

# A 3-year Health Care Coalition Experience in Advancing Hospital Evacuation Preparedness

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#### Abbreviations:

AAR: After Action Report  
CPE: Center for Preparedness Education  
EMS: Emergency Medical Services  
EOC: Emergency Operations Center  
IC: Incident Command

**Abstract:** This report outlines a 3-year health care coalition effort to advance and test community capacity for a large-scale hospital evacuation. The multi-year effort utilized a variety of workshops, seminars, webinars, tabletops, functional exercises, and culminated with a full-scale exercise testing hospital evacuation. While most hospital evacuation exercises focus on internal movement of patients, this exercise process tested command-level decision making and it tested external partners such as transportation agencies, law enforcement, receiving hospitals, and local emergency management. This process delivered key coalition-building activities and offered a variety of training and exercise opportunities to assist a number of organizations, all at different stages of hospital evacuation planning. The 2012 Hospital Preparedness Program outlined the incorporation of health care coalition activities to transform individual organization preparedness to community-level readiness. This report outlines a health care coalition effort to deliver training and exercises to advance community capacity for a large-scale hospital evacuation.

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#### Introduction

Numerous disasters have resulted in hospital evacuations throughout the United States. Hospital evacuations have been reported from disasters such as hurricanes,<sup>1-3</sup> earthquakes,<sup>4</sup> tornadoes,<sup>5</sup> floods,<sup>6</sup> fires,<sup>7</sup> hazardous material events,<sup>8</sup> and other threats. Hospital evacuation not only represents a critical aspect of hospital emergency management planning, but also of the entire community required to evacuate a hospital. Hospital evacuation strains community health care resources for security, personnel, transport, and patient care as evacuation often occurs due to events impacting the health care capacity of an entire community. For example, in May of 2011, a tornado struck Joplin, Missouri (USA) destroying a 327-bed hospital and damaging the only other hospital in the community. As in other disasters, the Joplin health care infrastructure was impacted heavily; yet, it remained the primary source of medical care to the devastated area.

In response to disasters like the Joplin tornado, numerous activities have been undertaken at the local, state, and national level. The United States funds approximately US \$350 million annually to improve disaster preparedness of hospitals through the Hospital Preparedness Program.<sup>9</sup> This funding was accompanied by a shift in focus of the Hospital Preparedness Program to promote health care coalition building and disaster planning. Hospital accreditation organizations and the Hospital Preparedness Program promote the use of exercises to prepare for potential emergencies by testing capabilities and identifying areas for improvement. Since 2001, great strides have been made in hospital disaster planning efforts supported by the Hospital Preparedness Program. Despite the improved readiness of hospitals through planning, training, and testing, key leadership gaps have been identified in hospital decision-making capacity with respect to hospital evacuation.<sup>10</sup> Dawn et al. found that leaving crucial decisions to isolated health care facilities during Hurricane Sandy (New York, USA; 2012) resulted in inconsistent decisions and

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recommended public health and emergency management agencies help develop protocols for collaborative decision making by facilities and public officials. These collaborative decisions should include whether to shelter-in-place or to transfer fragile patients.<sup>10</sup>

In response to several high-profile hospital evacuations, health care and community emergency management planners in a large metropolitan medical response system identified the need for a community-wide health care coalition-based evacuation exercise. While many hospital evacuation exercises focus on internal movement of patients within a facility, this exercise tested the entire continuum of evacuation by engaging external partners such as transportation agencies, law enforcement, receiving hospitals, and local emergency management in a variety of activities carried out over three years. It also assessed the hospital process for deciding whether a facility should shelter-in-place or evacuate.

This report outlines the 3-year effort of the Omaha (Nebraska USA) Metropolitan Medical Response System to develop training and exercises that would assess and advance capacity of a metropolitan area for hospital evacuation. The multi-year effort utilized internal and community-level workshops, seminars, webinars, tabletops, and functional exercises; it culminated in a large community, full-scale exercise that evacuated approximately 150 patient volunteers.

## Methods

### Overview

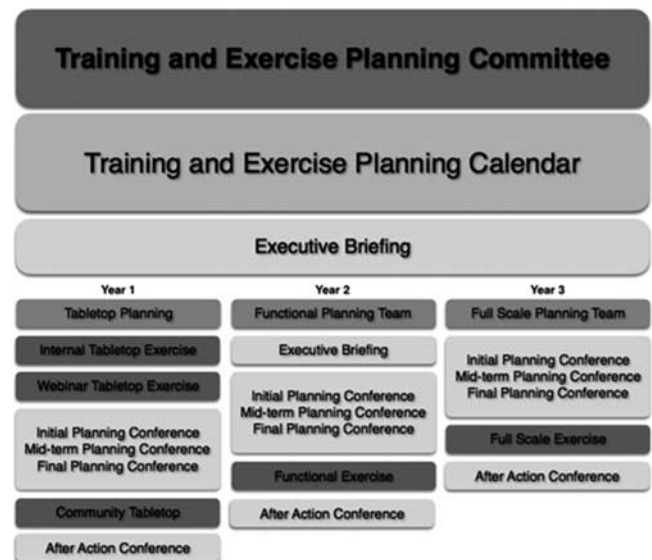
In August 2011, the Center for Preparedness Education (CPE; Omaha, Nebraska USA) worked with health care and first responders from the metropolitan area to develop a planning/training/exercise calendar. As a result of this calendar, from August 2011 to October 2013, the CPE developed two workshops, three tabletops, two functional exercises, and one full-scale exercise. Each exercise conformed to the standards established by the Homeland Security Exercise Evaluation Program (HSEEP) and the National Incident Management System (NIMS).<sup>11</sup>

### Planning Team

An 8-member planning team was established to develop the training and exercise plan as well as set overarching training and exercise program objectives. The planning team was comprised of three CPE staff and five health care coalition representatives. The three CPE planning members were exercise design coordinators with extensive experience designing and conducting exercises. Health care coalition planning team members included preparedness coordinators at health care coalition hospitals as well as the coalition coordinator. Three additional planning teams were established to develop a community tabletop exercise, two functional exercises, and a full-scale exercise with representatives from participating organizations. The scenario used for individual and community tabletop exercises focused on tornado damage; functional exercise scenarios utilized credible bomb threats to drive decision making of hospital Incident Commands (ICs) to determine when and how a facility should evacuate through interaction with local bomb squads; and the full-scale exercise scenario involved a partial building collapse. Exercises became progressively more complex, in terms of both scenario and participating agencies.

### Training and Exercise Calendar/Plan

A 3-year training and exercise plan was established for the entire coalition. This allowed participation by all agencies, regardless of



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**Figure 1.** Three-year Health Care Coalition Hospital Evacuation Training and Exercise Plan.

their stage of planning for hospital evacuation (Figure 1). For each of the three years, activities were planned to lead up to community exercises that increased in operational complexity in each successive year. Year one culminated with a community tabletop, year two with functional exercises, and year three with a full-scale exercise. Planning conferences attended by planning representatives from area 911 services, Emergency Medical Services (EMS), emergency management, fire departments, hospitals, law enforcement, public health, and public transportation preceded each exercise.

## Results

### Year One Community Tabletop Exercise

To engage the entire health care coalition community, an introductory briefing to executive hospital leadership was held to present the 3-year agenda. The orientation included presentations by the coalition director, CPE lead planner, metropolitan emergency management agency, and an evacuation case report from an area hospital. Additionally, an educational webinar was delivered to coalition hospitals to review best practices and lessons learned in health care evacuation.

An internal hospital evacuation tabletop exercise was developed for hospitals to participate in a web-based venue or to conduct internally without assistance from the CPE. The web-based tabletop exercise was conducted using Blackboard Collaborate (Blackboard Inc.; Washington, DC USA) webinar software and allowed hospital command staff to participate in the facilitated tabletop with the ability to share information with other participating hospitals. Nine hospitals conducted individual internal tabletop exercises to prepare for participation in the community tabletop.

The community tabletop exercise was conducted with 97 participants from 44 organizations in a large conference center. The tabletop exercise provided realistic scenarios including radar maps of the coalition area developed by the National Weather Service (NWS; Silver Spring, Maryland USA) that included detailed storm information. Five exercise objectives were accomplished through the community tabletop exercise (Table 1).

Target Capability	Objective
Evacuation and Shelter-in-Place	Evaluate hospital and regional plans for evacuation of staff and patients, and for sheltering-in-place.
Communications	Evaluate regional communications capabilities, plans and how participants communicate with each other through traditional and non-traditional methods.
On-Site Incident Management	Evaluate the use and knowledge of the Incident Command System.
Medical Surge	Evaluate plans for surging staff in order to evacuate a facility, to receive patients from an evacuated facility, or to handle medical surge of patients when evacuation is necessary.
Critical Resource Logistics Distribution Medical Supplies Management	Evaluate plans for identifying, obtaining, tracking, and utilizing critical resources.

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**Table 1.** Tabletop Target Capabilities and Objectives

The tabletop participants were grouped by county. Participant organizations included health care organizations and non-health care responder agencies. Moderators and evaluators were assigned to each table to facilitate discussion and share appropriate information with the large group. After each small-group discussion, the exercise director facilitated a large-group discussion. The large-group discussion allowed all participating agencies to compare plans and consider available community resources.

Following the tabletop exercise, groups completed participant feedback forms, moderators facilitated group debriefings, and a large-group discussion reviewed all group concerns for inclusion in the After Action Report (AAR).

*Year Two Functional Exercises*

Seven overarching exercise objectives were defined for the functional exercises (Table 2). Functional exercises were structured to allow health care facilities to navigate complex and timely decisions about their needs during a disaster situation, such as an evacuation. To avoid testing evacuation of all community health care facilities at once, the exercise was divided into two functional exercises conducted over two successive days. On day one, five hospitals exercised evacuation to 17 receiving hospitals, and on day two, six additional hospitals exercised evacuation to 16 receiving hospitals. A total of 343 players, 32 evaluators, and three observers participated in the 2-day exercise process. After each exercise, the lead controller at each site facilitated a debriefing to identify the top strengths and weaknesses at each organization. The after action conference allowed discussion of community and individual facility “lessons learned,” allowing comparison of individual facility needs to identify duplicate training needs.

*Year Three Full-scale Exercise*

A full-scale exercise was planned and conducted in year three to test patient evacuation of a large trauma center to 16 receiving hospitals in the Omaha metropolitan area. This full-scale exercise tested internal evacuation, patient tracking, transportation,

Target Capability	Objective
Communications	Test staff and patient notification for a disaster response.
Communications	Utilize multiple forms of redundant communication.
Communications	Test the notification process to mobilize the OMMRS Medical Table during an evacuation event.
Evacuation	Practice evacuation response according to the facility evacuation plan.
Medical Surge	Review triage and reverse triage processes for hospital facilities during an evacuation event.
Critical Resource Logistics Distribution Medical Supplies Management	Review the pharmaceutical, supply, and equipment needs during an evacuation event.
On-Site Incident Management	Utilize the Incident Command System to respond to a disastrous event.

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**Table 2.** Functional Exercise Target Capabilities and Objectives

Abbreviation: OMMRS, Omaha Metropolitan Medical Response System.

admission, and IC response at participating organizations. The exercise utilized approximately 225 patient volunteers that were evacuated and transported to area hospitals via ambulance, public transportation, or receiving hospital transportation assets. Hospitals, EMS, law enforcement, fire, 911 dispatch, emergency management, volunteer organizations, and public health participated in the full-scale exercise. A total of 43 organizations and approximately 1,050 individuals participated in the full-scale exercise. Continuing Medical Education credits were offered for participating hospital and EMS staff.

**Discussion**

*Post-exercise Reporting*

Results from the three exercises (community tabletop, functional, and full-scale) were compiled into three separate AARs. Additionally, each participating organization was provided the AAR template for individual facilities to compile internal lessons learned and improvement items.

*Tabletop Exercise Improvement*

Six target capabilities were identified as areas for improvement from the community tabletop exercise: planning, communications, community participation, medical surge, mass care, and medical supply management. Each of these capabilities had specific implications for each participating agency. For example, communication improvements were identified within each facility (ie, paging protocols, communication plans, and 800 MHz radio training). The result of the tabletop as a whole, however, was the identification of community-level improvement items that impacted many agencies. For example, health care facilities were

able to identify how to communicate with community services during a large-scale event.

#### *Functional Exercise Improvement*

Numerous capabilities were identified for improvement following the functional exercises. These capabilities include communication, resources and assets, safety and security, and patient clinical and support activities. As with the tabletop exercise, results of the functional exercise revolved around the ability of numerous community response agencies to assess their command, control, and resource allocation plans for a mass-casualty and evacuation event. And, as with the tabletop exercises, agencies completed internal AARs, in addition to the community-wide AAR.

Key communication improvement items, identified through functional exercise that included errors in the coalition mass-notification system, resulted in review and improvement of the system. The exercise also identified consistent confusion among multiple hospitals regarding how to coordinate with the coalition medical table and what back-up methods of communication could be utilized to communicate with the coalition Emergency Operations Center (EOC). While not tested in through the exercise, participants identified the need to expand the number of personnel trained to communicate with HAM radios and/or 800mghz radios.

A prime concern from many functional exercise participants was the potential for limited EMS transportation availability during a hospital evacuation as existing capacity relies heavily on mutual aid agreements. As with most communities, it was recognized that many medical facilities were at different stages of developing and perfecting full hospital evacuation plans. It was suggested among the participants that all coalition hospitals consider sharing existing plans. Participating medical facilities also recognized a lack of Advanced Life Support resources for a large-scale hospital evacuation. Coalition exercise participants recognized the need for a singular patient tracking form for large-scale hospital evacuations. Coalition participants decided to review/revise Hospital Incident Command System forms 255 and 260 to insure uniform hospital evacuation patient tracking methods. Police, fire, and hospital participants identified challenges related to non-standardized codes within the various coalition hospitals and requested development of a standardized code notification systems to ensure consistent messaging between agencies and facilities.

#### *Full-scale Exercise Improvement*

The Core Capabilities identified for improvement during the full-scale exercise included Intelligence and Information Sharing, Public Information and Warning, Operational Coordination, and Public Health and Medical Services (Table 3). The recommendations mainly revolved around the ability to coordinate transportation between facilities and communication between the hospitals, EMS, and law enforcement and the communication with the media. As with the preceding exercises, there were numerous learning opportunities identified within the IC process at the health care facilities representing the need for routine training and use of IC.

Key improvement items identified as a result of the full-scale hospital evacuation exercise included greater integration of 911 call centers in the hospital evacuation planning, as this was a key element of information sharing between hospitals and EMS. The coalition medical table that had been established as a hospital

Target Capability	Objective
Intelligence and Information Sharing	Utilize appropriate Hospital Incident Command System (HICS) forms during evacuation.
Emergency Public Information and Warning	Determine the appropriate use of the public information officer (PIO), and the PIO will have practiced their role in an evacuation event.
Emergency Operations Coordination	Utilize the Incident Command System to respond to a disastrous event.
Medical Surge	Locate and utilize appropriate transportation for a large-scale evacuation.
Medical Surge	Identify and utilized a staging area for patient transport.
Volunteer Management	Follow the appropriate process for the request of volunteer medical and non-medical staff.

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**Table 3.** Full-scale Exercise Target Capabilities and Objectives

liaison to the Metropolitan EOC required greater personnel capacity to facilitate a full hospital evacuation. Of note, involving information desk staff in emergency planning was identified as a key element for disseminating disaster response or evacuation information between staff, visitors, and the public. Similar to functional exercise findings, the full-scale exercise identified confusion on IC roles for duration of event. Improvements were recommended to expand IC training as well as utilization of IC on a regular basis. Overall, the full-scale exercise identified the need for hospital evacuation plans to include transportation plans that identify areas for EMS staging, patient hand off, and patient staging for transport. This exercise utilized over 150 patient actors which introduced a significant complexity to exercise planning that required multiple volunteer coordinators. While the patient actors increased the realism of the exercise, utilizing simulated patients or patient cards would have significantly reduced efforts to plan and conduct the exercise.

Health care coalitions are defined as collaborative networks of health care organizations as well as public and private sector response partners within a defined region.<sup>12</sup> Health care coalitions function as multi-agency coordinating groups to support emergency management with preparedness and response activities that advance health care emergency response. National guidance provided in 2012 for health care systems established 10 Hospital Preparedness Program capabilities aligned with 15 Public Health Emergency Preparedness capabilities.<sup>9</sup> Health care coalitions have been identified as key to building resilient medical systems as well as mounting an effective Emergency Support Functions/ESF-8 response.<sup>9</sup>

A tiered training and exercise plan was established to maximize participation from coalition partners at different stages of planning. This enabled each agency to participate in the process in a manner that best suited their individual organizational readiness. The web-based workshop and individual facility tabletop were developed to assist hospitals with limited evacuation planning to initiate planning and internally test evacuation plans. The web-based tabletop

exercise allowed facilities with a variety of planning and evacuation experience to exercise and share best practices.

Evacuation of an entire health care facility is difficult to plan and exercise. Many hospital evacuation exercises focus on internal movement of patients, do not test external partners such as transportation agencies, law enforcement, receiving hospitals, and local emergency management, and do not test the decision-making process of sheltering-in-place or evacuating. Trainings and exercises were developed for this process to test command-level decision making with respect to hospital evacuation and to utilize effective decision-making guides,<sup>13</sup> risk analysis tools,<sup>14</sup> and systematic approaches.<sup>15</sup>

## Conclusions

The decision to shelter-in-place or evacuate a health care facility represents a complex issue involving a variety of risks, including patient safety, business continuity, and public health. Decision-making guides, risk analysis tools, and systematic approaches have been developed to aid health care facilities through crucial evacuation decisions that often are encountered during emergencies. Hospital evacuations during Hurricane Sandy highlight the importance of testing existing plans and resources at both the command level and community level.

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