In Search of the Silver Lining
The Impact of Superstorm Sandy on Bellevue Hospital

Amit Uppal1*, Laura Evans1*, Nishay Chitkara1, Paru Patrawalla1, M. Ann Mooney1, Doreen Addrizzo-Harris1, Eric Leibert1, Joan Reibman1, Linda Rogers1, Kenneth I. Berger1, Jun-Chieh Tsay1, and William N. Rom1,2

1Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Medicine, and 2Department of Environmental Medicine, New York University School of Medicine, New York, New York

Keywords: climate change; disaster medicine

Superstorm Sandy made landfall on the evening of October 29, 2012. The storm caused severe flooding, power outages, and billions of dollars in damage to New York City and surrounding areas. The storm forced the evacuation and closure of Bellevue Hospital, the oldest public hospital in the United States and the primary teaching site for the New York University (NYU) School of Medicine. As members of the NYU Division of Pulmonary, Critical Care, and Sleep Medicine, we cared for a distinctly vulnerable group of patients during the storm and the evacuation of Bellevue Hospital. Although the circumstances of the storm and the characteristics of our hospital may be unique, the way in which we prepared for and conducted the evacuation may be useful to hospital systems that find themselves in similar circumstances. Perhaps even more useful are the lessons we learned from our shortcomings during this time. By telling this story, we hope to remember the heroic acts we witnessed and the gratitude we felt for those who came to our aid.

Manhattan

To understand the effect of Superstorm Sandy on our hospital system, one must first recognize the vulnerabilities of Manhattan. Although New York Harbor separates it from the open sea, the harbor entrance is actually funnel-shaped. The consequence of this shape is that, during an ocean surge, a huge mass of water is channeled into the small harbor entrance. The surge is thus amplified as it is directed at the southern tip of Manhattan and transmitted to the Hudson and East rivers. Because of land reclamation projects using landfill material, both rivers have lost thousands of acres of tidal marshes. As a result, their level and direction of flow vary with the ocean tide. Because they form Manhattan’s western and eastern borders, large areas of the borough are vulnerable to tidal fluctuations and storm surge (1). These fluctuations can lead to devastating flooding. As much as 14% of Manhattan sits on land reclaimed from the ocean, and several parts are less than 8 ft above sea level. The subway system, telecommunication cables, power lines, and plumbing are all underground. Although this location protects them from winds and accumulating snow, it makes them vulnerable to flooding. Last, the population density in Manhattan is the highest in the nation. This means that flooding in a small area can potentially impact millions of people (2).

Bellevue Hospital

Bellevue Hospital, founded in 1736, is located less than 1,000 ft from the East River, on land that is only 20 ft above sea level. Originally on the waterfront, the hospital is now separated from the East River by a stretch of the Franklin D. Roosevelt East River Drive (the FDR), which was constructed on reclaimed land. Bellevue is an 828-bed level 1 trauma center with large, busy intensive care units (ICUs), a locked tuberculosis (TB) isolation ward, and outpatient clinics that serve thousands of people each day. Bellevue serves as an essential safety net for some of New York City’s most vulnerable residents (3).

In its long history, Bellevue has survived natural disasters as well as blackouts, plane crashes, terrorist attacks, the height of the AIDS epidemic, and the associated resurgence of TB in the city. Before Superstorm Sandy, none of these events forced the evacuation or closure of the hospital. On the contrary, Bellevue often served as a sanctuary. In this context, one can imagine the significance of a storm that forced the hospital to evacuate and remain closed for several weeks. Although the size and strength of Superstorm Sandy were unprecedented, the outcome could have been much worse if the preparedness of the staff at Bellevue had not been tested and refined during Hurricane Irene, 1 year before Sandy.

Hurricane Irene

Hurricane Irene approached the northeast in August 2011. Aside from the winds and

(Received in original form December 6, 2012; accepted in final form January 21, 2013)

*These authors contributed equally to this manuscript.

Correspondence and requests for reprints should be addressed to Laura Evans, M.D., Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Medicine, and Department of Environmental Medicine, New York University School of Medicine, 550 1st Avenue, New York, NY 10016. E-mail: laura.evans@nyumc.org

Copyright © 2013 by the American Thoracic Society
DOI: 10.1513/AnnalsATS.201212-116OT
Internet address: www.atsjournals.org
rainfall, the main concern was the storm surge that could potentially flood parts of the city. Before the storm arrived, Manhattan was declared in a state of emergency, and mandatory evacuation of low-lying areas was ordered. Although the city’s hospitals were well prepared to accommodate victims of external disasters, this situation forced them to evaluate their readiness for flooding and possible loss of power. Bellevue’s internal examination revealed that its power supply was its most significant vulnerability. If the hospital was to lose main power, it would depend on backup generator power. The generators, located on the 13th floor, would not be directly affected by flooding. However, the generator’s fuel pumps, located in the basement, would fail if submerged. This would result in a total loss of power to the hospital.

Although a loss of power would certainly affect the entire hospital, the most immediate and dramatic impact would be in the critical care areas. Preparing for this contingency in the ICU meant planning to care for patients dependent on machinery such as mechanical ventilators, medication pumps, and dialysis equipment. In the most extreme circumstances, if resources became scarcer than the patients who required them, decisions about resource allocation would have to be made. These could, quite literally, be life-and-death decisions with major ethical and legal implications. These issues were being considered and discussed under stressful and urgent circumstances as Hurricane Irene approached.

In August 2011, Hurricane Irene devastated several parts of New York and nearby states. Many suffered from loss of property, prolonged power outages, contamination of local waters by sewage, prolonged interruption in public transit lines, and long-lasting effects on crop yields. In contrast, Manhattan suffered limited flooding, no interruption in power, and was largely unaffected (4). The opportunity to learn an important lesson without a patient being harmed is a rare occurrence in medicine. Hurricane Irene gave us just that opportunity.

To address the vulnerability of the backup generator fuel pumps, they were encased within protective structures and sealed by submarine-style doors. This intervention would, it was thought, allow the pumps to continue functioning even if the basement flooded. Modifications were made to the hospital disaster plan in light of what we learned through preparations for Hurricane Irene. With these changes, we felt prepared for the next “100-year storm,” which, as fate would have it, arrived the next year.

Superstorm Sandy

Superstorm Sandy started as a tropical storm on October 22, 2012. Two days later, it was upgraded to a category 1 hurricane. It made landfall in Cuba and the Bahamas, gathered strength, and then curved north along the eastern coast of the United States. This path is common for storms originating in the Atlantic Ocean or Caribbean Sea. However, these storms usually encounter a predominant easterly jet stream that pushes them out to sea before they reach the northeastern United States. As Sandy made its way north, a high-pressure system over Greenland created a predominant northwesterly jet stream. This stalled an Arctic storm and caused it to collide with Sandy. A phenomenon known as the “Fujiwhara effect” caused the two storms to rotate around each other and put them both on a course for the northeastern United States. As Sandy made its way north, a high-pressure system over Greenland created a predominant northwesterly jet stream. This stalled an Arctic storm and caused it to collide with Sandy. A phenomenon known as the “Fujiwhara effect” caused the two storms to rotate around each other and put them both on a course for the northeastern United States (5, 6). This combination of storms led most media outlets to adopt the term “Superstorm.”

As the storm approached, landfall near Manhattan appeared likely. New York was declared in a state of emergency, and President Obama preemptively declared the situation a disaster. This allowed federal resources to be deployed before the storm had actually arrived. The National Guard put more than 45,000 personnel on alert and deployed more than 200 troops to Manhattan. Public transportation was suspended, schools were closed, and mandatory evacuation of low-lying areas was ordered.

Preparing for the Storm

As it had been during Hurricane Irene, Bellevue Hospital’s main vulnerability was its power supply. If flooding occurred, primary power might be lost. Backup generator power would rely on the structures now encasing the fuel pumps, and the efficacy of these structures remained unproven. There was also a supplementary generator supplied by a separate fuel pump that could conceivably provide limited power if the main generators failed. In the worst-case scenario, both generators would fail and the hospital would be left without power.

The effects of Superstorm Sandy were evident many hours before it arrived. At 8:00 a.m. on October 29, 12 hours before the storm made landfall, the high-tide water levels in parts of Manhattan were already at moderate flood stage. Although the water level receded during low tide, it appeared that the arrival of the storm would coincide with the next high-tide cycle. To make matters worse, there would be a full moon that night. Sandy was expected to bring a storm surge of approximately 11 ft. As a reference, flooding would begin when the storm surge reached 6.7 ft (7).

In preparation for the storm and the planned suspension of public transit, many staff members, including ICU
leadership, arrived before the storm. They came prepared to stay for the duration of the event. The 56 adult ICU beds at Bellevue are organized into medical, surgical, cardiac, and neurosurgical units. A closed design is used, and the ICU leadership structure includes a director of critical care as well as individual directors of each unit. ICU leadership evaluated each critically ill patient to assess their level of dependence on life-sustaining equipment. If possible, attempts were made to wean the assistance. Patients who required ongoing support were listed by level of acuity in anticipation of a potential loss of power. Other forms of support, such as supplemental oxygen and continuous medication drips, were titrated to their minimum required level.

By that afternoon, with the storm still several hours away, flooding was already noted on the FDR (Figure 1). There was no evidence of flooding within the hospital and there had been no interruption in power. Efforts were being made to maintain the morale of the ICU staff, many of whom had been asked to stay in the hospital the night before their scheduled shift. To this end, “The Breakfast Club” was shown and snacks were provided. This was indeed the calm before the storm, and was the last moment many of the staff would rest during the subsequent 72 hours.

As the movie was coming to an end, the conditions outside were clearly worsening. Even a brief walk outside was difficult as the wind gusts were over 70 mph (8). The East River was flowing over the FDR and westward toward the hospital (Figure 2). From the windows of the ICU, a car could be seen stranded on the highway, surrounded by rising waters. The driver was signaling that he needed assistance, and the ICU staff made repeated attempts to reach emergency services. At that time, 9-1-1 operators were overwhelmed by more than 10 times their normal call volume (9).

ICU leadership met at the hospital command center for an update. Television news reported that the storm had ripped the façade off of a Westside apartment complex, leaving the personal belongings of the residents visible from the street below (10). These images revealed the strength of the storm and created a sense that, like the contents of those apartments, we were exposed. A staff member suddenly exclaimed that the waterfront apartment complex just east of the hospital had “gone down.” This created a few moments of panic as the phrasing seemed to imply that the building had collapsed. Some relief came with the clarification that the building had only lost power, but the level of tension had clearly increased. The storm, it seemed, was closing in around us.

Updates in the command center revealed that a cellular tower was damaged, causing significant interruptions in communication for customers. The main concern remained the power supply. Loss of power could represent one of three possibilities: the transition to a different...
power grid, the loss of main power and transition to generator power, or the prelude to a full power loss. At that time, approximately 7:15 P.M., the basement was dry. The storm would make landfall in the next hour (Figure 3) and high tide, the time of greatest flood risk, was expected at 10:30 P.M.

In preparation for a potential power loss, each ICU patient was reevaluated. All continuous drips were reviewed and simplified to the extent possible. All IV pumps not in use were plugged in to charge. Gravity-drip manual IV infusion systems were collected and placed at the bedside of patients who still required continuous infusions. Calculations to convert their current infusion rate into drips per minute were made and documented. Because the pumps that supplied wall oxygen were also in the basement, there was a possibility that we would lose central oxygen. Oxygen tanks were deployed to the bedside of patients requiring supplemental oxygen. Two staff members were assigned to each mechanically ventilated patient. In the event of total power loss, their role would be to manually ventilate the patient in alternating shifts.

In the event of total power loss, limited resources would have to be allocated to the patients most likely to benefit from them. This issue had been addressed during preparations for Hurricane Irene and there was already a precedent for a transparent, ethical, and multidisciplinary process in making determinations of resource allocation. Thus, a committee was formed and included representatives from critical care, surgery, nursing, and ethics. This group reviewed every patient in the ICU and evaluated their severity of illness, need for life-sustaining equipment, and likelihood of recovery. The Ontario guidelines for allocation of limited ventilators during pandemic influenza were adapted and applied to our specific circumstance (11). While this process was underway, the lights began to flicker.

**Power Down**

At approximately 9:00 P.M., there was a brief loss of light, followed by a return of emergency lights and outlets. The hospital was now operating on generator power. Millions of gallons of water were rushing into the basement, which had been dry less than 2 hours earlier. Although some elevator service should have remained while on generator power, water could be heard rushing into the elevator pits and all elevator service was lost. Cell phone service was inconsistent, but landline telephones remained functional at that time. At 10:00 P.M., the mechanisms protecting the generator fuel pumps failed. The pumps were now submerged, and all power would be lost when the generators ran out of fuel. This was likely to occur in the next two hours. There was a possibility that an additional backup generator, supplied by a separate fuel pump, would remain functional. This generator, designed to provide power to a different building in the medical center, could power six outlets in the entire ICU. Those patients most dependent on electrical devices were moved as close as possible to these outlets, and extension cords were used to power the necessary equipment. The peak of high tide was yet to arrive.

High-tide arrived at 10:30 P.M. and brought a massive 14-ft storm surge, well above the predicted 11-ft surge. The view from any window in the ICU revealed that the hospital was completely surrounded by water. While we were working under the assumption that generator power would be lost, National Guard troops and hundreds of hospital staff members, ranging from hospital administrators to custodial workers, began carrying fuel from the ground up to the generators. They were able to form a continuous brigade, standing shoulder-to-shoulder up 13 flights of stairs (Figures 4 and 5). They passed the drums of fuel up to one final person, who carried the drum up a small ladder and poured it into the generator fuel tank. In the end, this brigade worked through the night and the following day and managed to supply the generators with enough fuel to last approximately 72 hours. This tremendous effort prevented the hospital from being thrown into total darkness, and protected countless patients from harm.

**Communications, Water, and Oxygen**

Soon after avoiding a power blackout, we suffered a communication blackout. Cellular networks were either damaged by the storm or overwhelmed with traffic. Our medical center e-mail server had gone offline. Hospital landlines, including the emergency phones, had been damaged by the flooding. Two-way radios had been distributed for emergency communications, but there were too few to handle such a massive coordinated effort. Essential information could be exchanged between the ICU and...
the command center only by sending messengers up and down 10 flights of stairs.

One of the limited communications we were able to receive was that our water supply, dependent on water pumped from the ground to large tanks on the roof, would soon run out. This would mean no way to wash hands, bathe, or flush toilets. This would also mean inadequate water pressure to perform dialysis on patients who required it. With the loading dock now submerged, drinking water would be limited to the amount of bottled water already in the hospital. At midnight, because of the high likelihood that wall oxygen would be lost, National Guard troops began carrying H-cylinders of oxygen, each weighing 180 pounds, from the ground floor to the 10th floor. Many of these cylinders were carried up the stairs by teams of two National Guardsmen, providing a short-term supply of oxygen if central oxygen were to fail (Figures 6 and 7). Diagnostic imaging and laboratories, with the exception of blood gases, could not be done. Staff found creative ways to care for our patients despite these limitations. Pharmacists designed an in-hospital courier system and worked around the clock to provide needed medications. With the field illuminated by flashlights, a chest tube was placed in a patient on the medical ward.

The Decision to Evacuate

At daybreak on Tuesday, October 30, the view from the ICU confirmed that the rain had lightened, the wind had died down, and the floodwaters had begun to recede. Although it became easier to see what the storm had left behind, it became more difficult to see what lay ahead. Main power could not be restored in the near future and the generators were running on a limited supply of fuel. Without a reliable power source, we could not care for our patients indefinitely. Evacuation would be necessary. This enormous project would have to be achieved while conditions within the hospital were rapidly deteriorating. Vacuum power had been lost and patients were being suctioned via syringes attached to suction catheters. Food and water supplies were running low. Trash began filling the hallways. All 1,000 toilets could only be described as unusable, and staff members were forced to use bedside commodes in empty patient rooms. Many members of the hospital staff, despite these conditions and their concerns about their own homes and loved ones, chose to stay and assist with the evacuation.

Ambulance Crews

No step in the evacuation would be simple. Without functioning elevators, every ICU patient would have to be carried down 10 flights of stairs. Ambulance crews were in short supply, and more could not arrive until the city’s bridges and tunnels reopened. Nearby hospitals were already overwhelmed with patients evacuated from NYU Langone Medical Center during the storm.

The first patients to be evacuated, those on mechanical ventilators or requiring dialysis, were prepared for transport and carried downstairs by anyone willing to help. This included physicians, nurses, medical students, and ambulance crews. Although inspiring, the efforts were inefficient. Some patients, weighing as much as 185 kg, could only be carried by two teams of National Guard troops working in shifts and would require hours to successfully evacuate.

By midday on Wednesday, October 31, the conditions outside had greatly improved. News of our situation had spread, and ambulance crews poured in from all over the country. They represented Alabama, Colorado, Connecticut, Illinois, Louisiana, Michigan, Ohio, and many others. At the same time, more than 300 additional National Guard troops arrived to assist in the evacuation. With this additional help, the pace of the evacuation changed. The huge number of ambulance crews was able to mass in the lobby, while the National Guardsmen would carry the patients down the stairs. By 9:00 P.M., up to 30 patients were being evacuated each hour. The last ICU patient was transported out at 10:00 P.M. (Figure 8). The ICU staff, many of whom had been working for nearly 96 straight hours, erupted in applause, hugs, and tears of joy.

By the morning of Thursday, November 1, the majority of Bellevue Hospital had been evacuated. The only patients who remained in the hospital were those with distinctive needs. This included two patients who could not be moved without a functional elevator and several patients with TB who were mandated by the Department of Health to remain hospitalized for the duration of their TB treatment (12). Over the course of the next 12–48 hours, these patients were also evacuated.

Evacuated patients were sent to receiving facilities with as much information as possible. As many computers were not reliably functioning during the evacuation, written notes were sent with some patients. Some of the patients with resistant TB were receiving second- and third-line medications. To avoid any interruptions...
in therapy, supplies of these medications were sent with the patients. In the hours following the evacuation, we learned that some patients arrived at receiving facilities without accompanying records and staff spent many hours ensuring that the accepting facilities had received adequate information to safely care for the evacuated patients. In the end, more than 700 patients were evacuated within 48 hours and no deaths or serious adverse events were reported. However, the challenges didn’t end with the evacuation of the last patient.

Outpatient Clinics

Thousands of outpatients are treated every day in Bellevue’s clinics. Within days of the evacuation, “virtual” clinics were set up. In the absence of working hospital telephones, staff and physicians called patients on any cell phone or land line available; making so many calls that some wore gloves to hold their overheated cell phones. Crowding into full facilities, doctors used remote access to the electronic medical record and cared for acute events and patients with urgent needs. Patients who had been undergoing diagnostic evaluations before the storm were seen urgently to ensure continuity. Some faculty and fellows, in their free time, volunteered at medical shelters and ad hoc clinics in some of New York City’s hardest hit areas.

Fellowship Training Program

Bellevue is the primary training site for most NYU School of Medicine programs. The other training sites, NYU Langone Medical Center and Manhattan Veterans Administration (VA) Hospital, had also evacuated because of the storm and were expected to remain closed for several weeks to months. House staff, attending physicians, and nurses were deployed to many of the facilities that had received our patients. The storm also interrupted our fellowship interview season. Several interviews had to be cancelled, and those that could be rescheduled were conducted in the lobby of a nearby hotel or via online video conference.

Maintaining communication with faculty and fellows was a priority. However, email servers remained offline and cellular phone networks were still overloaded. An impromptu list of personal e-mail addresses was generated. Departmental meetings were held at local restaurants and hotels for planning, dissemination of information, and to maintain a sense of camaraderie and cohesiveness among our faculty and fellows.

Impact on Research

Years of research efforts were placed in jeopardy when many buildings on the NYU medical campus lost all power. Faculty, fellows, and postdoctoral students went to heroic lengths to save research samples, animal colonies, and records. Many researchers moved their samples to the few laboratories with functioning backup power. Others carried dry ice to their laboratories to save samples. Laboratories throughout the city offered to share their space for temporary sample storage, and a “Research Help Desk” was set up to organize these efforts. Samples were transported to off-site locations by rented trucks with -80°C freezers. This intervention ensured that samples were safe, but also meant they would not be available for daily experiments. Despite the heroic efforts of NYU researchers, thousands of research animals were lost in the flooding, many of them valuable transgenic mouse lines.

Investigators who had used the Clinical and Translational Science Institute facility located within Bellevue Hospital had no place to conduct patient visits, and they scrambled to find space to continue their clinical trials. Essential study equipment was recovered from the hospital buildings so that their work could continue during hospital repairs. Medications that had been stored in the research pharmacy had to be replaced. In the days following the storm, many discussions were held with NIH leadership to ensure ongoing support through the disaster. With this assistance, we hope to recover all basic, translational, and clinical research efforts.

Looking Back

For more than 275 years, Bellevue Hospital has opened its doors and offered assistance to anyone in need. For the first time in that history, our hospital found itself in urgent need of assistance. To those of us who witnessed these events and participated in the evacuation, Superstorm Sandy will remind us of the heroic and selfless ways that our colleagues, both within Bellevue and around the city, performed under the most difficult of circumstances. Our staff acted in the true spirit of Bellevue, with an unflinching dedication to our vulnerable patient population.

Reflecting on the preparation and evacuation, several things were done well.
We learned several important lessons during Hurricane Irene and developed a systematic approach to contingency planning. This approach was used and made the evacuation process dramatically more efficient. Our staff showed impressive creativity and adaptability as unexpected circumstances arose. The impromptu fuel brigade, transfer of TB patients under respiratory isolation, and rapid creation of satellite clinics are some examples of this adaptability. Remote access to electronic medical records (with servers in safe locations) was critical for continued care.

Some things could have been done better. Although the vulnerability of the hospital’s power supply was recognized, the multiple other systems affected by flooding of the basement were not fully appreciated by ICU leadership. As such, we were not optimally prepared for interrupted communications, a limited water supply, a loss of central vacuum, or the loss of all elevator service. Adjustments to Bellevue’s disaster preparedness plan will account for each of these components. A centralized emergency telephone number and way to reach clinic patients would have been helpful to reduce emergent issues and maintain prescriptions for medications.

The decision not to evacuate patients preemptively must also be discussed. If these vulnerable patients had been evacuated before the arrival of the storm, they would have been exposed to the risk of transport and disruption in continuity of care. Whether the benefit of preemptive evacuation outweighs these risks cannot truly be known before an event. To best assess the risks and benefits of preemptive evacuation versus sheltering in place, systems to predict the impact of extreme weather events on our hospitals must be developed and used. This analysis of risk and benefit and a clear understanding of the factors that contribute to that analysis are important components of disaster preparedness. However, it seems clear that the correct decision in events like Superstorm Sandy can be known only in retrospect.

Looking Ahead

With the help of $300 million allocated by the city to repair Bellevue and a sister hospital, the hospital returned to full operations in February 2013 (13). In addition to facility repairs, there are many steps being taken to “harden” the facility to prevent similar damage in the case of another major storm with associated flooding, including moving vital systems to locations above ground wherever possible. Although complete recovery from the wide-ranging and severe effects of this storm will take time, it is clear that Bellevue and NYU will be stronger for this experience.

A significant impact of this storm will be the focus it places on global warming. In the aftermath of Superstorm Sandy, New York University School of Medicine collaborated with the New York City Department of Health and Mental Hygiene’s Office of Climate Change (28) to track the occurrence of hospitalizations due to weather-related events, such as hurricanes and floods. This tracking is expected to help policymakers and healthcare providers better prepare for future extreme weather events.
York Governor Andrew Cuomo made the connection between global warming and the changing weather patterns (14), while Al Gore went as far as to state that the storm was “strengthened by the climate crisis” (15). Although no single event can be conclusively linked to global warming, Superstorm Sandy involved a very specific sequence of events. Atlantic Ocean temperatures were unseasonably warm. This likely contributed to the fluctuation in the jet stream and caused Hurricane Sandy to combine with an Arctic storm (16). Sea levels near Manhattan, which have increased several inches over recent decades, certainly exacerbated the flooding. What was once referred to as a “100-year storm” is now predicted to occur every 15–20 years (17). Although we cannot conclude that global warming “caused” Superstorm Sandy, this disaster may have been a glimpse of what can be expected with increasing frequency as global warming continues (18). The silver lining on Superstorm Sandy is that, one day, we may look back on it as one of the events that prompted the world to change.

Author disclosures are available with the text of this article at www.atsjournals.org.

Acknowledgment: The authors thank Ms. Melrene Dechezve, Ms. Patricia Tennill, and all of our nurses, fellows, residents, medical students, and other staff whose extraordinary efforts contributed to the success of the evacuation and saved the lives of many patients. The authors also thank the research staff of NYU and Bellevue Hospital, whose dedication and hard work saved years of research. The authors gratefully thank all of the hospitals, and the physicians and staff who accepted and cared for our patients and welcomed our staff.

References