limited support that may be available from external partners due to competing emergency operations. In addition, when considering whether to shelter-in-place, hospitals should consider that difficulty accessing the hospital may make immediate evacuation impossible (i.e. during a major earthquake, wildfire, or flood).

This hospital Shelter-in-place guidance is meant to prompt the development and documentation of specific criteria regarding the sheltering decisions, identify critical factors in the decision-making process, and assist with the drafting of concrete plans to permit safer sheltering through pre-assessment of the structural and material needs for sheltering. This guidance is meant to be integrated into the institution's Emergency Operations Plan (EOP). Shelter-in-place planning should not replace, duplicate, or conflict with the structures, roles, or guidance offered by the EOP. Not all portions of this guidance will necessarily be appropriate for all hospitals. Hospitals are encouraged to review this document and adapt and incorporate those sections and tools they deem useful and appropriate to their needs.

EMERGENCY SHELTER-IN-PLACE GUIDANCE

Activation of the Hospital EOP

Upon learning of an event that may warrant sheltering in place, hospitals should strongly consider activation of their Emergency Operations Plan (EOP). The leadership and communications structures that are provided for within a hospital's EOP should be used to facilitate smoother communications with partner agencies and support better situational awareness within the hospital. In addition, should the decision to shelter-in-place quickly change to an evacuation decision, the mechanisms to do so will already be in place.

Deciding Whether to Shelter-in-place

Most decisions to shelter-in-place occur in practice in response to an anticipated threat, such as a hurricane or regional flooding. While shelter-in-place decisions are made somewhat commonly, the actual decisions to shelter-in-place are often merely the de facto consequence of decisions not to evacuate, rather than the result of considered deliberation or specific planning. Optimal planning for sheltering in place should include a detailed assessment of the specific facility vulnerabilities, checklists for preparation of the facility, and operational considerations needed to support sheltering. For example, any areas of the facility at higher risk for wind damage, flooding, or other threats should be identified, and patients should be moved out of those areas during sheltering operations. Mechanisms to limit or manage the air handling requirements should be planned for, both to limit demand and to protect the facility from ambient air quality issues if they occur. The support services and mechanical supports available in the areas of the hospital used for sheltering, such as food, water, toiletry, and others should be hardened if possible and additional supplies should be stored in close physical proximity. In addition to the facility considerations, sheltering in place may involve altering clinical operations as well to limit the demand on the system. Active steps that should be considered include proactively managing (downward) the hospital inpatient census, cancelling elective procedures and admissions, and discharging or transferring especially vulnerable patients. Decreasing pre-event census not only reduces the burden on the facility's infrastructure but makes an evacuation, should one become necessary, less burdensome. Categories of patients who may be especially vulnerable if sheltering options fail may include, depending on the facility and threat, bariatric patients, ventilator-dependent patients, neonatal patients, among others. Prophylactically transferring such patients ahead of the impending threat may both prevent subsequent harm to them in an evacuation, and also decrease staff and facility demands on staff during sheltering operations.

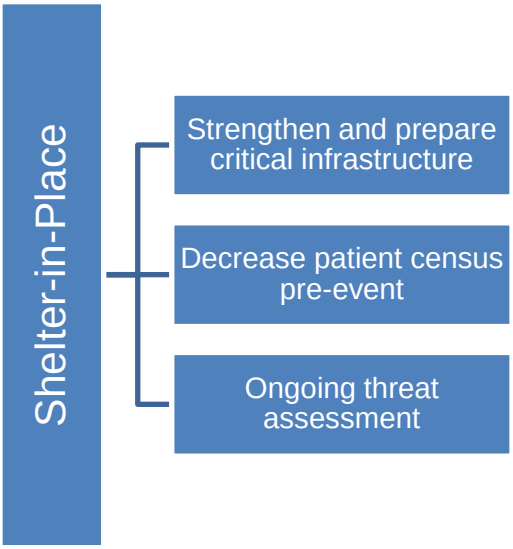
A decision to shelter-in-place is not necessarily irrevocable or permanent. Hospital decision teams should constantly reassess the threat that the event poses to patient and staff safety as the event evolves. Recent hospital evacuations following from an advanced warning event (e.g. hurricanes) show that the decision of whether to shelter-in-place or evacuate can change very quickly as the event occurs. For example, with hurricanes, the predicted and actual dynamics of the storm including direction, wind speed

Examples of shelter-in-place and evacuation decisions taken during Superstorm Sandy[1]:

- *NYU Langone Medical Center: Discharged approximately 250 patients, canceled elective procedures pre-event and decided to shelter-in-place. The remaining 300+ patients were eventually evacuated during the event as a result of failure of multiple utilities.*
- *Coney Island Hospital: Discharged 150 patients, canceled elective procedures, and transferred 33 electrically-dependent patients out prior to the event. When the power failed the remaining patients were safely cared for until a post-event evacuation could be arranged.*

(category), storm surge, rainfall etc. commonly change within 24-48 hours pre-landfall posing a significant challenge to hospital decision maker(s). Local emergency management and other experts are often the best sources of information on event characteristics, and therefore it is essential that hospitals maintain constant communication with partner agencies (state or local health authority, emergency management and other partner agency) in order to have access to the most accurate and up-to-date information to support their decision-making.

The diagram below depicts key elements of sheltering in place:



During Superstorm Sandy, only those hospitals that had lowered their census as part of shelter-in-place preparations were able to support evacuating hospitals and thereby the community at large[2].

Further details describing the decision making process for hospital shelter-in-place can be found in Section VIII: Hospital Shelter-in-place Checklist, on page 109.

Staffing

For a no-notice event, onsite staffing numbers and adequacy should be quickly assessed. If it seems that sheltering in place may develop into an extended operation, staff may need to be redeployed to support continuity of care. Off-duty staff should be notified of the incident with instructions on when/whether they should report for duty to avoid confusion, and keep staff off of the roads who are not needed or requested. If there is a significant hazard outside the hospital, staff should be directed to stay away so they are not exposed to the hazard.

For an event with notice, essential functions should be identified, and those functions should be staffed to up to 150% of projected need over the duration of the sheltering operation. Non-essential functions should be discontinued to limit the need to feed and shelter staff who are not involved in essential operations. Staff who are sheltering on site are considered the Stay Team. While staffing plans for the Stay Team are being developed, a staffing plan should also be developed for the resumption of normal activities so that the Stay Team can be relieved as quickly and efficiently as possible.

A Labor Pool is a critical part of the Stay Team for their ability to meet a variety of needs as the incident evolves. The Labor Pool may be formed from staff whose departmental functions are suspended due to sheltering operations.

All staff staying onsite must be provided with the option of accommodations and available food. Staff should be instructed to arrive for duty with sufficient clothing, toiletries, and personal medications. Staff should work in a rotation and with responsibilities as close to daily operations as possible.

Staff tracking and accountability is critical during sheltering operations. Hospital leadership must be able to account for all staff on the premises and primary work locations. This is essential both for safety and financial purposes.

Human Resources should pre-prepare plans for compensation of Stay Team staff if standard policies do not provide appropriate guidance and coverage.

Supplies

For a no-notice event, the institution will have to subsist with the supplies that are on hand. As most hospitals have moved to just-in-time inventory systems, this can present a significant challenge for sheltering. Therefore, it is essential that hospitals consider their inventories of supplies when planning for sheltering operations, and also when deciding whether to shelter-in-place. As soon as the decision to shelter is made, the hospital must institute appropriate conservation strategies to limit the burn rates for supplies. As one example, assigning staff to hand out linens instead of allowing carts to be opened can prevent excess and/or avoidable consumption.

> *During Superstorm Sandy, food, water, and supplies were lost because they were not stored higher than the flood waters. Lack of food and water made challenging sheltering and evacuation operations even more challenging[1].*

For a planned sheltering event, the hospital should increase par levels of all critical supplies such as food, linen, and clinical supplies. These items should be stored in places where they can be secured and where potential damage from the event would be limited. In some cases, this might mean storing items in non-traditional spaces. Provisions for medications must be included in material and supply planning. If there is a threat of loss of power or other systems that would impact the ability to access pharmaceuticals, measures to provide appropriate and monitored access must be taken. Efforts should be made to ensure that the supplies are secured as appropriate and carefully monitored.

Patient Care

When sheltering, it may be desirable to limit clinical operations and interventions to only the essential functions and actions. This may limit use of scarce supplies, as well as avoid unnecessary risks (such as travelling by elevator when the power may go out). In a dynamic and evolving situation, the hospital should not conduct procedures that would make a patient more vulnerable, if they can be safely delayed.

For an incident with advance notice, non-critical and all valuable patient belongings should be sent home with family members. Visitors and family members should also be kept to a minimum to avoid undue demands on the facilities and supplies, recognizing that some patient companions may be essential to assist with mobility, translation, simple provision of care, and/or emotional support during sheltering.

When considering sheltering, hospitals should conduct contingency planning that will help support effective patient care if utility or other services fail during sheltering operations. An example of effective contingency planning would be printing portions of the medical record and essential radiology images so that patient care can continue with minimal disruption if the IT and/or power systems fail. Printed medical records should be re-printed or updated at regular intervals if sheltering continues for an extended period.

Evacuation Contingency Plan

If a hospital is forced to consider Sheltering in place, it must consider that evacuation is also a possibility if sheltering operations fail. In anticipation of sheltering, and also while sheltering, hospitals

should encourage key managers and leaders to review the hospital's evacuation plan, specifically focusing on their departmental roles and responsibilities. Depending on the circumstances, hospitals may even wish to consider activating portions of their evacuation plan, such as creating a detailed inpatient census organized by medical, functional and/or durable medical equipment needs, identifying potential receiving facilities, or other actions.

Patients should be reviewed for their clinical acuity and mobility levels. Because the priorities and resources available for evacuation can change as an incident evolves, knowing the acuity and mobility levels of patients will help quickly identify who should be moved first. Remember that, if rapid discharge has taken place, the remaining patients may be at a higher overall acuity level than the baseline hospital population.

Any evacuation equipment should be inspected and just-in-time training should be conducted as necessary whenever evacuation is considered, even during sheltering operations.

Patients who are ambulatory day-to-day may not be ambulatory in an emergency. During Sandy, patients who were otherwise considered ambulatory preferred to be moved on evacuation equipment because they were fearful of walking down the stairs in the dark[1].

Facility Preparation

Facilities preparing to shelter-in-place must perform an in-depth assessment of the specific strengths and vulnerabilities of their facilities to identify areas where patients and staff may be safer or at higher risk of injury. Vulnerability to high winds and risks from surrounding flying debris (which may come from nearby neighborhoods or businesses) must be assessed, as should flood risks. The likelihood of loss of power, lighting, medical gasses or air handling should be assessed on a building-by-building and floor-by-floor basis to guide decisions about whether to shelter, and also where to shelter-in-place.

Facilities should also identify safer zones or hardened areas of the facility to which staff and patients may retreat when facing threats such as tornadoes or hurricanes. Access to and egress from these safer/hardened areas should receive special attention in facility planning efforts.

Facilities must also have both clear mechanisms as well as clear chains of command to be able to rapidly shut off air handling and outside air intake systems when the ambient air may be hazardous, such as in a chemical release.

Communication

During sheltering operations, hospitals should communicate regularly with staff, patients, and visitors regarding the threat situation and the measures that they should take to protect themselves. Frequent and open communications have the potential to diffuse conflicts as tensions can run high when patients and staff shelter for a prolonged period. The rapid ability to print signage that was placed on all external doors explaining a Governor's order to shelter-in-place was cited as a very important part of one Boston hospital's communications response to a citywide shutdown following the Boston Marathon bombing of 2013. Town halls held within the facility for the Stay Team can be especially beneficial in bringing the team together and allowing people to ask questions of senior leadership.

Security

Sheltering in place will likely require additional security measures around the facility and also require restrictions on ingress and egress. Areas of the hospital that are vacated during sheltering operations will need regular patrol as long as it is safe to do so. Additionally, the identified safer and/or hardened areas of the hospital may become congested with staff, patients, and visitors and security patrols should be frequent and observe for escalating tensions or obstructions of life safety pathways.

Security assistance may also be required to assist with maintaining accountability for staff, patients, and visitors during sheltering. Hospitals may wish to establish check-in/check-out stations during sheltering in order to maintain good accountability monitoring for all.

SECTION III REFERENCES

1. Teperman S. Hurricane Sandy and the greater New York health care system. J Trauma Acute Care Surg. 2013 Jun; 74(6):1401-10.

2. Adalja A, Watson M, Bouri N, Minton K, Morhard R, Toner E. Absorbing citywide patient surge during Hurricane Sandy: a case study in accommodating multiple hospital evacuations. Ann Emerg Med. 2014 Jul; 64(1):66-73.