International Diabetes Federation Western-Pacific Region Program for Diabetes Management in Natural Disaster
Forward

On a global scale, diabetes is one of the non-communicable diseases that is an epidemic out of control. The Western Pacific Region is known as the “Epicenter of the Diabetes Epidemic” because 8 of the top 10 countries with the highest prevalence of diabetes are from the Western Pacific Region. Of the estimated 387 million cases of diabetes, about 36% (138 million) of all people with diabetes are living in our region, and diabetes in our region will expand to more than 200 million cases by the year 2035. It is the largest number among the 7 regions. The Western Pacific Region is not only significantly affected by the diabetes epidemic, it has the most frequently occurring natural disasters and many people’s lives and health, with or without diabetes, are affected by the disasters. In the past 10 years, several natural disaster events have occurred in the Western Pacific regions, including the Southeast-Asia Tsunami in 2004, the earthquake in Christchurch, New Zealand in 2010, the Great East Japan Earthquake and Tsunami in Japan’s Tohoku district in 2011, and the Haiyan Typhoon in the Philippines in 2013. After disaster events, not only do mortality and morbidity rates immediately increase, the stress, infections, lack of food, water, and medications can all lead to worsening of chronic illness, and may seriously impact their disease management. Therefore, a better disaster management plan for preparation, action, response, and recovery is essential to reduce the effects of a disaster incident. It is well recognized that major disasters have a significant impact on diabetes, both in the short and long terms. The International Diabetes Federation – Western Pacific Region Disaster Program aims to help each member country develop disaster preparation and medical care strategies, and minimize the effects of disaster events on the lives and health of diabetic patients. It is hoped that people with diabetes, health providers, and official emergency departments should always be prepared, and by way of such preparedness the impact an emergency may have on their condition will be lessened. In the WPR council meeting in 2013 IDF world congress in Melbourne, Australia, it was proposed that a disaster program should be established in the region to serve as a guide to assist each country to create a national standard operational process for diabetes management in natural disasters. IDF-WPR executive council members put the task in their hands and gave birth to “IDF-WPR Natural Disaster Program” to help and save lives of people suffering from diabetes.

Professor Nam H. Cho
IDF-WPR Chairman
Preface

In the past 10 years, serial natural disaster events occurred in the west Pacific regions, including the Southeast-Asia Tsunami in 2004, the earthquake in Christchurch, New Zealand in 2010, the Great East Japan Earthquake and Tsunami in Japan’s Tohoku district in 2011, and the Haiyan Typhoon in the Philippines in 2013. After disaster events, not only are mortality and morbidity immediately increased, but the stress, infection, and lack of food, water, and medications can all lead to worsening of chronic illness, and may seriously impact their disease management. Therefore, a better disaster management plan for preparation, action, response, and recover is essential to reduce the effects of a disaster incident. It is well recognized that major disasters have a significant impact on diabetes, both in the short and long terms. The International Diabetes Federation Western-Pacific Region Disaster Program aims to help each member country develop disaster preparation and medical care strategies, and thus minimize the effects of disaster events on the lives and health of diabetic patients. It is hoped that people with diabetes, health providers, and official emergency departments should always be prepared, and by way of such preparedness the impact an emergency may have on their condition will be lessened.

Professor Lee-Ming Chuang
Executive Board member, IDF-WPR

Professor Sidartawan Soegondo
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Rationale

A patient’s living environment can change extensively after a natural disaster such as an earthquake, tsunami, or typhoon. After disaster events, stress, infection, and lack of food, water, and medications can all lead to worsening of chronic illness, such as glycemic control in diabetes. Based on the challenge of the rise in numbers of natural disaster events in the WPR and their great impact on medical care of diabetic people, the professionals in the WPR are much concerned about the this issues to call for a better preparation and response to the disaster events. In the WPR council meeting in 2013 IDF world congress in Melbourne, Australia, it was proposed that a disaster program should be established in the region to serve as a guide to assist each country to create a national standard operational process for diabetes management in natural disasters. It is recommended that diabetes patients should be educated to prepare for a disaster, including the maintenance of personal stocks of general supplies, daily-required medications, medical records, and contact information, as well as planning for early evacuation from a disaster area. For the diabetes care providers, and related organizations, and governments, they should (i) develop a disaster guideline for emergency with periodic rehearsal assessments before a disaster, (ii) cooperate and communicate closely with coordination of medical resources during a disaster, and (iii) review the response after the disaster events. Through the sharing and exchange of information throughout WPR-Asia, the effects of disaster events on the lives and health of diabetic patients can be minimized.
Program process

The Executive Committee of IDF-WPR considered and discussed the need to develop the Disaster Program for member associations of the Region. The participants (‘disaster program group’) were formed from members of the IDF-WPR. Initially, some designated individuals with expertise in the topic prepared an evidence summary of the program for diabetes management in natural disaster. Then, the draft guideline was sent out for wider consultation to IDF-WPR member associations, and changes were made according to comments received. In 2014 WPR council meeting in Singapore, the whole IDR-WPR members met to hear the synthesis of the program for the topics of diabetes care disaster program, and to address what additional recommendations should be made. A decision was made to review the guideline after 3-5 year, and individuals who prepared the original sections were invited to review and update their section taking into consideration new evidence and new treatments.
Acknowledgements

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Introduction

Natural disasters are events that occur periodically and affect society locally and globally. Examples of natural disasters include the Southeast-Asia Tsunami in 2004, Hurricane Katrina in New Orleans in 2005, the Great East Japan Earthquake and Tsunami in Japan’s Tohoku district in 2011, and the recent Haiyan Typhoon in the Philippines.\textsuperscript{1-5} Because natural disasters markedly increase mortality and morbidity, developing a disaster management plan for preparation, action, response, and recovery (including disease surveillance, patient evacuation, health and medical support services, and hospital staffing support) is essential to reduce the effects of a disaster incident.\textsuperscript{4,6} Besides, during the development of disaster management program, it is important to consider local ways of living and habits, and support resources, such as emergency foods, kinds of shelters preparation, and individual action and response for disaster event, among different countries and areas in the West-Pacific region.

Natural disasters and patients with diabetes: Tohoku earthquake in Japan

Natural disasters are disruptive to glycemic control in patients with diabetes.\textsuperscript{5-13} Previous studies observed significantly increased blood glucose, glycated hemoglobin (HbA1c), systolic blood pressure, and diastolic blood pressure in patients with diabetes after the Great East Japan Earthquake and Tsunami in 2011.\textsuperscript{5-9,14} Several factors such as changes in diet, interruption of drug intake, and psychological stress are proposed to deteriorate blood glucose in acute disaster events.\textsuperscript{5,14} Fresh food tend to be in particularly short supply after a natural disaster, and thus cause patients to predominantly subsist on preserved foods such as sweets, pastries, canned products,
instant noodles, and boil-in-the-bag foods, that can disrupt glycemic control. In addition, the use of antihyperglycemic drugs is reported to be decreased by 30%–40% because many patients are separated from diabetic medications, have no access to medical care, or lose their insulin vials, needles, or pens in the disaster. Even two to three months after a disaster, patient adherence to diet and exercise regimens can still be compromised because food supplies and living environments may have not yet to fully recover to the usual levels. Besides, post-disaster emotional stress affects glycemic control.

In the afternoon of the March 11, 2011, Japan’s Tohoku district experienced a magnitude-9.0 earthquake. Shortly after the quake, a giant tsunami developed, causing the Fukushima nuclear power plant to leak.

(1) Observations in the affected area

After the Great East Japan Earthquake, it took a long time to restore life-lines such as supplies of electricity, water, and gas as well as telephone and transportation. Periods for the restorations were: approximately 3 days in Iwate, approximately 20 days in Miyagi, and approximately 5 days in Fukushima. Due to the shortage of electricity and gas, they had problems in reading electrical medical records, performing laboratory examinations, preparing meals, and collecting information. Telephones, mobile phones, and short message service (SMS) were often unusable.

(2) Diet

Refuges were unable to provide basic healthy meals, including foods recommended for people with diabetes. Even almost a month and a half after the disaster, most of the refuges could provide meals only twice a day, breakfast and supper. Meals in refuges tend to be unbalanced, with a high proportion of carbohydrates and few vegetables.
(3) Medication

Due to the destruction of roads, railways, and airports, shortage in supplies of insulin, needles and SMBG sensors were problems for those who required insulin injections. Approximately 20% of patients with type 1 diabetes on the coast area of Sendai city did not have enough insulin supplies, and more than 50% of them needed to receive insulin from sources other than physicians in charge (e.g., pharmacy and friends).

(4) Healthcare professionals

The Disaster Medical Assistance Teams (DMAT), groups of professional medical personnel consisting of one physician, two nurses, and one coordinator were sent from other parts of Japan to Tohoku district. But they did not carry medications for chronic diseases, and network shutdown made it difficult for DMAT’s headquarters to coordinate dispatch well.

(5) Mental health

Many of the survivors experienced post-disaster mental trauma.

(6) Suggestion

i. Prepare an emergency manual and familiarize it among all workers in each medical facility.

ii. For each medical facility to prepare stocks of necessary supplies (water, foods, and fuels) for inpatients, workers, and, if possible, neighboring residents.

iii. Prepare stocks of insulin and medications as well as medical devices, and carry medical and prescription records such as “JADEC’s Diabetes Pocketbook” and “Prescription Pocketbook” along with his/her health insurance card.

iv. Coordinate healthcare professionals including pharmacists, dieticians and nurses, to support refugees with chronic diseases.
Natural disasters and patients with diabetes: Typhoon Haiyan in Philippines

(1) Observations on diabetes care in the affected areas

Typhoon Haiyan, also known as Typhoon Yolanda in the Philippines, was the deadliest Philippine typhoon on record in November 8, 2013. Many people with type 2 diabetes did not have access to medicine, and their supplies of insulin had been exhausted prior to the disaster. According to Dr Richard Elwyn V. Fernando, President of the Diabetes Philippines (DP), proposed that there are several challenges existed. The first was sending the vials of insulin to diabetic people because the roadways were so poor. Some people with diabetes in the disaster areas were reluctant to travel to get their insulin because food, security, and other survival needs were more urgent priorities. In addition, oral medications for diabetic control, hypertension, and heart disease were in low supply.

(2) Partnership with Insulin for Life

Established in 1999 by Ron Raab, the primary objective of Insulin for Life (IFL) is obtaining diabetes medicines and supplies and delivering them to diabetes associations and other organizations for distribution to patients in need. After Typhoon Haiyan in November 2013, IFL has prioritized the delivery of insulin and other essential diabetes supplies, some of which were sent by the Taiwanese Association of Diabetes Educators.

(3) Suggestion

Following Typhoon Haiyan, Dr Fernando and his team developed two objectives for the DP to improve outcomes for people with diabetes surviving disaster. The first objective was to create a national standard operating procedure (SOP) for providing assistance to people with diabetes in the Philippines, in cooperation with government agencies concerned. The second objective was to create a type 1 diabetes registry, so that in times of disaster or crisis development, the locations of children and adults requiring insulin could be identified. However,
although IFL can provide free insulin, test strips, and other supplies, funding is required to cover the shipping and handling costs.

Natural disasters and patients with diabetes: Christchurch earthquake in New Zealand

Christchurch suffered a major earthquake in September 2010 which in effect acted as a training ground for the more damaging earthquake occurring in February 2011. Emergency supplies of insulin, pen injectors and glucose meters were out of action for many weeks. Hospital outpatient supplies of insulin and spare pen injectors were low. Retail pharmacies that were in a position to remain open and serve customers also had low levels of stock as part of inventory control. The diabetes service asked the local health system for two things; some dedicated outpatient space to act as a temporary office / clinic and also prolongation of access to free pharmaceutical supplies so that the cost for patients of restocking insulin and glucose meters lost in the quake was not seen as a barrier. During the recovery phase, diabetes services are competing for reduced resources, and may remain a low priority in the overall re-planning of clinical services.

Suggestion:

(1) Redeployment of staff

Diabetes service delivery is predominantly ambulatory and non-acute. Following the Christchurch earthquakes, trying to maintain a non-acute service is inappropriate for multiple reasons, including reduced availability of staff as they grappled with their own loss of housing and/or water and electricity and also problems with food security and child care, as many schools were closed for several weeks. If one or more staff members are in a position to do a reconnaissance of diabetes needs, including inpatient needs, this may reveal opportunities for a reallocation of resources.
(2) Assistance from external agencies

Assistance from external agencies such as pharmaceutical companies is most welcome but it needs to be timely and needs to acknowledge ‘on the ground’ understanding of problems, for example the insulin micro-distribution issues discussed above. Rather than pre-judge the situation on the ground, external agencies should ask the questions: “How can we be of help” and “What do you need”, then listen carefully to the answers and respond accordingly.

(3) Role of the internet

If the internet is accessible to clinicians, a lot of published wisdom is available from past disasters that can be adapted to the local situation e.g. need for medication identification and medication switches (especially insulin switches), food security, and insulin storage. If the internet is accessible to patients, the diabetes team may wish to make the development of a local self help e-sheet a priority – such an e-sheet was found to be very useful by the local diabetes community.

Natural disasters and patients with diabetes: Aceh tsunami in Indonesia

(1) Observations on medical care in the affected areas

Aceh tsunami is considered as one of the most devastating natural disasters in the history of Indonesia, triggered by a 9.15 magnitude earthquake that occurred in the Indian Ocean. Based on the data from Indonesian government which released 1 year after the disaster, it is estimated that 129,775 people were killed and 38,786 were missing. There are 1,458 trauma and wound victims of Aceh tsunami reported to the WHO, starting from the disaster until around May 2005. Communicable diseases such as acute respiratory tract infections were the most highly diagnosed cases, with the total number of 37,492
diagnoses were reported to the WHO right after 5 months after the tsunami. After the disaster, there were issues in food and clean water distribution among the affected areas. Hygiene became the main problem, along with medical supplies and basic needs such as clothing. Based on the cross sectional, record-based study performed in the International Committee of the Red Cross (ICRC) Hospital, the diagnosis of chronic diseases such as hypertension and diabetes was 17.3% from the total number of 1188 cases analysed.

(2) Suggestion

i. Natural disaster with huge impact would bring a remarkable effect on people with diabetes, especially those who have dependencies to insulin administration. These effects are also long lasting; bring in both negative economic and health consequences. A good database system containing at least people, who need insulin administration, and diabetic complications if any, will affect a lot in the management of diabetes during disaster events. Therefore, a good collaboration between the government through minister of health and related institutions regarding natural disaster, national organization of diabetes, local hospital and nongovernmental organization, should be managed and created.

ii. The coordinating institution, preferably the national organization of diabetes, should have the updated data of diabetic patients with important characteristic, such as insulin usage and dosing, type of insulin used, the level of HbA1c for at least the past 3 months, and diabetic related complications which they have. This information will help the coordinating organizations in disaster events to manage the distribution of goods and specific needs for diabetic people affected by the incident.
iii. Drug supplies are affected usually during disaster events, due to the damaged transportation access and business activity, which is stopped for a while. A good communication with pharmaceutical industries involved should be made to ensure that the supports could be fulfilled. The distribution of diabetic medication and related supply should be maintained under the coordination by the national diabetes organization, together with the local hospital, until the condition back to normal.

iv. The awareness could be created by routine educations with several options of media choices, such as posters, leaflet, seminars etc. What to do, what to prepare, and whom to contact are few points which should be put. With a good preparation in normal situation, and solid collaboration during and after the disaster, we could at least minimize the impact of natural disaster to diabetic patients.

**Natural disasters and patients with diabetes: Hurricanes in USA**

Hurricanes detrimentally affect patients with diabetes by rapidly depleting medications and impairing access to medical care.\(^{10,21-23}\) Epidemiological studies have indicated that diabetes is one of the most prevalent chronic conditions in hurricane-affected areas in the United States.\(^{10,21-23}\) Estimates of chronic disease prevalence in the New Orleans area after Hurricane Katrina, which struck the US Gulf Coast in 2005, revealed that 9% of the population affected by the disaster had diabetes, with nearly 25% receiving insulin therapy. The high prevalence of diabetes was unanticipated by relief agencies. Collapse of the health care infrastructure severely impaired access to diabetes care, leading to heavy reliance on nongovernmental organizations to provide supplies, medications, and glucometers for diabetes patients.
Suggestion of the American Diabetes Association

(1) Disaster response guidelines for identifying the first response team must be developed.

(2) Clear guidelines with industry partners on shipping requirements for supplies and medications should be prepared. Coordinating with partnerships and relief organizations is recommended to ensure quality medical donations. Instructions on sharps disposal and carrying medical records may also be required.

(3) People with diabetes should receive instructions on action in an emergency, methods for switching insulin and medications, and methods for treating high and low blood glucose levels in an emergency situation. Stress management skills, including dealing with major disasters, should be considered as part of the diabetes education curriculum.

(4) ADA should be the leading information provider for people with diabetes, caregivers, and the media, and serve as an information clearinghouse on the status of ongoing relief efforts in diabetes care.

(5) It should be recognized that the ADA cannot, and will not, supply medication, supplies, and direct patient medical care.

(6) All sponsors, investigators, and institutional review boards must create plans for the protection of patients in clinical trials.
Aims of the International Diabetes Federation Western-Pacific Region Disaster Program

(1) The International Diabetes Federation Western-Pacific Region (IDF-WPR) Disaster Committee aims to assist each country to create a national SOP for diabetes management in natural disasters. The SOP includes:

i. Educating diabetic patients and their family members to prepare for disasters.

ii. Conducting a registry of the diabetic populations most vulnerable after disaster events.

iii. Developing a disaster diabetes care program for medical staff.

iv. Conducting surveys on the quality and quantity of medical resources for diabetic care, and creating guidelines for coordinating donations of equipment and medicine from other countries.

v. Cooperating and communicating with governments and various relief organizations.

vi. Establishing an information network to support diabetic patients.

(2) Facilitating the sharing and exchange of information among researchers and educators throughout WPR-Asia.

(3) Through relationships with the IDF and other collaborative organizations, providing education to support diabetic people and aid their recovery from disaster situations.
Suggestions for diabetes management protocols before, during, and after a disaster

General principles
During the development of disaster management program, it is suggested to have to consider local ways of living and habits, and support resources, such as emergency foods, kinds of shelters preparation, and individual action and response for disaster events. In geographic regions where the likelihood of a natural disaster seems very remote, extending an individual’s ‘sick day management plan’ to include a disaster management component is probably the best way of introducing and maintaining a disaster management plan. In addition, there may be a need to distinguish between a disaster that allows for a small amount of pre-planning, when patients are more likely to be able to stockpile a few days of emergency supplies of medications and a disaster such as an earthquake or tsunami, in which situation there is greater likelihood of the patient being separated from their medical supplies.

Predisaster preparation
(1) Diabetes organization
- Survey and registration of diabetic populations particularly vulnerable in disaster events, such as type 1 diabetes patients requiring dialysis care and patients with cardiovascular and cerebrovascular complications, complications, and develop a special care program for the patients.
- Evaluate the quality and quantity of medical resources for diabetic care (such as insulin, oral medicine, and test strips), and establish guidelines for coordinating the donation of equipment and medicine from other countries in the WPR. The process for drug donations should adhere to the Guidelines for Drug Donations developed by the World Health Organization in cooperation with major international agencies active in humanitarian relief.
- Regularly preview and conduct periodic rehearsals with relief organizations (such as the Red Cross) and various government agencies to determine the recommended action and type of assistance required in cases of disaster.

(2) Medical staff

- Develop training projects for medical and paramedical staff.
- Physicians should contribute to developing the guides for diabetic patients on recommended action in an emergency, methods for switching insulin and medications, and methods for treating high and low blood glucose levels in an emergency situation.
- Nurses should contribute to developing education materials, such as guides on self-management of blood glucose, self-monitoring of blood pressure, foot and wound care, hypoglycemia and hyperglycemia management, and lifestyle modifications in disaster events.
- Dietitians should contribute to developing diet principles in disaster events.
- Pharmacists should contribute to developing a catalog of oral antidiabetic drugs (including photographs of the drugs).
- Psychosocial workers and volunteers should be trained to assist medical staff to provide long-term, continuous, and comprehensive care for patients, including mental health support.

(3) Diabetes patients and family

- Complete education projects designed for diabetes patients and family members.
- Learn stress-management skills, including techniques for dealing with major disasters.
- Maintain stocks of medications and records of medication and dosage regimens.
- Establish an information network to support diabetic patients, including contact information for hospitals and emergency agencies, such as phone number, e-mail address and name of contact persons.

**During a disaster**

1. **Diabetic organization**
   - Provide information to people with diabetes, caregivers, and the media, and serve as an information clearinghouse on the status of ongoing relief efforts in diabetes care.
   - Contact relief organizations, such as the Red Cross, and various government agencies to obtain information and statistics, and ascertain the type of assistance required by patients.
   - Contribute to identifying resources of medication supplies and direct patient medical care.
   - Assist to organize multidisciplinary medical teams, including physicians, nurses, dietitians, psychosocial workers, and volunteers.

2. **Medical staff**
   - Manage glucose, blood pressure, and the evaluation and management of acute and chronic diabetic complications and other related medical problems (physicians and nurses).
   - Educate patients on self-management of diet and lifestyle (nurses and dietitians).
   - Assist to provide comprehensive care, including mental health support, to patients (physicians, psychosocial workers, and volunteers).

3. **Patients and family**
   - Adhere to usual medications and recommended diet and lifestyle as much as possible.
   - Regularly self-monitor blood glucose and blood pressure, and perform other forms of self-management, such as wound care.
Resolution stage

(1) Diabetic organization
   - Review and discuss diabetes management strategies for diabetic people during and after a disaster, and revise the guideline program as necessary.

(2) Medical staff
   - Support people recovering from disaster situations, and assist to provide long-term, continuous, and comprehensive care to diabetic patients, including regular medication, medical problem management, diet and lifestyle modifications, and psychosocial function evaluations.
   - Regularly evaluate the health of each diabetic patient and provide support to prevent the worsening of chronic conditions (prolonged care in temporary housing can worsen chronic diseases and cause the development of new diseases).

(3) Patients and family
   - Ensure that appropriate meals are provided to diabetic patients (meals in shelters can be inappropriate for diabetes patients and impair glucose control).
   - Ensure that diabetic patients maintain their daily activities and prevent becoming bedridden, which would reduce quality of life.
Flow diagram for disaster preparation and response at different timelines

1. For patients with diabetes\textsuperscript{32,33}

Before disaster

<table>
<thead>
<tr>
<th>Up-dated lists at all times</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Medications and other major health problems</td>
</tr>
<tr>
<td>- Emergency food supply</td>
</tr>
<tr>
<td>- Emergency medical supply kit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Create a personal evacuation plan and evacuate early if authorities advise evacuation</td>
</tr>
<tr>
<td>- Learn stress-management skills and complete education projects</td>
</tr>
<tr>
<td>- Physician and emergency contact information, such as phone number, e-mail address, and name of contact persons</td>
</tr>
</tbody>
</table>

Response during disaster

| - Adhere to usual medications and recommended diet and lifestyle as much as possible |
| - Regularly self-monitor blood glucose and blood pressure, and perform other forms of self-management, such as wound care |

Resolution and recovery

| - Ensure that appropriate meals are provided to diabetic patients (meals in shelters can be inappropriate for diabetes patients and impair glucose control) |
| - Ensure that diabetic patients maintain their daily activities and prevent becoming bedridden, which would reduce quality of life |
Flow diagram for disaster preparation and response at different timelines

2. For diabetic medical staff \textsuperscript{32,33}

Before disaster

- Make an emergency plan
  - Appoint a leader and deputy to oversee preparation and operations
  - Procure and maintain emergency equipment and supplies with standardized resource request correctly
  - Periodic rehearsal and assessment

Guideline development and staff training and preparation
  - Develop training projects for medical and paramedical staff, including physicians, nurses, dietitians, pharmacists, and social workers, etc.
  - Organize multidisciplinary medical teams for diabetes care

Response during disaster

- Help network coordination and assist to provide comprehensive care, including mental health support, to patients
- Manage glucose, blood pressure, and evaluate and manage acute and chronic diabetic complications and other related medical problems
- Educate patients on self-management

Resolution and recovery

- Support people recovering from disaster situations, and assist to provide long-term, continuous, and comprehensive care
- Regularly evaluate the health of each diabetic patient and provide support to prevent the acute complications and worsening of chronic conditions
**Flow diagram for disaster preparation and response at different timelines**

3. For government and diabetes organization\textsuperscript{32,33}

### Before disaster

<table>
<thead>
<tr>
<th>Planning</th>
<th>Addressing needs</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Help survey diabetic populations particularly vulnerable in disaster events</td>
<td>- Evaluate the quality and quantity of medical resources for diabetic care</td>
<td>- Regularly preview with relief organizations (such as the Red Cross) and various government agencies</td>
</tr>
<tr>
<td></td>
<td>- Develop a special care program for the patients</td>
<td>- Establish guidelines for coordinating the donation of equipment and medicine from other countries</td>
</tr>
</tbody>
</table>

### Response during disaster

- Provide information to people with diabetes, caregivers, and the media and direct patient medical care.
- Contact relief organizations to obtain information and statistics, and ascertain the type of assistance required
- Contribute to identifying resources of medication supplies
- Assist to organize multidisciplinary medical teams

### Resolution and recovery

- Review and discuss diabetes management strategies for diabetic people during and after a disaster, and revise the guideline program as necessary
Figure: Timeline for preparation and response to disaster management for diabetes

4-5 Days Before
- Review disaster plan and buddy system with patients.
- Give patients disaster packet with personal medical/disaster information.
- Patients renew prescriptions and prepare for evacuation.
- Renew patient communication plan.
- Renew patient plan with staff and affiliated units.
- Ensure adequate medication supplies for at least 2 wks (possibly longer).
- Maintain contact with Diabetes Network, and remember phone number, e-mail address and name of contact persons.
- Diabetes units update electronic records for transmission to central database status.

3-4 Days Before
- Early evacuation for special needs diabetic patients, such as nursing home patients and those who require special assistance (some areas mandate earlier evacuation).
- Encourage early evacuation for patients who can travel independently, ideally to outside the likely disaster theater.

2-3 Days Before
- Determine when safe return possible.
- Maintain contact with emergency units.

Disaster Day
- For diabetic patients who remain, ensure medical supplies at safe location.

1 Day Before
- DM Networks review current plans with region medical needs, supplies, relay location, special needs shelters willing to receive diabetic patients.
- DM Network confirms contact information for first responders, state EOC, and shelters. Vulnerability of DM population emphasized.

Disaster
- DM networks assist medical facilities in facilitating ongoing diabetic care.
- Monitor likely impact of event on diabetic population and formulate post-event response.

After the event
- Contact for diabetic medication
- Request additional supplies and staff augmentation if necessary.
- Ask for help early; don’t assume that everything requested will be received.

After the Event
- Request for staff forwarded to government which sends employees or diabetic volunteers as temporary federal employees.
- DM networks help coordinate post-event diabetic care.
Appendix: Disaster preparations for people with diabetes

1. By ADA^{22,24,25,34}

(1) Obtain good diabetes education that emphasizes self-management skills and stress management.

(2) Be up-to-date with all immunization, including tetanus.

(3) Keep a waterproof and insulated disaster kit ready with

- A list of items to pack during an evacuation: Glucose testing strips, lancets, and a glucose testing meter; Medications, including insulin; Syringes, Glucose tabs or gels; Antibiotic ointments/creams for external use; Glucagon emergency kits; Prepackaged snacks

- A list of contacts for national organizations, such as ADA through their help lines or the Internet.

- Photocopies of relevant medical information, particularly recent lab tests/procedures, if available.

- Up-to-date information on all oral medications and insulin, regarding formulation and dosing. (If possible, have the prescription number available. Many chain pharmacies throughout the country may be able to refill based on the prescription number alone. This should be reviewed and replenished at least twice yearly.)

(4) Evacuate early, if possible, taking the items listed above with you.
2. By CDC^{35-37}

Diabetes disaster preparedness

As a person with diabetes, your daily routine involves schedules and planning. An emergency can seriously affect your health. It may be difficult to cope with a disaster when it occurs. You and your family should plan and prepare beforehand even if the event is loss of electricity for a few hours. The first 72 hours following a disaster are the most critical for families. This is the time when you are most likely to be alone. It is essential for you and your family to have a disaster plan and kit which should provide for all your family’s basic needs during these first hours.

What to do during emergencies for diabetic patients

People with diabetes face extra challenges during emergencies and natural disasters such as hurricanes, earthquakes, and tornadoes. If you are evacuating—leaving your home to get away from a threat or staying in an emergency shelter, let others know that you have diabetes so that you can take care of your health. If you have other health problems, such as chronic kidney disease or heart disease, make sure you let others know about those, too.

- Drink plenty of fluids, especially water. Safe drinking water may be hard to find in emergencies, but if you do not take in enough water, you could develop serious medical problems. Heat, stress, high blood sugar, and some diabetes medicines such as metformin can cause you to lose fluid, which increases the chances you will become dehydrated.

- Keep something containing sugar with you at all times, in case you develop dangerously low blood sugar (hypoglycemia). You may not be able to check blood sugar levels, so know the warning signs of low blood sugar.
• Pay special attention to your feet. Stay out of contaminated water, wear shoes, and examine feet carefully for any sign of infection or injury. Get medical treatment quickly for any injuries.
  Make an emergency plan for you and your family.
• Always wear identification that says you have diabetes.
• If you take insulin, ask your doctor during a regular visit what to do in an emergency if you do not have your insulin and cannot get more.
• If you take other medicines for diabetes, ask your doctor what to do during an emergency if you do not have your medicine.
• Prepare an emergency supply of food and water.
• Include an adequate supply of medicine and medical supplies in your emergency kit, enough for at least three days and possibly more, depending on your needs. Ask your doctor or pharmacist about storing prescription medicines such as heart and high blood pressure medicine and insulin. Plan how you will handle medicine that normally requires refrigeration, such as insulin.
• Make sure you change medicine and medical supplies in your emergency kit regularly, to ensure they stay up to date. Check expiration dates on all medicine and supplies often.
• Keep copies of prescriptions and other important medical information, including the phone number for your health care provider, in your emergency kit.
• Keep a list of the type and model number of medical devices you use, such as an insulin pump, in the emergency kit.
• If you have a child with diabetes who is in school or daycare, learn the school’s emergency plan. Work with them to ensure your child will have needed diabetes supplies in an emergency.
• If you need regular medical treatments, such as dialysis, talk to your service provider about their emergency plans.
Prepared list
You should safely store the following medical supplies or have them readily available:

- Copy of your emergency information and medical list
- Extra copies of prescriptions
- Insulin or pills (include all medications that you take daily including over the counter medications)
- Syringes
- Alcohol swabs
- Cotton balls & tissues
- A meter to measure blood sugar
- Blood sugar diary
- Insulin pump supplies (if on insulin pump)
- Strips for your meter
- Urine ketone testing strips
- Lancing device and lancets
- Quick acting carbohydrate (for example, glucose tablets, orange juice, etc.)
- Longer lasting carbohydrate sources (for example, cheese and crackers)
- Glucagon Emergency Kit (if on insulin)
- Empty hard plastic detergent bottle with cap to dispose used lancets and syringes

Other supplies:
- Flashlight with extra batteries Pad/pencil
- Whistle/noisemaker Matches / candles
- Extra pair of glasses First-aid kit
- Female sanitary supplies Copy of health insurance cards
Heavy work gloves Important family documents
Tools Water
Food Clothing and bedding
Radio with extra batteries Cell phone
Make sure you have enough supplies for 2 weeks. These supplies should be checked at least every 2 – 3 months. Watch for expiration dates.

Helpful hints about insulin, pens, and syringes
Insulin may be stored at room temperature (59°C - 86 °F ) for 28 days.
Insulin pens in use can be stored at room temperature according to manufacturer’s directions.
Insulin should not be exposed to excessive light, heat or cold.
Regular and Lantus insulins should be clear.
NPH, Lente, Ultralente, 75/25, 50/50, and 70/30 insulins should be uniformly cloudy before rotating.
Insulin that clumps or sticks to the sides of the bottle should not be used.
Although reuse of your insulin syringes is not generally recommended, in life and death situations, you have to alter this policy. Do not share your insulin syringes with other people.

Things to be remembered
Stress can cause a rise in your blood sugar.
Erratic mealtimes can cause changes in your blood sugar.
Excessive work to repair damage caused by the disaster (without stopping for snacks) can lower your blood sugar.
Excessive exercise when your blood sugar is over 250mg can cause your blood sugar to go higher.
Wear protective clothing and sturdy shoes.
Check your feet daily for an irritation, infection, open sores or blisters. Disaster debris can increase your risk for injury. Heat, cold, excessive dampness and inability to change footwear can lead to infection, especially if your blood sugar is high. Never go without shoes.

Hot weather tips

- Stay indoors in air-conditioned or fan cooled comfort.
- Avoid exercising outside.
- Wear light colored cotton clothing.
- Remain well hydrated (water, diet drinks).
- Avoid salt tablets unless prescribed by your physician.
- Seek emergency treatment if you feel: Fatigue, weakness, abdominal cramps, decreased urination, fever, confusion.
- You should wear diabetes identification AT ALL TIMES

Food items to be stored

- 1 large box unopened crackers (saltines)
- 1 jar peanut butter
- 1 small box powdered milk (use within 6 months)
- 1 gallon or more of water per day per person for at least one week
- 2-6-pack packages cheese and crackers or 1 jar soft cheese
- 1 pkg. dry, unsweetened cereal
- 6 cans regular soda
- 6 cans diet soda
- 6-pack canned orange or apple juice
- 6 pack parmalat milk
- 6 cans “lite” or water packed fruit
- 1 spoon, fork and knife per person
- Disposable cups
- 4 packages of glucose tablets or small hard candies for low blood sugar
- 1 can tuna, salmon, chicken, nuts per person
- Mechanical can opener
These supplies should be checked and replaced yearly.

Food consideration during a disaster
(1) Food and water supply may be limited and/or contaminated. Do not eat food you think may be contaminated. It may be necessary to boil water for 10 minutes before use.
(2) Drink plenty of water.
(3) Maintain your meal plan to the best of your ability. Your plan should include a variety of meat/meat substitutes (i.e., peanut butter, dried beans, eggs), milk/milk products, fruits, vegetables, cereal, grains.
(4) Limit sugar/sugar-containing foods. These foods include:
   Jellies, jams, molasses
   Honey
   Syrups (fruits canned in sugar syrup, pancake syrup)
   Tonic (dietetic tonics with less than one calorie per ounce are allowed)
   Frosted cake
   Presweetened or sugar-coated cereals
   Pie, pastry, Danish pastry, doughnuts
   Chocolate
   Custards, pudding, sherbet, ice cream
   Gelatin
   Soda
   Cookies, brownies
(5) Monitor your blood sugars frequently and record in diary.
(6) When reading labels, limit products with these sugar-containing ingredients:
   Sugar
   Corn syrup
Dextrose
Sucrose
Corn sweeteners
Honey
Molasses
Brown sugar
Fruit syrup

(7) Avoid greasy, fried foods.

(8) Try to eat meals and snacks at the same time every day. Avoid periods of hunger and overindulgence. The quantity and frequency of your food intake should remain similar day-to-day depending upon your activity level.

(9) Increase food and water intake during periods of increased exertion or physical activity by either eating between-meal snacks before activity or by eating additional food with meals.

(10) Carry a fast source of sugar with you at all times:

3 glucose tablets
1 small box of raisins
6-7 small hard sugar candies

Sick day during a disaster

(1) Always take your insulin or pills on time or close to it. Never omit your insulin unless your doctor has told you otherwise. Insulin is still good if there is no refrigeration. A used or unused bottle of insulin may be kept at room temperature (59°C - 86°F) for 28 days. Discard unrefrigerated insulin after 28 days.

(2) Keep an extra bottle of each type of insulin you use on hand at all times.

(3) Eat within 15 min. or no later than ½ hour after taking your insulin
(depending on insulin type) or diabetes medicine. Try to eat on time.

(4) Never skip a meal. If you cannot eat solid food because of nausea, vomiting, and/or diarrhea, sip regular coke, eat hard candies, fruit or regular soft drinks instead of following your usual meal plan.

(5) Most Important:

Do not let yourself get dehydrated.

Drink plenty of liquids.

In between meal times, sip diet soda.

(This will not replace food, but can help you be hydrated.)

(6) Rest.

(7) Check your blood sugar. Notify your doctor if your blood sugar average is over 240mg or if you are ill for 2 days.

(8) Test your urine for ketones when:

Your blood sugar average is over 240mg.

You are vomiting

You have symptoms of high blood sugar (increased thirst or hunger than usual, quick weight loss, increased urination, very tired, stomach pain, breathing fast or fruity breath smell).

(9) Call your doctor if your ketone test is moderate or high and/or if you have symptoms of high blood sugar (as listed in number 8). You may need more than your usual amount of insulin on a sick day. Your doctor can guide you in this. If you need medical assistance / or are out of all medications, food, and cannot reach your doctor, immediately: Go to the nearest hospital; or Contact the police; or Contact the American Red Cross; or Go to an Emergency Medical Center
References


(30) University of Hyogo, Graduate School of Nursing. Information base for disaster nursing knowledge and skills to protect life.http://www.coecnas.jp/


