Disaster Preparedness: Is Your Unit Ready?

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Disasters, whether natural or human-made, require advanced planning to lessen the impact of each unique occurrence. This is true for dialysis units as well as whole communities. Unfortunately, without previous first-hand experience, there is a tendency to underestimate the potential for devastation, suffering, and death. There may also be a tendency to believe disasters always occur somewhere else and, therefore, to ignore the need for disaster preparedness.

The need for disaster planning is greater today than at any time in history (Taggart, 1985). The increased number of patients on dialysis, the increased average age of this patient population, and the increased existence of their co-morbid conditions adds validity to this claim. The purpose of this article is to review various issues that may arise with disasters and to promote predisaster planning for dialysis units.

Background Information

A disaster can be considered any human–made or natural event that causes destruction and devastation that cannot be alleviated without assistance (Hassmiller, 1996).

Natural disasters include such events as hurricanes, floods, tornadoes, earthquakes, volcanoes, blizzards or other occurrences that may affect the whole community. Other disasters may affect only the dialysis facility, such as a fire or bomb threat.

This article brings attention to the need for disaster preparedness by individual dialysis facilities. It is recommended that each facility develop a specific plan for each type of disaster that might occur in the particular geographic location. It is also recommended that the community's disaster plan(s) be reviewed and incorporated in the planning process. This article addresses all aspects related to a natural disaster, including planning, drills, basic services, personnel, and the aftermath. Adequate preparation may lessen the destruction and negative consequences of a natural disaster.

Planning a response to such disasters is an enormous undertaking and requires anticipation of the numerous problems a disaster will pose. When developing a disaster plan, the facility should have specific plans of action for each type of disaster that might occur in the particular geographic location (Waeckerle, 1991). A general description of various disasters is presented in Table 1.

Each type of potential disaster must be considered in terms of predictability, onset, duration, frequency, and potential magnitude (Waeckerle, 1991). For example, tornadoes are among the most lethal and violent of the natural disasters due to their unpredictability and strength. These storms can strike anywhere. Tornadoes usually appear as funnel clouds that extend from the base of thunderclouds toward the ground (Tornado Disaster, 1991). The most violent tornadoes can produce massive destruction with wind speeds of 250 miles per hour (mph) or higher. The path of a tornado's destruction can be more than a mile wide and 50 miles long. It travels at an average forward speed of 30 mph; but this can vary from stationary to 70 mph. In the United States an average of 800 tornadoes are reported annually resulting in 80 deaths and over 1,500 injuries. While a tornado can strike at anytime, it is more likely to strike between 3 pm and 9 pm. The prime months for tornadoes in the southern states is between March and May; in the northern states it is during the summer season (National Weather Service, 2000).

Between the afternoon of April 26, 1991 and the morning of April 27, 1991, 54 tornadoes hit the Great Plains of the United States. Twenty-one persons were left dead while another 308 were injured. The economic impact of the storms was over $277 million (Weather Channel Enterprises, 1998). In 1993, there were 1,173 tornadoes of which 16 killed 33 people; there were 948 injuries. These figures were compiled by the staff at The National Severe Storms Forecast Center in Kansas City, MO and released by the Weather Channel over the Internet (February 2, 1995).

In contrast, the nature of hurricanes allows for timely warnings, preparation, and evacuation if necessary. Approximately 6 to 10 hurricanes develop from nearly 100 tropi-

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Table 1
Information on Various Disasters

With any or all of these disasters there may be disruption of utilities, communication, transportation, sanitation, and public services. Resources and supplies may get depleted. Families may be separated from each other. Persons may be left homeless.

General Description	Special Considerations
Hurricanes (East Coast) (Also typhoons and floods) A hurricane is a rotary storm involving a wide area with winds exceeding 73 mph. The usual forward speed is 10-15 mph, but can be as high as 25 mph. The hurricane can have a track several thousand miles long and several hundred miles wide; it may persist 5 days along the coast. The exact path of a hurricane is not completely predictable. Persons in the projected path of the storm may be required to evacuate the area. The main mechanisms of injury and death are the destructive winds and flooding. The water level can rise 16-18 feet above high tide. The results can cause houses to cave in. Poisonous snakes pose additional danger as they seek protection.	1. Follow progress of storm. 2. Have administrative personnel meet to make final assessment and definitive plan of action. 3. Encourage patients and staff to prepare and stock up necessary food, water, medicines, batteries, flashlights, etc. 4. Schedule additional dialysis treatments for noncompliant patients before storm strikes. 5. Encourage patients and staff to evacuate if officially requested to do so. 6. Ensure patients have copies of care plans, flow sheets, medication list and information regarding alternate facility. 7. Obtain phone numbers and locations where staff and patients can be reached after the storm.
Tornadoes Tornadoes usually appear as funnel-shaped clouds that extend from the base of thunderclouds toward the ground. Severe tornadoes may be over a mile wide, travel as far as 185 miles, and reach wind speeds of up to 250 mph or higher. In the United States, most tornadoes occur in the late afternoon from April through July. Each year, there are an average of 800 tornadoes.	1. A weather-alert radio may be helpful in receiving information regarding tornado watches/warnings. 2. Injury or even death may be caused by flying debris or by being caught in the tornado itself. 3. The effects of heparin can cause patients to bleed longer after injury. 4. Protect the patients as much as possible – remember there may be very little or no warning. 5. If there is time to evacuate, go to a predetermined location not outside. This site should be away from windows/glass. 6. Debris and broken gas lines present a fire hazard. 7. Employees must know how to shut off water, power, and gas lines. The proper wrenches must be available. 8. Secure building and property, and medical and administrative records.
Earthquakes An earthquake is a sudden slipping or displacement of a portion of the earth's crust. The damage results from the vibration of this sudden movement. A major quake may occur with no warning. The time of the earthquake can be an important factor, as most deaths and injuries result from collapsing buildings. Following an earthquake additional injuries and deaths can be caused by tidal waves or fire. Broken gas mains and fallen electrical lines make fire prevention a priority.	1. Minimize injuries within the facility by securing bookshelves and objects on walls. 2. During an earthquake do not panic; seek protection under a desk, sturdy tabletop, etc; don't let others run outside. 3. Employees must know how to shut off water, power, and gas lines. 4. The effects of heparin can cause patients to bleed longer post injury. 5. Citizens who receive crush injuries may require acute dialysis.
Volcanic Eruptions A volcanic eruption is an outpouring of molten rock from an opening in the earth's crust. The lava may ooze out slowly or blow out with explosive force. Most victims are killed by poisonous fumes, superheated gases or masses of volcanic dust.	1. Warning signs must be heeded and evacuation carried out.
Blizzards, Snow and Ice Winter storms can wreak havoc with basic services (water, electricity) and with transportation services.	1. Follow weather forecasts. 2. Know how to obtain alternate power for and/or water for the facility. 3. Alternative means of transportation and alternate routes to the facility should be identified. 4. Assess patient's needs for adequate shelter, heat, clothing, blankets, etc.

cal storms that form annually. Most of these storms develop over the warm waters of the tropics (Weather Channel Enterprises, 1995). A hurricane has winds of at least 74 mph but can surpass 155 mph (Weather Channel Enterprises, 2000). The hurricane season lasts from June through November along the Atlantic and Gulf coasts. Most of a hurricane's destructive work is done by the storm surge, wind, and flood – producing rains. The storm surge is the most destructive part of the hurricane as it is the storm surge that claims 9 out of 10 victims of a hurricane. Not only can the mean water level increase 15 feet or more, but the wind waves of 10 feet high or more can be superimposed on the level of water. This build up of water can cause severe flooding in coastal areas. Additionally, a typical hurricane brings at least 6 to 12 inches of rain that can result in additional flooding (National Weather Service, 1996). These heavy rains can cause major flooding in areas hundreds of miles from where the storm originally came ashore. The wind is responsible for much of the structural damage such as trees being uprooted and power lines being torn down (Weather Channel Enterprises, 2000).

More and more Americans have put themselves and their property at risk by moving to the vulnerable coastal locations (Piekle & Landsea, 1998). It may be that many of these residents, and even the local officials, have never experienced the brunt of a major hurricane and may not take the threat of one of these storms seriously (DiVincenzo, 1992).

It is important that the staff of a dialysis facility know the community's disaster plan or plans (many cities have more than one plan). The facility must not only be aware of all existing plans and the differences in the plans in regards to communication, authority, responsibility, etc., but must also be willing to incorporate these plans into the facility's specific plan. The city's Emergency Preparedness Office is usually the center of control (Klein & Weigelt, 1991).

It is also important that the staff of a dialysis facility know what other dialysis facilities may be able to provide emergency dialysis for their patients. Ideally regional planning would occur with the cooperation of individual units and the ESRD Networks. Suppliers and vendors may also be able to provide valuable input and suggestions.

Table 2
Desirable Characteristics of the Disaster Preparedness Plan

- The plan should be easy to understand and widely disseminated.
- The plan should be functional, highly flexible, and easy to implement so that it can be adapted to a variety of situations and circumstances.
- In developing the plan, consideration should be given to the various views of administrative, medical, nursing, technical, and support staff and patients. Opinions of community services and the local civil authorities should also be taken into account.
- The plan should be written and updated annually. It should provide for a constant availability of resources and knowledgeable, capable personnel prepared to implement the plan.
- The plan should be comprehensive in that it applies to disasters within the facility and to external disasters of medium and high severity.
- The plan should be coordinated with similar plans of other units so that patient care may be achieved throughout the disaster period.
- The plan should possess an official stamp of authority. It designates a central authority figure and lays out the responsibilities that are delegated to specific persons.

General Principles for Disaster Planning

All hospitals and health care facilities should have a disaster plan. Taggart (1985) divided disasters into five chronological phases that can be useful in providing an outline by which to develop disaster plans. Assigning tasks and responsibilities and setting priorities for activities takes on a logical sequence. The first phase is the *predisaster preparation phase.* During this phase, disaster potentials are assessed and the plan developed. Education, training, and drills take place. Needed equipment and supplies are reviewed and in some cases secured for future use (sandbags, communication equipment, generators, etc.). The next is the *warning phase* – the period of time from the first danger signal to the moment of impact. The disaster plan is activated and communicated to all involved parties. This may be the most important phase in minimizing the loss of lives and preventing damage. Evacuation may be indicated. During the *impact phase,* the disaster actually strikes and little can be done. It can last anywhere from a few seconds, as in an earthquake, to a few days or weeks, as in a heat wave. The *emergency phase* begins at the end of the impact and can be divided into three parts: (a) *isolation,* during which a preliminary assessment occurs (broken gas, water, power lines, etc.); (b) *rescue,* when first survivors render first aid to victims (summon additional help, triage, mutual aid, etc.); and (c) *remedy,* when the injured are moved to hospitals. Actions are aimed at preventing further injuries and damage. Attention begins to focus on sanitary measures and public health concerns (drinking water, etc.). Finally, the *recovery phase* begins and ends gradually with the resumption of normal order and functions (repair of damage, restoration of services, initiation of preventive measures, etc.). The activities mentioned are given only as examples and are not meant to be all-inclusive.

Consideration must be given to the time periods of alert, impact, emergency, rehabilitation, and reconstruction. While some disasters have an alert period lasting days or even weeks, this is not the time to develop a disaster plan. Such plans should be developed, tested, and rehearsed prior to a disaster. Without a specific disaster plan, people are likely to respond without direction in the event of a disaster (Clark, 1996).

The principle objectives of a disaster plan are: (a) to prepare the staff, the facility resources, and chronic patients for optimal performances in

an emergency situation of a certain magnitude; (b) to reduce the facility's vulnerability to a disaster and perhaps even prevent it; (c) to make the community aware of the needs of the facility and patient population; and (d) to establish a security system to be implemented if needed.

Security arrangements may be necessary to keep curious persons out and to protect the staff from hostile actions. Desirable characteristics of a disaster plan are listed in Table 2. Key components of the plan should include basic services, communication, supplies, personnel, transportation, and record keeping.

Ideally, the development of the disaster plan involves a multidisciplinary committee, including administrative personnel, physicians, nurses, social worker, dietitian, and technical personnel. For freestanding units, it may be helpful to solicit a representative from the back-up facility. A patient representative should also be included to provide insight from the patient's point of view. The disaster plan should not specify responsible persons by name, but rather by position or title. The plan needs to be adjusted to the needs of the patient population and the staff. For example, if there are non-English speaking persons, the plan needs to address this (Clark, 1996). Once developed, the written plan must be stored in a specific location that is easily accessible to all employees.

As the plan is developed, consideration should be given to the vulnerability of the physical structure of the facility in terms of its construction, location, and resistance to different types of disasters. Additionally, thought must be given to potential damage or injury that can be caused by nonstructural items. For example, Nordberg (1993) pointed out that formaldehyde should not be stored next to bleach in case both were accidentally knocked over and subsequently mixed together creating toxic fumes; that heavy items hanging on walls must be securely fastened; that oxygen cylinders must be properly secured; and that all shelving should have lips to prevent supplies from rolling off.

Disaster planning includes posting a system of signs that include the layout of the building, escape routes, and the location of fire-fighting equipment. Fire detection devices and fire extinguishers should be strategically located (Pan American Health Organization, 1983a).

Drills. It is the responsibility of the facility administrator and medical director to maintain continuing education and training programs to ensure that proper action is taken promptly in the event of a disaster. All staff and patients must be totally familiar with the disaster plan (Pan American Health Organization, 1983a).

The purposes of the disaster drills are: (a) to provide realistic practice sessions; (b) to acquaint each employee with his/her respective role; and (c) to allow for follow-up critiques that can identify potential problems in the plan (Klein & Weigelt, 1991). It is necessary to evaluate and update established plans as resources, methods, and techniques constantly change (Pan American Health Organization, 1983a).

Basic Services

Natural or human-made disasters can impose problems associated with the basic services needed to operate the facility. A downtown Chicago dialysis unit, located on the 11th floor of a high rise affected by the Chicago flood in 1992, had water and electrical supplies unexpectedly interrupted (Wagner, 1992). A meaningful disaster plan must address all basic services.

Water. It is important that the disaster plan indicate the water supply and an alternate water source. For example, an outpatient dialysis unit in Charleston, SC was without water following a record-setting 8 inches of snow. The solution was to deliver water in a milk tank truck from a dairy located over 100 miles away. Because this supply of water was very limited, a fire hose was used to connect the building to a nearby fire hydrant. Had a fire broken out in the neighborhood, water for dialysis would have been shut off immediately.

Consideration must also be given to operation of the water treatment systems and to the reprocessing of dialyzers. If the quality of the water is questionable, it may be necessary to temporarily suspend a reprocessing program.

Waste disposal. The disaster plan should also show the location of drains, sewage, and solid waste outlets. Following a major disaster, normal garbage disposal may be interrupted for weeks. What is to happen to the refuse generated by the dialysis unit? Alternate systems for use in an emergency should be identified. For instance, it may be possible for trucks bringing in supplies to carry away properly packaged waste for proper disposal.

Electricity. With regard to electric energy, the location of control panels and electric power distribution lines, both internal and external, should be listed. Voltage, amperage, and cyclage used in the facility should be described. The sources where a generator can be acquired should be included (Pan American Health Organization, 1982). The National Guard or Army Reserve units may be able to supply an electric generator. By planning and making arrangements in advance, the facility may receive top priority in the use of such equipment (Hargest, 1983). The record of the identified source, contact person, and telephone numbers should be on hand as a quick reference.

The use of portable generators poses potential hazards. For example, it may be assumed that electric power lines are disconnected or deenergized. It is possible to inadvertently feed generator power to the outside of the facility and central power lines (this can electrocute workers as they are repairing lines). Also, carbon monoxide fumes entering the facility either directly or through central heating and air conditioning ducts could present a grave threat to the occupants of the building (Banov, 1990).

To prevent such sequelae only a qualified person, preferably a licensed electrician, should connect the generator to the electrical system if it is not already connected. Safe operating procedures must include: (a) identification of all potential hazards at the worksite; (b) verification that lines have been deenergized, grounding all lines that will be

accessed; (c) use of appropriate personal protective equipment (such as, insulating gloves, rubber mat); and (d) use of adequate portable lighting in low light or darkness ("Update: Work-Related Electrocutions," 1989).

If the facility has a gas supply, it is essential to know the layout of the pipes and location of safety valves. The gas should be turned off due to the risk of fires. Considerable care should also be taken to prevent spills or leaks of material that might spark explosions or fires (Pan American Health Organization, 1983a). Oxygen must always be properly secured and stored, and flammable chemicals, such as formaldehyde, should be appropriately labeled and stored with the material safety data sheets (MSDS).

Other problems. Banov (1990) identified other potential problems associated with disasters. Among those were: (a) the loss of the facility's medical and administrative records; (b) the effects of the loss of electrical power on refrigeration; and (c) the lack of needed medical supplies and staff. These are other areas to be considered with the evolution of a facility's disaster plan. While preparing for a hurricane, one facility stored its medical records in plastic trash cans with tight-fitting lids. The trash cans were placed on tabletops in case of flooding.

Communication. The ultimate goal to consider when planning for the element of communication is to send the right information to the right person at the right time. This should be done in an understandable and effective form (Cummings, 1987). Good communication has been repeatedly cited as one of the most difficult problems in disasters (Banov, 1990; Klein & Weigelt, 1991; Waeckerle, 1991). The disaster plan should include a list of telephone numbers that would be used in an emergency. Examples of the types of telephone numbers to be included are listed in Table 3.

The disaster plan must address how information is going to be transmitted to staff, patients, and the community before, during, and after a disaster. The 1993 explosion in the World Trade Center in New York City provided an example of problems with communication following a disaster. Individuals who were caught inside the building repeatedly stated on television interviews that there was no communication, that no one was told what was happening, or where to go. It was later discovered that the building's communication center was rendered inoperable by the explosion.

Communication within the facility is vitally important. The chain-of-command must be clearly delineated and known to all persons. Decisions regarding the handling of emergency situations have to be made in a timely fashion and communicated to everyone involved. For instance, if evacuation of the facility becomes necessary, there may or may not be enough time to return the patient's blood. This decision must be made, and the plan of action must be communicated in a predetermined manner to everyone.

Many facilities have multiple telephone lines that require electricity for operation. Without electricity, these telephones become inoperable for both incoming and outgoing phone calls. The smallest of generators can obviate this problem. It is also possible (and relatively inexpensive) to attach a battery-operated ringer device to a telephone system (Banov, 1990).

The multitude of personal cell phones may help alleviate communication problems. However, in a community experiencing a disaster and more phone calls being made, the system may become overloaded and give only busy signals. Additionally, the batteries for these phones may lose their power.

The ability to contact family and/or significant others was a major concern of the staff members of one hospital in San Francisco following the 1989 earthquake. Not knowing how the earthquake affected family, friends, and home was a major stressor. Therefore, talking with family members as soon as possible was a major coping mechanism (Walker & Gatzert-Snyder, 1991). Communication with family in a reasonable time should be encouraged as it can contribute to the mental health of the employee and be an enabling factor in the provision of patient care.

It is important that the facility have an alternative means of communication (Clark, 1996; Hargest, 1983). Mechanisms for delivering messages to the staff and the patients via broadcast by commercial radio and television should be arranged (Pan American Health Organization, 1982). It is important that everyone knows about and is alert for such messages. Communication within the facility is also vitally important. One possible method of communication is a centrally located bulletin board where messages can be left (Clark, 1996).

Finally, contact with members of the press may be unavoidable in a disaster or emergency. It is recommended that the administrator or medical director select one individual to represent the facility to the press: a person who is not easily ruffled and who speaks with authority (Hargest, 1983). It is important that all staff and patients know who the spokesperson is and the reasons for delegating this responsibility. Periods of disaster can be delicate times when emotions are

Table 3
Required Telephone Numbers

Patients

Unit Staff
- Administrator
- Nursing supervisor
- Medical director
- Chief technician
- Nursing staff
- Technical staff
- Social worker
- Dietitian

Others
- State adjutant general
- Building contractor
- Electrician
- Plumber
- Heating and air conditioning service
- Fire department
- Electric company
- Water supplier
- Dairy (for milk truck)
- Supply companies
- Red Cross
- State Board of Nursing
- Nearby dialysis unit(s)
- ESRD Network

high and inappropriate release of information can produce confusion (Klein & Weigelt, 1991). Reporters without information may also distort the situation. It is therefore far better to provide accurate information on a regular basis (Hargest, 1983).

Supplies. The disaster plan must anticipate the need for supplies, both usual and special, and the potential problems associated with managing them (Waeckerle, 1991). Clark (1996) defines logistical coordination as the coordination of attempts to procure, maintain, and transport needed materials. The disaster plan should specify where and how supplies and equipment will be obtained and then stored.

The facility should be equipped with enough supplies to allow it to be essentially self-sustaining for a minimum of 1 week (Cummings, 1987). The Pan American Health Organization (1983b) recommended that at least 3 months worth of supplies be kept on hand. This additional inventory would allow for an influx of patients from other facilities, unscheduled dialysis treatments, cessation of the reprocessing of dialyzers if necessary, and an increase in the number of acute dialysis treatments.

Each facility must determine the appropriate amount of necessary supplies to be kept on hand while considering that it may be difficult to obtain supplies from the usual sources if airports are closed and/or roads are impassable. The facility must also consider how these supplies will be protected from physical damage and contamination during a disaster. Additionally, the supplies routinely recommended to have on hand for emergencies should be readily available, periodically tested, and replaced when needed. These items would include flashlight(s), battery- operated radio(s), spare batteries, and first-aid equipment.

Personnel. A staff shortage is a reality that must be considered when planning for disasters. Some staff members may be injured, and others may not be able to reach the unit. During a disaster, the staff may be justifiably concerned for family and property and may not report to work or may leave the facility with or without notice (Hargest, 1983).

A disaster plan will work only if it identifies appropriate avenues for adequate staffing. During an actual disaster, volunteers who have knowledge of the internal functioning or physical layout of the facility may be helpful. For example, a family member of one of the employees could answer the telephone and take messages (Cummings, 1987). If volunteers are managed properly, they can accomplish much; however, if they are not organized and directed, they may be a hindrance (Waeckerle, 1991).

During and after a disaster, the physical and mental demands on the staff can be great. It is important that the staff be encouraged to get proper rest and nutrition. They should also be evaluated for stress reactions (Waeckerle, 1991).

Transportation. Transportation to and from the facility is a fundamental necessity for both staff and patients. The disaster plan should address this potential problem (Pan American Health Organization, 1983a). If the disaster disrupts roads, communications systems, and transportation systems, the results can become a nightmare (Waeckerle, 1991). Each patient should be encouraged to establish his or her own back-up transportation – a relative, friend, neighbor, church member, or fellow patient. If there is absolutely no one to provide back-up transportation, the social worker or other facility personnel should know this. Such patients definitely need help following a disaster.

The facility should investigate its local community plans to see if potential alternative means of transportation exist in times of emergency. There may be a plan by which local police or volunteers provide emergency transportation. If there are no other means available, facility employees may need to go out and pick up patients for dialysis. While there is a certain risk and liability involved, this may be necessary. This was the case at an outpatient facility following a hurricane.

Record keeping. It would be difficult to develop a systematic record-keeping system during an actual disaster, so it is important to address this issue in the disaster plan. Emphasis should be placed on using documentation forms that are in routine daily use rather than devising special ones (Klein & Weigelt, 1991). Computer-generated records deserve special consideration. It may be necessary to temporarily revert to hard copy flow sheets/dialysis records.

Accurate record keeping is important to identify the patients and to provide an ongoing account of each patient's care and condition. Paperwork is not considered a priority during a disaster, so the disaster plan should deal with this issue and associated problems that can arise (Waeckerle, 1991). For example, patients who do not normally dialyze at a facility will need to have new medical records established and appropriate consents signed. New patients may also be inadvertently left off of a billing form or charge sheet. Accurate records also need to be kept of supplies obtained from or loaned to another facility. The results of improper record keeping can be quite costly to the facility (Klein & Weigelt, 1991).

Aftermath. During the recovery phase of a disaster, there may be delayed injuries and potential health problems. Staff and patients may require food, drinking water, shelter, and clothing. Public health officials may be faced with having to provide adequate sanitation facilities to minimize the spread of communicable diseases (Waeckerle, 1991). The facility should maintain periodic contact with the local health department in order to facilitate a working relationship during times of disaster. For example, the facility may be able to more easily secure a supply of tetanus toxoid if a specific contact person at the health department is already known.

The facility should also listen to the messages being broadcast by local health officials concerning the health and welfare of all citizens of the community. These messages should be reiterated and explained to patients and staff, if needed. An example of one such message would be the current recommendations for purifying water used for cooking and drinking.

A part of the disaster plan should include psychosocial support for both the health care providers and patients (Klein & Weigelt, 1991). It may not be possible to completely ward off the

Table 4
Questions to be Addressed in Creating a Disaster Plan for a Dialysis Unit

Planning
- What plans already exist in the community?
- When is each plan implemented and by whom?
- Is there knowledge of the facility's disaster plan among staff and patients?
- Are the plans reviewed and practiced often enough?
- Is the disaster plan posted in the facility?
- Are there appropriate Material Safety Data Sheets (MSDS) available?

Administration
- Does the plan prepare the facility to be self-sufficient for at least 3 days?
- Where are the nearby facilities and what is their willingness to assist in a disastrous situation? Is your facility willing to reciprocate?
- What does your state require for out-of-state licensed nursing personnel to practice in an emergency situation? What would the facility's registered and licensed practical nurses have to do to assist dialyzing the facility's patients at another facility in another state?
- Is there a plan for providing adequate staffing?
- Is there a plan for managing volunteers?
- How will the staff be paid if banks are closed and automatic teller machines are out of commission?
- Is there a means of instituting a census to ensure that all staff and patients are accounted for in either an internal or external disaster?

Communications
- What are the lines of communication between administrative personnel, staff, and patients?
- Are plans made to make announcements on commercial radio and TV stations?
- Is there a back-up communication system if telephone lines are down or if telephones are inoperable without electricity? (cell phones, walkie talkies, etc.)
- What will the lines of communication be with the media?

Preparation
- Are the steps to physically secure the building outlined?
- Are patients and staff given information regarding emergency supplies, medications, and nutrition?
- If a community-wide evacuation is enacted, is there a system to know where patients and staff are going along with the addresses and telephone numbers where they can be reached?
- Are the patients given copies of the last run sheet, care plan, medication list, and latest laboratory results in the event of transfer to another facility?
- Does the plan address the needs of noncompliant patients, such as emergency treatment prior to a predicted disaster?

Record Keeping
- Is there a back-up system for computer records?
- Have medical and administrative records been protected?
- Have billing/bookkeeping issues been addressed to lessen the potential for financial loss?
- Is inventory control maintained?

Security
- Is the normal security system inoperable without electricity?
- Is there a means of providing security to property and person?

Supplies
- Is there a plan for stocking an adequate amount of extra supplies?
- Is there a means of obtaining additional supplies if needed?
- Does the plan address the possibility of closed airports and impassable roads?

Transportation
- Do patients and staff have alternate means of transportation and alternate routes to the facility if required?
- Will gasoline be available?
- Are there procedures to provide for the prompt transfer of patients when necessary?
- If a curfew is imposed, can patients and staff get permission to be out late if necessary?

Power
- What are the electrical requirements of the facility?
- Where can an emergency generator be obtained that can meet the electrical needs of the facility?
- Where will the generator be placed in order to provide for safe ventilation?
- How will the generator be safely connected?
- How will fuel for the generator be obtained?
- Are automatic timers adjusted or disconnected after power interruptions?

Water systems
- How will the quality of the water be determined following a disaster?
- How much water is required to operate the facility?
- What is an alternative water supply?
- Is it possible to run a fire hose from a nearby fire hydrant to the facility?
- Can water be trucked in a dairy tanker?
- If bleach is used to disinfect drinking/cooking water, is it stipulated that lemon-freshened bleach should not be used as it can cause GI upset?
- Will high flux dialysis or reprocessing need to be discontinued because of the quality or quantity of water?

Waste Disposal
- What will happen if the garbage disposal service is interrupted?
- What will be done with the spent dialysate fluid if the sewage system is disrupted?

Aftermath
- Are the physical and psychosocial needs of the staff and patients addressed?
- Does the plan include food, shelter, clothing, and dealing with emotional reactions?
- Is a review and critique of the facility's performance planned?

Table 5
Additional Resources for Disaster Planning

Disaster Preparedness for Dialysis Patients
The *Disaster Preparedness for Dialysis Patients* booklet produced by the Transpacific ESRD Network is an excellent example of specific information patients and their families need. It is reviewed in the Book Review Department of this issue of the *Journal*. It is available from the Transpacific Renal Network; 38 Issaquah Dock; Waldo Point; Sausalito, CA 94965.

Planning for Natural Disasters A Guide for Renal Facilities
Planning for Natural Disasters A Guide for Kidney Patients
These publications were produced by the National Kidney Foundation in 1995. They are very comprehensive and contain a lot of practical and useful information. The patient's booklet is written at the 8th grade level. For further information, contact the National Kidney Foundation 30 East 33rd Street New York, NY 10016. Telephone number: 1-800-622-9010.

Preparing for Emergencies: A Guide for People on Dialysis
The Department of Health & Human Services with the help of the Transpacific ESRD Network and others created this 32-page booklet. It was sent to dialysis facilities for distribution to all patients prior to the Y2K experience. For additional copies, contact your local ESRD Network.

Emergency Preparedness Checklist
Your Family Disaster Plan
Your Family Disaster Supplies Kit
The Federal Emergency Management Agency (FEMA) and the American Red Cross have issued three free booklets to help families create their own disaster plans, including supplies to have on hand and an escape route. These booklets are *Emergency Preparedness Checklist, Your Family Disaster Plan,* and *Your Family Disaster Supplies Kit*. These can be picked up at your local Red Cross Chapter office or you may write FEMA; Department P, Box 70274; Washington, DC, 20024.

Medical Supply Management after National Disaster
Environmental Health Management after Natural Disasters
Health Services Organization in the Event of Disaster
The Pan American Health Organization released three helpful manuals in 1982 and 1983. These manuals are available in Spanish. They are available in most medical libraries and can be obtained from the Office of Publications; Pan American Health Organization; Washington, DC. The titles are *Medical Supply Management after National Disaster* (ISBN 92 75 11438 2), *Environmental Health Management after Natural Disasters* (ISBN 92 75 11430 7), and *Health Services Organization in the Event of Disaster* (ISBN 92 75 11443 9).

Hospital Evacuation Planning in Catastrophic and Emergency Situations
The Association for the Advancement of Medical Instrumentation (AAMI) Outreach Series produced a booklet, *Hospital Evacuation Planning in Catastrophic and Emergency Situations* (ISBN 0910275 30 0). This booklet written by Thomas S. Hargest was published in 1983. It may be available from your local medical library or can be obtained by writing AAMI; 1901 North Fort Myer Drive; Suite 602; Arlington, VA 22209.

traumatic effects of a disaster, but there are interventions that may be helpful. Certainly the expected emotional reaction to a disaster must be recognized as well as those reactions that suggest the need for additional therapy (Stanley, 1990). Mental health professionals can assist in the recovery process and aid in the return to a normal life (Waeckerle, 1991).

Following a disaster, the number of depressive reactions will be highest soon after the event and may be accompanied by posttraumatic symptoms. These symptoms may include shock, numbness, anxiety, and concern over the future, guilt, sleep, and/or appetite disturbances, inability to concentrate, and even deterioration of health. Memories of the event may manifest themselves as intrusive thoughts, flashbacks, or nightmares (Stanley, 1990).

Role conflicts add to the stress employees face, as each must choose between remaining with or going to one's family versus performing one's duty to the patients. This decision must be made while being not only a health care provider, but also a victim (Stanley, 1990).

Stanley (1990) described a post-disaster crisis stabilization program that was implemented to help hospital nursing personnel following Hurricane Hugo. Implementation began with assisting the staff to recognize normal reactions, which in itself helps shorten recovery time. Debriefing groups were used to share daily experiences, both positive and negative. Information was dispersed regarding hotlines, available mental health resource numbers, and the names of specific contact persons. One self-help technique that was described was a buddy system adopted at work and at home. This partnership system allowed for mutual support on a day-to-day basis. For example, if on a particular day one staff member could function at only 40% of normal, the buddy would help pick up the slack.

Other interventions that were taught or used included relaxation techniques, child/parent coping exercises, and problem-solving methods (Stanley, 1990). Information regarding psychosocial issues, outside support, and specific interventions should be addressed in the facility's disaster plan. Handouts regarding topics such as relaxation techniques could be developed and kept on hand.

Following the disaster, there is also a need for an honest performance critique while staff can accurately recall the events and associated problems. Everyone should participate with someone designated to record the comments. This discussion should focus on personnel, resources, communications, and specific problems faced by the facility, staff, and patients. This information can then be used to aid the facil-

Table 6
Useful Web Sites

Note: The most prolific means to find more information about a particular type of natural disaster is to do a Web search. Type in a word (such as hurricane or emergency preparedness) and go to search. Thousands of pieces of information and articles are available. You can also look at your own state's, county's, and city's Web sites for disaster preparedness information.

American Red Cross – http://www.redcross.org/
Here you can find a wide variety of very helpful information, such as: emergency preparedness check list, disaster supplies for your family, ready for a winter storm, earthquake preparedness guide practical ideas, the birth of a tornado, etc.

FEMA: Federal Emergency Management Agency – http://www.fema.gov/
There is information about disasters, disaster mitigation, preparedness, response, and recovery.

The U.S. EPA's Chemical Emergency Preparedness and Prevention Office – http://www.epa.gov/swercepp

Chef Noah Emergency Preparedness – http://www.chefnoah.com/the-bookstore.htm
Books can be purchased on a variety of topics such as earthquake, hurricane, winter storms, etc.

***Morbidity and Mortality Weekly Report* (*MMWR*)– http://www2.cdc.gov/mmwr/mmwr_rr.html**

ity in preparing to face the next disaster (Klein & Weigelt, 1991). The revised disaster plan should be tested and periodically rehearsed.

Conclusion

In order to lessen the effects of a disaster, a facility must plan and prepare to face any disaster that might occur within its geographic location. This article has raised a number of issues related to disaster planning in hopes of prompting and assisting facilities in developing or improving disaster plans designed to meet the unique needs of the facility and patients. Ideally, at least some of this is done in conjunction with other nearby facilities and the area's Network. A list of questions a dialysis unit should address when developing or evaluating a disaster plan is summarized in Table 4. Table 5 lists additional resources for disaster planning. Table 6 lists web sites that contain useful information in regards to disaster planning.

Unfortunately, there are no universal answers that can be given as each facility, region, and Network is independent and each disaster is a one-of-a-kind experience. Through adequate preparation, the staff and patients may function more safely and effectively and feel more in control in a disastrous situation.

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