TRACIE

HEALTHCARE EMERGENCY PREPAREDNESS INFORMATION GATEWAY

Dialysis Centers Topic Collection 6/2/2015

ASPR

ASSISTANT SECRETARY FOR PREPAREDNESS AND RESPONSE

Topic Collection: Dialysis Centers

Disasters can significantly impact patients who are being treated with maintenance dialysis in several ways. For one, structural damage to dialysis and healthcare facilities can hamper a patient's access to their treatment site, which can also cause a delay in the receipt of treatment. Disasters may also impact water supply, leading to "boil water advisories." This may affect a facility's ability to provide safe dialysis treatments to their patients. When disasters strike, dialysis and healthcare facilities will need time to recover from the damage. This includes staff who may have been affected by the disaster and are challenged in their ability to report to work. These resources highlight lessons learned from recent events, information on dialysis center recovery, strategies for post-disaster dialysis patient care, and plans, tools, and templates that can be modified to suit facility-specific needs.

Each resource in this Topic Collection is placed into one or more of the following categories (click on the category name to be taken directly to that set of resources). Resources marked with an asterisk (*) appear in more than one category.

Must Reads

Centers for Disease Control and Prevention. (2014). Dialysis Care After a Disaster.

> The Centers for Disease Control and Prevention provides links to information on post-disaster dialysis care, including bringing water systems back on line after a disaster, using "tanker water" for dialysis, and how to handle "boil water advisories."

Centers for Medicare and Medicaid Services. (2011). Disaster Preparedness: A Guide for Chronic Dialysis Facilities. Second Edition.

> This emergency operations plan manual includes emergency management templates that can be tailored to the needs of dialysis facilities.

Fournier, C. (2011). Re-Establishing Clean Water in a Disaster. Nephrology News and Issues. 25(10): 28-9, 34.

The author identifies and discusses the five steps a dialysis clinic should take to ensure their water systems are safe and functional after a disaster.

Ishida, K., Sawa, M., Fujiwara, K., et al. (2013). Study of Electrical Power Facilities and Measures for Planned Outages in Japanese Hemodialysis Clinics after the Great East Japan Earthquake. Therapeutic Apheresis and Dialysis. 17(1): 65-71.

The authors analyzed more than 175 questionnaires submitted by hemodialysis clinics to better understand how they handled the power outage that followed the 2011 earthquake and tsunami in Japan. Nearly all of the clinics reported that they had established procedures to deal with future planned outages and nearly as many reported implementing lessons learned just after the disaster struck.

Kelman, J., Finne, K., Bogdanov,A., et al. (2015). Dialysis Care and Death Following Hurricane Sandy. American Journal of Kidney Disease. 65(1): 109-15.

The authors of this study address the variation in dialysis care patterns and mortality for patients with end stage renal disease in New York City and the State of New Jersey after Hurricane Sandy. They discuss their findings and conclude that members of the study group (those living in areas affected by Sandy) had higher rates of post-storm visits to the emergency department, hospitalizations, and 30-day mortality than members of the comparison groups.

Kidney Community Emergency Response Coalition. (2007). Dialysis Facility Disaster Plan Template.

This facility-specific emergency operations planning template can be customized by dialysis facility staff.

Kleinpeter, M.A., Norman, L., and Krane, N.K. (2006). Disaster Planning for Peritoneal Dialysis Programs. (Abstract only.) Advances in Peritoneal Dialysis. 22: 124-9.

The authors share the story of a peritoneal dialysis center's experience with Hurricane Katrina, from the planning, response, and follow-up phases of the event.

Kopp, J., Ball, K., Cohen, A., et al. (2007). Kidney Patient Care in Disasters: Emergency Planning for Patients and Dialysis Facilities. Clinical Journal of the American Society of Nephrology. 2(4): 825-38.

The authors of this article review the disaster-specific patient care recommendations that have been put forward by the Kidney Community Emergency Response Coalition. They also provide a detailed overview of the disaster planning process from the perspectives of

kidney patients, dialysis facilities, and volunteer nephrology professionals who may participate in disaster relief.

Lempert K. and Kopp, J. (2013). Hurricane Sandy as a Kidney Failure Disaster. American Journal of Kidney Disease. 61(6):865-8.

The authors review lessons learned after recent disasters and provide "the cardinal features of kidney failure disaster preparedness."

National Kidney Foundation. (2010). Planning for Emergencies: A Guide for People with Chronic Kidney Disease.

The authors share resources on a wide range of topics for patients with kidney disease to consider in preparation for various types of disasters.

Stoler, G., Johnston, J., Stevenson, J., and Suyama, J. (2013). Preparing Emergency Personnel in Dialysis: A Just-In-Time Training Program for Additional Staffing During Disasters. (Abstract only.) Disaster Medicine and Public Health Preparedness. 7(3): 272-7.

Preparing Emergency Personnel in Dialysis is a just-in-time training program that aims to teach those with minimum familiarity with basic dialysis to support dialysis staff during a disaster. The authors pilot tested the curriculum and found a nearly 30% improvement in knowledge as a result of the program.

Dialysis Center Recovery

*Buttimore, A. (2011). Renal Dialysis Services in the Christchurch Earthquakes of 2010-2011. Renal Society of Australasia Journal. 7(2): 66-68.

The author provides a timeline of events from an earthquake that struck New Zealand, and discusses how the event impacted dialysis centers.

Centers for Disease Control and Prevention. (2014). Dialysis Care after a Disaster.

The Centers for Disease Control and Prevention provides links to information on post-disaster dialysis care, including bringing water systems back on line after a disaster, using "tanker water" for dialysis, and how to handle "boil water advisories."

Fournier, C. (2011). Re-establishing Clean Water in a Disaster. Nephrology News and Issues. 25(10): 28-9, 34.

The author identifies and discusses the five steps a dialysis clinic should take to ensure their water systems are safe and functional after a disaster.

*Kamei, D., Kuno, T., Sato, S., et al. (2012). Impact of the Fukushima Daiichi Nuclear Power Plant Accident on Hemodialysis Facilities: An Evaluation of Radioactive Contaminants in Water Used for Hemodialysis. Therapeutic Apheresis and Dialysis. 16(1): 87-90.

The authors of this study discuss the nuclear power plant accident and the impacts it had on hemodialysis facilities. They discuss their methodological approach and their findings and emphasize In conclusion, the need to clarify the maximum safety level of radiation in dialysate for chronic hemodialysis patients.

*Matsumura, T., Osaki, S., Kudo, D., et al. (2015). Water Supply Facility Damage and Water Resource Operation at Disaster Base Hospitals in Miyagi Prefecture in the Wake of the Great East Japan Earthquake. (Abstract only.) Prehospital and Disaster Medicine. 30(2): 193-8.

The goal of this study was to highlight the challenges associated with damage to water supply facilities (including dialysis centers) in Japan after the 2011 earthquake and tsunami.

U.S. Food and Drug Administration. (2010). Reopening Dialysis Clinics After Restoration of Power and Water.

This report includes steps facility staff can take to reopen clinics after water or power outages.

Event-Specific Lessons Learned

Abir, M., Jan, S., et al. (2013). The Impact of a Large-Scale Power Outage on Hemodialysis Center Operations. (Abstract only.) Prehospital and Disaster Medicine. 28(6): 543-6.

The authors examined how power outages in Washington, DC, and five counties in West Virginia and Maryland impacted operations in a sample of hemodialysis centers.

Adalja, A., Watson, M., Bouri, N., et al. (2014). Absorbing Citywide Patient Surge during Hurricane Sandy: A Case Study in Accommodating Multiple Hospital Evacuations. (Abstract only.) Annals of Emergency Medicine. 64(1): 66-73.e1.

The authors used a qualitative, interview-based method to study medical surge strategies used at hospitals receiving patients from evacuated healthcare facilities during and after Hurricane Sandy. One gap noted was a challenge associated with the increase in the number of dialysis patients.

Akabayashi, A., and Kodama S. (2011). Lessons from Japan's March 2011 Earthquake Regarding Dialysis Patients. Therapeutic Apheresis and Dialysis 15(3): 334.

In this letter to the editor, the authors refer to the "dialysis refugees" that emerged as a result of the power outages after the 2011 earthquake and tsunami that struck Japan. They note the need for centers, as well as patients, to plan for future outages.

Anderson, A. H., A. J. Cohen, et al. (2009). Missed Dialysis Sessions and Hospitalization in Hemodialysis Patients after Hurricane Katrina. Kidney International. 75(11): 1202-8.

The authors interviewed dialysis patients and listed the reasons they provided for missing sessions after Hurricane Katrina. As a result, the authors stress the need for emphasizing patient awareness and activating emergency plans early in the response phase.

*Buttimore, A. (2011). Renal Dialysis Services in the Christchurch Earthquakes of 2010-2011. Renal Society of Australasia Journal. 7(2): 66-68.

The author provides a timeline of events from an earthquake that struck New Zealand, and discusses how the event impacted dialysis centers.

Edmondson, D., Gamboa, C., Cohen, A., et al. (2013). Association of Posttraumatic Stress Disorder and Depression with All-Cause and Cardiovascular Disease Mortality and Hospitalization among Hurricane Katrina Survivors with End-Stage Renal Disease. American Journal of Public Health. 103(4): e130-7.

The authors discuss their study findings, one of which is a positive association between psychiatric symptoms in the year after Hurricane Katrina and hospitalization and mortality in patients with end-stage renal disease.

Haga, N., Hata, J., Yabe, M., et al. (2013). The Great East Japan Earthquake affected the laboratory findings of hemodialysis patients in Fukushima. BMC Nephrology. 14: 239.

The authors investigate the impact of the 2011 earthquake on laboratory findings in chronic hemodialysis patients in Fukushima whose treatment was shortened for up to an hour after the disaster. Results indicated that treatment duration can be decreased without significantly affecting laboratory findings.

Hyre, A.D., Cohen, A., Kutner, N., et al. (2008). Psychosocial Status of Hemodialysis Patients One Year after Hurricane Katrina. American Journal of the Medical Sciences. 336(2): 94-98.

The authors used various tools to measure hemodialysis patients' psychosocial status after Hurricane Katrina. Results suggest the need for more screening and management of psychosocial issues in these patients after disasters.

Ishida, K., Sawa, M., Fujiwara, K., et al. (2013). Study of Electrical Power Facilities and Measures for Planned Outages in Japanese Hemodialysis Clinics after the Great East Japan Earthquake. Therapeutic Apheresis and Dialysis. 17(1): 65-71.

The authors analyzed more than 175 questionnaires submitted by hemodialysis clinics to better understand how they handled the power outage that followed the 2011 earthquake and tsunami in Japan. Nearly all of the clinics reported that they had established procedures to deal with future planned outages and nearly as many reported implementing lessons learned just after the disaster struck.

*Kamei, D., Kuno, T., Sato, S., et al. (2012). Impact of the Fukushima Daiichi Nuclear Power Plant Accident on Hemodialysis Facilities: An Evaluation of Radioactive Contaminants in Water Used for Hemodialysis. Therapeutic Apheresis and Dialysis. 16(1): 87-90.

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The authors share the story of a peritoneal dialysis center's experience with Hurricane Katrina, from the planning, response, and follow-up phases of the event.

*Kopp, J., Ball, K., Cohen, A., et al. (2007). Kidney Patient Care in Disasters: Emergency Planning for Patients and Dialysis Facilities. Clinical Journal of the American Society of Nephrology. 2(4): 825-38.

The authors of this article review the recommendations that have been put forward by the Kidney Community Emergency Response Coalition. They also provide a detailed overview of the disaster planning process from the perspectives of kidney patients, dialysis facilities, and volunteer nephrology professionals who may participate in disaster relief.

Kutner, N.G., Muntner, P., et al. (2009). Effect of Hurricane Katrina on the Mortality of Dialysis Patients. Kidney International. 76(7): 760-6.

While the authors did not find a significant relationship between Hurricane Katrina and the mortality rate of dialysis patients, they emphasized the need for ongoing disaster education.

Lempert, K., and Kopp, J. (2013). Hurricane Sandy as a Kidney Failure Disaster. American Journal of Kidney Disease. 61(6):865-8.

The authors review lessons learned after recent disasters and provide "the cardinal features of kidney failure disaster preparedness."

Lin, C., Pierce, L., Roblin, P., and Arquilla, B. (2014). Impact of Hurricane Sandy on Hospital Emergency and Dialysis Services: A Retrospective Survey. (Abstract only.) Prehospital and Disaster Medicine. 29(4): 374-9.

The authors conducted a retrospective study on hospital dialysis services provided after Hurricane Sandy. They found challenges with the following: lack of documentation from transient dialysis patients, staff shortage, staff transportation, and communication with other agencies.

*Matsumura, T., Osaki, S., et al. (2015). Water Supply Facility Damage and Water Resource Operation at Disaster Base Hospitals in Miyagi Prefecture in the Wake of the Great East Japan Earthquake. (Abstract only.) Prehospital and Disaster Medicine. 30(2): 193-8.

The goal of this study was to highlight the challenges associated with damage to water supply facilities (including dialysis centers) in Japan after the 2011 earthquake and tsunami.

Miller, A.C. and Arquilla, B. (2008). Chronic Diseases and Natural Hazards: Impact of Disasters on Diabetic, Renal, and Cardiac Patients. Prehospital and Disaster Medicine. 23(2): 185-94.

The authors reviewed resources from multiple healthcare databases, along with real-life experience treating chronic disease after disasters. In their data gathering process, they found that the international nephrology community formed an effective organization (the Renal Disaster Relief Task Force), which emphasizes the need for patients to have emergency diet and renal fluid restriction plans and be prepared to modify dialysis schedules and methods. Suggestions for facilities are also provided.

Moynahan, L. (2011). The 2011 Queensland Floods: A Dialysis Clinical Nurse Manager's Personal Account. Renal Society of Australasia Journal. 7(2): 56-58.

This paper details the experiences of the author, a nurse unit manager, in 2011 when working for four days in the Wesley Hospital, located on the (then-flooding) Brisbane River.

Nishimura, H., Kagara, I., Inokuchi, S., et al. (2014). Local Dialysis Disaster Relief during Two Torrential Downpours on Amami-Ohshima Island. Journal of Disaster Research. 9(1): 86-91.

The authors share information about two storms that affected Japan's Amami-Ohshima island's dialysis treatment centers. The author's report that communication and transportation proved to be challenging, but responders reallocated patients, changed dialysis schedules, and used a satellite phone to communicate.

General Resources

*Foster, M., Brice, J., Shofer, F., et al. (2011). Personal Disaster Preparedness of Dialysis Patients in North Carolina. Clinical Journal of the American Society of Nephrology. 6(10): 2478-84.

The authors note that dialysis patients are particularly vulnerable to disaster and sought to study their levels of preparedness. They found that in general, dialysis patients were not prepared for critical incidents, regardless of demographic characteristics.

Kidney Community Emergency Response Coalition. (2009). Emergency Management and Dialysis: What Emergency Planners Need to Know about Dialysis Patients and Facilities.

This brochure highlights important facts regarding dialysis patients and facilities for emergency planners.

Kidney Community Emergency Response Coalition (2006). Final Report of the Eight Response Groups Created at the January Disaster Summit. The National Kidney Foundation, Inc.

This report is a summary of the progress made by workgroups formed during the 2006 Kidney Community Emergency Response Coalition's January Disaster Summit. Information is categorized by group (patient assistance, coordination of staff and volunteers, physician assistant, vendor services, facility operations, patient provider tracking, federal response, and communications).

Stoler, G., Johnston, J., Stevenson , J., and Suyama, J. (2013). Preparing Emergency Personnel in Dialysis: A Just-In-Time Training Program for Additional Staffing During Disasters. (Abstract only.) Disaster Medicine and Public Health Preparedness. 7(3): 272-7.

Preparing Emergency Personnel in Dialysis is a just-in-time training program that aims to teach those with minimum familiarity with basic dialysis to support dialysis staff during a disaster. The authors pilot tested the curriculum and found a nearly 30% improvement in knowledge as a result of the program.

Patient Care

Abdel-Kader, K. and M. L. Unruh. (2009). Disaster and End-Stage Renal Disease: Targeting Vulnerable Patients for Improved Outcomes. Kidney International. 75(11): 1131-3.

The authors of this paper discuss how disaster planning by dialysis centers, providers, and patients can help improve outcomes during a disaster, particularly in disadvantaged areas.

Centers for Disease Control and Prevention. (2010). Cryptosporidium: Dialysis During a Boil Water Advisory.

Healthcare providers can use the information on this web page to assess steps to take when treating dialysis patients during a boil water advisory.

Centers for Disease Control and Prevention. (2014). Recommendations for Safely Performing Acute Hemodialysis in Patients with Ebola Virus Disease in U.S. Hospitals.

This resource can be used to help medical professionals safely perform renal replacement therapy in critically ill patients infected with Ebola.

*Kopp, J., Ball, K., Cohen, A., et al. (2007). Kidney Patient Care in Disasters: Emergency Planning for Patients and Dialysis Facilities. Clinical Journal of the American Society of Nephrology. 2(4): 825-38.

The authors of this article review the recommendations that have been put forward by the Kidney Community Emergency Response Coalition. They also provide a detailed overview of the disaster planning process from the perspectives of kidney patients, dialysis facilities, and volunteer nephrology professionals who may participate in disaster relief.

Zoraster, R., Vanholder, R., and Sever, M. (2007). Disaster Management of Chronic Dialysis Patients. American Journal of Disaster Medicine. 2(2): 96-106.

Patients who are dialysis-dependent (with end-stage renal disease [ESRD]) are at particularly high risk after disasters. Dialysis may be delayed and the authors write that few physicians are experienced or trained in the nondialytic management of ESRD.

Strategies such as dietary restrictions, potassium removal via resins and cathartics, and adaptations of acute treatment can help patients who cannot receive dialysis. The authors emphasize the need for medical facilities to plan and stockpile medications such as Kayexalate to help minimize morbidity and mortality.

Patient Resources

*DaVita. (2015). Emergency Preparedness for People with Kidney Disease. (Includes basic kit information and "The 3-day emergency diet.")

DaVita shares emergency preparedness information for patients on dialysis to ensure they can receive necessary treatment or lessen the impact of missing a dialysis session.

*Foster, M., Brice, J., Shofer, F., et al. (2011). Personal Disaster Preparedness of Dialysis Patients in North Carolina. Clinical Journal of the American Society of Nephrology. 6(10): 2478-84.

The authors note that dialysis patients are particularly vulnerable to disaster and sought to study their levels of preparedness. They found that in general, dialysis patients were not prepared for critical incidents, regardless of demographic characteristics.

National Kidney Foundation. (2010). Planning for Emergencies: A Guide for People with Chronic Kidney Disease.

The authors share tips that are useful for people with kidney disease to consider in preparation for various types of disasters.

U.S. Department of Health and Human Services. (2015). Preparedness Tip: Dialysis & Early Treatment.

This 10-second (un-narrated) video emphasizes the point that dialysis patients should learn more about early treatment before a storm or other type of critical incident.

U.S. Department of Health and Human Services. (2015). Preparedness Tip: Dialysis & Early Treatment.

This 10-second (un-narrated) video encourages dialysis patients to ask their provider about receiving treatment before a storm strikes.

Plans, Tools, and Templates

Centers for Medicare and Medicaid Services. (2011). Disaster Preparedness: A Guide for Chronic Dialysis Facilities. Second Edition.

This emergency operations plan manual includes emergency management templates that can be tailored to the needs of dialysis facilities.

Centers for Medicare and Medicaid Services. (n.d.). Emergency Preparedness for Dialysis Facilities: A Guide for Chronic Dialysis Facilities. (Accessed 4/15/2015.)

This guidance covers general emergency management planning by phase and includes suggestions specific to chronic dialysis facilities.

*DaVita. (2015). Emergency Preparedness for People with Kidney Disease. (Includes basic kit information and "The 3-day emergency diet.")

DaVita shares emergency preparedness information for patients on dialysis to ensure they can receive necessary treatment or lessen the impact of missing a dialysis session.

Fadem, S., and Rosenthal, B. (2013). GFR Calculators: Serum Creatinine and Cystatin C. The National Kidney Foundation.

Healthcare professionals can use this tool to measure patients' glomerular filtration rates (i.e., kidney function).

Kidney Community Emergency Response Coalition. (2007). Dialysis Facility Disaster Plan Template.

This facility-specific emergency operations planning template can be customized by dialysis facility staff.

Kidney Community Emergency Response Coalition. (2009). Contacting Local Emergency Management.

This document highlights an update to the 2008 Centers for Medicare and Medicaid Services Conditions of Coverage. It provides facility staff guidance on communicating status with emergency management officials before and after a disaster.

End Stage Renal Disease (ESRD) Networks

The following is a list of ESRD networks and the states they serve.

Network 1 (CT, ME, MA, NH, RI, VT): End-Stage Renal Disease Network of New England.

Network 2 (NY): End-Stage Renal Disease Network of New York.

Network 3 (NJ, PR, U.S. VI): Quality Insights (Renal Network 3).

Network 4 (PA, DE): Quality Insights (Renal Network 4).

Network 5 (MD, VA, WV, District of Columbia): Mid-Atlantic Renal Coalition.

Network 6 (NC, SC, GA): Southeastern Kidney Council, Inc.

Network 7 (FL): FMQAI Network 7.

Network 8 (AL, MS, TN): Network 8, Inc.

Networks 9 (IN, KY, OH) and 10 (IL): The Renal Network (ESRD Networks 9 and 10).

Network 11 (MI, MN, ND, SD): Renal Network 11.

Network 12 (IA, KS, MO, NE): Heartland Kidney Network.

Network 13 (OK, AR, LA): End-Stage Renal Disease Network 13.

Network 14 (TX): End-Stage Renal Disease Network of Texas.

Network 15 (AZ, CO, NM, NV, UT, & WY): InterMountain ESRD Network, Inc.

Network 16 (AK, ID, MT, OR, WA): Northwest Renal Network.

Network 17 (AS, Guam, HI, Mariana Islands, Northern CA): Western Pacific Renal Network, LLC.

Network 18 (Southern CA): ESRD Network 18 of Southern California.

Agencies and Organizations

Note: The agencies and organizations listed in this section have a page, program, or specific research dedicated to this topic area.

American Association of Kidney Patients (AAKP). http://www.aakp.org/

American Hospital Association. http://www.aha.org/

American Kidney Fund, Disaster Relief for Dialysis Patients. http://www.kidneyfund.org/donate/disaster-relief/

American Nephrology Nurses Association (ANNA). https://annanurse.org/

American Society of Nephrology. https://www.asn-online.org/

American Society of Pediatric Nephrology. http://www.aspneph.com/

Centers for Medicare and Medicaid Services End Stage Renal Disease Center. http://www.cms.gov/Center/Special-Topic/End-Stage-Renal-Disease-ESRD-Center.html

Dialysis Finder. http://dialysisfinder.com/

End Stage Renal Disease National Coordinating Center. http://esrdncc.org

Institute of Medicine. http://iom.edu/

International Society of Peritoneal Dialysis (ISPD). http://ispd.org/

Kidney Community Emergency Response. http://kcercoalition.com/

Medical Education Institute. http://meiresearch.org/

National Association for Nephrology Technicians/Technologists (NANT). http://www.dialysistech.net/

National Renal Administrators Association (NRAA). www.nraa.org/

Renal Physicians Association. http://www.renalmd.org/

The Kidney Care Council. http://kidneycarecouncil.org/

The National Forum of ESRD Networks. http://www.esrdnetworks.org/

The National Kidney Foundation. https://www.kidney.org/professionals

Large Dialysis Organizations

Fresenius Medical Care. http://www.freseniusmedicalcare.us/en/home/

DaVita. http://www.davita.com/

Dialysis Clinic, Inc. http://www.dciinc.org/

Small Dialysis Organizations (limited list)

American Renal Associates. http://www.americanrenal.com/

Atlantic Dialysis Management Services. http://atlanticdialysis.com/

Centers for Dialysis Care. http://www.cdcare.org/

DSI Renal, Inc. http://www.dsi-corp.com/

Northwest Kidney Centers. http://www.nwkidney.org/

Renal Ventures. http://www.renalventures.com/

Satellite Healthcare, Inc. http://www.satellitehealth.com/

U.S. Renal Care, Inc. http://www.usrenalcare.com/

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