

# Disaster Preparedness for Dialysis Patients

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Locally and federally declared disasters and emergencies ranged from severe weather events across the nation to man made chemical spills that disrupted dialysis services temporarily throughout the year with seemingly more episodes in the past decade. Using an all-hazards disaster planning approach, the effects on dialysis patients can be mitigated or prevented. The events of hurricane Katrina followed by Hurricane Rita in 2005 highlighted the vulnerability of the poor and elderly and of patients with chronic diseases, such as patients who have chronic kidney disease and are on dialysis (1,2). The massive devastation of hurricane Katrina and the subsequent flooding, resulting in temporary or permanent closing of dialysis units in the New Orleans metropolitan area and coastal Mississippi, has shaped future disaster preparedness across the nation. Dialysis patients were evacuated to areas across the nation and subsequently received dialysis treatments in both acute care units in hospitals and chronic units as they remained evacuated (1–3). Lessons learned from the experiences of the 2005 Atlantic hurricane season, with the massive disruption of the health care infrastructure, has led to systemic changes in the dialysis community for emergency preparedness and among health care providers overall (1,4,5).

The experiences of peritoneal dialysis patients after hurricane Katrina has also been described with recommendations for future response and considerations in the face of disaster (2). The peritoneal dialysis patients were, in general, more self-sufficient because many evacuated in advance of the disaster and had included peritoneal dialysis supplies in their evacuation supplies (2). These patients were able to arrange delivery of replacement supplies in their evacuation location through the large peritoneal dialysis suppliers, and other patients contacted their peritoneal dialysis nurse to assist in restocking their supplies to their evacuated location (2).

The experience of the hemodialysis patient population is in stark contrast to the experiences of peritoneal dialysis patients during hurricane Katrina and the aftermath (1). Many patients reported missing dialysis treatments after the hurricane as a result of disruption of utilities, dialysis unit flooding or destruction, and disruption of transportation services in the areas (6). Although more than three fourths of patients studied evacuated before the landfall of hurricane Katrina, many were evacuated from shelters or

rescued after landfall (6). One study reported that approximately 44% of hemodialysis patients missed one or more dialysis sessions in the aftermath of hurricane Katrina compared with between 5% and 9% who missed treatment during a non-disaster period (6). Despite these increased numbers of missed treatments, patients overall did not experience significantly increased morbidity or mortality (7).

The experiences of dialysis patients after hurricanes Gustav and Ike in 2008 were overall positive among hemodialysis and peritoneal dialysis patients (8). This summary demonstrated that effective disaster planning by patients and providers minimizes the disruption of treatments as a result of the natural disaster (8). However, many lessons were learned as a result of this disaster that led to additional recommendations for the medical infrastructure and for community-level emergency preparedness professionals to minimize the threat to vulnerable patients during disasters (8).

In this issue of *CJASN*, Foster *et al.* (9) report on personal and medical disaster preparedness among dialysis patients. Natural and manmade disasters are a constant threat to dialysis patients and providers, such that a state of constant vigilance is maintained. Disasters over the past few years extended across the United States but were primarily related to weather-related events in the form of severe storms throughout the year. The 100- and 500-year flood events across the Midwest and Mississippi River tributaries resulted in temporary interruption of dialysis services in many communities. These events seem to occur more often and affect more people as the population at risk as a result of the increased population density in close proximity to river banks and the US coastline. Secondary effects from severe storms led to interruption of utilities, which resulted in disruption of dialysis temporarily in most areas but occurred in some areas for extended periods. Alternative dialysis services were arranged when services were interrupted.

Dialysis providers are required to develop and implement disaster plans for patients and their services as a part of the Medicare Conditions for Coverage (10). Information from this review of emergencies and disasters may be used to optimize emergency preparedness resource utilization to provide efficient use of dialysis services during declared emergencies and disasters (4). In addition, dialysis providers are often

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included in the development of a local community's disaster plan and execution of periodic disaster drills.

By developing and reviewing disaster plans periodically, dialysis providers and patients can recover early and minimize interruption of dialysis services, thereby preventing morbidity and mortality from missed dialysis treatments (6). Recommendations are made throughout the nephrology literature to mitigate the effects from disasters on patients and assist dialysis providers in rapid recovery from disaster. Using the all-hazards disaster planning approach, dialysis patients and providers are constantly prepared for interruption in dialysis services by natural and manmade emergencies and disasters.

After the Armenian earthquake of 1988, the nephrology community developed an international disaster task force for acute and chronic dialysis services, the Renal Disaster Relief Task Force (RDRTF) of the International Society of Nephrology (11). The RDRTF provided services during the catastrophic Marmara earthquake in Turkey in 1999 with a postdisaster analysis that included both a hospital-based acute care unit and a community chronic care unit disaster events and recovery (12). Since these events, the task force remains active and has been mobilized worldwide in the face of disasters. Most recently after the earthquake in Haiti, the multidisciplinary RDRTF provided acute dialysis for patients with crush injuries and made recommendations to improve response to disasters from lessons learned from this major disaster (13).

The Kidney Community Emergency Response Coalition (KCERC) was developed in 2006 in Washington, DC, at a meeting with representatives from all aspects of the dialysis community and related businesses, with support of federal partners including the Centers for Disease Control and Prevention (CDC), the Centers for Medicaid and Medicare Services (CMS), the National Institutes of Health (NIH), and the Food and Drug Administration (FDA). KCERC has developed a strategic plan for national and local response to disasters to address the needs of dialysis patients and other vulnerable populations in a variety of disaster settings (14). This coalition has developed its resources and programs through work groups with information assembled on a website and distributed through its constituent coalition members (14).

With reports of severe weather across the United States and the subsequent disruption of utility and often transportation services, dialysis patients may face constant challenges to maintaining compliance with their dialysis treatment program whether on in-center or home modalities. The development of personal disaster plans is discussed as part of the patient education program for most of the large dialysis providers but does not often include filing a copy of an individual patient's disaster plan. This may be a potential shortcoming of implementation of disaster plans in the face of a disaster. Patients and dialysis providers therefore must maintain a constant state of readiness and have disaster plans that are comprehensive to cover the multiple potential threats that may interrupt dialysis services. Patient and provider education must be ongoing in the face of new threats with examples to mitigate service interruption to prevent missed dialysis treatments.

Governmental agencies and nephrology organizations

provide patient education materials for disaster preparedness and community resources to assist patients in the face of disaster and in developing personal disaster plans. During severe weather alert periods and at the beginning of hurricane season, public service announcements highlighting the need for disaster preparation and planning in advance of events and contact numbers or websites to obtain more information is provided. Despite the plethora of disaster preparedness resources for the dialysis community, there may be a disconnection regarding the urgency among patients to implement personal dialysis plans.

Foster *et al.* (9) in this issue of *CJASN* highlight the gap in disaster preparation among dialysis providers and the patients for whom they provide ongoing services long term in the in-center and home environment. More surprising, they found that age, gender, race, education, literacy, and socioeconomic status did not affect general disaster preparedness (9). This finding should result in proactive measures among dialysis providers and emergency preparedness professionals to improve disaster preparedness in the vulnerable population (9).

The impact of low health literacy and chronic illness management has revealed poorer outcomes in association with inadequate and low health literacy for a variety of chronic conditions including chronic kidney disease on dialysis. Low health literacy is associated with increased mortality in patients with ESRD and affects peritoneal dialysis performance and outcomes (15,16). The general disaster preparedness of patients in the study by Foster *et al.* (9) was largely inadequate, despite representing a snapshot in time of a portion of the North Carolina dialysis community. Despite the sampling bias and limited generalizability for other areas of the North Carolina or the United States, this study provides valuable information that may be used by dialysis providers, nephrologists, and emergency preparedness professionals in assisting dialysis patients in disaster preparation and recovery.

Despite these limitations, the study by Foster *et al.* (9) highlights the importance of reviewing disaster plans of patients with social workers or other nephrology professionals to ensure that it is comprehensive and that patients can implement the plan in a variety of settings to minimize disruption of dialysis treatments to prevent morbidity and mortality. This study adds to the growing body of evidence for disaster professionals and has significant implications for dialysis providers and nephrologists caring for this vulnerable population.

#### Disclosures

None.

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- See related article, “Personal Disaster Preparedness of Dialysis Patients in North Carolina,” on pages 2478–2484.