COMMENTARY

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Medical Residency Training and Hospital Care During and After a Natural Disaster: Hurricane Sandy and Its Effects

During natural disasters, resident physicians in teaching hospitals play an integral role in ensuring continuous patient care. The challenges that a residency program experiences as a referral hospital after such calamities have not been documented in the past. However, there is literature addressing the demands faced by hospital programs that were forced to close down temporarily, such as what happened during Hurricane Katrina in New Orleans in 2005.[1-3] In this article, we highlight some of what occurred during and after Hurricane Sandy in New York City.

On October 29, 2012, the wind started to blow in New York City. Hurricane Sandy was expected. The implications of this disturbing storm were uncertain. It had been 1 year since Hurricane Irene passed by New York City. Metropolitan Hospital Center (MHC), a public hospital located in East Harlem, in Manhattan, suffered minimal disruptions at that time.

A state of emergency was declared days before Hurricane Sandy, which included the suspension of all public transportation, mandatory evacuation of Zone A (where the MHC staff housing building was located), and closing of all major bridges and tunnels. Likewise, the Department of Medicine at MHC started planning for this natural disaster. A plan for a medical resident backup system was developed. Medical interns and residents who lived near the hospital were identified and informed ahead of time that they would serve as first-line responders as the need arose during this time of anticipated calamity. All residents living outside Manhattan and those evacuated from the hospital's housing building were encouraged to stay within the city with peers or friends. The program leadership advocated for the solidarity of the house-staff and faculty.

During the day of the storm, volunteer residents were asked to stay in the hospital. At 5:00 PM, we put in place a ward team composed of 1 senior resident, 3 junior residents, and 3 interns, and a medical intensive care unit team of 2 senior residents and 2 interns. Also in-house were 1 of the chief medical residents, 4 medical attending physicians, and the chief of medicine. Everyone volunteered to stay and to work overnight without hesitation despite the fact that they also had families left behind. At 7:00 PM when the winds were very strong, we advised the on-call teams to remain inside the hospital. The night float team was notified not to report for their regular 9:00 PM shift out of concern for their safety. At 9:00 PM, we learned that New York University Hospital was being evacuated and that possibly our institution would accept patient transfers from them.[4] At 9:30 PM, First Avenue was flooded and the winds were fierce. Lights on the street gradually faded within the buildings, and the cars were under water. Our institution's command center provided information by the minute. At 9:45 PM, the lights of MHC went off for the first time. After half a minute, the main emergency generator started to work and the lights came back. The flooding continued and 45 minutes later, the main generator failed, leaving the hospital in darkness. Critical supportive equipment was working with the backup system. The backup generator started to work 15 minutes later; however, large portions of the hospital, including the medical floors and medical intensive care unit, had no electrical power. The transfer of critical patients was coordinated from the medical intensive care unit on the 9th floor to the recovery room (the only unit with full power at that time) on the 10th floor. One by one the patients were transferred by one of our interns and a senior resident accompanied by the nursing staff and an intensivist, by the use of the one and only functioning elevator. On the medical floors, everything was dark. Calls to assess patients became a challenge. At midnight, we received news that we would continue admitting patients. That night, with no electrical power, attention to the patients continued nonstop. The clinical skills of the medical staff were challenged continuously by the absence of full laboratory support and by the lack of electronic medical records until early morning when we got our main generator back.

On the morning of October 30, the flooding subsided, but we saw the damage the storm left behind. We learned that Bellevue Hospital (BH), a 700+ bed facility in the Kips Bay neighborhood of Manhattan, was being evacuated and many of the patients would be transferred to MHC,[4] which at the time had the physical capacity to accept new patients.

On the night of October 31st, we had an influx of patients from BH and needed to construct an additional night float team for the care of these patients. Two medicine senior residents and 1 attending physician volunteered for the job. This team

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admitted a total of 22 patients, in addition to the regular overnight admissions. The patients were triaged by the chief of medicine and supportive staff sometimes in the hallways near the admitting office and then brought safely to the appropriate services, including the medical intensive care unit.

On November 1st, a new "emergency" team of medical residents from MHC was created to take care of these patients in units newly opened to accommodate the increased patient volume. Later, a medical team from BH was deployed to MHC so as not to lose the continuity of their residency training. A MHC senior resident was assigned to coach the BH team in their transition. During this time, close lines of communication with our MHC and the new BH staff were vital. We ensured that all of our residents were supported and that their work and living conditions would not be disrupted in the aftermath of the storm.

The BH teams that came in different groups at different times generated added stress to the program leadership because orientation, credentialing, and access to our hospital needed to be addressed. During the following weeks, our admission rate increased up to 40%. An increased number of overnight admissions with limited bed availabilities were problems that our house-staff and faculty members faced daily, especially when the BH emergency department reopened without an inpatient facility 8 weeks after the disaster. The closing of nursing homes flooded by the storm also became a hurdle, because we were unable to discharge patients in a timely manner.

The outpatient clinics were closed during the days after the storm, which provided additional physicians to attend to hospitalized patients. One week later, the outpatient clinic was fully operational. During the time that the hospital did not have full power, the academic activities that depended on electronic devices were suspended, but bedside teaching continued daily.

THE CHALLENGES FOR THE PROGRAM

1. Although daily scheduled conferences were resumed 1 week after the storm, because of prioritization of essential patient care activities, residents had to be excused, at times, from attending noon conferences. However, there was a noticeable change of learning patterns from classroom to bedside.
2. The inaccessibility of the hospital housing building for a prolonged period of time contributed to additional stress for our house-staff.
3. There needed to be increased numbers of emergency meetings to coordinate and to address Accreditation Council for Graduate Medical Education cap limits, patient redistribution, and team assignments, among other matters.
4. The Department of Medicine strategy to integrate the BH teams into our activities to have a homogenous group of physicians sometimes created problems because the interpretation of the Accreditation Council for Graduate Medical Education rules between the program's leadership differed.
5. The BH emergency department reopened on December 27, and the accepting MHC residents were unable to assess the patients before they were transferred to the MHC medical floors.

OPPORTUNITIES FOR THE PROGRAM

1. Working closely with trainees and faculty members from another residency program provided a unique opportunity for our residents to be exposed to another style of medical education. BH house-staff interacted with MHC house-staff during conferences and with the consulting services. The BH residents returned to the main BH campus in early February after 3 months at MHC.
2. Having BH faculty members as teachers for some of our academic activities was beneficial.
3. Working for a short time in *crisis mode* was viewed as a learning opportunity and a chance for personal and professional growth.

LESSONS LEARNED

The burdens of this crisis proved to be a unique opportunity for learning. We noticed tremendous collegiality, professionalism, and a willingness to help our guest colleagues and to continue to excel in patient care. In the era of modern technology, the residents demonstrated their basic clinical skills, efficiency, and ability to take care of patients without laboratory support and electronic medical records. All the physicians in the Department of Medicine demonstrated a great commitment in continuing the academic activities despite the increase of workload, keeping our program alive and fresh.

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References

1. Pero CD, Pou AM, Arriaga MA, Nuss DW. Post-Katrina: study in crisis-related program adaptability. *Otolaryngol Head Neck Surg*. 2008;138:394-397.
2. Cefalu CA, Schwartz RS. Salvaging a geriatric medicine academic program in disaster mode-the LSU training program post-Katrina. *J Natl Med Assoc*. 2007;99:590-596.
3. Ayyala R. Lessons from Katrina: a program director's perspective. *Ophthalmology*. 2007;114:1425-1426.
4. Ofri D. The storm and the aftermath. *N Engl J Med*. 2012;367:2265-2267.