On August 29, 2005, Hurricane Katrina, “the most destructive natural disaster in U.S. history,” made landfall along the southern coasts of Louisiana, Mississippi, and Alabama. On September 23, 2005, Hurricane Rita wreaked its destruction in Louisiana and Texas. Although extensive plans were in place at the federal, state, and facility levels to meet the needs of patients during a disaster, the preparations proved inadequate for these two deadly storms.

When the staff at one dialysis unit in Baton Rouge, Louisiana, the Renal Care Group (RCG), learned that Hurricane Katrina was going to make landfall in Mississippi and Louisiana, they carried out their disaster plan. Dialysis schedules were quickly rearranged so that patients could receive dialysis on Sunday rather than Monday, when Katrina was predicted to strike. The RCG unit closed on Monday and reopened on Tuesday. By Tuesday afternoon, patients who had evacuated from the coastal areas many miles to the south began to arrive.

According to Kopp and colleagues, at least 17 outpatient dialysis units in Baton Rouge and surrounding areas were equipped with generators and felt prepared to handle the surge of patients. The unwavering commitment to patient care was evident; several nurses at the RCG unit whom one of us (SC) interviewed spoke of the challenges they encountered. “The big influx of patients came the second day after Katrina hit,” said Johnie Flotte-Mouille, then director of nursing at this dialysis unit. Kym Herrin, a staff RN there, was asked to return from her family vacation to help with patients. “I remember driving to Baton Rouge, leaving my husband and children, and listening to [the news of] the devastation of Katrina on the radio,” Herrin said, “and wondering when I would see my family again.” Margaret Persilver, a social worker at the unit, said, “The current census of this free-standing hemodialysis unit is 62 patients. The first three days after Katrina we dialyzed an additional 199 patients.” Unfortunately, the challenges that the dialysis community would face in the following days, weeks, and months had just begun.

THE RENAL CARE SYSTEM

As of December 31, 2006, there were 6,960 hemodialysis patients in Louisiana. Patients with end-stage renal disease (ESRD) require regularly scheduled dialysis treatments to stay alive. Hemodialysis usually involves three four-hour treatments a week. Patients’ dietary intake and medications are closely monitored, and extensive records of their responses to treatment are maintained.
In 1976 federal regulations established standards for emergency procedures in dialysis facilities. Those standards focused on emergency preparedness, including the formulation of a written plan and training of providers and patients. Additionally, the regulations required ESRD facilities to “safeguard health record information against loss, destruction, or unauthorized use” and have “an affiliation agreement or arrangement with each other, in writing, for the provision of inpatient care and other hospital services.”

Congress authorized the formation of ESRD organizations to monitor the quality of care given at Medicare-certified dialysis and kidney transplantation centers. These organizations, now divided into 18 ESRD networks covering 50 states and the U.S. territories, bridge the Centers for Medicare and Medicaid Services (CMS) with dialysis and transplantation facilities to help them develop local disaster plans. Facilities are encouraged to partner with utility companies, local emergency operation centers, hospitals, transportation companies, departments of health, and other critical community-service providers. Each ESRD network evaluates its own disaster plans to identify places for improvement.

Disruption of the renal care system. Amid a monumental state and local infrastructure crisis, the renal care community was hit hard. After both hurricanes, many hemodialysis facilities closed abruptly because of power failure, broken water pipes, mandatory evacuation orders, and structural damage to buildings. In addition to the loss of sterile supplies and electricity to power the equipment, the reverse-osmosis water treatment systems used in hemodialysis were compromised or unavailable. On August 31, 2005, in Louisiana alone, 43 dialysis facilities were closed; by December 31, 22 still had not reopened.

Providing care and shelter amid chaos. While hundreds of patients with ESRD were evacuating their homes, abandoning access to life-sustaining treatment, and leaving trusted medical staff, members of the dialysis community responded. Melanie McKnight, MD, a medical director at the RCG unit, arranged for delivery of eight additional dialysis machines and a temporary building for providing dialysis.

Patients soon arrived at the dialysis unit, having been transported there by family members, church members, strangers, nursing home staff, RCG unit staff, and relatives of the unit’s staff who went to shelters to pick up patients. Many patients had had no dialysis treatment for several days. Acute complications—uremia, fluid overload, hypertension, hyperkalemia, severe anemia, and physical and psychological stress—were causing a range of conditions, from memory loss to seizure to cardiopulmonary arrest, that needed treatment. Many patients had traveled through contaminated water and arrived wet, dirty, and tired.

Triage. Within a day of Katrina’s striking, operational dialysis units were transformed into ED-like environments, where triage procedures were initiated. Security personnel not only allayed arriving patients’ anxiety but also asked them how long they had gone without dialysis. If it was less than 24 hours, the patient was directed to a dialysis unit farther north or west. (The ESRD networks assisted in keeping track of which dialysis units were open.) The unit lobby became a center for collecting demographic data such as patients’ allergies and medications. Patients with shortness of breath, chest pain, or confusion were sent immediately to a nurse for assessment. Additionally, patients who had not had dialysis for three or more days were given priority for dialysis. Nurses cared for patients without the benefit of medical histories or dialysis prescriptions. (A kidney dialysis prescription includes specifics tailored to the individual patient’s electrolyte status, acid–base balance, and fluid removal needs.)

The number of patients needing dialysis exceeded the number of machines available. Directors of dialysis facilities were forced to make decisions, sometimes in shelters and waiting rooms, about triaging, treating, and transferring patients. Many patients underwent dialysis with a standard set of orders, were stabilized, and then were transferred to neighboring states. Herrin described the method she used to assess patients on dialysis and give medications: “[There was] a constant turnover of patients. I had not seen any of them before. They
A new report highlights steps all nursing homes should take.

A study conducted by Knight Ridder Newspapers in the aftermath of Hurricane Katrina found that the majority (74%) of deaths in New Orleans resulting from the disaster occurred among adults who were ages 60 years or older; nearly half of those who died were at least 75 years old. From the ailing older people found wandering the airport tarmac without identification and medications to the nursing home residents who drowned when the levees broke, Hurricane Katrina demonstrated that the frailty of nursing home and assisted living facility residents increases their risk of disease, disability, and untimely death during a disaster.

A report released on the second anniversary of Hurricane Katrina, Caring for Vulnerable Elders During a Disaster: National Findings of the 2007 Nursing Home Hurricane Summit, underlines the critical roles that nurses play in long-term care facilities’ disaster preparedness and response (one of us, [LPW], was a coauthor of the summit report). The report offers findings based on two national summit meetings funded by the John A. Hartford Foundation with support from the University of South Florida and attended by nursing home and long-term care association representatives, emergency planning authorities from eight Gulf Coast states and the federal government, and transportation industry officials. A major conclusion of this group was that, although facilities have existing disaster plans, nursing homes must be integrated into local, state, and federal disaster preparedness efforts. The report also recommends that policymakers and disaster planners

- integrate long-term care facilities into disaster response systems at all levels: national, state, and local.
- give long-term care facilities the same priority status as hospitals with regard to the restoration of power and other essential services.
- maintain communications between long-term care facilities and emergency operation centers and rely, if necessary, on satellite phones and ham radios.

**Long-term care facilities.** Other recommendations direct how long-term care facilities should approach disaster preparedness and response, including

- shelter in place when possible, harden the physical plant to withstand hurricane winds, and plan to provide emergency power.
- know both how the facility is positioned in relation to storm surge and flood zones and the facility’s capacity to withstand hurricane winds.
- develop viable plans for both evacuating and sheltering in place that correspond with the facility’s risk.
- develop plans for communicating with residents, family members, and staff members before, during, and after a disaster.
- test disaster plans in drills that include identifying and managing those residents with cognitive impairment and those with special needs, such as dialysis and ventilation.

Preparation is crucial. Nurses need to understand the clinical priorities for the patients in their facility prior to, during, and after a hurricane or other disaster. The decision to evacuate or shelter in place is influenced by several factors: the viability of the facility’s transportation plan or of its plan and the supplies available for sheltering in place, the building’s capacity to withstand hurricane winds and its location in relation to storm surge and flood zones, and the particular needs of the residents being cared for in the nursing home. The director of nursing and the clinical team must be knowledgeable about patients’ care needs under both normal and disaster conditions.

**Important considerations in disaster planning.** A facility’s disaster plan should indicate how it will respond before, during, and after an event, and anticipate contingencies such as disrupted power and communications and failed equipment. Patient identification systems, such as wristbands or name tags, are critical during an evacuation. Medical personnel must have sufficient information and resources to be able to provide continuity of care (including medications), prevent patients from wandering off the facility (a major concern when caring for people with dementia), identify allergies, and communicate advance directives (such as a “do not resuscitate” order). Nursing homes should have a seven-day supply of medication and equipment on hand. Nurses must also be able to anticipate potential changes in residents’ status and plan for problems that may arise, such as pain, new infections, or behavioral changes.

If the facility has to evacuate, the director of nursing should be involved in the decision-making process to identify the health and mobility status of the residents, arrange for the requisite staff, secure supplies and equipment to be moved with residents, and coordinate residents’ care upon arrival at the receiving facility.

To read the complete report, go to www.fhca.org/news/summi-final.pdf.—LuMarie Polivka-West, MSP, and Amy Berman, RN

**REFERENCES**


received their initial assessment during triage and were sent to me to start their treatment. I assessed them on dialysis and gave them a sticky note indicating that I [had] assessed them and gave them their medications. I was caring for so many patients that I needed a method to help me determine who I had already seen without constantly rereading my chart.”

Surge. Once transportation problems were overcome, patients began to arrive at dialysis centers at the perimeters of the affected areas; these became known as surge areas. Staff shortages soon became apparent. In Louisiana, roughly 2,900 dialysis patients were directly affected by Katrina (personal e-mail communication to SC from L. Duval, director, Quality Improvement ESRD Network 13; September 13, 2006). Many providers worked long hours to care for the daily influx of evacuees. Flotte-Mouille said that her nurse–patient ratio was 1 to 12.

To meet demand, the nurses on the unit worked 18 hours and then slept in the unit’s conference room.

Volunteers came from the areas where dialysis units had been forced to shut down. Nurses brought their professional licenses and were instrumental in triaging patients and ensuring that psychosocial needs were addressed. Many of the affected facilities, parts of ESRD organizations, received relief staff from other parts of the country. The American Nephrology Nurses’ Association (ANNA) coordinated volunteer staffing online. For more information on the ANNA's involvement in coordinating volunteer staffing go to www.annanurse.org; click the “Practice” tab and then “Disaster Preparedness.”

Shelter was another immediate challenge. Most communities opened both “special needs” and “non–special needs” shelters. The government report The Federal Response to Hurricane Katrina: Lessons Learned designates special-needs shelters for those “who have no other resources and who need assistance that cannot be guaranteed in a regular shelter, i.e., medication that requires refrigeration, oxygen equipment, etc.” However, it is not intended for patients who need substantial or constant medical care.”

Patients with ESRD are not defined as having special needs, even though in a disaster they will need help beyond what a non–special-needs shelter can provide if they miss dialysis. During and after the two 2005 storms, patients requiring dialysis were evacuated into non–special-needs shelters throughout the surge areas. As a result, dialysis treatments were not consistently available to them. They also lacked consistent access to medication and foods fitting their dietary restrictions—a trifecta of health threats.

THE KIDNEY COMMUNITY EMERGENCY RESPONSE COALITION

A disaster’s disruption of health services has the potential to harm many, and it may quickly lead to death in patients with kidney disease. Recognizing that preparedness is critical, the renal care community came together to coordinate and formalize the emergency response.

The CMS, through a contract with FMQAI: The Florida ESRD Network, held a disaster summit in January 2006 in Washington, DC. Professionals from nephrology associations; renal dialysis and transplantation facilities; hospitals; universities; other ESRD organizations; and government agencies such as the National Institutes of Health, the Department of Health and Human Services’ Office of Inspector General, and the Food and Drug Administration attended. In all, 80 people representing 25 states and the District of Columbia participated. Together they formed the Kidney Community Emergency Response Coalition (KCERC), formed in January 2006 and announced in July 2006.

The KCERC set out to create “a shared plan for national strategic responses in the event of a disaster,” including “clear roles and responsibilities for developing and implementing these responses,” “priority action areas for the [KCERC] that includes a plan for disseminating best practices and strategies.
at the state and local level” to “build the foundation for formalizing [the KCERC] and action plans.”

Eight response teams were formed in the areas of patient assistance, coordination of staff and volunteers, physician assistance, communications, patient tracking, facility operations, federal response, and vendor services. Leadership, planning, and administrative committees were formed as well. Nurses are involved throughout the process by having a representative on the response teams and strategic planning committee.

A strong collaborative network has been formed. The work of the KCERC now extends into raising public awareness, promoting available tools, and refining the initial national response strategy. The KCERC held a second summit on March 1, 2007, in Baltimore, Maryland. According to Norma Gomez, the ANNA’s representative to the summit, the participants set out to identify the KCERC’s accomplishments and goals, develop a plan for raising public awareness, plan for promoting and disseminating tools and resources, and plan for a possible flu pandemic. A ninth response team was formed for pandemic flu.

The ESRD conditions for coverage are the minimum health-and-safety rules that dialysis facilities must meet in order to participate in Medicare and Medicaid. Proposed changes to the conditions of coverage were published on February 4, 2005, for public comment. Responding to the devastation of Hurricanes Katrina and Rita, the CMS has undertaken a review of the emergency preparedness regulations for all health care facilities. The final rule on the conditions of coverage must be published before February 4, 2008 (for more information, go to www.cms.hhs.gov/CfCsAndCoPs/13_ESRD.asp).

A changed landscape. Katrina and Rita changed how the U.S. health care system prepares for, responds to, and recovers from disaster. Lessons learned from the hurricanes include a heightened awareness of and more assertive movement toward using electronic health records. Nurses have the important role of educating patients on whom to contact, where to go, and what to do in a disaster. Not only food, water, and clothing are needed, but also medication reserves. Consistent daily dosing of medications is required to maintain therapeutic response and prevent rejection of transplanted kidneys.

Prior to Katrina, many dialysis units gave patients individualized emergency preparedness packets that included a list of their medications, insurance information, contact numbers for dialysis units, and personalized medical information, updated quarterly. Since Katrina, these packets are still given to the patients, with an emphasis on updating emergency phone numbers and having plans for evacuating.

Disaster preparedness requires support from every provider. All nurses have an obligation to spread the message that disaster preparedness saves lives. “When I think back at what we did,” says Flotte-Mouille, “I feel proud that we made a difference during a critical time. One thing for sure is that it took a whole team to accomplish what we did and we were there for each other.”

REFERENCES