



Hurricane Ike: One Lab's Experience

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By Donna Hermis

In the early morning of Sept. 13, 2008, Ike came ashore at Galveston, TX, as a category 2 hurricane. Although preparations began at the beginning of the week, this storm posed significant challenges to the entire coast and southeast areas of Texas.

In regards to maintaining vital healthcare operations, hospitals in the community were faced with the reality of having to be prepared for the impact of the storm. At Methodist Sugar Land Hospital, after many years of participating in community-wide emergency management drills, our hospital was put to the test.

The Methodist Sugar Land Hospital is a 54-bed, acute care community hospital. At the time of the storm, the hospital was very near completion on a major expansion project that would initially triple the bed size of the hospital. The laboratory provides routine and stat testing in support of a busy emergency room, medical surgical and obstetrical services. More than 75 percent of the testing ordered by physicians is performed on site in the laboratory; the remainder is transported to The Methodist Hospital Laboratory in the Texas Medical Center, Houston.

Code 99

Preparations for the arrival of Hurricane Ike began September 8, with regular weather updates sent to the hospital staff by the hospital safety officer and disaster preparedness meetings with administration and key management personnel. The official disaster code, Code 99, was called at 8 a.m. on September 12. At that time, the hospital opened the Incident Command Center and the hospital's emergency operations plan was in full activation. Although the plan was to discharge as many patients as possible, at the time of this activation, the hospital's occupancy was at 100 percent and the ED was saturated.

Methodist Sugar Land Hospital, located in Fort Bend County, is approximately 22 miles southwest of the The Methodist Hospital. For the purposes of hurricane preparation, this area is designated as a "pass through" county and residents were reminded that they were not in an evacuation area and should prepare to "shelter in place," expecting the wind and rain associated with the approaching storm. This strategy was kept in mind as the hospital prepared for the storm. Emergency management personnel at the hospital regularly collaborate with emergency preparedness personnel in the county and this is exactly the type of scenarios that have been practiced during drills while building relationships and striving to best serve the community.

The Lab's Preparation

For the laboratory, implementing the emergency operations plan for the hospital meant that we would need to have adequate supplies and staffing during the course of the storm, keeping in mind that we would probably lose normal electrical power and be unable to get needed supplies. Generally, the lab keeps a par level of supplies to support two weeks' volume of testing. Because the total laboratory space was less than 1,500 square feet, the lab has limited space for blood products and back up laboratory equipment on site. We immediately planned optimal blood inventories knowing that all of the hospitals in the area were trying to do the same.

Emergency computer workstations were identified in the lab, should we lose our LIS and have to resort to disaster recovery plan. Emergency cell phones were also available in all departments, a process employed after Tropical Storm Allison. Like most of the other hospital departments, the lab established a hurricane ride out team and plans for a recovery team. The ride out team was given the Friday day time hours off from work so they could prepare their homes and families accordingly before reporting to the lab at 3 p.m. that day.

The intent of the ride out team was to stay at the hospital during the duration of the storm--from Friday at 3 p.m. until at least Sunday morning at 7 a.m., depending on the course of the storm. The six volunteers understood that the plan was to staff the lab with three techs for 12-hour shifts with three staff members working while three others slept.

The Storm Arrives

The hospital began the day with a lockdown at 8 a.m., which meant that all visitors and staff were required to sign in. By 3 p.m. on

Friday afternoon (9/12/2008), the community and our hospital were ready to meet the challenges of Hurricane Ike.

In the laboratory it was business as usual, as we felt prepared but concerned as to what might happen during the storm. Staff experienced "separation anxiety" since many were apart from their families and concerned for what might happen to homes and personal properties. As a team, we talked openly about our feelings and tried to be both upbeat and positive knowing that we were safe in the hospital.

By 6 p.m., the outer bands of this very large storm were causing tropical force gusts of winds in our area. Between 6:30 p.m. and midnight, we lost power 16 times for very short periods of time. Although instrumentation in the lab is protected by universal power supplies, when power does surge, we can expect in the lab that instruments will power down and we quickly became accustomed to the expectations of momentary darkness and instruments alarming. Finally around midnight, we lost normal power and immediately began utilizing emergency power in our hospital. This was just the beginning of a very long night and an experience in the lab that will never be forgotten by the lab's ride out team.

Lab Challenges During the Storm

Customary with the loss of normal power and use of emergency power, support of the hospital's HVAC system (heating, ventilation and air conditioning) results in limited resources in this area.

By 1 a.m. on Saturday (9/13/2008), the lab's immunoassay system began to signal temperature lights, meaning that the ultimate system performance was being challenged by the heat in the lab. We immediately placed a fan on this instrument and moved the chemistry system away from the walls to allow for better air circulation.

In anticipation that this was the beginning of the lab's problems with heat, we requested spot coolers from Facility Management Services. We also made a request from city and county emergency operations center, knowing that we could anticipate cooling needs in other areas of the hospital as well. As far as the weather situation, the city of Sugar Land emergency operations center unofficially noted that sustained winds were approximately 50 mph, with gusts to 70 mph.

By 2:45 a.m., security was instructed by hospital incident command to keep all staff inside the hospital for their own safety. Power was lost on the recording instruments in the Sugar Land area so the Office of Emergency Management was unable to capture the highest winds. Jeff Braun, emergency management coordinator for Fort Bend County, unofficially noted (after discussing with officials from the National Weather Service) that winds across the county ranged from 48 mph in the west to 72 mph in the east. The durations of winds in excess of tropical storm force fell in an estimated range from 12 to 15 hours beginning around 7 p.m. on Friday to 10 a.m. on Saturday.

By 4 a.m., due to the heat in the lab, a decision was made to shutdown the immunoassay analyzer and resort to the back-up methodology for cardiac markers. Also, the chemistry instrument was moved out of the lab into the hallway since the ambient air was cooler in the hallway area than in the lab. During this time, until normal power was restored, the lab director continuously gave the ED and ICU updates on the services the lab was able to provide. Although the normal ambulance traffic to our hospital had ceased for safety reasons, the hospital remained full and the lab wanted to make certain that patient care was not compromised by the situation in the lab.

At approximately 5 a.m., the lab staff began to shut down the other instruments considered non-essential. These included a back-up hematology system and a newly installed large chemistry analyzer that was being validated in preparation for the hospital expansion. We also shut down the automated system for microscopic urinalysis with the plan to do manual microscopics if needed.

Although we were most concerned about the heat in our lab affecting our aged routine chemistry analyzer, this system proved to be the most robust, along with the blood gas analyzers. At this time, the lab was running back-up cardiac marker testing using a point-of-care device, which also began to give us temperature errors. The coolest spot was in the hallway outside the lab, so we kept moving a small table holding the testing device and reagents there. We made certain that we only took out one patient test at a time due to the heat, as we did have emergency power to store testing supplies in the refrigerator. The lab staff began to wear cooling vests; the ambient temperature in the lab began to approach 88°F.

By 6:30 a.m., now a full six hours on emergency power, the ambient temperature in the lab varied from 89 to 93°F with 56 percent humidity. There was concern that our room temperature testing kits would become compromised but the temperature seemed to stabilize.

By 8 a.m., we had to make a decision of whether to save our platelet inventory. At last our platelet incubator began to alarm. Knowing that we have a very small platelet inventory and not knowing how soon anyone might be able to get back on the road to bring us more blood products, we began to look for another cooler spot to move the entire incubator.

Soon after, the temperature indicator alerted us that the coagulation analyzer was heating up. We had no back up due to the space limitations, so we moved a fan to this instrument. While under stress, we continued to keep the ED staff and nurse practitioners informed of what was going on in the lab and supported each other by changing out the cooling packs in the vest while taking photo breaks. By this time, we had unplugged or shut down any instrument that would contribute to the heat. Fortunately, the lab workload

was very light but we knew that once the winds and rain stopped, the for surge capacity in the ED was inevitable.

Fortunately, the lab's blood supply was intact and the demand at that time was very low. We did, however, begin to have a back log of specimens that needed to go to the main campus for testing and the courier service was not functioning on a consistent basis. Once Incident Command was able to determine the road conditions and accessibility to the Texas Medical Center, approximately 22 miles from our community hospital, the supply chain director made a trip to drop off our specimens and pick up urgent supplies needed by other areas of the hospital.

By 1 p.m., the LIS began to deteriorate, due to a network-related challenge at the main hospital in the Texas Medical Center. This meant relying on our downtime procedure in the lab.

Two hours later, the power was restored in our hospital. We were warned that we may continue to experience power surges since the weather was still unstable and the damage was unknown. A decision was made by administration to return to normal work schedules as soon as possible, knowing that what we were facing would be an oversaturated ED and the need to cancel elective procedures.

Phone calls were made by the lab director to make certain that the recovery team was in tact with extra lab personnel to handle the potential patient surge in the ED. The lab continued to keep the platelets in the day surgery area as precaution as the lab began to slowly cool down in temperature. Later in the day, the platelets were needed and we were glad that we had made the effort to save them.

The instrumentation placed in the hallway continued to function in that area until we were certain that the temperature of the lab had stabilized before moving them back in. We staged the instrument start up so that we would be prepared for the return to normal operations on Monday. Fortunately, the lab supply inventory was very good and we did not run short of back-up cartridges for cardiac POCT.

Return to Normal Operations

Some of the highlights from the disaster period included:

- a temporary Medical Surgical unit in the day surgery area;
- a temporary intensive care unit in the recovery room (PACU);
- record breaking numbers in the number of patients treated in the ED;
- hospital child care set up in the assembly room area, staffed by the labor pool;
- support of the staff by administration and delivery of food, snacks, water, ice and other amenities;
- facility services' quick response to department needs and housekeeping response to dealing with water leaks;
- key communications from Incident Command and Disaster Information phone line messages; and
- a labor pool that truly exemplified the spirit of Methodist Sugar Land Hospital, showing integrity, compassion, accountability, respect and excellence while keeping focused on taking care of the patients and family members.

Lessons Learned

The following recommendations are made based upon our lab's experience during Hurricane Ike:

- Be prepared to deal with "separation anxiety" of the hurricane ride out team. Not all of the team members brought their families on site to the hospital as permitted.
- Know the temperature limitations of your instrumentation.
- Prepare back-up testing plans in detail.
- Identify alternate lab testing locations.
- Have adequate inventory for use of POC devices.
- Identify lab instrumentation that is non-essential and can be powered down.
- Be prepared to identify critical computer workstations for disaster recovery.
- Plan for the heat effects on the ride out team staff.
- Identify shower facilities and provide towels for staff.
- Plan sleeping quarters for the lab staff in advance.
- Keep a stash of cooling packs (the cooling vests worn by the lab staff reduced fatigue).
- Ensure that facility services has cooling units designated for the lab.
- Be prepared to use redundant communications with employees, e.g., land lines, cell phones and text messaging.
- Communicate the lab's testing capability in person to the critical care areas.
- Plan for the lack of courier services and inventory blood supplies well in advance.

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[Click here](#) to view photos from the lab's Hurricane Ike ordeal.

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