2011

Johnson Memorial Hospital Evacuation After Action Report

Response to Tropical Storm Irene

A review of events surrounding the evacuation of an Acute Care Hospital

Daniel Scace
Carmine Centrella
William Perkins
Capitol Region Council of Governments
9/30/2011

I. Executive Summary

Emergency preparedness and response for any organization, jurisdiction, or agency involves assessing pertinent vulnerabilities and capabilities; a cycle of outreach for planning and capability development, plan and scenario based training, exercising and actual response itself. Improvement is based upon openness to honest evaluation and then a commitment to that on-going program and process of improving. This report is intended to assist the Johnson Memorial Hospital, and the first responder agencies that the hospital relies upon, striving for preparedness and response excellence by analyzing preparedness and response efforts to a specific event or series of events. This analysis is intended to:

- Identify strengths upon which to maintain and build
- Identify challenges and potential areas for improvement
- Aid in the development of a plan for corrective actions as needed

During the afternoon of August 28, 2011, at the height of Tropical Storm Irene, Johnson Memorial Hospital (herein - JMH) found itself living one of the most severe scenarios possible for any acute care hospital; losing all power and generation capabilities. Faced with this circumstance a team of hospital Executive leadership met and made the decision to evacuate the hospital. Once this decision was made the JMH relied upon all those relationships built during planning, training and exercising to effectuate the evacuation of forty three (43) "floor" patients and five (5) Emergency Department patients.

Johnson Memorial Hospital is the smallest Acute Care Hospital in the Region licensed to 98 beds and normally staffed to 90 beds. Structurally the JMH is a three story brick and mortar encased steel frame building sitting in the middle of a small health care complex on the top of a "hill" in one of the more rural communities in the Region- Stafford, CT. For purposes of this After Action Report (AAR) the Region refers to the CT- Division of Emergency Management and Homeland Security (DEMHS) Region 3 (The Capitol Region). Connecticut has five (5) of these Regions used for emergency planning and preparedness efforts with a DEMHS Regional Coordinator for each of the respective Regions to aid and assist the Regions and act as a liaison to local governments for the State of CT emergency preparations and response actions. DEMHS manages the State of Connecticut – State Response Framework for the CT-Department of Emergency Services and Public Protection (CT-DESPP). Further, each of the DEMHS Regions is responsible for the Regional Emergency Support Plans (RESP). In Region 3 the RESP is managed and maintained through the Capitol Region Emergency Planning Committee which is under the auspices of the Capitol Region Council of Governments.

Stafford as mentioned is a rural community and represents the farthest north east border in the Region bordering DEMHS Region 4 to the east and the State of Massachusetts to the north. The town is approximately 58 square miles in size with a reported total population of 12, 087 *(US Census-2010).*

The first responder community in Stafford consists of the following:

1. CT State Police Resident Trooper – contingent of four (4) troopers
2. Stafford Constables – two (2) full time and three (3) part time constables
3. Stafford Fire Department
4. West Stafford Fire Department
5. Stafford Ambulance Association

The complexity of this response and coordination effort is further exacerbated by the fact that, although in Region 3, for certain dispatch and Centralized Medical Emergency Direction (CMED) responsibilities, Stafford falls under a different "system" (Tolland County Mutual Aid Fire Service – Station TN) than the one in place (North Central CMED) designated as the Region 3 coordination point for the Forward Movement of Patients Plan and the Region EMS Mobilization Plan. These plans are what would constitute the Region's response efforts in support of a local incident for medical surge. Additionally, the Region 3 RESP was activated as the overarching mechanism for this coordination effort.

Key Strengths identified during this review include, but were not limited to:

- Pre storm preparation
    - To include training and a hospital evacuation exercise in December of 2010
- Collaborative hospital leadership meetings
- Collaborative command decisions between the IC and hospital leadership
- Cooperation and coordination of JMH staff, first responders and regional support
- Leadership of the Regional ESF-8 Public Health and Medical Services Duty Officer
- Ability to identify certain operational efficiencies and implement them "on the fly"
- Reach out to patient families regarding evacuation and patient status
- First responder operations
- No untoward patient outcomes as a result of being evacuated

Challenges identified during this review include, but are not limited to:

- Failure of backup power generator
- Inter hospital communications -Three essential elements identified
    - Transfer coordination Points of Contact (POC)
    - Ambulance follow up notification once enroute
    - Call back POC for receiving hospital follow up – "closing the loop"
- Other hospitals trying to maintain situational awareness
- Lack of a standard inter hospital "Mutual Aid Plan"
- Realization of how dependent a hospital is on power – taking for granted
    - Power to Pixus/medication cabinets
    - Poor illumination from emergency lighting
    - Could not see once you got more than 30' into the facility

- Stairwell and other emergency lighting had to be augmented by fire department emergency lighting resources

These and all other issues identified during the After Action Review will be covered in more detail with this report.

II. Introduction

Tropical Storm Irene presented many problems for Connecticut towns and citizens. The focus of local officials was in maintaining essential services and critical infrastructure in the interest of assuring public safety. JMH provides key community health and medical services for the North central part of Connecticut and maintains a strong partnership with the surrounding community. It is widely recognized that sustaining a hospital's ability to care for their current population and to support the routine and emergency medical needs of the surrounding communities makes them a priority for power, support and accessibility at all times, not just during disasters. Backup systems are installed and extensive planning, training and exercising are done to help ensure continued safe hospital operation at all times.

This report summarizes the activities associated with the evacuation of the hospital on August 28, 2011 including hurricane preparation, planning, training and exercises, and operations at the hospital, local community, Region and State.

III. Incident Timeline

Friday, August 26, 2011

- JMH staff completes planning and preparation for the arrival of Irene
  - Hospital Incident Command System (HICS) established.
  - Hospital Staff positions established. The plan calls for staff to stay at the hospital to avoid travel issues due to the storm if needed. Extra staff, including maintenance personnel, is placed on duty
  - Tree cutting/clearing on JMH campus is conducted to ensure vulnerable areas are safe

Saturday, August 27, 2011

- Preparations finalized. Staff conference call completed via hospital Everbridge system.

Sunday, August 28, 2011

- Hurricane Irene decreases in intensity in the early hours and is downgraded to a Tropical Storm. All of Connecticut is warned it will still bring significant rain and winds and power is likely to go out in some areas.
- 0820 - Johnson Memorial Hospital loses commercial electric power. Backup generators pick up the load for both Evergreen and the main hospital.

- 1527 - A short occurs in the main hospital backup generator. Power is lost as the generator shuts down and a small fire is started by the shorting of the generator.
- 1527+ - Hospital engineering/maintenance staff extinguishes the fire and commences to make notifications of the loss of power situation.
- **SITUATION- Patient Census** - At the time power was lost there were 43 patients admitted on patient floors at the hospital and 5 patients were in the emergency room that had not yet been admitted. Two of the ER patients were transported immediately. ER patients were not considered transfers since they had not been admitted and thus were not entered into the Electronic Patient Tracking System. In addition, one of the JMH staff members experienced chest pains during the evacuation process and was transported as an emergency. There were 4 patients in the ICU and no patients were on ventilators. **SITUATION - Hospital Conditions** – Emergency lighting provided poor illumination. Once personnel got about 30 feet into the hospital it was pitch black. Patient call bells were out of service with the loss of power and individual "waiter" hand bells and flashlights were provided. Staff had difficulty hearing bells with closed doors so all doors were propped open. In addition, radio repeaters normally available with power were not functioning making radio communication in the facility difficult.
- 1527+ - Notifications completed to local EMD and FD, CT-DPH, and Region
- ~1530 - Johnson Memorial Hospital is on diversion.
- ~1530 - Discussions about options/next steps commence.
    - CL&P estimates commercial power would be restored in approximately 35 minutes but staff expresses concern about backup generation capability not being available.
    - JMH EMS Coordinator contacts local EOC regarding securing backup generator and EOC advises him to contact the Region 3 Regional Coordination Center
- ~1532 - Local Fire Department arrives on scene and establishes Incident Command
- **SITUATION - Incident Command** - The Hospital Incident Command System was already in place at the time of generator failure. Fire Department ICS was established as part of the response for the loss of power/fire in the generator and continued for the duration of the evacuation. Both Incident Commanders indicated the command was essentially unified, but it does not appear that establishment of a true unified command structure was ever formalized. Command was not an issue and focus was maintained by all participants in achieving the established goals as this collaborative effort between local and hospital command had been exercised in the past. The missing elements included the ability to manage operations via a single operations section chief and utilization by all involved in the response of available communications assets.
- ~1547 - Land line phones fail as 20 minute backup battery power is exhausted.
- 1552 - JMH contacts RCC and inquires about availability of Capitol Region Medical Reserve Corps 55 bed Mobile Ambulatory Care Unit (MACU)
- ~1600 - Regional Emergency Support Plan activated
- ~1600 - Decision is confirmed to evacuate the remaining patients. Intent was to carry out most of the evacuation prior to nightfall.

- **SITUATION - Transfer Numbers** - Of the 43 patients admitted to the hospital a total of 33 were transferred to other locations. The other 10 were discharged to "home". Average age of transferred patients was 73.5 years with a range of 31-92. Since the incident occurred just prior to dinner time, all patients were fed prior to transfer. Food service was accomplished by carrying trays up through stairwells.
- 1615 - Electronic Patient Tracking System is set up to support the evacuation process.
- 1643 - First regional Everbridge message to CREPC Leadership and EMS to stand up EMS Strike Teams and Hospital EOCs for the possible evacuation. (33 contacts, 69% confirmed)
- 1653 - Second regional Everbridge message to EMS and Hospital groups. (11 contacts, 54% confirmed)
- 1706 - Third regional Everbridge message to RESP notification and ESF-8 Leaders. (62 contacts, 67% confirmed)
- Evacuation - Priorities for evacuation were ICU and more serious patients first. ICU patients were coordinated with receiving hospitals by ICU staff. Follow on patients arrived without notice at receiving hospitals. In addition there was no feedback to JMH Command Staff that patients had arrived. The CT Department of Public Health dispatched two personnel from their Facility License & Investigation Section (FLIS) to monitor the evacuation and Region 3 provided an EMS Liaison.
- **SITUATION - Evacuation Process** - Evacuation required moving some patients down 3 flights of stairs. The local Fire Department set up a string of lights, and assisted with stair chairs, backboards, and scoop stretchers in moving the patients the 3 flights of stairs.
- **SITUATION - Patient Processing** - Patients were prepped on their assigned floor; notifications were then made by the staff to patient families as to the evacuation without information about where they were going and they were then moved to EMS loading area. The hospital discharge station was set up at the exit/loading area. Once Patients reached the discharge area destinations were assigned. Due to the inability to copy patient medical records a JMH staff person was sent with patients to receiving hospitals. Copies were made at the receiving hospital and returned by the staff member.
- **SITUATION - Ambulance Dispatch, Emergency Response and Transfers** - North Central CMED was responsible for tasking ambulances for the evacuation. Station TN (Tolland County radio network) maintained EMS coordination and dispatch for 911 calls as it normally does. There were no issues related to licensed versus certified ambulances since local ambulance services handled all the emergencies/emergency room responses and commercial EMS providers handled the transfers.
- 1905 - Commercial power restored. Evacuation continued due to lack of backup power and concern for attempting full operations with compromised power and a potentially unstable power grid.
- ~2000 - JMH staff member locates a replacement emergency generator in Newington. Previous requests for this resource could not be filled by the Region or the State.
- 2200 - Last patient evacuated

Monday, August 29, 2011

- 2128 - Normal hospital operations resumed

IV. Participating Agencies in the Hospital Evacuation/Response

1. Johnson Memorial Hospital
2. Stafford Fire Department
3. West Stafford Fire Department
4. Stafford Ambulance Association
5. Stafford Emergency Management Director
6. Station TN
7. North Central Centralized Medical Emergency Direction
8. Region 3 Regional Coordination Center
    a. ESF-5 Duty Officer
    b. ESF-8 Duty Officer
    c. RCC Staff
    d. ESF-8 Liaison at JMH
9. DEMHS Region 3 Coordinator
10. CT Department of Public Health
11. CL&P
12. Ambulance Service of Manchester
13. American Medical Response
14. Evergreen Health Care Center
15. Hartford Hospital
16. Hebrew Healthcare
17. Hospital of Central CT - New Britain Campus
18. Manchester Hospital
19. Rockville General Hospital
20. Saint Francis Hospital and Medical Center
21. Suffield House
22. UCONN - John Dempsey Hospital

V. Discussion and Analysis

A. Hospital Planning and Response

JMH had plans in place to deal with this type of incident. Plans had been updated, trained and exercised recently (December 2010) which greatly aided in the response and coordination efforts. Regional response plans that support this type of incident, such as the Forward Movement of Patients and EMS Mobilization Plans, are less well known and understood at the local level. The hospital understood the potential impacts of Tropical Storm Irene and took appropriate measures to ensure staffing and continuity of operations. As the incident unfolded, appropriate actions and decisions were made to mitigate consequences to the extent possible. The decision to evacuate was maintained even though power generation was restored due to unstable nature the power grid.

Other systems that failed due to the loss of power included the hospitals phone system – battery backup for handsets lasts less than 30 minutes; Pixus electronic medication "cabinets" – master key backup; patient call bells – individual "waiter"/hand bells back up.

Staff used personal cellular phones to make calls but it was not apparent that this was part of any "planned" response to the loss of the phone system but more ad hoc. Additionally there was no detailed discussion regarding the establishment of a contact directory using cell phone numbers but it only makes sense to infer that as calls were made return numbers were given.

Even though the Pixus machines have a master key override problems were reported with the machinations of how to open and secure individual medication trays. This seemed to be addressed through trial and error.

To aid with the loss of light and patient call bells, flashlights and individual hand bells were distributed to each patient floor. A problem was reported in hearing the hand bells due to the fact doors to patient rooms being closed, but no negative impact was reported beyond that in this instance.

The single most reported difficulties centered on inter-hospital communications. Some hospitals were contacted through their Emergency Operations Center if activated, if not, calls were placed to receiving hospital "transfers" line, or nursing supervisor. There is no standardized process in place among all hospitals for evacuations as to "who gets the call when" especially if a hospitals EOC is not activated. Once the notifications were made to receiving hospitals said hospitals reported that they were not able to consistently reach back to JMH for follow up information or to confirm patient arrival. Finally, receiving hospitals were not contacted by transporting ambulances on a consistent basis either; this led to confusion as to where the patients were supposed to be going once they arrived at the receiving hospital. Some patients were held in Emergency Departments until contact and coordination could be made with staff that actually took the patient "transfer" call. Both the EMS transport coordinator and CMED North Central stated they reminded units to contact the receiving

hospitals when enroute, so it is unclear as to why this did not happen on a consistent basis other than a "fog of war" response where not everything is heard and understood by all parties during a crisis event.

Resolving this one overarching issue of standardized inter-hospital communication and coordination should not only be a "Regional" solution but one explored on a statewide basis given the relatively small size of Connecticut. In this immediate instance communications could have been better coordinated through the Incident Command system which had established a communications network / platform using one of the Region Mobile Communications Vehicle (MCV). The MCV could have served as the communication focal point not only for standard incident interoperability but as the link to receiving hospitals.

At least one receiving hospital reported that they received calls from patient family members before the hospital was aware said patient was enroute. Although this created some brief confusion the hospital reported they were able to gather more detailed patient histories beyond the initial transfer information.

Johnson Memorial Hospital (JMH) reported on an observation that patient family members were able to access the patient floors during the evacuation process and suggested that access into the hospital be better controlled by locking down all doors except those not being used for evacuation purposes. Although there was "no damage" done an unsecure facility obviously poses a problem regarding liability and a smooth evacuation process.

STRENGTHS - Hospital Planning and Response

- Tree clearing to ensure electrical lines going to facilities were not impacted
- Staff planning/preparations, including having staff hold over or report early to ensure availability
- Exercises with local responders that strengthened relationships and capabilities
- Ability of all responders to work well together towards a common goal "Unity of Effort"
- Patient care throughout the day and evacuation was extraordinary
- Assessment of situation and timely decision to evacuate
- Outreach to patient families regarding evacuation
- Evacuation was completed with no untoward patient impact or injuries
- Evacuation process improved as it proceeded
- Use of hospital Everbridge system for tele-conferencing
- Availability and use of individual "waiter" hand bells and flashlights on patient floors

CHALLENGES - Hospital Planning and Response

- Use of WebEOC
- Inability to secure electrical generation resource via Region or State
- Use of all features associated with Unified Command
- Inter-hospital communications
- Ability to provide patient evacuation and destination information together

- Hospital lighting and communications under a loss of power scenario
- Copying patient records under a loss of power scenario
- Feedback on completion of patient transfers
- Access to Pixus/medication cabinets under a loss of power scenario
- Inter-hospital communication

RECOMMENDATIONS – Hospital Planning and Response

- Advocate for and develop a hospital mutual aid plan such as the Long Term Care-Mutual Aid Plan – Standardize emergency "transfer" process beyond Forward Movement of Patients
    - Hospital, CREPC and CT-DPH representatives
- Formalize a "tactical" communications plan for instances when JMH telephones are out of service
- Assure necessary staff members are trained to all backup systems they may be expected to operate; e.g. Pixus, lighting, communications, etc.
- Socialize, train and exercise staff and response partners to appropriate response and support plans; e.g. Forward Movement of Patients, EMS Mobilization, R-3 RESP, etc.
- Identify operational best practices and develop plans and training as appropriate
- Continue robust community stakeholder training and exercise opportunities

B. First Responder Support

Local responders were very familiar with the JMH facility and staff and worked well together during the incident. Challenges encountered with patient movement techniques involving stairwells and evacuation devices during the response were addressed quickly and effectively. Ambulance support for emergency transport and evacuation transfers was more than adequate at all times.

STRENGTHS - First Responder Support

- Local responders were well prepared and equipped
- Regional communications assets were made available to support the communications requirements for the Fire Department IC
- Regional EMS support assisted the local responders
- Use of the Electronic Patient Tracking system assisted in managing the evacuation

CHALLENGES - First Responder Support

- Communications between EMS providers and CMED
- Initial differences between JMH staff and first responders on how to evacuate patients down stairs
- A single Unified Command that included all stakeholders was not formally identified
- Establish who should be allowed into the ICP
- Individual departments/companies equipment not clearly labeled

RECOMMENDATIONS - First Responder Support

- Continue the drills and training with JMH and local first responders
- Educate the JMH emergency management staff regarding Regional communications support capabilities
- Continue to embrace the philosophy of the 3 C's (Communication, Coordination , and Cooperation)
- Continue to use Regional assets when local assets are overwhelmed
- Look into the use of portable radios that do not need to go through a repeater that are capable of radio to radio communications, and place in areas that will require communication capability.
- CMED should conduct a review as to why ambulances did not contact receiving hospital
- Conduct training between first responders and Hospital staff so each can understand the other's process of moving patients
- Define and formalize what would constitute Unified Command for this type of event in the future
- Develop an ICS organizational structure and place security at the entrance to the ICP and only allow those who are authorized in the ICP
- All mutual aid units should be directed to plainly mark their equipment to aid in the ease of returning or retrieving the proper equipment

C. State and Regional Response and Support

Upon notification of the loss of power and need to evacuate the hospital, regional and state entities put plans in motion and took action to support JMH and the local responders. The Regional Emergency Support Plan was activated and the RESF-8 Duty Officer activated appropriate portions of EMS plans and put support in motion. This included alerting all regional hospitals about the evacuation, although most hospital EOCs were no longer manned and it was a challenge to reopen them after the previous day's activities. RESF-5/RCC made notifications but did not research available sources for a replacement generator. Neither the State nor the Region had ready access to standby generators and it was left to the JMH staff to secure a replacement. State coordination consisted of sending CT-DPH/FLIS representatives to monitor the evacuation. This created a bit of tension among some non-medical JMH staff because it was the first time many of them had experienced CT-DPH being on site and it was not clear what their role was during the evacuation. Both Tolland County Mutual Aid Fire Service (Station TN) and North Central-CMED worked well in providing coordinated emergency (local EMS providers) and evacuation (commercial services) ambulance support.

STRENGTHS - State and Regional Response and Support

- Regional/State Plans supported the incident response
- Electronic Patient Tracking (EPT) system supported the evacuation
- RESF-8 Public Health and Medical Services Liaison on scene helped coordination efforts
- Evacuated patient load was adequately managed by regional hospitals and long term care facilities

CHALLENGES - State and Regional Response and Support

- Ability to provide or access data via EPT system that transfers were complete
- Ability of Region or State to truly address resource shortfalls (generator)
- Ability to notify receiving facilities of all patient transfers
- Confusion over use of EPT for ER patients
- Unfamiliarity of some JMH staff with CT-DPH – mission or purpose on scene not well communicated
- Effectiveness of Everbridge for notification

RECOMMENDATIONS - State and Regional Response and Support

- Regional and State Multi-Agency Coordination Centers, if one of their missions when activated is to support resource requests, should establish a better process for supporting the resource needs of local jurisdictions and other regional partners.
- Refine regional use of the Electronic Patient Tracking system to include awareness, training, data access and better defined protocols for system use.
- Region 3 should perform a more in depth review of Everbridge notification limitations, including a review of notification effectiveness during emergency notifications and development of a backup system to reach key personnel during emergencies. Notifications should be considered in pre-incident planning.

VI. Conclusion

Learning from an event is directly proportional to the willingness to use the opportunity to improve. All stakeholders in this incident should review this report against their response actions and develop an improvement plan of corrective actions as appropriate for their agency/department. This incident highlights the lack of a hospital mutual aid plan that provides preplanned strategies and processes for inter-hospital transfers during the execution of hospital emergency plans. This type of plan will take a commitment from not only hospitals, but also requires state wide advocacy and a coordinated effort with regional and state stakeholders.

Furthermore, the region and State should assess their ability and desire to deliver resources to local jurisdictions and stakeholders during incidents. Reliance on only known and available resources will not always meet needs. Processes to conduct research and develop more robust resource lists should be a priority in the quest to serve the 41 communities in DEMHS Region 3.

Johnson Memorial Hospital and staff demonstrate an on going desire for continuous improvement by hosting and participating in the After Action Review process. They successfully managed the incident and demonstrated compassion and a high level of care for their patients during this incident. JMH and the first responders will continue to serve their community with excellence as improvements and further review are conducted.