

Absorbing Citywide Patient Surge During Hurricane Sandy: A Case Study in Accommodating Multiple Hospital Evacuations

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Study objective: Hospital evacuations have myriad effects on all elements of the health care system. We seek to (1) examine the effect of patient surge on hospitals that received patients from evacuating hospitals in New York City during Hurricane Sandy; (2) describe operational challenges those hospitals faced pre- and poststorm; and (3) examine the coordination efforts to distribute patients to receiving hospitals.

Methods: We used a qualitative, interview-based method to identify medical surge strategies used at hospitals receiving patients from evacuated health care facilities during and after Hurricane Sandy. We identified 4 hospital systems that received the majority of evacuated patients and those departments most involved in managing patient surge. We invited key staff at those hospitals to participate in on-site group interviews.

Results: We interviewed 71 key individuals. Although all hospitals had emergency preparedness plans in place before Hurricane Sandy, we identified gaps. Insights gleaned included improvement opportunities in these areas: prolonged increased patient volume, an increase in the number of methadone and dialysis patients, ability to absorb displaced staff, the challenges associated with nursing homes that have evacuated and shelters that have already reached capacity, and reimbursements for transferred patients.

Conclusion: Our qualitative, event-based research identified key opportunities to improve disaster preparedness. The specific opportunities and this structured postevent approach can serve to guide future disaster planning and analyses. [Ann Emerg Med. 2014;■:1-9.]

Please see page XX for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background

From October 22 to 31, 2012, Hurricane Sandy* affected 14 US states and Washington, DC, causing particularly severe damage in New York and New Jersey. It was the second costliest hurricane in US history and caused 43 deaths in New York City and tens of thousands of injuries.¹

When Sandy hit New York City on October 29, 2012, the flooding and power outages led to the evacuation of residents,¹ hospitals, nursing homes, and assisted living facilities. New York City hospitals and various government agencies evacuated approximately 6,300 patients from 37 health care facilities.² Figures 1 through 3 illustrate a timeline of the evacuation.

Despite robust preparedness efforts, the severity of Sandy caught New York City hospitals by surprise because major hospital evacuations were not anticipated. Widespread power outages forced hospitals to rely on backup generators, which subsequently failed because of flooding. When health care facilities evacuated, neighboring institutions received the displaced patients.

*When Hurricane Sandy hit New York City, it was downgraded to a post-tropical cyclone but will be referred to as a hurricane throughout the article.

Importance

The Centers for Medicare and Medicaid Services and The Joint Commission require hospitals to have evacuation plans as part of their emergency operations plans.³ Additionally, since 2002 the US government's Hospital Preparedness Program has fostered much progress in hospital emergency response and spurred the development of health care emergency coalitions.^{4,5} Most medical literature is devoted to the decision to evacuate and the mechanics of evacuations. Little empiric data exist to describe the effect on receiving facilities and opportunities to improve with respect to evacuations.

Goals of This Investigation

We sought to use a structured, narrative-based approach to describe the effect Hurricane Sandy hospital evacuees had on hospitals and the strategies that facilitated their response.

MATERIALS AND METHODS

Study Design and Setting

From January to May 2013, we used a qualitative, interview-based method to identify medical surge strategies used at hospitals receiving patients from evacuated health care

Editor's Capsule Summary*What is already known on this topic*

Hurricane Sandy caused major disruptions to the medical care system in New York City, forcing many medical facilities to evacuate their patients.

What question this study addressed

Seventy-one interviews with key personnel provided qualitative data on how the evacuations affected facilities that received a large proportion of the evacuated patients.

What this study adds to our knowledge

The interviews identified problems not anticipated in the emergency preparedness plans, including long-term care of displaced patients, management of dialysis- and methadone-dependent patients, and absorption and credentialing of displaced staff.

How this is relevant to clinical practice

It helps in the improvement of disaster preparedness plans.

leadership roles, and our previous work on hospital surge. We interviewed 17 individuals. The purpose of these interviews was to discover whether there was interest in participating in a project of this sort. Individuals (2 chief medical officers, 1 emergency department [ED] director) from 3 evacuating hospitals were included in these interviews.

Using New York City governmental data, we then identified 4 hospital systems receiving the majority of evacuated patients and those departments most involved in managing patient surge (Table 1). We requested hospital leadership to assemble staff at those hospitals to participate in on-site group interviews from February to May 2013. Participants in this convenience sample included representatives from affected departments, clinical staff, hospital administrators, hospital emergency managers, nursing leadership, and physician leadership. We interviewed 54 additional individuals (Table 2).

Selection of Participants

We identified participants according to clinical or administrative leadership in departments most likely to be affected by the increase in patient volume: ED, critical care, surgery, social work, obstetrics and gynecology, psychiatry, and ambulatory care. At each hospital, the ED medical director or chairperson was the point of contact and helped assemble personnel from other departments for interviews.

Data Collection and Processing

We ensured interviewees that their responses would be deidentified to enhance candid responses and provide confidentiality. Researchers visited each hospital and interviewed participants individually (44%) or in groups (56%), using semistructured, open-ended questions (Appendix E1, available

facilities during and after Hurricane Sandy. The study was exempt from Institutional Review Board approval. We did not focus on individual hospital evacuation decisions. In January 2013, we conducted key informant, telephone-based interviews with staff from hospitals, hospital administration, and public health departments in New York. We identified targeted individuals according to media reports, affected departments,

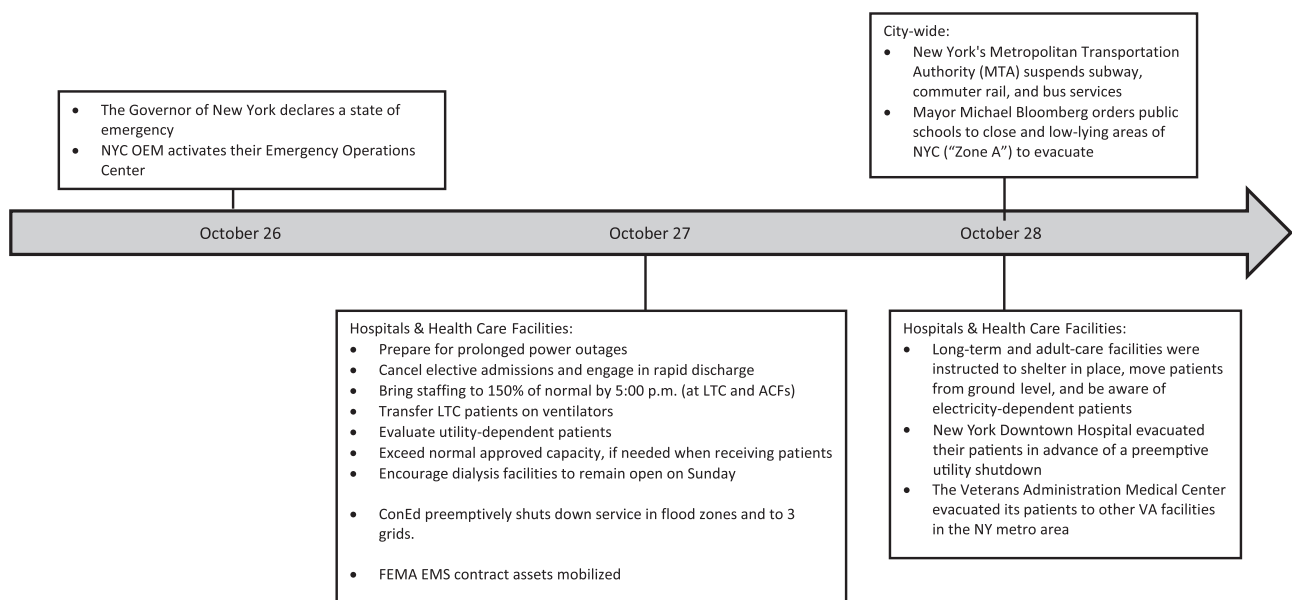


Figure 1. Prestorm timeline. OEM, Office of Emergency Management; LTC, long-term care; ACF, adult-care facilities.

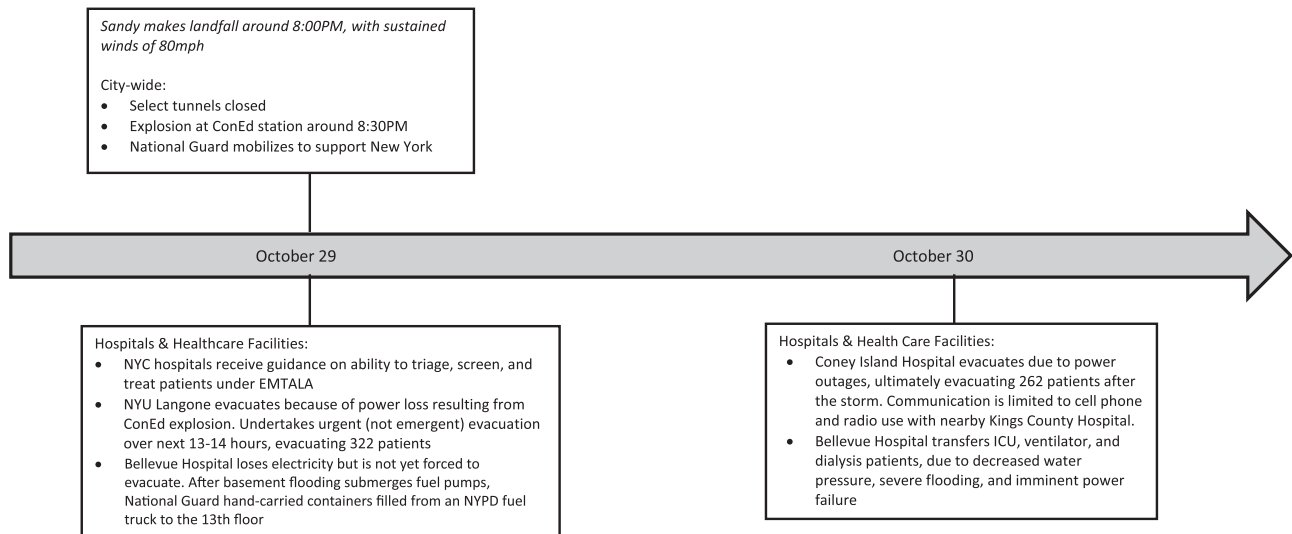


Figure 2. Timeline during the storm.

online at <http://www.annemergmed.com>), developed according to our previous work in hospital surge. Questions were not externally vetted before interviews. We handwrote notes and taped all interviews to ensure accuracy. Recordings were used to supplement written notes and were then destroyed. All notes were stored on a secure server or in confidential physical file folders, to which only the project team had access. All of the interviews were led by the lead researcher.

The project team consisted of 2 physicians, a paramedic, a public health attorney, and a person with a master's in public health, all of whom have worked full time on issues of public health and medical emergency preparedness for several years. Each of the project team members has been involved in multiple qualitative research projects that involve analyzing data from interviews with preparedness professionals, health care providers, policymakers, and scientists. We posed follow-up questions about specific specialties or institutional roles. We analyzed responses to identify themes based on recurring issues. No specific tool was used to group or organize identified themes. Our description of the responses is a synthesis of the most salient responses of the interviewees, attempting to aggregate the most common and important themes.

RESULTS

Interviewees at each receiving hospital reported that their institutions took precautionary measures, largely based on experiences during Hurricane Irene,[†] to mitigate Sandy's effect

[†]Hurricane Irene was a Category 1 hurricane that affected much of the East Coast in August 2011. The storm caused widespread destruction and is currently ranked as the seventh costliest hurricane in US history. In New York City, before the storm, city and state officials ordered the evacuation of nearly 7,100 patients in health care facilities throughout the city. This prestorm evacuation has since been questioned because the effect of the storm on New York City turned out to be much less severe than originally predicted.

on clinical operations. Although lessons from Irene influenced preparedness efforts, many interviewees indicated that mandatory evacuations during Irene were an overreaction and unlikely to recur. Nevertheless, hospitals anticipated requests to absorb a limited number of patients from hospitals within their individual system. They therefore took precautions to ensure they were prepared to shelter in place and receive some evacuated patients. Efforts included proactive management of the in-hospital census, adjusting operating room schedules, enhancing security, scheduling supply deliveries to arrive early, and ensuring adequate staffing levels and accommodations. All of the hospitals activated their incident command systems and participated in the citywide unified command structure.

Interviewees noted that they identified patients who could safely be discharged, ultimately discharging 10% to 25% of their prestorm census. Although anecdotally no adverse events were reported from these discharges (eg, readmissions), hospitals experienced difficulties discharging patients who required skilled nursing care because these arrangements take time to coordinate. Hospitals also reported concerns about discharging patients dependent on public transportation because this service would be suspended.

Concomitant with decanting the census, receiving hospitals also suspended elective surgeries for approximately 2 days to free operating room space and prevent elective admissions. Hospital administrators did not report resistance to this action.

Interviewees indicated that efforts were made to augment clinical and administrative staff during and after the storm. Anticipating that public transit and bridges providing access to Manhattan would be shut down, hospitals called supplemental staff before Sandy's landfall. Drawing on lessons learned from Irene, hospitals created sleeping quarters for employees, organized meals, and planned for employees to remain on site for 72 hours.

On October 26th, the NY State Department of Health and the New York City Department of Health and Mental Hygiene

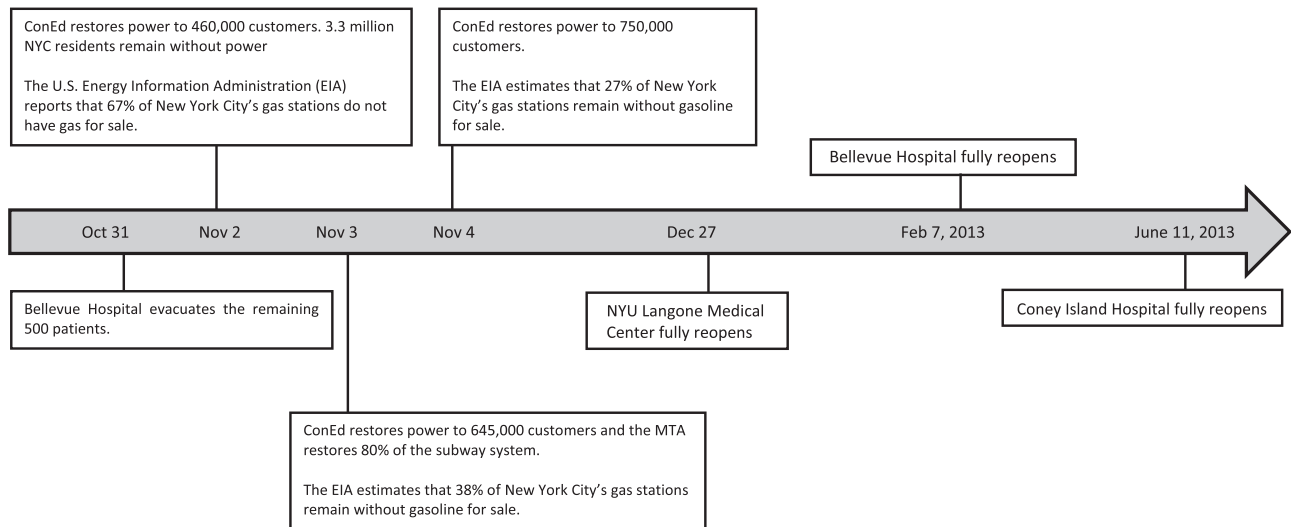


Figure 3. Poststorm timeline.

activated the interagency Healthcare Facility Evacuation Center.[‡] The center was first established by the New York City Office of Emergency Management in advance of Hurricane Irene to help coordinate the evacuation of health care facilities. During that storm, representatives from various health and medical agencies, including the New York City Fire Department Bureau of Emergency Medical Services (EMS), the New York City Department of Health and Mental Hygiene, and the Greater New York Hospital Association, staffed the Healthcare Facility Evacuation Center, and aided in the evacuation of at least 7,000 patients.² The center was again used leading up to Sandy.

The Healthcare Facility Evacuation Center was activated to facilitate the transfer of patients from evacuated facilities. From the center, the Greater New York Hospital Association communicated with hospitals to coordinate patient transfers. Hospitals informed the Association, which relayed that information to evacuating hospitals, of the number of beds available.

For situational awareness, the Healthcare Facility Evacuation Center relied on contacts within hospital emergency operations centers or on administrators with relationships with the Greater New York Hospital Association. Although this approach was reported as effective for some, one hospital reported that the center was unaware of the hospital emergency operations center and command structure and relied instead on calls from

clinicians on individual floors, making it difficult for the center to discern needs of the entire facility.

Although the Healthcare Facility Evacuation Center played an important role identifying available assets at potential receiving hospitals, much of the coordination took place bilaterally between sending and receiving hospitals, with direct conversations between clinicians with preexisting working relationships. Physicians preferred to send patients to nearby facilities with levels of comparable care and, when possible, within the same health system.

Whether clinicians were calling one another or using the Healthcare Facility Evacuation Center, communication during Sandy was difficult. Receiving facilities attempted to compile lists of incoming patients, documenting name, sex, and diagnosis, but obtaining patient reports proved challenging, especially given increasingly limited modes of communication. Facilities relied, with mixed results, on cell telephones, text messages, and radios because telephone systems were damaged.

Interviewees stated that although the Healthcare Facility Evacuation Center's efforts and strong prestorm relationships undoubtedly made response easier, lack of situational awareness at the center and facilities proved challenging throughout the storm. Some facilities received large numbers of patients with no advance notice, and others prepared to receive patients who instead went to other facilities. For example, one facility was told to prepare for 135 patients, but instead received only 35. Other

[‡]The Healthcare Facility Evacuation Center is the interagency command-structure mechanism by which the New York City Office of Emergency Management, Department of Health and Mental Hygiene, and Greater New York Hospital Association coordinated emergency interfacility transfers by matching evacuated patients with destination facilities that had the appropriate capacity and resources. Because of their placement and separation from evacuation operations, the center was intended to have citywide visibility of health care system capacity and status.

Table 1. Hospital characteristics.

Hospital	Beds	Trauma Center	Teaching Hospital	Private/Public
A	2,600	Yes; Level I	Yes	Private
B	1,171	No	Yes	Private
C	652	No	Yes	Private
D	1,028	Yes; Level I	Yes	Private

Table 2. Interviewee characteristics.

Physicians	21 (65% Emergency Medicine)
Nurses	12
EMS/hospital emergency management	6
Administration	21
Other	11
Total	71

hospitals received large numbers of patients who, given more effective communication, could have been more evenly distributed among multiple facilities. Several facilities relied on news broadcasts to determine which facilities were evacuating and the number of patient transports.

To overcome a lack of information, one receiving hospital sent 2 senior nurses to the patient loading area at one of the evacuating hospitals, where they relayed information on incoming patients by radio.

EMS personnel from several organizations contributed to the evacuation of hospitals. EMS in New York City are normally provided by a partnership between the New York City Fire Department Bureau of EMS and several hospital-based ambulance services through the city's 911 system.⁶ Hospitals also contract with private services primarily for interfacility transports. In the event of large-scale emergencies, mutual aid agreements and the Federal Emergency Management Agency National EMS Contract can help supplement additional resources.⁷ All these assets were used during Sandy, though patient transportation during hospital evacuations was primarily performed by hospital-based ambulance services and assets deployed under the contract.

When New York Downtown Hospital evacuated before Sandy, their EMS division collaborated with New York–Presbyterian EMS to coordinate the evacuation, which involved the transportation of 123 patients during 12 hours. Notably, facilities far from the hospital were prioritized to receive patients, and more proximal facilities were involved later. This decision was made to preserve some surge capacity at nearby institutions and increase the rate of evacuation toward the end. However, some participants believed this strategy resulted in longer transport times and that more frequent, shorter transports would have been preferable.

In contrast, the emergency evacuations of NYU Langone and Bellevue were more complex and chaotic. Between the 2 facilities, approximately 1,000 patients were transported to receiving hospitals, mainly in Manhattan, during 3 days.⁸ The activation of the Federal Emergency Management Agency EMS Contract helped meet the need for patient transportation. Under this mechanism, an EMS provider deployed 368 ground ambulances from throughout the United States to New York City, expediting the evacuations.⁷

Participants noted several challenges with the EMS response, including personnel who were unfamiliar with the city's geography and the location of some receiving facilities, environmental conditions, lack of centralized command and control for EMS operations at the 2 sending facilities, provider fatigue, and lack of fuel.

Interviewees reported that EMS personnel provided clinicians at receiving hospitals with their understanding of facility status, incoming patient number and disposition, and other salient factors. This information was important in achieving situational awareness at receiving hospitals because official updates from the Healthcare Facility Evacuation Center or evacuating hospitals were deemed by some hospitals to be inadequate.

Hospitals received patients in one of 2 manners: admission to beds on nursing units directly from ambulances (3), or through the ED, where patients were rapidly assessed and triaged (1).

In choosing to process patients through the ED, participants cited the ability to assess potential deterioration during transport or the ability to modify a patient's designated acuity level. These brief ED assessments were segregated from the main workspace of the ED and were not viewed as disruptive to regular ED throughput. Hospitals using direct admissions mostly knew the diagnosis and condition of patients before arrival. Those hospitals did not anticipate clinical deterioration of patients during transport but did report concerns about crowding the ED.

The information receiving hospitals obtained from evacuating hospitals varied from case to case. Sources included direct information conveyed to chief medical officers, physician-to-physician reports, partial chart materials, anecdotal EMS reports, and face-to-face nurse-to-nurse handoffs. With pre-event evacuated hospitals, communication was generally robust. According to interviewees, the information shared about evacuated patients during the midst of sudden evacuation may have been inadequate.

One hospital reported that as the evacuation continued and became more imperative, information became more scant. Hospitals cited unavailability of electronic medical records from one evacuating hospital as hindering communications about patient information.

In the days and weeks after Sandy, the city continued to feel the effects of the devastating storm. In Manhattan, methadone and dialysis clinics were unable to reopen, and 4 hospitals around the city only gradually reopened after weeks or months of restoration.^{9–12} For hospitals that remained open, this resulted in significant challenges related to patient volume, methadone and dialysis patients, and absorption of displaced health care workers.

All interviewed hospitals experienced a posthurricane surge in ED volume of approximately 20% during the months preceding the reopening of evacuated hospitals' EDs. This surge was attributed to the loss of 2 major EDs in the area, individuals with chronic medical needs who would typically seek care at closed facilities, and the beginning of influenza season and was corroborated by proprietary hospital census data. To facilitate care for the increased patient load, hospitals converted empty spaces into areas in which patients could be treated. One hospital converted a building lobby into an ad hoc ED patient care area. Hospitals also managed the surge by frequent bed meetings, increasing staff, creating holding areas for admitted patients, and using urgent care areas to treat higher-acuity patients.

As expected, operating and delivery rooms also experienced higher volumes as surgeons and obstetricians sought venues in which

to practice. Hospitals augmented labor and delivery staffing and credentialed displaced obstetricians to absorb the increased load.

Hospitals reported the arrival of patients seeking medication at EDs because of inaccessible pharmacies and methadone clinics. However, this posed a challenge because hospital EDs had no way to confirm prescriptions or doses.

Also, because many dialysis centers were unable to reopen after Sandy, many hemodialysis patients presented to EDs for dialysis.¹³ Most hospitals have limited dialysis capacity because routine dialysis is performed in freestanding outpatient facilities and is not a procedure often performed in EDs.

After Sandy, many dialysis patients missed 1 or more treatments and some were in crisis. ED staff had to correct electrolyte imbalances as best they could until alternative dialysis arrangements could be made in the hospital or at functioning dialysis centers. Generally, hemodialysis was not performed in EDs. One interviewed hospital anticipated this need and arranged for rapid triage of patients requiring hemodialysis to an off-site dialysis center, forestalling the need for admission.

Hospital closures displaced thousands of physicians, nurses, and other providers. After Sandy, the facilities that received evacuated patients also used displaced health professionals to alleviate patient surge. Using licensed personnel necessitates formal credentialing, a process governed by internal hospital policies in accordance with applicable laws and regulations. Credentialing can be time consuming because performing background checks, gathering peer references, and investigating malpractice claims can take months. However, most hospitals have abbreviated credentialing procedures for use in emergencies. For example, temporary emergency admitting privileges can be granted on the spot to a physician by the hospital's Chief Medical Officer, pending formal credentialing.

Credentialing processes varied among receiving hospitals. One hospital fast-tracked credentialing of physicians from an evacuated hospital to help treat new patients. However, another hospital proceeded to credential through the usual process, albeit at a faster pace.

In some cases, "absorbed" staff from evacuated hospitals were kept as a discrete team, taking care of patients who were transferred from the same hospital. The duration these newly credentialed personnel worked at a new facility varied from less than a day to several months. In some cases, personnel were credentialed but never worked in the new hospital.

Despite having to undergo training at new facilities, especially to learn unfamiliar information technology systems, freshly credentialed staff members were key to meeting patient needs during response. However, one facility, struggling with meeting staffing needs, was reluctant to take on nurses from an evacuated hospital because of fear of being seen as poaching staff.

In addition to hospitals, Sandy adversely affected nursing and assisted living facilities. Despite mandated precautions, 30 nursing or adult care facilities evacuated, displacing roughly 6,300 residents.² Some facilities attempted to evacuate residents

to hospitals, but this was sometimes infeasible, given the strain hospitals faced during the storm.

To meet the needs of these vulnerable populations, the New York City Department of Health and Mental Hygiene opened 8 medical shelters staffed by volunteer health professionals. These shelters provided basic care for approximately 1,800 residents.¹ Issues during the evacuation and care of residents included a lack of medical records systems and the arrival of evacuees with conditions necessitating hospitalization.

At the interviews, participants noted that reimbursement for transferred patients was a significant, unresolved problem. Receiving hospitals incurred significant costs associated with the care of evacuated patients, without assurance of how or whether they would be reimbursed for that care. However, guidelines for reimbursement now exist.¹⁴

LIMITATIONS

Given its qualitative interview-based methodology, our study is limited by the potential for recall, experience-based, and related biases of our interviewees and interviewers, as well as the fact that our primary focus was on receiving hospitals. These biases may have been compounded by the months that elapsed between the events and our interviews. Additionally, because our interview selection process was based on identification of key response personnel, there is a chance that individuals were inadvertently excluded. Our questions were also not pilot tested before interviews and may have been suboptimal at eliciting information. Last, because New York City is geographically unique, with a large number of hospitals in a small geographic area, findings may not be easily extrapolated to other regions, and the nature of this event may also limit generalizability to other scenarios.

DISCUSSION

In analyzing the experiences of hospitals that received evacuated patients during Sandy, several broad themes were apparent after analysis of interviewee reports, including the essential nature of prestorm anticipatory actions, leveraging preexisting relationships with peers at other hospitals, the limitations of central coordination, communication difficulties, the need to plan for postevent surge (including addressing the needs of special populations), electronic medical record availability, and EMS logistic challenges.

One finding warrants further study to assess its role in other disaster scenarios. We found that hospital emergency managers consistently reported that their first calls during Sandy were to their counterparts in other hospitals with whom they already had a relationship. Whether first turning to colleagues—rather than to a central coordinating entity—is behavior peculiar to this event or to hospital emergency management culture in New York City or whether this behavior is something to be expected in other disasters is unclear.

This behavior could be the result of the rise of health care coalitions, which have fostered interpersonal relationships among

hospital emergency managers.¹⁵ Health care coalitions, in various stages of development across the country, collaborate and pool resources to develop regional resiliency to disasters and, in so doing, rely on strong relationships among member hospitals.⁴ New York hospitals, with the support of the Greater New York Hospital Association, implemented some response functions of a coalition by making bed space and personnel available to evacuating hospitals. As has already been written with respect to Sandy, future regional hospital evacuation planning may best be situated at the coalition level and will harness the power of already existing relationships.^{16,17}

Although the Healthcare Facility Evacuation Center/Greater New York Hospital Association played an important role in identifying potential receiving hospitals, it did not replace dialogue between staff at affected hospitals. Specialized patient needs require clinicians to be involved in the process. Also, the desire to keep patients within the care of a single hospital system or physician practice may have influenced some decisions. Although privately arranging transfers may be in the best interest of an individual patient or physician, these behaviors are often discouraged because they may inhibit an organized, efficient evacuation that is in the best interest of all patients. However, during hospital evacuations after an earthquake in California both methods worked equally well, arguing that a hybrid approach, which retains some control while allowing some degree of flexibility to address unique patient needs and accommodating bilateral discussions among clinicians, may be optimal.¹⁸

That the lack of communication and absence of needed information posed challenges was not surprising. The concurrent failure of redundant communication during Sandy raises the question of how many layers of redundancy is enough. In widespread natural disasters, in which telephone systems and Internet connections may all be inoperable, alternate stand-alone communication systems may be necessary (eg, ham or 2-way radios). Sandy reinforces the need to establish shared, resilient, and redundant communication systems within and among hospitals.

An additional element of communication, also identified in a review of hospital evacuations after Hurricane Rita, is the crucial need for situational awareness, a key component of efficient hospital evacuation.¹⁹ As such, real-time, 2-way updates between the Healthcare Facility Evacuation Center and health care facilities should be prioritized, as well as the establishment of a bed availability database to be shared during emergencies.

Another significant problem identified was limited access to medical records. Pre-event preparation should include ensuring reliable, up-to-date, and accurate access to patients' medical records. As many hospitals move toward off-site storage of electronic medical records, lack of access should be less problematic because records will become accessible from any Internet-connected computer. Meanwhile, for hospitals without this capability, at minimum, essential summary information (patient lists, problem lists, medication lists, admission history,

and physical examinations) should be printed before a predicted disaster. These needs could form the basis for "downtime" drills by hospitals to emphasize the need for a paper backup in the event of an emergency.²⁰

Last, the prolonged hospital-wide surge caused by hospital closures—a supply shock rather than a demand spike—proved more difficult to manage than any anticipated acute surge. As discovered in a previous New York City hospital surge event, hospitals mostly coped "by doing what they knew," using several well-described techniques such as the conversion of open space into patient care areas, streamlining ED processes (eg, minimizing boarding), and use of supplementary staff.²¹ A possible underrecognized component of disaster response is the accommodation of patient surge through a streamlined provider credentialing process, along with just-in-time training on potentially unfamiliar IT systems.

The field of hospital emergency preparedness has undergone a major frame shift during the last decade. Many hospital systems, professional societies, and other stakeholders have devoted considerable resources to preparing for all hazards—including extreme weather event surge responses,²² coalition building, alternate care sites,²³ and implementation of crisis standards of care.^{24,25} These investments were leveraged in New York City's exemplary medical response to Sandy and clearly reflect significant advancements in hospital preparedness. Sandy also illustrates the need to design for resilience by improving hospital infrastructure, especially to ensure the integrity of the power supply, thereby minimizing the need for evacuation.²⁶

Health care emergency planners at all levels should carefully consider lessons from Sandy to improve the resiliency of the overall health care system.

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APPENDIX E1.**Interview questions.**

For receiving hospitals

1. Background

- a. Can you tell us about your role at [name of hospital] and how were you involved during Hurricane Sandy response efforts?
 - i. Did you anticipate having this role or were your responsibilities unexpected?
- b. Tell us about your hospital:
 - i. Number of staffed beds?
 - ii. Range of services (eg, trauma center)?
 - iii. For profit, not for profit, public?
 - iv. Teaching hospital?
 - v. Is your hospital part of a larger health system? If so, what other facilities (hospitals or other)? Does your hospital have an affiliation with any of the evacuated hospitals?

2. Hospital Preparedness Plans

- a. Can you share with us how the hospital's preparedness plans addresses evacuation of patients and, more specifically, receiving patients from other hospitals?
 - i. What aspects of preparedness plans worked especially well?
 - ii. What did not work as expected?
 - iii. What was missing from plans?
- b. To what extent did collaborating with other hospitals and agencies in advance better prepare you to respond to Sandy?
 - i. How did this collaboration take place?

3. Response Operations

- a. Collaboration and coordination
 - i. How was the decision made of how many patients you would receive and from which sending hospitals? To what extent was this coordinated among the receiving hospitals and by whom?
 - ii. What role did the New York City Healthcare Evacuation Center have on response operations?
 - iii. What role did the Greater New York Hospital Association play in your response?
 - iv. To what extent and how did the hospital engage with nonmedical entities (eg, shelters, the Red Cross, Medical Reserve Corps, Federal Emergency Management Agency, nursing facilities)?
- b. Patient surge
 - i. Transferred patients:
 1. How many patients were transferred to your hospital?
 2. During what time frame?
 3. Which hospitals did you receive patients from?
 4. What was the timeline between when you were notified you would receive patients and the time they arrived?
 5. How was the notification made?
 6. How were patients transported?

7. What types of medical needs did the transferred patients have?
 - a. Acute vs nonacute care?
 - b. Specific health needs (eg, psychiatry, oncology, surgical)?
- ii. Other than transferred patients, to what extent did you see an increase in patient volume (ED, outpatient and inpatient) related to the other hospitals being closed?
 1. What types of medical needs did these additional patients have?
 - a. Acute vs nonacute care?
 - b. Specific health needs (eg, psychiatry, oncology, surgical)?
- iii. How could your capabilities meet these needs?
- iv. How did you integrate medical personnel from other hospitals into your operations? What worked? What did not?
- v. Describe any innovations or adaptations that helped accommodate influx of patients (eg, converting other units to makeshift ICU, handwriting orders after computers went down, using cell telephones and personal relationships to connect with staff at other hospitals).
- vi. What are your impressions about how hospital personnel handled the influx of patients?
- vii. What other operational and logistic challenges did you have with a large influx of patients?
- c. Continuity of care
 - i. What worked and did not work in regard to continuity of care for relocated patients?
 - ii. How did you obtain medical information about relocated patients?
 1. What was the role of electronic medical records?
 2. What communication did you have with staff from the hospitals sending these patients?
- d. Policies and procedures
 - i. What policies or procedures enabled an efficient response?
 - ii. What policies/procedures would you change now to better prepare you for a similar response?
 - iii. What legal concerns did you have during this response?

4. Lessons Learned and Future Preparedness

- a. What are the main lessons that you learned from Hurricane Sandy, particularly in regard to your ability to absorb a large influx of patients?
 - i. What have been the immediate effects on hospital operations of receiving so many patients?
 - ii. What do you anticipate will be the long-term effect(s)?
 - iii. What should your hospital do now to better prepare for a similar disaster (facilities, personnel, equipment, etc)?
- b. If you could give policymakers a "wish list" of 2 to 3 key requests, what would they be? What would you want them to know?

5. Conclusion

- a. Is there anything else you would like to add?
- b. Do you have any suggestions of other people we should talk to?