

Chronically Ill Patients and Natural Disasters – a Case Study of How Jamaica Protected Patients Receiving Dialysis During Hurricane Melissa

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Abstract

Tropical cyclones disproportionately affect individuals with chronic illnesses, particularly patients who require uninterrupted renal replacement therapy. Millions of people live in hurricane prone areas. By some estimates, half of that population suffer some form of chronic illness. Hurricane Melisa hit Jamaica at the end of 2025. We present the coordinated, multistakeholder protocols put in place to save the lives of our patients dependent on dialysis so other countries susceptible to natural catastrophes learn from this case study.

The article examines storm preparation, equipment and supply management, communication systems, patient education, dialysis scheduling, staffing logistics, and post-storm recovery. Despite the catastrophic damage the country suffered as a result of Hurricane Melisa, no dialysis dependent patient die. Proactive planning, flexible dialysis protocols, robust equipment and supply safeguards, redundant communication strategies, and early rescheduling of dialysis treatments allowed continuity of care despite were key for the positive outcome.

INTRODUCTION

Tropical cyclones occur each year. In the Northern hemisphere, the hurricane season occurs between June and November, with a peak in September. In the Southern hemisphere, the season spans from November to April, peaking between January and March.¹ Climate models predict that tropical storms would get stronger with wider rainfall and flooding impact.^{2,3}

Approximately 560 million people in 117 countries live in areas affected by tropical cyclones with 95% of all-person-day exposure occurring in the coastal areas of Eastern Asia (43%), Southeast Asia (24%), Eastern India and Bay of Bengal (14%), Japan and the Korean peninsula (6%), North and Central America (5%), and the Caribbean (3%).⁴ Approximately 40 million people inhabit Caribbean islands one of the world regions most prone to tropical storms.⁵

A conservative estimate suggests that 50% of individuals living in hurricane prone areas have some form of chronic medical condition, such as cancer, diabetes, hypertension, chronic obstructive pulmonary disease, and chronic kidney disease, which follows the increasing proportion of elders noted in these regions over the past two decades.³ Patients with chronic illnesses, particularly those receiving dialysis, are vulnerable during natural catastrophes.^{3,6,7} Of the 2 million people worldwide receiving dialysis, between 200,000 and 500,000 live in hurricane-prone areas.⁴ The mortality rate for those patients increases in the aftermath of the storms.⁷

As other middle-income country (MIC), Jamaica – the largest English-speaking nation in the Caribbean – has undergone epidemiological transition from communicable disease to non-communicable chronic disease (NCCD). Diabetes and hypertension are now major causes of mortality and morbidity, resulting in higher numbers of individuals suffering chronic kidney disease and end-stage renal disease.^{5,8}

Jamaica came under a storm watch on October 21, 2025, which meant hurricane conditions were likely to occur within 48-hours. Two days later, Hurricane Melissa, a large category 5 hurricane, made landfall wolfing the entire country.⁹ The objective of this paper is to describe the actions taken by the various stakeholders to properly care for patients with end-stage renal disease receiving dialysis prior to and after the storm so other nations at risk can learn from our experience.

STORM PREPARATION

At the start of the Hurricane Season, the Office of Disaster Preparedness and Emergency Management (ODPEM) sends out a bulletin to the entire island with a global forecast of what experts anticipate in terms of the number of storms and severity. There are regular radio and television messages to the public about hurricane tips and preparedness. The government also activates the emergency preparedness unit within ODPEM and any other supporting unit to start the preparation for the upcoming hurricane season. Emergency protocols are reviewed, updated, if necessary, and communicated to stakeholders. They include protocols for the recovery phase.

The key priority is to ensure that patients with end-stage renal disease on dialysis safely and timely receive treatment pre- and post-storm. This is achieved by having clear protocols in place that have been decided by the various stakeholders with guidance from the country's Ministry of Health and Wellness in advance of a storm. However, the procedures incorporate some flexibility allowing the existing hospital based-dialysis units at University Hospital of the West Indies, Kingston Public Hospitals, Spanish Town Hospital, Mandeville Regional Hospital, and Cornwall Regional Hospital accommodate different patient loads (i.e. regular patients schedule at the hospital-based unit, patients in need of emergency dialysis, and patients from outpatient dialysis centers that could not continue to operate because of the storm) and unexpected conditions derived from the storm itself (i.e. damage to infrastructure and equipment). Figure 1 depicts the roles of the leadership structure at each dialysis center.

EQUIPMENT AND SUPPLY MANAGEMENT

As the first storm alerts are issued by ODPEM, the primary goal in terms of buildings, equipment and supplies is to ensure their safety, reliability, and availability. All dialysis machines, reverse osmosis and water treatment systems are serviced and checked to ensure optimal functioning. Sites check the availability of spare parts should a device fail; the repair can take place promptly minimizing any disruption.

Sites review consumables, including but not limited to dialysis cartridges, dialysate solutions, medications, needles, syringes, and medications, to ensure the necessary stockpiles exist for as storms frequently disrupt supply chains. All water tanks are inspected for leaks and verified that they remain full.

Sites identify factors or hazards that make buildings and other structures susceptible to flooding, mechanical failure, and infrastructural damage. Attention is placed in areas where patients receive

dialysis and storage areas. Windows, entrance doors, and roofs are inspected and, if necessary, boarded or repaired to protect them from wind damage. Overgrown trees are trimmed, powerlines are reinforced, and electrical circuits are insulated. Debris near street drains in the surrounding areas is cleared and large loose objects that might become airborne with the wind removed or secured.

Power protection readiness, such as generators and uninterruptible power systems, that are essential during power outages are verified, serviced, and made operational. Validation of data backups and secure storage of critical configurations is performed. In case a complete shutdown needs to occur during the period surrounding the storm, a contingency plan is in place to execute it in a controlled fashion. This allows for the protection of equipment and data and the restoration of services promptly once conditions are safe and support systems are stable.

INFORMATION AND COMMUNICATION

Clear and timely communication is essential to successfully care for patients receiving dialysis during a tropical cyclone. It is a challenge to maintain effective communication when infrastructure that supports cell phones, internet, landlines, and radio systems frequently collapse due to wind damage, flooding, or power outages. As ODPEM issues a hurricane watch alert, staff from the dialysis units communicate with patients informing them about their dialysis schedule and primary and alternate dialysis sites. Staff members also verify that the patients still live in the same address, review alternate contact information, and inquiry about other support systems as these patients are particularly vulnerable during the storm period.

Staff members instruct patients to update the operating system of their communication devices (i.e. cellphone, tablet, computer) and their apps and to verify they are in working order. If patients have new devices or have not downloaded the recommended apps (see Table 1), they are instructed to do so and to verify their functionality. Patients are also reminded to keep their devices fully charged, and they are encouraged to have an external battery pack that can keep the primary communication device charged during a power outage. Patients who do not know how to operate the apps receive instructions on how to do so. Staff members and patients are frequently reminded that digital communication requires an initial internet connection, so outages would likely occur. Everyone from staff members to patients is instructed to keep paper copies of vital information including names, phone numbers, and addresses of close relatives, caregivers, treating physicians, dialysis units, hospitals and nearest police station.

In the dialysis units, staff keeps master lists containing patients' contact information and patient schedules. Emergency contact information for key stakeholders is also posted (i.e. medical, nursing, facilities, and emergency responders' directors), as well as evacuation plans. Dialysis units also follow a continuous communication and reporting protocol as the storm makes progress allowing stakeholders to respond timely as conditions change on the ground.

Staff members and patients are encouraged to tune in to the news, so they are abreast of the latest updates regarding the hurricane path and expected landfall, mandatory evacuations, infrastructure

conditions (i.e. power, water and roads).

Table 1
Communications Apps Used

Name	Functionality
Zello	A walkie-talkie app that allowed you to communication with others in real-time, even without Wi-Fi or cellular data (once connected)
Life360	A GPS app that enables tracking each other's locations and communication
Edge@Team	A secure, real-time multimedia push-to-talk app for public safety and enterprise customers.
LifeRing Assist	An app that enables smartphones, tablets, and computers users to establish secure ad hoc digital networks.
American Red Cross Emergency App	Provides real-time alerts, shelter locations, and disaster response information

DISASTER PREPAREDNESS

When ODPEM issues the first hurricane alerts and staff members do outreach, they also review with patients their stockpile of medications and other medical supplies, such as glucometer test strips, and insulin syringes, and are instructed to immediately proceed to the pharmacy if they are running low. Each patient is instructed to keep a first aid kit, dressing supplies for central line catheters or fistulas, flashlight, battery power radio, extra batteries, potable water bottles, and non-perishable food supplies. Patients taking medications that need refrigeration, like those using insulin, are told to have a cooler with ice packs ready in case of a power outage.

Staff members pay particular attention when talking with patients who live far from a dialysis unit to ensure that they temporarily relocate to a friend's or a relative's house who lives closer to the hospital-based dialysis units. This ensures that emergency teams can reach the patients in the event of road blockade and down powerlines.

Staff members and patients are advised to learn what areas near their homes or dialysis units are prone to flooding and alternate routes to enter and exit, how to manage a power surge and what to do during a power outage, and what to do if a dwelling endures some kind wind damage.

Finally, staff members and patients are instructed to keep at hand important documents, such as national identification cards, passports, and cash.

DIALYSIS TREATMENT SCHEDULING

Scheduling patients for dialysis during and after a hurricane is a dynamic process that depends on the predicted time of landfall, the areas of the country expected to be hit by the storm, the time forecasters

estimate the storm would linger over an area and the patient volume expected at each of the hospital-based dialysis units. All patients scheduled for routine dialysis have their schedule forward one day, and the treatment sessions are increased to 6-hours so underlying metabolic and electrolyte abnormalities commonly noted in patients with chronic kidney disease are completely corrected providing an additional buffer time in case the post-storm dialysis care is seriously disrupted. The change in dialysis schedules allows non-essential staff, those from outpatient dialysis centers in particular, to head home before the landfall of the hurricane.

STAFFING AND LOGISTICS

Hospital-based dialysis units receive additional staff to absorb increased patient demands. Techs, nurses, and nephrologists stay at the hospital for the duration of the storm as the buildings are considered hardened structures capable of surviving storms, thus facilitating any extraordinary response. As elective surgical cases get cancelled as soon as a tropical storm watch is issued by ODPEM, the additional dialysis staff is accommodated in those rooms.

In addition to the physical accommodation, hospital leadership works closely with the dialysis units to coordinate meals, essential supplies such as flashlights, raincoats, radios, and communication devices, and transportation after the storm to bring new personnel and relieve those who stayed during the storm.

RECOVERY EFFORTS

Immediately after the storm had passed, a damage assessment was conducted according to the post-storm protocols. All outpatient and hospital-based dialysis centers, whether private or public, were inspected to ensure buildings were safe and to verify equipment was in working order and consumables preserved. Close coordination with municipal authorities took place to make sure roads to these sites were open (i.e. debris and power lines removed). Close communication and coordination also took place to ensure prompt restoration of potable water, electricity, and sewage services.

The immediate assessment revealed that dialysis units in the western regions of the country were destroyed or rendered inoperable. Any piece of equipment - dialysis machines, reverse osmosis equipment, and water filters – and supplies – dialysate, medications, syringes, tubing – that was not damaged, as well as staff members, were moved to dialysis centers that were operable. Communication with international organization, such International Society of Nephrology, American Society of Nephrology and Renal Dynamics, was key to obtain volunteers, additional equipment and supplies to restore dialysis services to the most affected areas.

Staff members also reached out immediately to patients to start the process of rescheduling dialysis. After ensuring patients had survived the storm, staff inquired about their overall health, which would have triggered an emergency response. To accommodate the gap that had occurred in dialysis while the storm passed through the country, dialysis units doubled shifts and increased the duration of the

sessions to ensure patients' metabolic and electrolyte disturbances were properly treated. Having an immediate knowledge as to which dialysis centers were rendered inoperable and road condition, the condition of equipment and supplies at each site, the availability of personnel, the census of patients in each region and their contact information, and the close communication and coordination with municipal and national authorities facilitated the process of scheduling dialysis and relocations of patients from the western regions of the country.

OUTCOME AND CONCLUSION

Hurricane Melissa was the first ever category 5 storm to directly hit Jamaica not only bringing destructive winds, torrential rains and ocean surge but also engulfing the entire country. Despite the damage caused by the hurricane to infrastructure, telecommunications, and transportation, western areas of the country in particular, we had no deaths among patients receiving dialysis. Success is the result of careful and intentional planning, open communication among all stakeholders, and a sense of community.

We believe that the steps we took for our dialysis dependent patients are applicable to other natural catastrophes and to patients with other chronic medical conditions, such as those patients with ventricular assisted devices and noninvasive ventilatory support (i.e. tracheostomy, CPAP and BiPAP).

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Figures

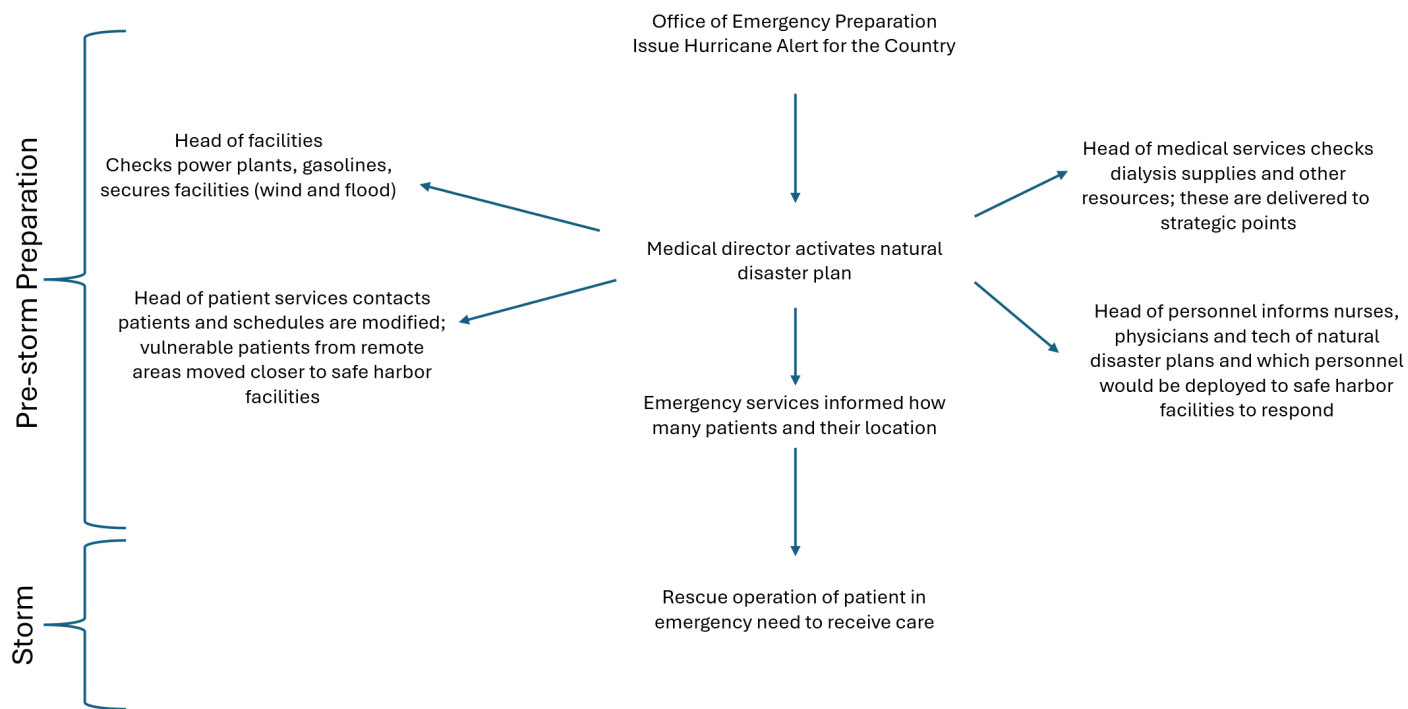


Figure 1

Roles of dialysis center leadership