

Diabetes Care and Disasters
IDF Western Pacific Region, 2nd edition
July 2022



Prof. Alicia Jenkins, Prof. Takashi Kadowaki and Prof. Moon-Kyu Lee
on behalf of the IDF WPR

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Preface

Foreword

Diabetes is still one of the most prevalent non-communicable diseases that has been out of control worldwide for a long time. The Western Pacific Region (WPR) has the largest numbers of people with diabetes among the seven International Diabetes Federation (IDF) regions, i.e., In 2021 of the world's estimated 537 million cases of diabetes, about 38% (206 million) of them are living in WPR, and it is predicted that diabetes in our region will expand to more than 238 million by the year 2030¹. The WPR is, at the same time, the most frequent site for natural disasters. Several natural disaster events have occurred in our region in the early 21st century, and the number and rate of them continue to increase.

After disaster events, it is well known that chronic illnesses, such as diabetes and its complications, worsen due to the ensuing stresses and lack of medications. A realistic and comprehensive disaster management plan which is modified according to the local and regional needs is essential to reduce the aftermath of disaster incidents. The "IDF-WPR Natural Disaster Program" was originally developed by the IDF-WPR General Council to help and save lives of people suffering from diabetes in our region. Since the publication of the first edition of IDF-WPR Natural Disaster Program in 2015, there were several occasions of updates of the Disaster Program, such as that during the IDF-WPR Congress in Kuala Lumpur in 2018 and a symposium during the Japan Diabetes Society Congress in 2019 and an updated consensus by the regional executive board members.

I greatly appreciate the dedicated and never-ending efforts and contributions by Alicia Jenkins and Takashi Kadowaki, who are also executive board members of the IDF-WPR, for this updated second edition. And last but not least, I hope this new version of the Natural Disaster Program will be a handy and useful guide for the preparation of local programs in the WPR and other regions of the world as well.

Reference:

1. International Diabetes Federation Atlas. <https://diabetesatlas.org/>

Professor Moon-Kyu Lee
IDF-WPR Executive Council President



Introduction

Globally, over the past decade an average of 60,000 people die each year due to natural disasters, about 0.1% of all deaths, with there being 276–393 reported disasters per annum¹. The number of disasters is increasing, related to factors such as climate change and increased infectious diseases due to novel agents, such as now being experienced in 2019–2022 with COVID-19. A very common type of natural disaster is an earthquake, but the largest cause of morbidity and mortality will likely be that due to the current COVID-19 pandemic. While the world's population has grown substantially over the past century, there has been substantial reductions in deaths due to natural disasters (not counting COVID), related to rising affluence, improved living standards, robust infrastructure and effective disaster response systems. However, what has not changed is that people in lower income regions fare far worse during disasters, with deaths in low standard of living countries averaging 10-fold higher than that in more affluent regions. The ratio of deaths in low to high affluence regions ranged from 2 to 288 over the past 10 years.¹

Diabetes mellitus affects people of all ages, ethnicity, education and socioeconomic status in cities, rural, and remote regions of every country. Approximately one-third of the world's estimated 483 million people with diabetes live in the most populous of the seven International Diabetes Federation (IDF) regions, the Western Pacific Region (WPR). An estimated 10% of people aged 20–79 years, i.e., 163 million adults and over 102,000 children and adolescents have diabetes, with related substantial personal and socioeconomic costs.²

Unfortunately, the WPR is also the IDF region most frequently impacted by natural disasters, such as earthquakes, landslides, tsunamis, cyclones, floods, fires and infectious diseases, such as COVID-19. Such disasters impact the lives of many people with and without diabetes, with people with chronic health conditions, such as diabetes, being particularly vulnerable. Given that diabetes is very common in the WPR, as are disasters, it is inevitable that people with diabetes will be impacted by disasters. With socioeconomic losses due to the COVID-19 pandemic the resilience of many regions and people to withstand any disasters in the short-term may be even more limited.

Identifying means to reduce the negative impact of natural disasters and the sharing of knowledge as to how individuals, communities and countries can increase their resilience to natural disasters is key, and the goal of these guidelines.



During and after disasters injury, loss of food, clean water, shelter, loss of medications and healthcare, and lead to worsening of metabolic control, complications and increase morbidity and mortality. Adverse effects can continue for several years after a disaster. A robust disaster management plan can mitigate these adverse outcomes. The classic approach for disaster management is that of prevention where possible (such as by vaccination against infectious agents), preparation, response and recovery (PPRR).

As discussed herein, multiple stakeholders from individual to local community to national and international levels are involved. There are many stakeholders, who should be identified and linked pre-disaster. Preparation should be optimised well in advance and regularly rehearsed and updated.

The IDF-WPR Disaster Program aims to help each member country and association develop disaster preparation strategies that will help minimise the detrimental effects of disasters on people with diabetes. The first IDF WPR Disaster Guidelines arose after the WPR council meeting at the 2013 IDF World Congress in Melbourne, Australia and recognised the need to periodically update the guidelines. Since then, several individual IDF-WPR countries have developed national guidelines (with links provided herein), including (in alphabetic order) Australia, China and Japan. Unfortunately, such guidelines are not yet common in some of the even more vulnerable WPR areas. It is hoped that the resources in this expanded second edition guideline will serve as a template for more locally relevant guidelines, including their translation into local languages and availability in print. The free electronic guidelines can be downloaded and printed. As the internet and power may be lost in a disaster, and time is needed to review and update guidelines and templates for local use, such as with local contacts, we recommend having printed copies of this resource available.

New elements in this second edition include expanded checklists for people with diabetes and for clinicians, a downloadable slide presentation for modification to help dialogue and planning, recipes for hand and surface sanitisers, water purification and rehydration solutions, insulin switching charts, guidelines for insulin storage, sharps reuse and disposal, blood and interstitial fluid glucose and HbA1c units conversion charts, guidelines for the emergency treatment of diabetic ketoacidosis, a basic baby delivery kit, advice for first responders, guidelines for palliative care and to human rights aspects related to disasters.

We hope that these resources will promote dialogue and most importantly action, including sharing and co-operation that will increase the resilience of people with diabetes, their family, community, healthcare system, their country, our IDF region and international stakeholders to withstand the adverse effects of the inevitable disasters.

We encourage the sharing and use of these regional guidelines for the preparation of guidelines optimised for local use. It would be appreciated if copies of any guidelines developed are provided to us (see contact details on page 15) for sharing with others. Thank you and our best wishes for health and the avoidance or mitigation of disaster related damage.

References

1. Our World in Data. <https://ourworldindata.org/natural-disasters>
2. International Diabetes Federation Atlas. <https://diabetesatlas.org/>



Prof. Alicia Jenkins



Prof. Takashi Kadowaki

Executive Council Members IDF-WPR
Chairs of IDF-WPR Disaster Guidelines 2nd edition

“Disasters and diabetes — not if but when”

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Contributors

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Professor Moon-Kyu Lee (South Korea): Adult endocrinologist, IDF-WPR Executive Council and President (2020–2022) assisted with planning, reviewing and dissemination.

Dr Frank Brennan, (Australia): Palliative care physician and lawyer with an interest in human rights. Dr Brennan provided content related to palliative care (pages 165–177) and to human rights aspects of diabetes care during disasters (pages 179–188) and guidance as to who to ask for assistance (pages 189–198).

A/Profesor Gary Kilov (Australia): A general practitioner (Launceston, Tasmania), academic at the University of Melbourne and University of Sydney, and lived diabetes experience. He researched information regarding a basic baby delivery kit, which was informed by Doctors Without Borders (Australia) (page 83).

Dr Hironori Waki (Japan): Endocrinologist involved in the preparation and dissemination of the Japanese Diabetes and Disasters Guideline.

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- Dr. Tatsuya Kondo, Japan
- Dr. Takafumi Senokuchi, Japan
- Prof. Gary Wittert, Australia

Organisations (in alphabetical order): Reproduction permission requested

ANZ COR

American Diabetes Association (ADA)

Australian Diabetes Educators Association (ADEA)

Center for Disease Control (CDC), USA

Chinese Diabetes Society

Diabetes Australia (DA)

Diabetes Disaster Response Consortium (DDRC), USA

Diabetes New Zealand

Diabetes in Control (www.diabetesincontrol.com)

Doctors Without Borders/Medecins sans Frontieres

Eli Lilly

International Society Pediatric and Adolescent Diabetes (ISPAD)

Insulin For Life Global Inc (www.insulinforlife.org)

Japan Diabetes Association

Journals: Diabetes Care, Diabetes Technology and Therapeutics, Pharmacists Letter, PLOS One

Life For a Child (LFAC)

Nationwide Children's Hospital, USA

New Zealand Government

National Institutes of Health (NIH), USA

National Diabetes Services Scheme (NDSS) Australia

Novo Nordisk

Pocket Nurse

Royal Australian College of General Practitioners (RACGP)

UNICEF

World Health Organization (WHO)

Photo credits

Cover: *Firefighter + fire* (R Jenkins)

Page 6: Dry lake (R Jenkins);
Masked doctors (D Chen);
Fire truck (R Jenkins), Fireman + masked worker during COVID (R Jenkins)

Page 11: Photographer R Jenkins (A Jenkins)

Page 16: Japan earthquake damage (E Araki), Road flooded sign (R Jenkins)

Page 17: Fireman coats (R Jenkins)

Page 24: Power line repair, police boat (R Jenkins)

Page 25: Vaccine clinic nurse (R Jenkins)

Page 27: COVID public sign and vaccine clinic (R Jenkins)

Page 28: Clinicians in face masks (D Chen)

Page 30: Some 'go bag' contents and backpack (A Jenkins)

Page 32: Burnt tree (R Jenkins)



Page 33: Kumamoto University earthquake damaged lab (T Senokuchi);
Vaccine clinic sign (R Jenkins)

Page 42: Damaged road from 2016 Kumamoto earthquake (T Kondo)

Page 42: Powerline workers (R Jenkins)

Page 43: Fire (R Jenkins)

Page 44: Bottle, measuring cup and spoons (A Jenkins)

Page 64: Paper plates, bowls and cups and plastic cutlery (A Jenkins)

Page 65: Community COVID testing tent (R Jenkins), Social distancing
marker (A Jenkins)

Page 74: Water, dropper and wet cloth (A Jenkins)

Page 78: Ambulances (A Jenkins)

Page 84: Masked clinician (D Chen)

Page 85: Testing supplies, insulin pens and glucagon injection (G Wittert)

Page 92: Sharps bins (G Wittert)

Page 179: People with diabetes and donated diabetes supplies in the
Philippines during COVID-19 (A Jenkins and Insulin For Life)

Page 188: Library – old books (A Jenkins)

Page 190: Boxes of emergency supplies (A Jenkins and Insulin For Life)

Page 191: Woman with diabetes aid during COVID (Insulin For Life)

Page 202: Diabetes aid recipients during a disaster (Insulin For Life)

Page 212: Firemen (R Jenkins)

Page 215: Press Conference Sendai Declaration Japan (via T Kadowaki)

Page 223: Sunset (G Wittert)

*“Individual commitment to a group effort — that
is what makes a team work, a company work, a
society work, a civilization work” Vince Lombardi*

Declaration of potential conflicts of interest

No financial support was provided to produce these guidelines.

Alicia Jenkins: Insulin For Life (IFL) Board Member (IFL Global, IFL Australia and IFL USA); collaborates with Life For a Child Program; IDF-WPR Executive Council, Diabetes Australia International Affairs Committee, Diabetes Australia Research Advisory Committee, Australian Cardiovascular Alliance Precision Medicine Flagship Co-Director; Served on Australian Diabetes and Disaster Guidelines Committee (2016). Industry advisory boards or grants: Amgen, Eli Insulet, Sanofi-Aventis, Medtronic, Mylan, Abbott.

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Advisory Board: Abbott Japan LLC; Medtronic Japan Co., Ltd.; Novo Nordisk Pharma Ltd.; Honoraria for lectures: MSD Corporation; Takeda Pharmaceutical Co., Ltd.; Mitsubishi Tanabe Pharma Corporation; Astellas Pharma Inc.; Teijin Pharma Ltd.; Ono Pharmaceutical Co., Ltd.; Astra Zeneca K.K.; Sumitomo Dainippon Pharma Co., Ltd.; Sanofi K.K.; Eli Lilly Japan K.K.; Nippon Boehringer Ingelheim Co., Ltd.; Novo Nordisk Pharma Ltd; Novartis Pharma K.K. Daiichi Sankyo Co., Ltd. FUJIFILM Toyama Chemical Co., Ltd.; Kowa Co., Ltd.; Kyowa Kirin Co., Ltd.

Moon-Kyu Lee: Executive member of the Asian Association for the Study of Diabetes (AASD); Research grants from MSD and Novartis.

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Free downloadable PDF documents of this manual and a related PowerPoint Presentation in both PPT and PDF version are available at:

[Diabetes & Disasters \(idf.org\)](https://idf.org/our-network/regions-members/western-pacific/diabetes-disasters.html) or if the hyperlink does not work please copy and paste this address into your browser: <https://idf.org/our-network/regions-members/western-pacific/diabetes-disasters.html>

Good disaster plans have a back-up, hence and the same resources are also available under the diabetes and disasters tab at <https://www.ajenkinsdiabetes.org>

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Notes



Executive Summary and Overview



Executive summary

A disaster can be defined as a serious disruption to community life which threatens or causes death or injury and/or property damage beyond the day-to-day capacity of the prescribed statutory authorities and which requires special resources other than those normally available¹.

Examples of natural disasters include earthquakes, landslides, floods, cyclones, storms, tsunamis, fires, volcanic eruptions, heatwaves, drought and epidemic or pandemic infections, with earthquakes and landslides in particular increasing in frequency. While the focus of these guidelines are natural disasters, many elements are also relevant to man-made disasters, such as war and civil unrest.

The number of reported natural disasters globally over the past decade ranges from 276–393 per annum, with the number of disasters increasing. Globally during the past decade there has been an average of 60,000 deaths per annum² and no doubt many-fold that number in injured people. Disasters in the WPR in the past decade include the COVID-19 pandemic (2019–2021); the 2019–2020 Australian bushfires, the 2018 Indonesian earthquake and tsunami, the 2015 Nepalese earthquake and the 2013 Indonesian earthquake and tsunami.

People in lower income regions fare far worse during disasters, with deaths in low standard of living countries averaging ten-fold higher than that in more affluent regions, with the ratio of deaths in low to high affluence regions ranging from 2 to 288 over the past ten years.² People with health conditions, such as diabetes, are also particularly vulnerable during disasters. In spite of rising numbers of disasters globally, and likely better reporting, the number of disaster-related deaths has been falling over the past century². This can likely be attributed to better disaster management, to which preparedness at multiple levels is key. Nevertheless, the associated morbidity, mortality and socioeconomic losses are excessive and both top-down (national and international) and bottom-up (individuals and local community) approaches are needed to reduce the impact of disasters, which should address the specific needs of people with, or at risk of, diabetes.

Over one-third of the world's estimated 537 million people with diabetes live in the Western Pacific Region (WPR), the most populous of the seven International Diabetes Federation (IDF) regions. In 2021 an estimated 1 in 8 adults (11% of people aged 20–79 years), i.e., 206 million adults and over 102,000 children and adolescents have diabetes, with related substantial personal and socioeconomic costs³. Diabetes caused 2.3 million deaths in the region in 2021. It must also be recognised that an estimated one in two people with diabetes (109 million people) in the IDF WPR do not know they have it, and they would also be particularly vulnerable during disasters.

A general approach to disaster management is to 'prevent, prepare, respond, and recover'. Thorough preparation is key to an optimal response and recovery and to limiting adverse effects on people with diabetes. Preparation should consider multiple aspects before, during and after a disaster and that adverse physical, psychological and socioeconomic effects can last for years after the acute event is over. Activities should also consider local conditions and resources. Even very

disadvantaged regions and individuals can put in place measures to lessen the negative impacts of a disaster, and the earlier this is done, and the more detailed the preparation is the more likely it is to be protective. Outcomes will be impacted by the type and scale of the disaster, but also pre-disaster status and preparedness.

Multiple stakeholders should be actively involved in disaster management. This includes the person with diabetes, their family, neighbours and local community, their diabetes and other healthcare providers, the healthcare system, national and international diabetes associations and diabetes related non-government organisations (NGOs), first responders, the military, communications, power and transport providers, local and national governments, and international organisations such as the Red Cross, Doctors Without Borders, the United Nations and the World Health Organization. Local knowledge and prior experiences are key.

The resources provided in this second edition of the IDF-WPR Guidelines for Diabetes and Disasters should trigger a review of existent national guidelines or the development of new guidelines where no prior resource exists. Most countries have a general disaster response plan and connecting with those involved and contributing helpful information regarding the special needs of people with diabetes is desirable. This should be done well before a disaster. Being proactive rather than reactive is preferable.

Knowledge sharing, including the dissemination and adaption of existent resources, such as those provided herein, to local conditions should contribute to better outcomes for those affected by the inevitable future disasters.

References

1. Emergency Management Australia. Commonwealth Government Department of the Attorney General, 1998.
2. Our World in Data. <https://ourworldindata.org/natural-disasters>
3. International Diabetes Federation Atlas. <https://diabetesatlas.org/>

*“To Reduce the Negative Impact of a
Disaster: Prevent, Prepare, Respond,
and Recover”*

Overview

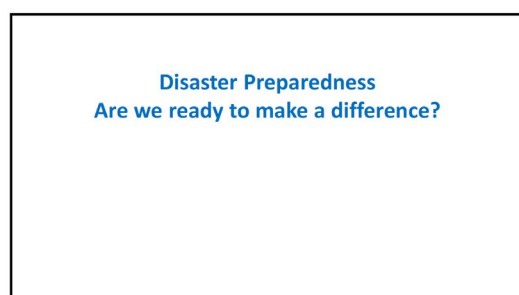
To facilitate thought, dialogue and planning, a PowerPoint slide presentation related to diabetes and disasters that can be adapted for local conditions and purposes is provided.

The slide-set in Powerpoint and as a PDF are available for (free) download at:

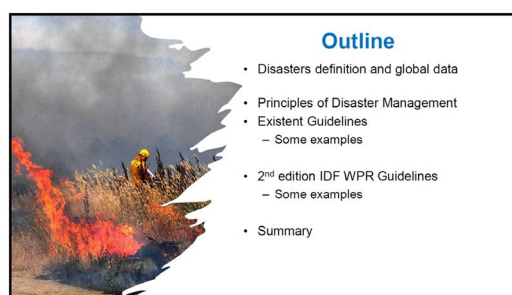
www.ajenkinsdiabetes.org and the IDF-WPR website <https://idf.org/our-network/regions-members/western-pacific/diabetes-disasters.html>

A slide outline view is provided below.

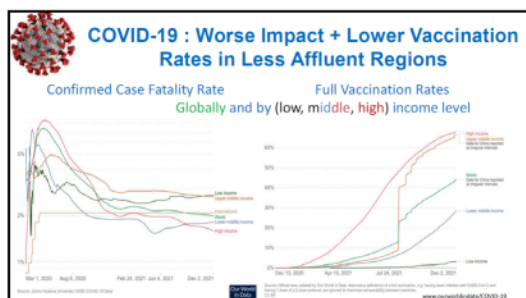
This presentation was derived from invited lectures written and delivered (virtually) by Dr Alicia Jenkins at the 2021 Conference of the Philippines Diabetes Association, November 2021 and the IDF Diabetes Conference, Lisbon, December 2021.



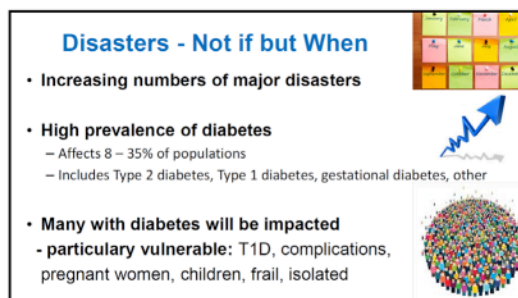
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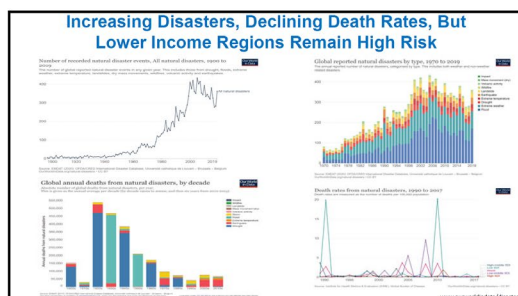
5



6



3



4

Disasters Impacting People With Diabetes

**THINK
NOT IF, BUT WHEN
AND
HOW TO PREPARE**

7

Pre-Disaster Communication, Preparation + Contacts Ideal

8

Phases of Disaster Management

- Prevention
- Preparation
- Response
- Recovery

'PPRR' framework

- Guidelines presented in PPRR format
- Roles of individuals, household, clinicians, diabetes bodies, other national + overseas organisations
- Potential sources of help
- Flowcharts and Timelines
- Suggested lists e.g. 'Go-bag', home preparation, diabetes associations
- Templates e.g. medicines, contacts
- Examples of prior learnings

9

Existent Diabetes in Disaster Guidelines

IDF-WPR 1 st ed. 2014	Australia 2016	IDF 2017	Japan 2014 / 2019	China 2019
www.idf-wp.org	www.ndss.com.au	www.idf.org	jdi.2019	www.idf-wp.org

Guidelines collated at <https://www.diabetes.org.nz/managing-diabetes-emergencies>

10

IDF WPR Diabetes and Disasters Management

IDF WPR Guidelines 2nd Edition
For release in 2022

By Profs. Alicia Jenkins, Takashi Kadowaki + Moon-Kyu Lee on behalf of IDF-WPR Executive Council

E- guidelines
Over 210 pages

11

Example Personal Emergency Plan Guide

- from Australia 2016 Guidelines -

- Personal details
- Contacts
- Useful phone numbers
- Medications and devices
- Allergies
- Medical letter
- Drugs and devices (14 days)
- Diabetes Sick Day plan
- Food / water
- Good footwear and gloves
- Eye protection
- Basic first aid kit

Consider engaging GPs, nurses, allied health care professionals, students and patient support groups and add resources to your website(s).

12

Example Flowchart: IDF-WPR Summary For Health Care Professionals

Similar charts for people with diabetes and for diabetes organisations

IDF WPR Disasters 1st edition

13

Other Stakeholders to Link With

- Support services**
 - Ambulance
 - State Emergency Squad
 - Fire brigade
 - Police
 - Military
 - Electricity / water company
 - Phone / internet services
- Government**
 - Local council
 - Evacuation Centres
- Clinical Organisations**
 - Diabetes Associations
 - Clinician Associations
 - Pharmacy Guild
- Donors of medical aid**
 - In country
 - Overseas e.g. Pharma, IFL
- Volunteers**
 - Ham radio operators
 - Transport operators / pilots
 - Service Clubs
 - Retired Health Care Professionals
 - HCP Students
- Media**
 - Media
 - VIPs
- Other NGOs**
 - IDF
 - Red Cross, UN, WHO
 - Drs. Without Borders

14

Preparedness

15

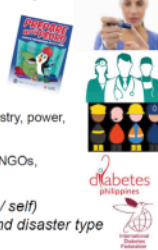
What to Prepare For

- **Loss of**
 - shelter, power: Leaks of gas, water, downed power-lines
 - communication – avoid dependence on internet + phones; paper
 - clean water and healthy food supply
 - medicines and related devices e.g. syringes, glucose monitoring
 - diagnostic + treatment facilities (e.g. dialysis, hospitals) + staff
 - access to medical records (hospital and personally held)
- **Diversion / fragmentation of healthcare system**
- **For people with diabetes** worsening of glycaemia, BP, cardiac status, kidney dysfunction, medication errors, injuries, infection e.g. foot, eyes
- **Psycho-social distress**
- **Evacuation** e.g. fire, or 'shelter in place' for days – months e.g. pandemic
- **First responders may not know diabetes well, nor have resources**

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Preparation and Response at Multiple Levels

- Person with diabetes / family / carers
- Community, including volunteers
- Clinicians and Healthcare system
- Diabetes Associations (professional and lay)
- Other organisations
 - local: medical groups, hospitals, local govt., NGOs, industry, power, communications
 - national: govt., military, general disaster response, diabetes associations, pharmacies and pharma industry, NGOs,
 - international e.g. industry, NGOs e.g. IDf, Red Cross, MSF, IFIL



Be guided by prior experiences (of others / self)
Consider local circumstances, pre-disaster status and disaster type

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Diabetes and Disasters - New in 2nd edition

- Risk Factors and Care Strategies
- Low-cost home-made sanitisers, water decontamination, rehydration solutions
- Specific Diabetes Care Guidelines**
 - Conversion charts: glucose (mg/dl - mmol/l), eAG and TIR to HbA1c
 - Insulin swapping charts
 - Alternate refrigeration
 - Safe use of non-refrigerated insulin during emergencies
 - Sharps reuse by individuals and safe disposal
 - DKA treatment by s.c. or i.m. insulin injection in a low resource setting
 - Hypoglycaemia, ketone testing, sick day care
 - Diabetes care for first responders + shelter staff
- Special circumstances**
 - Birth, Palliative Care
 - Human Rights
 - Who to ask for help

More lists, resources, templates, slide-set

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Pandemics



19

Pandemics and Diabetes

- Risk factors for adverse COVID-19 outcomes: high glucose, older age, high or low BMI, smoking, hypertension, chronic complications (heart, kidney), low Vitamin D.

Care strategies

- Vaccinate early
- Reduce contacts: masks, hand-sanitisers
- Phone / telehealth; PPE if must come to clinics
- Healthy diet and exercise and home monitoring (glucose, weight, BP)
- Optimal care of glucose + co-morbidities e.g. non-smoking
- Advice re ongoing medication use
- Up-to-date sick day care knowledge
- Adequate medical supplies, nutrition + mental health support
 - May need to limit supplies, e.g. stockpiling, ketone strips for T1D



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Low-Cost Household Items To Make Up Sanitisers, Rehydration Fluids, Water Decontamination



- Formulae for: hand sanitisers, surface sanitisers, water decontamination and rehydration fluids from low-cost household ingredients
- Can be made up by individuals or volunteers

21

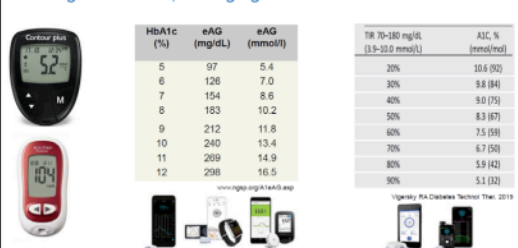
Diabetes Care Resources



22

Glucose Conversion Charts

mg/dl to mmol/l; Average glucose and TIR to HbA1c



23

Reuse and Disposal of Sharps

- During disasters individuals may reuse their own insulin syringes and lancets
- "Using insulin pen needles up to 5-times does not affect needle tip shape nor increase pain"
- 17 T1D subjects reused 111 single-use syringes for 1 - 80 days,
 - mean 21.3 (range: 2 - 126) injections
 - no infections or local reactions
- Risks - low
 - Increased discomfort
 - Needle tip may break off
 - Fat hypertrophy if prolonged use
 - Infection
- Do not share devices between individuals
- Sharps storage and disposal - some home-made solutions



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Storing Insulin

Non-refrigerated Insulin Can Be Used In An Emergency

- Never freeze insulin - freezing inactivates insulin
- Ideal storage temp.: 4°C, room temp. for vials in use (to 28 days)
- Storage systems:
 - FRIO pack or similar
 - Battery or solar powered refrigerator
 - Mini-USB cooler off laptop or recharger
 - Insulated cooler with cold bricks (but not right next to insulin)
 - Traditional cooling devices - clay pots and goat skins

www.shoatrails.com

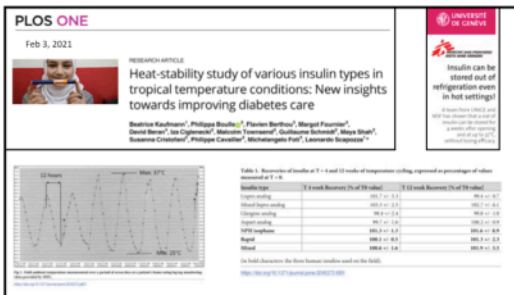
Open ID et al. Diabetes Technol Ther. 2016

- In an emergency do not discard or not use insulin that has not been refrigerated
 - does not become toxic
 - slow rate of loss of potency
 - data from industry, Doctors Without Borders

Griffin M. Diabetes Care. 2016

Krishnan S et al. PLoS One. 2021

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Swapping Insulin: Insulin Charts and Health Care Professional Advice

Long-Acting Insulin Pens

Generic	Brand	Conc.
Gargine	Basaglar	U-100
Toujeo	U-300	
Detemir	Levemir	U-100
Degludec	Tresiba	U-200

Rapid-Acting Insulin Pens

Generic	Brand	Conc.
Aspart	Novolog	U-100
Lispro	Humalog	U-100
Gluclase	Admelog	U-100
Gluclase	Admelog	U-100

DDRC
Diabetes Disaster Response Coalition

INFORMATION FOR HEALTH CARE PROFESSIONALS
SWITCHING BETWEEN INSULIN PRODUCTS IN DISASTER RESPONSE SITUATIONS
<https://ddrcdisasterresponse.org/>

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Low Resource Setting DKA Treatment s.c. or i.m. insulin regimens

Diabetes: Childhood & Adolescence
IN LOW-RESOURCE SETTINGS

Management of Diabetes, ketones and ketonuria with intramuscular regular insulin in a low resource family healthcare setting
Insulin: Basal: 0.5 U/kg/dose, 1-2 times/dose; Bolus: 0.1 U/kg/dose, 1-2 times/dose
J. Family Med. and Primary Care 2017

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Other Diabetes Care Resources

Hypoglycaemia

Sick Day Care

Ketone monitoring

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Diabetes Tips For First Responders and in Evacuation Centres

- Hypoglycaemia treatment
- Ketone monitoring
- Glucose testing
- Nutrition
- Mental Health
- Activity (DVT prevention)
- When to seek clinician help

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Care at the Start and at the End of Life

Pregnancy Clean Delivery Kit

- Safe delivery kit for an uncomplicated birth:
- Ensure in evacuation shelter medical kit
- Consider giving basic kit to near-term women

Palliative Care

Human Rights

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Summary

- Individual patient, clinician and (local, national and international) system preparedness will lessen negative impact of disasters
- Diabetes Clinicians and organisations - key
- Multidisciplinary teamwork essential
- Guidelines for use and adaptation
 - 2nd edition IDF-WPR Guidelines soon
 - at www.ajenkinsdiabetes.org and www.idf-wpr.org
- Best guidelines are local:
 - Prepare / update / rehearse local guidelines

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Making a Difference: Challenges

Someone else should / will do it; Who to connect with?; Time; Diverse pre-disaster status and resources; Geography; Funds

Solutions

- Modify other guidelines: Some low-cost initiatives: add resources to websites
- Your network, trainees, and communities have volunteers and Champions
- Others already involved e.g. national disaster responders
- Web-based and phone meetings
- Funding: government, diabetes organisations, grants, philanthropy

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Acknowledgements

- People who have experienced disasters
- IDR WPR Executive Council incl. Profs. Takashi Kadowaki, Moon-Kyu Lee, and other WPR 2nd edition contributors including Drs Frank Brennan and Gary Kilov (Australia) and IDF WPR members
- Guidelines from: IDF WPR, IDF, Australia, Japan, China, Korea, WHO, NIH, ISPAD, ADEA, Diabetes Australia, DDRC
- NGO Insulin For Life (www.insulinforlife.org)

Contacts: alicia.jenkins@sydney.edu.au

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Notes



General Guidelines



General guidelines

To follow are the general guidelines and flow diagrams from the first edition of the IDF-WPR Diabetes and Disaster Guidelines, with minor editing.

Suggestions for diabetes management before, during, and after a disaster

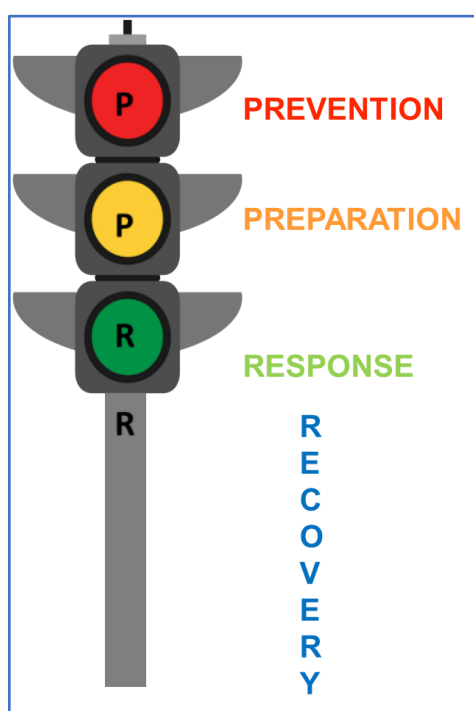
General principles

During the development of a disaster management program, consider local ways of living and support resources, such as emergency foods, types of shelter preparation, and individual action and response for disaster events.¹⁻⁸

In geographic regions where the likelihood of a natural disaster is low, extending an individual's 'sick day management plan' to include a disaster management component is probably an excellent option for introducing and maintaining a disaster management plan.

One should consider different types of disasters, such as those that are more likely to separate a person from their medical supplies and pre-prepared disaster kit, such as an earthquake. As well as having an emergency kit at home, having another kit at a secondary location, such as at work, may be helpful.

The general framework for a disaster is to Prevention, Preparation, Response and Recovery (the PPRR framework).



To follow are pre-disaster, during disaster and post-disaster relevant points for: (i) diabetes organisations, (ii) healthcare professionals and (iii) for people with diabetes and their family.

Pre-disaster preparation

1. Diabetes organisations: e.g., diabetes associations or diabetes clinics

- Survey and register people with diabetes who would be particularly vulnerable during a disaster, such as people with type 1 diabetes, people requiring dialysis, who are blind, amputees, or disabled by a stroke or cognitive impairment. A special program, such as early evacuation or a 'buddy program' should be developed.
- Evaluate the sources and supply chains and the quality and quantity of medicines and devices for diabetes care, including insulin other glucose control drugs, delivery systems (e.g., syringes, insulin pump reservoirs and lines), glucose and ketone testing supplies).
- Guidelines for the receipt and distribution of essential medicines and related devices from national stockpiles and national and international areas outside of the disaster zone should be prepared. 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.⁹
- Update contact lists and regularly review and rehearse disaster responses with relief organisations and government agencies in various types of disasters.
- Decide director(s) and deputies to be spokespersons.
- Inform and encourage people with diabetes and their carers and relevant bodies such as the Government and health authorities of the needs of people with diabetes, such as priority for vaccines.



2. *Healthcare professionals*

- Develop educational and training materials for medical, nursing, pharmacy and allied healthcare professionals and also for trainees in these fields.
- Relevant clinicians should contribute to developing and disseminating guides for people with diabetes for recommended actions 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, including hypo- and hyperglycaemic care, sick-day care, self-monitoring of blood pressure and weight, foot and wound care, and lifestyle modifications in disasters.
- Dietitians should help develop diet principles in disasters, including for individuals with diabetes and for those providing support, such as at shelters and evacuation centres. Excessive carbohydrate and salt should be avoided. Hypoglycaemia treatment foods should also be recommended.
- Pharmacists should contribute to developing a catalog of commonly used glucose control medications, and other drugs, such as those related to cardiovascular care, including photographs of the drugs. Information regarding suitable alternatives and what to do when doses are missed should be prepared.
- Mental healthcare professionals and suitable volunteers should be trained to assist in the provision of acute and long-term comprehensive care for patients, including mental health support. This may include retired healthcare professionals and trainees.
- Remind and assist people with diabetes to prepare their essential medical records and drug sheets and their disaster preparation plans. Posters in the clinic may help. Talks to community groups, newspaper and radio interviews may assist.
- Provide resources suitable for all relevant languages and pictorial guides for those who cannot read.
- Ensure that you and your family are well-prepared for a disaster so that you are able to assist in disaster responses if and as required.
- Consider one's own physical and mental well-being.



People with diabetes and their families

- Educate yourselves and your family and support people (e.g., neighbours) about your diabetes and plan for a disaster. Write it down. Include contacts and assembly points. Some 'apps' (e.g., such as from the Red Cross (in Australia) are available to help with planning, but due to loss of power do not rely solely on information kept on electronic devices. Paper copies in a plastic bag are wise.
- Learn stress management skills.
- Consider early evacuation or relocation to a shelter.
- Maintain an updated information sheet regarding health conditions, medications, including eye drops, any wound dressings and over-the-counter treatments (including doses), allergies and any medical devices (e.g., insulin pumps, glucose monitors, hearing aids, glasses). Have paper-based and electronic files. Multiple options are: apps on your phone, emailed files, files in the cloud and a USB memory stick. However, power outages and loss of internet connectivity may render electronic versions unusable. Always have a paper backup, perhaps laminated or in a waterproof bag (e.g., zip-lock sandwich bag or plastic envelope or bag).
- Be proactive. Ask your doctor and/or nurse for assistance with a list of your health conditions and treatment. Also include any over the counter medications and allergies. Some templates are provided in these guidelines.
- Wear a diabetes or medical alert bracelet or a 'temporary' medical tattoo before and during a disaster, even if you do not do so at other times.
- Maintain a contact list of people and places, including contact information (phones, emails and social media) for family and friends, and also of treating clinicians, hospitals and emergency services.
- Maintain at least one and preferably two-week stocks of medicines, drug delivery and testing supplies. Have a means to keep medicines that are usually refrigerated, such as insulin, cool, but not frozen. Examples are a Frio™ (<https://frioaustralia.com/>) pack or an insulated lunch bag or cooler with cold packs or a portable refrigerator. Wrap any cold bricks in material or paper so that drugs do not freeze. Clay pots can also be used to store insulin if refrigeration is not available.
- **In an emergency do not discard essential medications such as insulin even if they have not been kept refrigerated until a secure replacement supply is available. (See 'Insulin cool storage', pages 87–92).**

- Have a general emergency kit (see checklists). A backpack may be a suitable carry bag to keep hands free to help others, carry something else or negotiate difficult paths. In case of flooding or heavy rain line the carry bag with waterproof bags, e.g., garbage bags.

Some items to include: thick gloves (e.g., garden or dishwashing gloves), protective footwear, goggles, safety glasses or sunglasses, face masks, basic sanitary supplies and spare clothing, including protective clothing, e.g., a rain/wind jacket and hat. Feminine hygiene, continence or baby care products should be included as appropriate.

Water purification means such as a filter or purification tablets and a cloth to filter out particulate matter. Some non-perishable food that can be eaten without preparation, (e.g., muesli bars, protein bars, dried fruit, nuts).

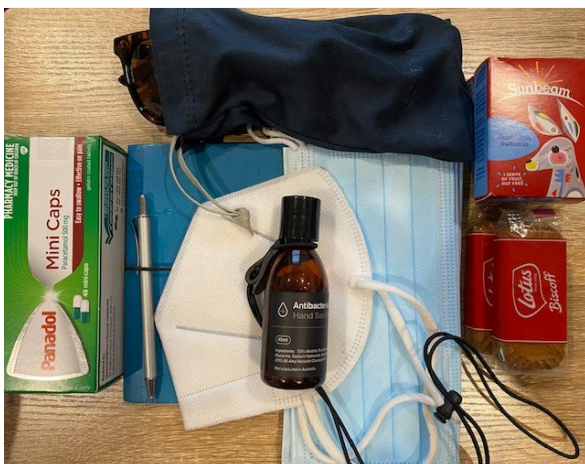
A notebook, pen, whistle, and means of communication e.g., phone or walkie-talkie, battery recharger, waterproof matches or lighter, and a light source such as a torch and spare batteries, a manually generated or solar powered light.

- A basic first aid kit (see checklists), as well as personal medications and devices (e.g., blood glucose test-strips and meter, insulin syringes).

Suggested general items: hand sanitisers, antiseptic, saline eye drops, paracetamol or other temperature and pain medicine, bandages, band-aids, rehydration tablets or powders, anti-diarrhoea and anti-vomiting tablets, antibiotics, anti-malarial tablets if appropriate,. Some agencies (e.g., St. John's Ambulance, hiking stores and chemists/pharmacists) sell pre-made first-aid kits.

Ask your doctor for advice and relevant prescriptions or sample/ trial packs of medicines.

- Review kits during non-disaster times to ensure contents are in-date.



During a disaster

1. Diabetes organisations

- Provide accurate and relevant information to people with diabetes, caregivers, the media, and serve as an information clearinghouse on the status of ongoing relief efforts in diabetes care.
- Contact relief organisations, 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 sources of medical supplies and direct patient medical care.
- Assist to organise multidisciplinary healthcare teams, including doctors, nurses, dietitians, pharmacists, mental-health workers, allied healthcare professionals and volunteers.
- Ensure shelters have adequate diabetes supplies and relevant knowledge and contracts (see the Australian Guideline book for non-healthcare professional aid workers for examples).

2. Healthcare professionals

- Manage glucose, blood pressure, and acute and chronic diabetes complications and other medical and surgical problems. This may include providing advice regarding alternate medications and use of blood glucose monitors in different units.
- Educate patients on self-management of diet, lifestyle, medication management, and mental well-being, especially in altered environments, e.g., shelters and changes to food supply and physical activity.
- Assist with triage and evacuation.
- Support colleagues.
- Attend to one's own physical and mental well-being.

3. People with diabetes and their families

- Adhere to usual medications and recommended diet and lifestyle as much as possible. Seek advice if medical supplies are running low or are contaminated.
- Regularly self-monitor blood glucose and blood pressure, and perform other forms of self-management, such as ketone testing and wound care. Seek healthcare professional advice if unstable.
- Avoid unhealthy food and drinks, including excessive calories, high refined carbohydrate, high salt foods or contaminated or stale food or fluids.
- Avoid excessive physical inactivity as this increases risk of blood clots and raises blood glucose levels. Also avoid unaccustomed exercise. If on

insulin or other drugs that can lower glucose excessively (such as sulphonylureas) carry hypoglycaemia treatment food.

- Wear a medical alert bracelet or necklace.



Recovery stage

1. Diabetes organisations

- Review and discuss diabetes management strategies for diabetes in disasters and revise the guidelines and contact lists as necessary.
- Provide information and resources for healthcare professionals and people with diabetes.

2. Healthcare professionals

- Support people recovering from disasters, and assist to provide long-term, comprehensive care with review of health status of existing and new conditions, mental well-being, medications, diet and lifestyle modifications.
- Regularly evaluate the well-being of each person with diabetes and be alert to new onset or worsening of chronic conditions and mental health problems. Being displaced or living in temporary housing can worsen chronic diseases and contribute to the development of new health issues.
- Ensure optimal vaccination status.
- Refer to social support services as needed.

3. People with diabetes and their families

- Ensure that appropriate meals and fluids are available for people with diabetes: Sometimes meals in shelters or temporary accommodation can be high in carbohydrate, fat and salt and low in protein, fruit and vegetables.
- Monitor glucose levels, ketones if appropriate and blood pressure.
- Avoid excess physical inactivity. This can elevate blood glucose levels, increase risk of deep venous thrombosis and reduce mobility, muscle mass and cardiorespiratory fitness.
- Avoid excessive unaccustomed exercise due to or injury, such as due to salvage or repair operations.
- Seek medical advice for example for new onset or worsening of heart disease, high blood pressure or other health condition.



Flow diagrams for before, during and after a disaster

(from the IDF-WPR Disaster Guidelines, 1st edition)

Figure 1: Diabetes associations and governments

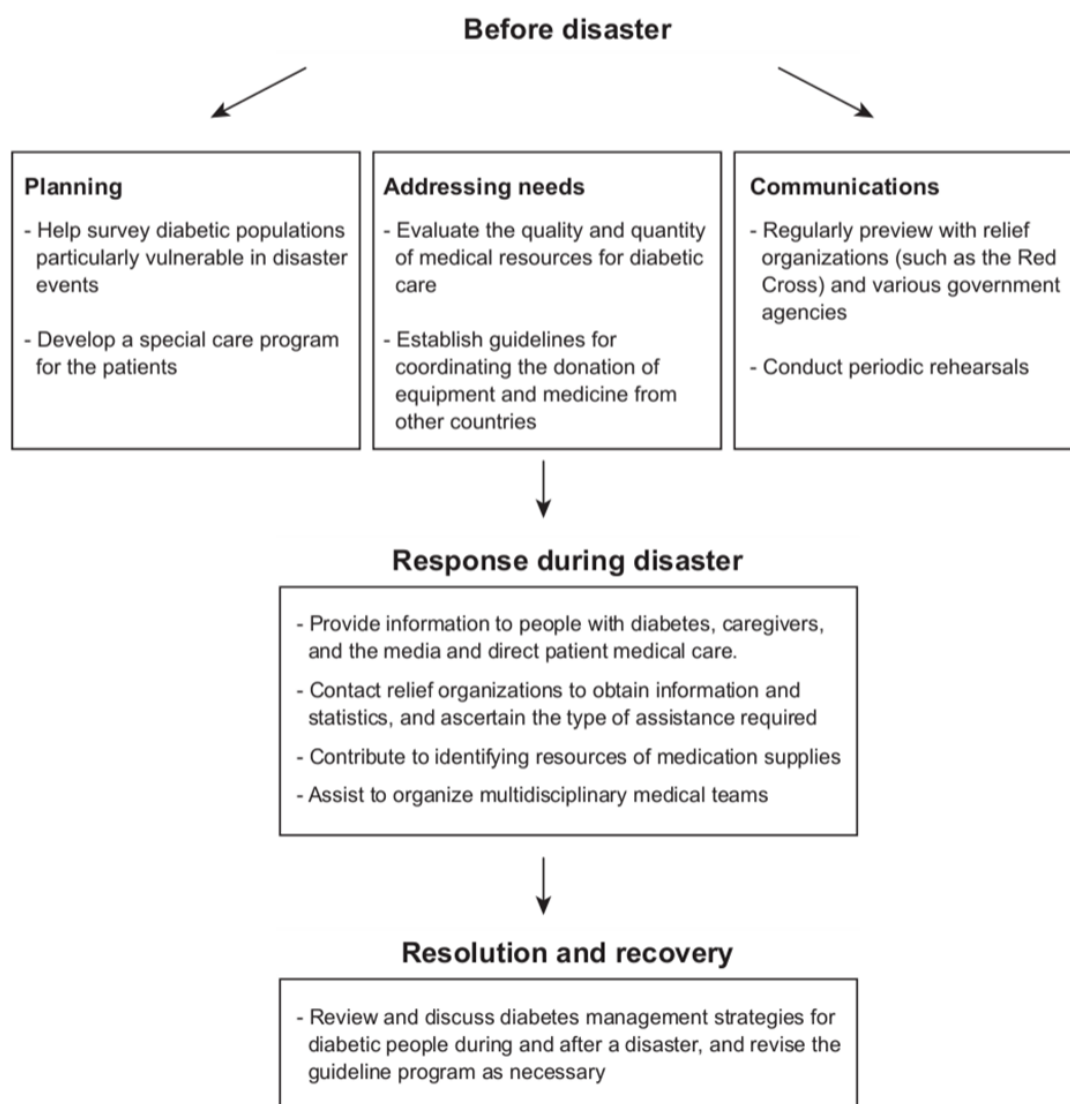


Figure 2: Healthcare professionals

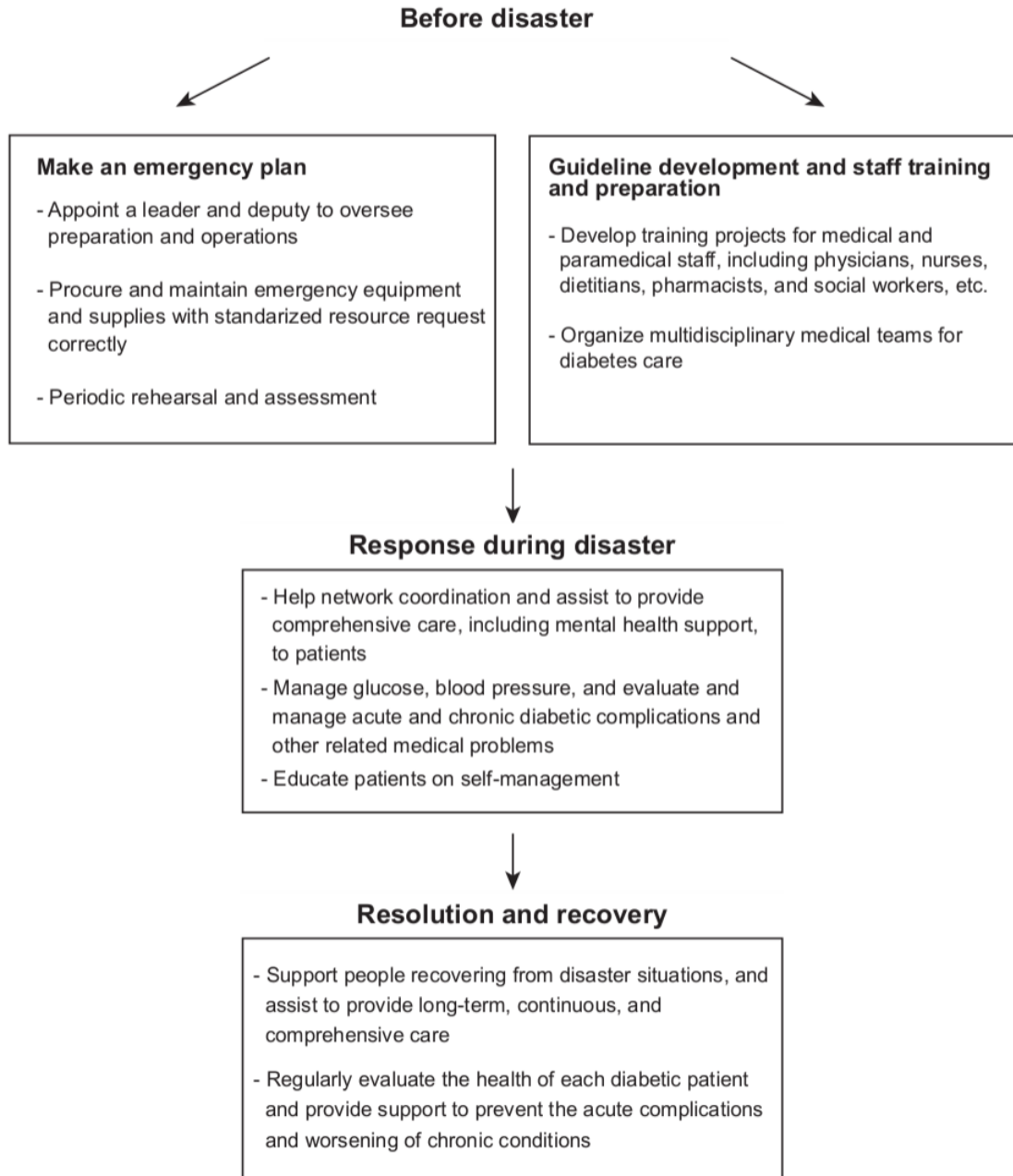
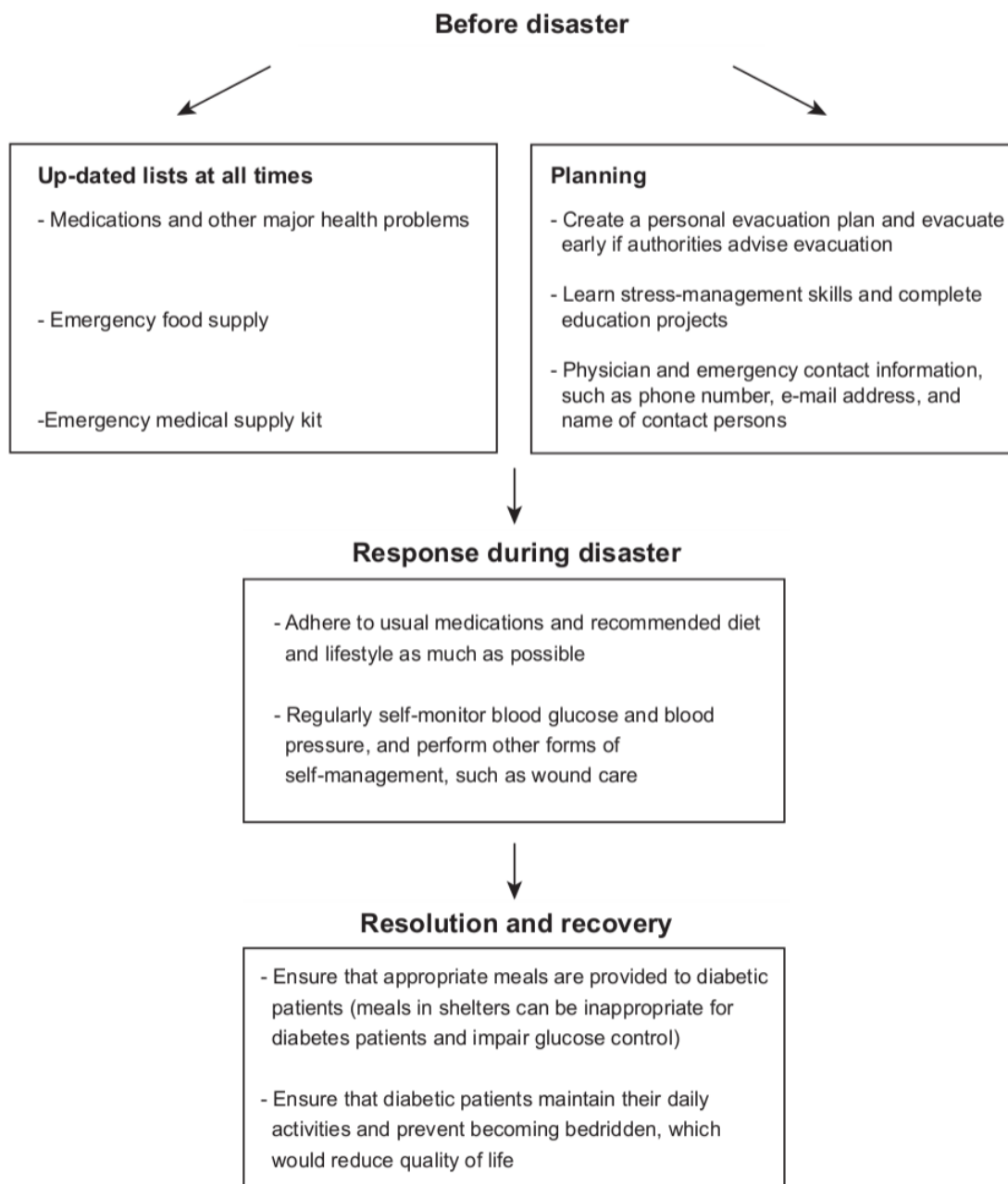
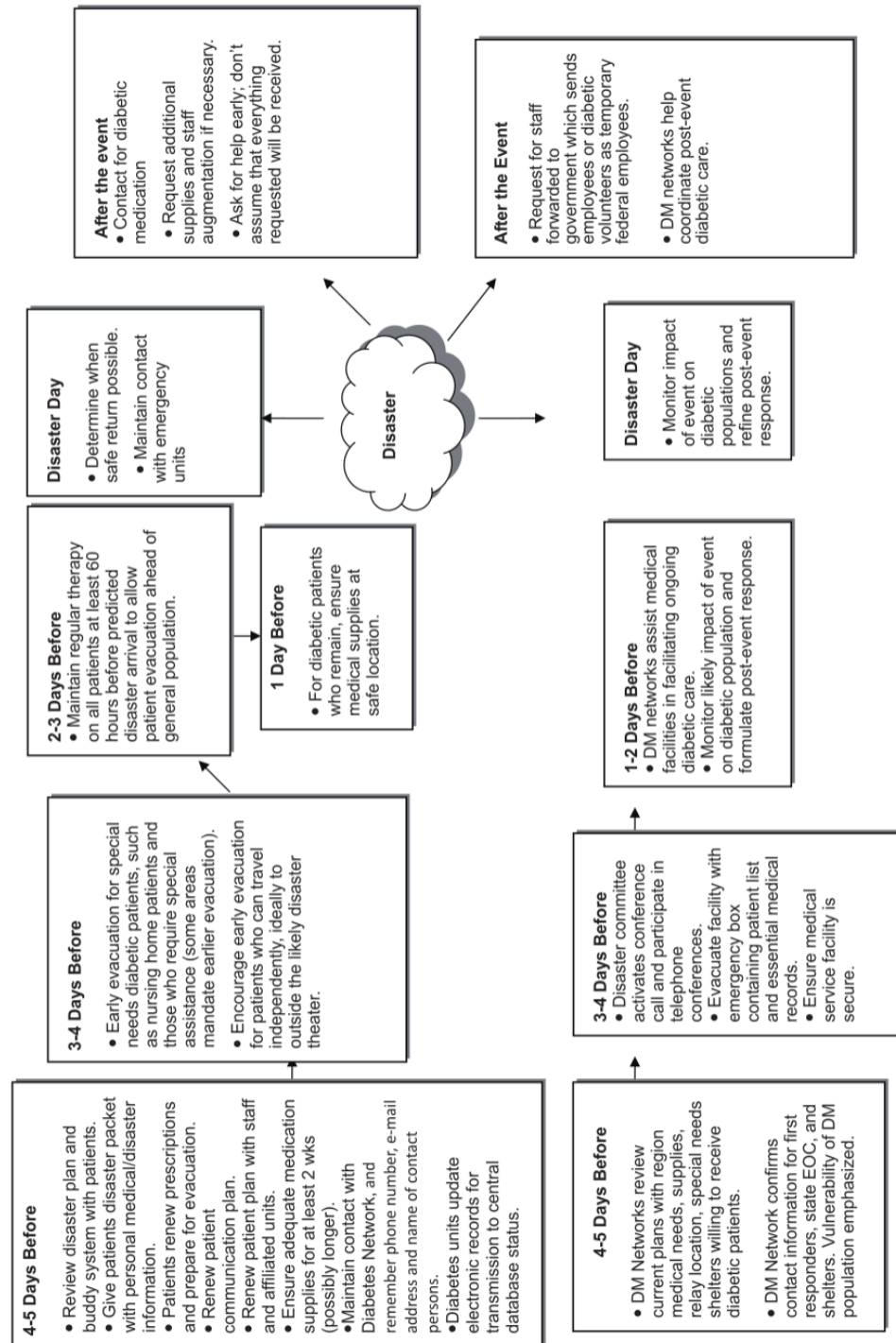


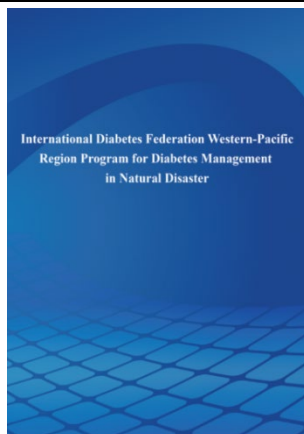
Figure 3: People with diabetes and their families



Suggested Timeline for Disaster Management (Fig. 4)
from IDF WPR Diabetes and Disasters Guidelines 1st Edition

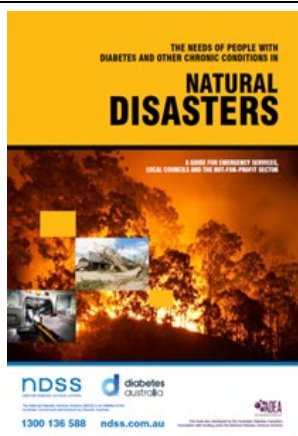


Existing guidelines



1st edition IDF-WPR Diabetes Management in Natural Disasters 2014

www.idf.org



Australia 2016

www.ndss.com.au

Available in five languages:
English, Vietnamese,
Turkish, Arabic, Chinese
(simplified/traditional)

Original Japanese
version (2014)



English digest version



Japan

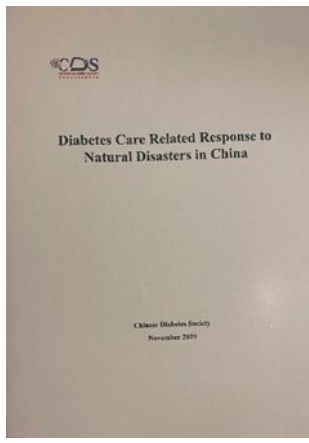
Japanese 2014
English version 2019



IDF 2017

www.idf.org

Available in 18 languages

	China 2019
Special Article Kidney Res Clin Pract 38:15–24, 2019 pISSN: 2211-0132 • eISSN: 2213-0149 https://doi.org/10.23876/j.krcp.18.0038 Disaster preparedness for earthquakes in hemodialysis units in Gyeongju and Pohang, South Korea Kyung Don Yoo^{1,2}, Hyo Jin Kim^{1,2}, Yunmi Kim³, Jae Yoon Park^{1,3}, Sung Joon Shin^{1,3}, Seung Hyeok Han⁴, Dong Ki Kim^{1,4}, Chun Soo Lim^{1,2}, Yon Su Kim^{1,2}	Korea r.e. haemodialysis 2019
DIABETES RESEARCH AND CLINICAL PRACTICE 165 (2020) 100246 Contents available at ScienceDirect Diabetes Research and Clinical Practice Journal homepage: www.elsevier.com/locate/diabetes The Australian response to the COVID-19 pandemic and diabetes – Lessons learned Sof Andrikopoulos^{a,1}, Greg Johnson^{b,1} ^a Australian Diabetes Society, 145 Macquarie Street, Sydney, NSW 2000, Australia ^b Diabetes Australia, PO Box 3156, Canberra, ACT 2601, Australia	Australia r.e. COVID-19 2020
DIABETES RESEARCH AND CLINICAL PRACTICE 166 (2020) 100278 Contents available at ScienceDirect Diabetes Research and Clinical Practice Journal homepage: www.elsevier.com/locate/diabetes Diabetes and COVID-19: IDF perspective in the Western Pacific region Yerin Huang^a, Altasai Khan Khasag^b, Weiping Jia^c, Alicia Jenkins^d, Chien-Ning Huang^e, Daisuke Yabe^f, Doo-Man Kim^g, Takashi Kadowaki^{h,i}, Moon-Kyu Lee^{j,k,1}	IDF-WPR r.e. COVID-19 2020
https://www.diabetes.org.nz/managing-diabetes-emergencies	New Zealand 2021

These and other guidelines are collated at the following websites and available for free download. Versions in other languages, where available, are at the listed website. If not in your language, please consider obtaining / sharing translations.



www.ajenkinsdiabetes.org
Diabetes in Disasters tab

www.idf.org



Checklist of status of individual IDF-WPR countries r.e. guidelines for diabetes management during disasters

While there are these general guidelines for our IDF-WPR region it is advisable that local guidelines be prepared. This will also serve the important purpose of connecting the many stakeholders prior to disasters. The status of each member country regarding their own guidelines, as reported (or not) during the request for feedback regarding this 2nd edition of IDF-WPR guidelines, is noted below. We hope that availability of this manual will encourage member associations to prepare and disseminate their own national guidelines.

We encourage member diabetes associations to undertake the preparation or updating of national guidelines and to share their knowledge so that all people in our region with diabetes and their families, communities and healthcare providers are less likely to be badly impacted by future disasters.

Country	Last guideline	Anticipated next version	Comment	Contact
Australia	2016			
Brunei Darussalam				
Cambodia				
China	2019			
Fiji				
French Polynesia				
Guam				
Hong Kong – China				
Indonesia				
Japan	2014/19			
Kiribati				
Korea (Dem. PR)				
Korea (Republic)				
Lao (PR)				
Macau				
Malaysia				
Marshall Islands				
Micronesia (Fed. States)				
Mongolia				
Myanmar				
Nauru				
New Caledonia				
New Zealand	2021			
Palau				
Papua New Guinea				
Samoa				

Singapore				
Solomon Islands				
Taiwan				
Timor-Leste				
Thailand				
The Philippines		Post 2022 WPR manual		
Tonga				
Vanuatu				
Vietnam				

Suggested sources for funding for guideline development

- The IDF-WPR currently (as of 2022) has no funds available to assist with guideline development or dissemination. Indeed, the development of these guidelines was by unpaid volunteers. We shall share knowledge of any funds from the IDF or IDF-WPR should such funds become available.
- National diabetes associations
- Local or national government funding
- Philanthropy
- Funding may also be sought to provide goods for the preparation of go-bags or to support people 'sheltering in place' such as during the pandemic, or to make up low-cost hand sanitisers, disinfectants, water purifiers and rehydration fluids. Some companies or individuals may be able to donate useful goods and services (such as food, medicines, hygiene kits or cover printing costs)



References

1. Disaster Response Task Force. American Diabetes Association Statement on Emergency and Disaster Preparedness: A Report of the Disaster Response Task Force. *Diabetes Care* 2007;30:2395–2398.
2. Chitwood M, Lewis C, Harle C. Preparing for natural disasters: A survival plan for persons with diabetes. *Diabetes Education* 1992;18:246–247.
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4. Motoki E, Mori K, Kaji H, Nonami Y, Fukano C, Kayano T, Kawada T, Kimura Y, Yasui K, Ueki H, Ugai K. Development of disaster pamphlets based on health needs of patients with chronic illnesses. *Prehospital & Disaster Medicine* 2010;25:354–360.
5. Miller AC, Arquilla B. Chronic diseases and natural hazards: Impact of disasters on diabetic, renal, and cardiac patients. *Prehospital & Disaster Medicine* 2008;23:185–194.
6. Arrieta MI, Foreman RD, Crook ED, Icenogle ML. Providing continuity of care for chronic diseases in the aftermath of Katrina: From field experience to policy recommendations. *Disaster Medicine & Public Health Preparedness* 2009;3:174–182.
7. Mokdad AH, Mensah GA, Posner SF, Reed E, Simoes EJ, Engelgau MM, Chronic Diseases Vulnerable Populations in Natural Disasters Working Group. When chronic conditions become acute: Prevention and control of chronic diseases and adverse health outcomes during natural disasters. *Preventing Chronic Disease* 2005;2 Spec no:A04.
8. University of Hyogo Graduate School of Nursing. Information base for disaster nursing knowledge and skills to protect life. <http://www.coe-cnass.jp/>
9. WHO Guidelines for Drug Donations. <http://www.who.int/hac/donorinfo/en/>



Guidelines and Checklists for People with Diabetes to Prepare in Advance



Guidelines and checklists for people with diabetes to prepare in advance

It is helpful for people with diabetes and their households, as well as other stakeholders, to have guidelines and lists of practical actions for people with diabetes to prepare in advance so as to reduce their risk of harm and need for external support during a disaster. Eight examples of such lists from the USA and from IDF-WPR countries are provided herein.

Some IDF-WPR member countries also requested advice regarding pandemics such as COVID-19 be included in this 2nd edition of the IDF-WPR Guidelines for Diabetes and Disasters, and this is also now included. While not specific to diabetes, some approved recipes for low-cost effective home-made solutions for cleaning hands, surfaces and for water decontamination are also provided.

This section includes:

- **Examples of available checklists for patients and the general population**
 1. ADA (USA)
 2. CDC (USA)
 3. Diabetes Disasters Response Consortium (USA)
 4. NIH (USA)
 5. Australia
 6. Japan
 7. China
 8. New Zealand
- **Advice regarding infectious diseases pandemics**
- **Low-cost effective home-made solutions**



Guidelines by other organisations

From the US: (1) ADA; (2) CDC; (3) DDRC; (4) NIH



Disaster preparations for people with diabetes

1. American Diabetes Association (ADA)¹⁻⁴

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; pre-packaged 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. Center for Disease Control (CDC) (USA)⁵⁻⁷

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 healthcare 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 two weeks. These supplies should be checked at least every two to three months. Watch for expiration dates.

Helpful hints about insulin, pens, and syringes

Insulin may be stored at room temperature (59°F–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 after 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 six 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
- Pies, 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°F–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 mealtimes, 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 two 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.



Diabetes Disaster Response Coalition (DDRC)

Email: diabetesdisasterresponse@gmail.com

Phone: +1 765-314-DDRC (+ 1-765-314-3372)

Resources can be downloaded for free from www.DiabetesDisasterResponse.org



PATIENT PREPAREDNESS PLAN

DO YOU OR A LOVED ONE HAVE DIABETES AND USE INSULIN?

Make a plan to stay healthy during natural disaster or emergency

Managing diabetes can be even harder when you are dealing with a major storm, loss of electricity, and possible evacuation from your home. Building a “diabetes kit” now can save a lot of worry and time when a disaster strikes. A checklist template is included for your use.



Your diabetes kit can be stored in an easy-to-carry waterproof bag or container to hold the documents, information, and supplies that you will want to have with you.

Important Information to Keep In Your Kit - Write down or copy the following:

- Type of diabetes you have
- Other medical conditions, allergies, and previous surgeries
- Current medications, doses, and time you take them. Include your pharmacy name, address and phone number.
- Previous diabetes medications you have taken
- A letter from your diabetes care team with a list of your most recent diabetes medications, if possible.
- A copy of your most recent laboratory result, like A1C results
- Make, model and serial number of your insulin pump or CGM. Include pump manufacturer's phone number in case you need to replace your device.
- Doctor's name, phone number, and address
- Phone numbers and email addresses for your family, friends, and work. Include out-of-town contacts.
- A copy of your health insurance card
- A copy of your photo ID
- Cash



Source: Adapted from American Association of Clinical Endocrinologists (AACE) - My Diabetes Emergency Plan.
For additional emergency preparation resources for people with diabetes, visit: <http://mydiabetesemergencyplan.com/>

www.DiabetesDisasterResponse.org • Questions? Call **765-314-DDRC** (765-314-3372)

Diabetes Supplies

- Additional week supply (or more) of all medications, including insulin and Glucagon, if prescribed.



If you lose power and you have unused insulin, don't throw it out! In an emergency, it is okay to use expired or non-refrigerated insulin.



- Protect your insulin pump from water.
- Supplies to check your blood sugar, like testing strips and lancets. Don't forget extra batteries!
- Extra supplies for insulin pump or CGM
- Cooler and reusable cold packs
 - Note: Do NOT use dry ice and do not freeze the medication
- Empty plastic bottle or sharps container to safely carry syringes, needles and lancets
- Items to treat high blood sugar such as pump supplies (infusion sets) and/or syringes
- Items to treat low blood sugar (hypoglycemia), like:
 - Juice
 - Regular soda
 - Honey
 - Hard candy (not sugar-free)
 - Glucose tablets
 - Glucagon

Other Supplies to Pack



- 2-day supply of non-perishable ready-to-go food, like:
- Pre-packaged tuna, beans, cheese and cracker snacks etc.
- Nuts or nut butters
- High-fiber/protein granola bars
- Dried fruits
- Anything according to dietary restrictions
- A 3-day supply of bottled water (or more)
- Pen/pencil and notepad to record blood sugar, other test results and any new signs/symptoms
- First aid supplies like bandages, cotton swabs, and antibiotic ointments or creams
- Extra clothing, including socks and undergarments
- Cell phone and charging supplies for phone and pump including battery pack
- Flashlight and batteries

Other Recommendations

- Make sure that all your vaccinations are up-to-date.
- Choose a meeting place with your family in case you are separated. Write down location and include in your kit.
- Wear a medical ID or medical alert bracelet or other form of identification in case you are evacuated to a relief shelter.
- For children, write down name of school, address and phone number.



www.DiabetesDisasterResponse.org • Questions? Call **765-314-DDRC** (765-314-3372)

Checklist



Important Information to Keep in Your Kit - Write down or copy the following:	Check if Completed
Type of diabetes you have	
Other medical conditions, allergies, and previous surgeries	
Current medications, doses, and time you take them. Include your pharmacy name, address and phone number.	
Previous diabetes medications you have taken	
A letter from your diabetes care team with a list of your most recent diabetes medications, if possible.	
A copy of your most recent laboratory result, like A1C results	
Make, model and serial number of your insulin pump or CGM. Include pump manufacturer's phone number in case you need to replace your device.	
Doctor's name, phone number, and address	
Phone numbers and email addresses for your family, friends, and work. Include out-of-town contacts.	
A copy of your health insurance card	
A copy of your photo ID	
Cash	
Diabetes Supplies	
Additional week supply (or more) of all medications, including insulin and Glucagon, if prescribed.	
Supplies to check your blood sugar, like testing strips and lancets. Don't forget extra batteries!	
Extra supplies for insulin pump or CGM	
Cooler and reusable cold packs: Note: Do NOT use dry ice and do not freeze the medication	
Empty plastic bottle or sharps container to safely carry syringes, needles and lancets	
Items to treat high blood sugar such as pump supplies (infusion sets) and/or syringes	
Items to treat low blood sugar (hypoglycemia), like: Juice, regular soda, honey, hard candy Glucose tablets, Glucagon	
Document for others that identifies specific signs of high and low blood sugar.	
Helpful if a person is unable to communicate, signs can be mistaken for drug or alcohol intoxication.	
Other Supplies to Pack	
2-day supply of non-perishable ready-to-go food, like: Pre-packaged tuna, beans, cheese and cracker snacks; nuts or nut butters; high fiber cereals; high-fiber/protein granola bars; dried fruits; anything according to dietary restrictions	
A 3-day supply of bottled water (or more)	
Pen/pencil and notepad to record blood sugar, other test results and any new signs/symptoms	
First aid supplies like bandages, cotton swabs, and antibiotic ointments or creams	
Extra clothing, including socks and undergarments	
Cell phone and charging supplies for phone and pump including battery pack	
Flashlight and batteries	

www.DiabetesDisasterResponse.org • Questions? Call **765-314-DDRC** (765-314-3372)

Checklist	
Important Information to Keep in Your Kit - Write down or copy the following:	Check if Completed
Other Recommendations	
Make sure that all your vaccinations are up-to-date	
Choose a meeting place with your family in case you are separated. Write down location and include in your kit.	
Wear a medical ID or medical alert bracelet or other form of identification in case you are evacuated to a relief shelter. For children, write down name of school, address and phone number	

www.DiabetesDisasterResponse.org • Questions? Call **765-314-DDRC** (765-314-3372)



National Institutes of Health *Office of Management*

<https://ors.od.nih.gov/ser/dem/emergencyPrep/Pages/Disaster-Preparedness-Tips.aspx>

Disaster Preparedness Tips

- Prepare to be self-sufficient for at least three days by putting together an emergency kit, including: non-perishable food, water, a flashlight, a portable, battery-operated radio or television, batteries, medicines, anti-bacterial hand wipes or gel, first aid kit, money, seasonal clothing, and sanitation supplies.
- Conduct practice drills so you and your family know the safe locations in your home for each type of emergency. Decide how and where your family will reunite if separated. Choose an out-of-state friend or relative that separated family members can call to report their whereabouts and conditions.
- Learn first aid and CPR from your local Red Cross chapter or other community organizations.
- Learn how to shut off gas, water and electricity in case the lines are damaged. Make sure insurance coverage is up-to-date and reflects present property values. Check on flood insurance.
- Compile an inventory of home contents. Take pictures and/or video. Store in a safe place.
- Check chimneys, roofs, walls and foundations for stability. Make sure your house is bolted to its foundation.
- Secure your water heater and major appliances, as well as tall, heavy furniture, hanging plants, picture frames and mirrors (especially those over beds).
- Make arrangements for pets.
- Organize your neighborhood to be self-sufficient after a disaster.

During a Disaster!

If you are evacuated:

- Follow directions of local officials. Carry your disaster supplies kit with you.
- Unplug appliances; turn off electricity, gas, and main water valve. (Safety note: do not attempt to re-light the gas pilot. Call the utility company.)
- If time permits, elevate or move furniture to upper floors.
- Tell someone outside of storm area where you are going.
- Lock home and leave.

If you stay at home:

- Listen constantly to a battery-powered radio or television.
- Stay inside away from windows, skylights and glass doors.
- If power is lost, turn off major appliances and keep refrigerators and freezers closed.

After a Disaster!

Unless there is an immediate life-threatening emergency, do not attempt to use the telephone. Be sure to:

- Stay calm. Check on neighbors, especially elderly or disabled.
- Turn on your portable radio or television for instructions and news reports. For your own safety, cooperate fully with public safety officials and instructions.
- Use a flashlight to cautiously check for gas and water leaks, broken electrical wiring or sewage lines. If there is damage, turn the utility off at the source. Immediately report gas leaks to your utility company. Check for downed power lines; warn others to stay away.
- Check your home for cracks and damage, including the roof, chimneys and foundation.

- Do not use your vehicle unless there is an emergency. Keep the streets clear for emergency vehicles. If you must drive, watch for downed power lines, flooded streets and highways and undermined roads.
- Take pictures of the damage, both house and contents, for insurance claims.
- When electricity is lost for several hours or days, frozen and refrigerated food may not be safe to eat. Do not re-freeze thawed food. Throw away all food that has been under flood waters, except canned food, but wash and sanitize the cans before opening. All food that cannot be saved should be double-bagged for normal trash disposal or buried at least 2-feet deep.
- Conserve water if your septic system is flooded.
- If your system lost pressure, boil water for 3 minutes before consuming.
- In warm weather, empty water out of birdbaths, tires, flowerpots and other containers to limit mosquito larvae growth.

Things You Need:

1. Water - You need clean safe water to drink. Store 1 gallon per day for each person in your home for drinking and cooking. Experts say it is best to plan for three days. You can buy bottled water from the grocery store or bottle it yourself. If you bottle it yourself, choose a clean washed container like a soda bottle. Add four drops bleach (sodium hypochlorite) per quart of water. Don't use the scented bleaches. You may also need water to flush the toilet if your home has a well with an electric pump. If you have any warning time before the power goes off, run your bathtub and your washing machine full of water for flushing the toilet. To flush the toilet when the power is off, just remove the tank lid and fill the tank with water. Now flush and the tank will empty as the water goes out of the bowl. Fill the tank back up for the next trip.
2. Food - You will need food that will not spoil or go bad if it is not kept cold. Have several days worth of canned foods on hand that could be eaten without heating if need be. Keep some foods that will keep for several days without heat or cold. Have on hand foods like peanut butter, crackers, fruit, vegetables, bread, and cereal. Food in your refrigerator and freezer will keep for a while depending on many factors. Keep the door closed as much as possible. Remember that you can cook on an outdoor grill if the weather is safe but you must do it outdoors.
3. Shelter - Staying dry and warm is most important in the case of winter storms. If your home has a safe fireplace, you have a good source of warmth for your family. Keep a stack of dry firewood in preparation for storm-related power failure. Gas logs will also work without power. Keep warm by dressing in layers. Wrap up in blankets for sleeping or sitting still. If you get wet, get dry as soon as possible. Make sure that your feet and hands stay warm and dry and check the hands and feet of children and older folks.
4. Transportation - In case of emergency, you need to be able to get to help, or get a message to help so that they can get you. If it is safe to drive your car, help is available at your community fire department. A Deputy Sheriff will be stationed at fire departments when communications lines are down. If you have to walk to help, remember to take care of yourself so you don't become the victim instead of the rescuer. Dress in layers, take water and food, and take the safest route even if it may take longer.
5. Radio - Most radio stations will broadcast even if your home power is off. Keep a battery powered radio available with extra batteries to receive emergency information.

Escape Routes

Draw a floor plan of your home. Use a blank sheet of paper for each floor. Mark two escape routes from each room. Make sure children understand the drawings. Post a copy of the drawings at eye level in each child's room.

Where to Meet

Establish a place to meet in the event of an emergency, such as a fire. Record the locations below:

Location	Where to Meet
Near the home	For example, the next-door neighbor's telephone pole
Outside the immediate area	For example, the neighborhood grocery store parking lot

Australia

ndss
national diabetes services scheme

diabetes
australia

Full guidelines available at www.ndss.com.au and www.ajenkinsdiabetes.org

BE AWARE. PREPARE. SURVIVE AN EMERGENCY.

MY DIABETES EMERGENCY PLAN



THIS PLAN HELPS YOU MANAGE YOUR DIABETES IN AN EMERGENCY

Stress in an emergency or a natural disaster can raise or lower blood glucose to dangerous levels. There may be no medication or food available, and no way of getting medical help.

A **Diabetes Emergency Plan** helps you to self-manage your diabetes before, during and after an emergency. Planning ahead reduces the risk of diabetes-related infections and life-threatening situations.

This plan also lists important things to put in a **Diabetes Emergency Kit** to help you survive.

Keep this plan and your emergency kit together in a safe place and keep them up to date.

EMERGENCY KIT CHECKLIST

Prepare a portable, insulated diabetes emergency kit to take with you if you need to leave at short notice. It should contain the following:

Important documents

- ☐ A list of your medical and surgery history
- ☐ A letter from your diabetes healthcare provider on your diabetes medication regimen
- ☐ A copy of your sick day management plan
- ☐ A copy of this completed plan

CHECK THE EXPIRY DATE of your supplies
UPDATE THIS PLAN at the start of every season.

General medical supplies

- ☐ A 14 day supply of your prescription medication
- ☐ Non-prescription drugs such as aspirin, panadol, antacid, vitamins, or any others that you buy and use from over the counter
- ☐ A 3 day supply of bottled water per person
- ☐ A cooler bag with 4 refreezeable cool packs or FRIQ packs

Diabetes specific medical supplies (depending on your regular diabetes management)

- ☐ A 14 day supply of your insulin and syringes or insulin pens
- ☐ Blood-glucose testing supplies, blood-glucose monitor and extra batteries, lancets and lancet device
- ☐ Empty sharps container
- ☐ Urine or blood ketone testing strips
- ☐ Hypoglycaemia kit containing jelly beans, glucose tablets, cans of sweet soft drink, glucagon kit, a supply of non-perishable foods (e.g. peanut butter, crackers, meal replacement shakes or bars)
- ☐ Cotton balls and tissues
- ☐ Alcohol swabs
- ☐ A pen and a notebook to record blood-glucose levels

Additional items for those on insulin pump therapy

- ☐ Insulin pump settings and passwords
- ☐ Insulin pump cannulas (sites) and reservoirs
- ☐ A 14 day supply of syringes or insulin pens – in case of damage to your pump
- ☐ Spare batteries for insulin pump

Please refer to your state and territory fire and emergency services agency for a list of additional items to include in your emergency kit.

OTHER IMPORTANT ITEMS FOR YOUR EMERGENCY KIT

- | | |
|---|--|
| ☐ Torch, extra batteries | ☐ Protective clothing |
| ☐ Lighter and candles | ☐ Heavy duty gloves |
| ☐ Handheld radio | ☐ Protective eye wear |
| ☐ First aid kit | ☐ Protective shoes |
| ☐ Whistle | ☐ Spare socks |
| ☐ Mobile phone and extra charger | |

For more information about how to use this plan visit www.ndss.com.au

ndss **diabetes**
national diabetes services scheme australia

The National Diabetes Services Scheme (NDSS) is an initiative of the Australian Government administered by Diabetes Australia.

ADEA
AUSTRALIAN DIABETES EDUCATORS ASSOCIATION

This plan was developed by the Australian Diabetes Educators Association with funding under the National Diabetes Services Scheme.

1300 136 588 ndss.com.au

Be aware. Prepare. Survive an emergency.

My diabetes plan for natural disasters and emergencies

This plan helps you manage your diabetes in an emergency

Stress in an emergency or a natural disaster can raise or lower blood glucose to dangerous levels. There may be no medication or food available, and no way of getting medical help.

A **diabetes emergency plan** helps you to self-manage your diabetes before, during and after an emergency. Planning ahead reduces the risk of diabetes-related infections and life-threatening situations.

This plan also lists important things to put in a **diabetes emergency kit** to help you survive.

Keep this plan and your emergency kit together in a safe place and keep them up to date.

Emergency kit checklist

Prepare a portable, waterproof, insulated diabetes emergency kit to take with you if you need to leave at short notice. It should contain the following:

Important documents

- ☐ A list of your medical and surgery history
- ☐ A letter from your diabetes healthcare provider on your diabetes medication regimen
- ☐ A copy of your sick day action plan
- ☐ A copy of this completed plan
- ☐ Copy of your photo ID

CHECK THE EXPIRY DATE of your supplies
UPDATE THIS PLAN at the start of every season.

General medical supplies

- ☐ A 14 day supply of your prescription medication
- ☐ Non-prescription drugs such as aspirin, paracetamol, antacid, vitamins, or any others that you buy and use from over the counter
- ☐ A 3 day supply of bottled water per person
- ☐ A cooler bag with 4 refreezable cool packs or FRIIO packs

Diabetes specific medical supplies (depending on your regular diabetes management)

- ☐ A 14 day supply of your insulin and syringes or insulin pens
- ☐ Blood glucose monitoring supplies, blood glucose monitor and extra batteries, lancets and lancet device
- ☐ If applicable, continuous glucose monitoring/flash glucose monitoring supplies
- ☐ Empty sharps container
- ☐ Urine or blood ketone checking strips
- ☐ Hypoglycaemia kit containing jelly beans, glucose tablets, cans of sweet soft drink, glucagon kit, a supply of non-perishable foods (For example peanut butter, crackers, meal replacement shakes or bars)
- ☐ Cotton balls and tissues
- ☐ Alcohol swabs
- ☐ A pen and a notebook to record blood glucose levels

Additional items for those on insulin pump therapy

- ☐ Insulin pump settings and passwords
- ☐ Insulin pump cannulas (sites) and reservoirs
- ☐ A 14 day supply of syringes or insulin pens - in case of damage to your pump

This plan is in addition to general emergency preparedness. Check your state and territory fire and emergency services for additional actions or items to consider in the case of an emergency.

Other important items for your emergency kit

- | | |
|--|--|
| ☐ Torch and extra batteries | ☐ Mobile phone charger and battery pack |
| ☐ Lighter and candles | ☐ Protective clothing |
| ☐ Battery powered radio | ☐ Heavy duty gloves |
| ☐ First aid kit | ☐ Protective eye wear |
| ☐ Whistle | ☐ Protective shoes |
| ☐ Spare socks | |

For more information about how to use this plan visit ndss.com.au



ADEA is a National Health
Professional Body Agent for the NDSS.
Version 4 August 2021. First published February 2015.
NDSSPO002



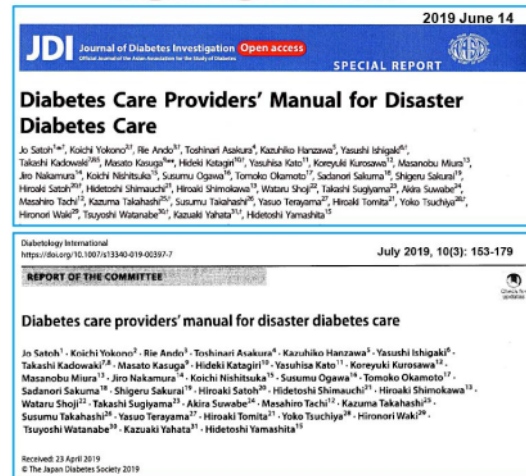
The NDSS is administered by Diabetes Australia

Japan

Original Japanese version (2014)



English digest version



Checklist of supplies taken from Satoh et al. (2019)⁹.

Table 4 | Recommended emergency supplies checklist

Diabetes care-related item	Checkbox	Essential/emergency item	Checkbox
Oral medications	☐	Valuables (e.g., cash, passbooks)	☐
Insulin self-injection kits	☐	Flashlight/batteries	☐
Glucose (e.g., tablets) for hypoglycemia	☐	Mobile phone/battery charger	☐
Diabetes Coordination Notebook	☐	Drinking water	☐
Drug Profile Book (or photocopy of prescriptions)	☐	Emergency food	☐
First-aid box	Checkbox	Extra clothes	☐
Regular medications	☐	Slippers	☐
Antiseptics	☐	Wet wipes	☐
Adhesive plasters	☐	Plastic bags	☐
Thermometer	☐	Spare glasses	☐
Masks	☐	Memo pads/writing utensils	☐
		Toiletry goods/towels	☐
		Toilet paper	☐
		Sanitary goods	☐
		Cotton work gloves	☐

China



From the Diabetes Care Related Response to Natural Disasters in China
by the Chinese Diabetes Society, November 2019

List of preparedness items for patients with diabetes

Emergency contact information

Medical record and copy of prescription

Insulin and oral hypoglycaemic medicine for daily use

Blood taking needle (lancet) and blood glucose meter and strips

Alcohol, cotton ball/cotton pad

Rapid-rising sugar food (e.g., candy, glucose, fruit juice, etc)



Downloadable free from <https://www.diabetes.org.nz/managing-diabetes-emergencies>

DIABETES & EMERGENCIES

DISASTER KIT

Disasters can strike at any time and often without warning.

Are you prepared?

- Have your disaster supplies in a bag that you can carry
- Make sure to check the expiry dates of items such as food, medication, and medical supplies. If necessary, renew these items every 12 months

Food

Canned or dried food for at least 3 days.

Here are some suggestions:

- Canned unsweetened fruit e.g., peaches
- Canned fish e.g., tuna or salmon in spring or brine water
- Baked beans
- Canned or packet soup
- Carbohydrate foods, e.g., wholegrain crackers, rice, or pasta
- Weet-Bix, unsweetened cereals, or muesli in a waterproof container
- Dried milk powder or long-life milk
- Nuts e.g., peanuts or almonds
- Jar of peanut butter or your favourite spread
- Pet food and baby food if needed
- Enough bottled water for 3 days (3 litres per person per day). Do not use milk bottles, as leftover milk may contaminate the water. Ensure you refresh your water supplies on a regular basis
- Quick acting carbohydrate for the treatment of hypos e.g., glucose tablets or jelly beans

Health/Hygiene

- Toiletries e.g., towel, toothbrush, toothpaste, soap
- Toilet paper
- Rubbish bags
- Towels
- 2 buckets: one for water and one for a temporary toilet
- First aid kit (including Panadol, sunblock, safety pins)
- Face and dust masks

Medication and medical supplies

At least two weeks supply:

First aid kit

- Syringes and/or needles, or pens
- Blood glucose meter with spare batteries and test strips (30 days supply—check the date on your strips regularly)
- Insulin and/or diabetes medication in an insulated container if possible
- Other medication, e.g., blood pressure, allergy, or heart pills
- Insulin pump supplies if needed
- List of insulin pump settings
- Written instructions from your diabetes team for an insulin regimen to use when off an insulin pump (along with appropriate insulins)
- Glucagon emergency kit
- Alcohol swabs or antibacterial wipes
- Blood glucose logbook and pencil
- Empty sharps container for used lancets and needles
- Finger pricker and lancets
- MedicAlert or similar identification

Clothes

- Wind/waterproof clothing
- Warm clothing
- Durable and comfortable outdoor shoes

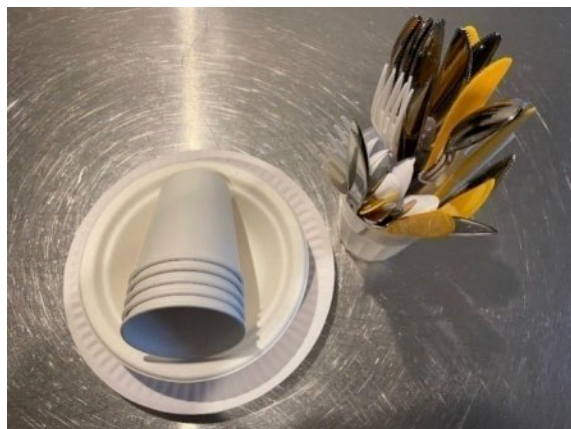
Other Supplies

- Cash
- Sharp knife
- Can opener
- Plastic cups, plates and utensils
- Portable gas cooker, and extra gas
- Pot for boiling water/heating food
- Torch
- Battery operated radio

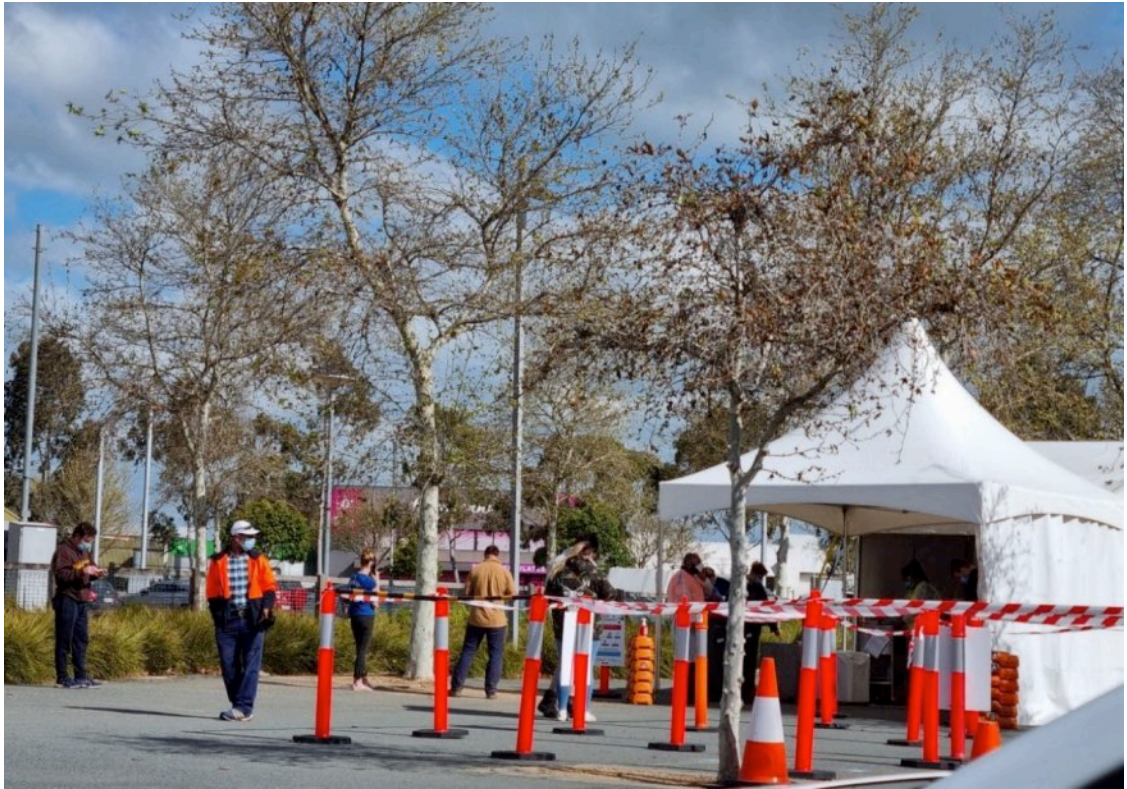
- Spare batteries—check them every 3 months
- Whistle (so you can be heard)
- Spare glasses, and hearing/mobility aids
- Waterproof matches or matches in a waterproof container
- Important documents in a waterproof bag/container e.g., birth/marriage certificate, passport, financial documents, your doctor's contact details, list of allergies and medications you take and prescriptions
- Extra cellphone batteries and charger
- Nappies if required

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General Advice for an Epidemic or Pandemic



General planning advice for an epidemic or pandemic

The general planning for an epidemic or pandemic, such as that of COVID-19, is similar to that of many other types of natural disasters, such as earthquakes. Often one's house remains available, but the acute phase of the disaster lasts much longer than many other types of disasters. The capacity to afford to be off work if one's employment and to stockpile or purchase ongoing food and other supplies must be considered.

The **prevent, prepare, respond and recover** framework is applicable and the same participants, from individuals with diabetes, to local communities, diabetes associations, including the IDF, the healthcare sector, local and national governments, the diabetes drug and device industry, NGOs, and other countries and aid agencies, such as the World Health Organization (WHO), the United Nations (UN), the USA Centre for Disease Control (CDC) all have important roles to play.

We also suggest a new acronym to guide planning and actions: HIP-AW: **H**ealthy, **I**nformed, **P**repared and **A**ssume the **W**orst (until reliable information).

Relative to the general population people with diabetes often have higher risk of infections and adverse outcomes, particularly if they have suboptimal glucose control or complications or comorbidities such as hypertension, obesity, kidney damage or heart disease. This has been found to be the case for COVID-19 outcomes and clinical practice guidelines have been suggested for COVID-19, which would likely be relevant to future epidemics and pandemics, until specific information becomes available.¹⁻⁸

Healthy refers to achieving and maintaining healthy lifestyle and optimal risk factor levels, such as a healthy diet, not smoking, avoiding dehydration (such as due to fever, vomiting or diarrhoea), glucose control (HbA1c levels), blood pressure and heart disease control. This also includes continuing regular medications and prescribed doses, unless specifically advised not to do so. Some drug doses may need to be changed, such as of glucose control medication if physical activity and weight change.

Informed. People with diabetes, their family and health care providers and relevant national authorities should remain informed by reliable sources. Reliable sources of information, such as via the internet if available, are often the USA Centre for Disease Control (CDC), the World Health Organization (WHO) and major diabetes associations such as the American Diabetes Association (ADA). Cross-referencing information and regularly checking for updates is advisable. National and local sources of information, such as from the government, emergency services or community leaders, should be sought via the internet, radio, newspaper and any SMS messaging.

Prepared. This includes the general preparedness tasks outlined earlier. As much as possible healthcare should be changed to remote (telehealth or phone) visits.

Have a written plan, contact lists and details, meeting places, and communicate with others, e.g., family, friends and neighbours as to your plans and their plans,

and what help they may need and could help you with. Some general disaster planning apps, such as by the Red Cross, have an option to email and print out a copy of one's personalised plan.

Help form or volunteer with local groups to prepare for, and assist with, emergency preparedness responses and help during the disaster: e.g., preparation of go-bags, hand sanitisers, water purifiers, food supplies, and ensuring adequate supplies of medications and devices.

Assume the Worst (until reliable alternate evidence is available). During an infectious disease disaster due to a novel agent, as was seen with COVID-19, it took weeks to months to provide evidence-based information such as that related to mode of disease spread, its infectivity and risk of infection, severe disease, adverse outcomes (e.g., requiring hospitalisation, ventilation, long COVID and death) for people with diabetes relative to those without diabetes. Given that diabetes, particularly if with poor glycaemic control or comorbidities, is often associated with higher risk of infections, slower wound healing, longer hospitalisation times and higher rates of adverse outcomes from cardiovascular and renal disease, it is prudent to assume the worse prognosis and take higher-level precautions. This includes priority for vaccinations, wearing masks and social distancing.

Useful additions for the home preparedness first-aid kit include a thermometer, fever relievers such as paracetamol and a pulse oximeter. Knowing what one's normal level of oxygenation is when well or at the very start of an illness and regularly checking least daily. Any available relevant home testing kits, such as Rapid Antigen Tests (RATs) for COVID, that are available should be considered.

Regarding limiting the spread of infection, until known otherwise, it would be prudent to assume the infection is highly contagious and can be acquired by multiple routes (as can the COVID virus): aerosols, respiratory droplets, via contact with hands, surfaces. Hence the wearing of high-quality masks, social distancing, excellent hand and surface hygiene (see pages 75–78)) and good ventilation is recommended.

To limit the spread of infections

Hygiene measures:

Teach all family members, including young children to:

- wash hands frequently with soap and water (hot water is not more effective than cold water), particularly if they are visibly soiled
- alcohol-based hand cleaners
- cover coughs and sneezes with tissues and dispose of them appropriately
- avoid others if ill or advised to maintain 'social distancing' or stay at home
- flush toilet with lid closed as this reduces aerosols
- face masks: wear one, or for added protection two, surgical masks covering both nose and mouth or one surgical mask and an outer cloth mask. If available, N95 or P2 or KN95 masks are more protective than standard surgical masks. Cloth masks, preferably multi-layer, can also be purchased or made at home. Any ill person should wear a mask, as should

others providing care. Wash reusable masks after single use. Disposable masks can be cleaned and recycled for individual use as per WHO protocols (see page 82).

If someone in the household becomes infected:

- Ideally the ill person should be isolated but provided with supportive monitoring and care, and hospitalisation if they become very unwell. Sometimes out-of-home accommodation is provided by authorities. If they remain in the same household as others, the ill person should remain alone in a bedroom with a closed door with any gaps between the door and floor/door surrounds closed such as with draught-stoppers or plastic. If available an air purifier type fan device should be used.
- The ill person should wear a mask, preferably a N95 or P2 type mask, particularly if they go out of their room, or someone else comes into the room. Others in the household should also wear a mask if in the same room as the ill person.
- If possible, the ill person should have their own bathroom. If only a shared bathroom, users should sanitise the area before and after use, and avoid using the bathroom within 30 minutes of the ill person.
- The ill person's room, and the rest of the household, should be well-ventilated (e.g., open windows and doors).
- If possible, provide meals for the ill person using disposable containers and cutlery, which along with any used tissues and masks should be placed in a garbage bag for disposal by a masked and gloved carer.
- The ill person's clothing and bedding and towels for washing should be carefully handled by a carer wearing a mask and gloves.

General advice for carers of ill people and cleaners of exposed areas, even at home

- Have a well-ventilated room—open all windows / doors if possible
- If available use air purifiers
- Masks and disposable gloves to be worn
- Clean all surfaces with a disinfectant solution
- Wash all bed linen and the clothes worn during the cleaning with detergent. All linens should be held away from the body and not shaken

As an epidemic or pandemic may go for many months, or years, another disaster, such as a fire, flood, earthquake or landslide may also occur, therefore it is ideal to also include additional items to cover such possible co-existent disasters, so such items are included in the lists below.

Medical needs

- Ensure your vaccinations and that of your household are up to date, including any pandemic-related vaccines
- Sufficient in-date prescribed medicines and related devices for at least 1–2 months.
- Avoid excessive stockpiling so that all who need medications can get a supply
- blood glucose meter, glucose test-strips and lancets
- syringes and pen-needles
- insulin pump reservoir and lines and spare batteries if on pump therapy, with back-up insulin syringes or pens, with record of pump settings and model if relevant
- Continuous or flash glucose monitoring glucose sensors if relevant
- Ketone test strips (blood or urine) if Type 1 diabetes or on sodium glucose transport 2 inhibitors (SGLT2-i)
- sick day care notes (see pages 51–52)
- other prescribed medications, including tablets such as anti-vomiting medicines, antibiotics, anti-malarial agents, anti-viral agents (may require prescription)
- eye drops, over-the-counter medicines
- wound dressings
- any required aids, e.g., prosthesis, hearing aid, prescription glasses, wheelchair, nappies, continence aids, female hygiene products
- disposal bins for sharps (e.g., empty detergent bottle (see pages 93–95) and disposable bags for soiled dressings and nappies
- cool packs, e.g., Frio™ for insulin cool storage if a refrigerator is not available (see page 87)

First aid kit

- non-prescription drugs: e.g., pain relievers and anti-fever medicines (e.g., paracetamol), antacids, anti-diarrhoea medications, antihistamines
- fluids with electrolytes or electrolyte tablets to prepare fluids,
- vitamins if diet quality is poor
- antiseptics, cortisone cream, burn creams
- dressings, bandages, elastic bandage, scissors, tweezers
- saline rinses including eye irrigation
- body heat retaining blanket
- thermometer
- pulse-oximeter to measure oxygen levels
- body weight scales
- any home testing kits for the specific infectious agent (such as Rapid Antigen Tests (RATs) that are available for COVID-19)

Protective items

- masks, including for dust, surgical masks, N95 or P2 masks, cloth masks
- face shield
- hand sanitisers
- goggles, safety glasses or sunglasses
- surgical gloves
- waterproof clothing
- hat
- garbage bags for disposal of soiled items e.g., masks
- helmet e.g., bike or canoeing helmet, motorbike helmet thick gloves e.g., gardening gloves or dishwashing rubber gloves
- fireproof blanket
- sturdy footwear

Cooking and cleaning items

- camping stove and fuel in case of power outages
- BBQ and fuel
- power generator
- solar-powered and generator-powered refrigerators can be used. Very small portable refrigerators, often used to keep a can of soda cool, with a USB power cable which can connect to a portable battery or laptop can be used to keep small quantities of medicines cool
- water purifier (see pages 74–75)
- portable toilet or buckets
- toilet paper, paper towels, tissues
- moist wipes in case bathing is limited
- detergents, soap, cleaners, disinfectants, alcohol-based hand sanitisers
- disposable gloves
- light sources: e.g., torch and batteries, solar lights, manual generator torch
- whistles and something to use as a flag to attract attention
- soap, detergents
- hand and surface sanitisers or the alcohol or bleach solutions to make them

Communications tools

- paper and pens for notes
- portable radio
- phone and phone charger (although power and telecommunications may be lost in some disaster types)
- tablet or computer and charger (recognising power may be lost)
- internet access
- walkie-talkie
- CB or ham radio

Documents

- contact lists
- medical records
- personal documents e.g., insurance, will, birth certificates, marriage certificate
- bank details
- digital back-up, cloud and paper back up of documents and contacts
- cash

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Food and water and cooking

Store a supply of water and food. Water purifiers will reduce the need for large stores of bottled water. As a minimum, keep three litres a day per person for three days.

Some water can be frozen in advance in large (e.g., ice cream) containers in a freezer. If power is lost, especially if freezer not opened, this will keep frozen food cool for hours, and the water can be drunk or used for cooking or washing.

Recommendations range for the time to have enough food for from two weeks to three months. The capacity of lower income people to stockpile this amount of food is likely limited, but as much as possible should be arranged.

Food items for an extended stay at home

- canned or TetraPak beans, soups, fruits, beans and milks
- canned, bottled, frozen or dried fruits and vegetables
- mashed potato mix
- dried soup
- pasta
- rice
- whole grains
- noodles
- dried legumes / lentils
- freeze-dried meals
- frozen foods
- protein bars or fruit bars
- dry cereal or granola
- canned meat or fish
- jerky (dried meat)
 - nuts and nut butters
 - whole-grain crackers
 - dried fruit and trail mixes
 - cereals
- canned or TetraPak juices
- bottled water, tea, coffee
- canned or jarred baby food and formula
- pet food if required for animals
- fresh food from gardens or pots

Entertainment

- cards, games, books, musical instruments, music, craft work, puzzles, movies, TV, radio, garden or pot-plants (which can also be used to grow some food)

Water purification and rehydration solutions

Water is essential for life. High glucose levels, hot environments or fever increase the need for fluids. Water is also needed for cooking, bathing and cleaning. As water supplies, including that in rivers, streams, springs, wells and lakes can become limited or contaminated during many disasters, a store of bottled water or water purifier devices (filters) (such as from bush walking/hiking stores) or water purification tablets are desirable.

Water purification by boiling

Disinfect clear water (sourced from a freshwater river, stream or lake) by keeping it at a rolling boil for at least 1 minute.

Recipe for water purification

For 1 litre clear water add unscented liquid household bleach (sodium hypochlorite) to each quart or litre of water. The amount of bleach to be added per litre of water depends on the strength of the bleach.

For 1% sodium hypochlorite add 10 drops per litre of water

For 4–6% sodium hypochlorite add 2 drops per litre of water

For 7–10 % sodium hypochlorite add 1 drop per litre of water

Mix well and let stand for 30 minutes before drinking.

Double the amount of bleach for cloudy or coloured water, or water that is extremely cold. The water should have a slight chlorine odour after purification. If not, repeat dosage of bleach and let stand for an additional 15 minutes.

If the chlorine taste is too strong, try pouring the treated water back and forth from one clean container to another several times.¹

Following this method, a single bottle of bleach would purify all the water you need to shelter in place for 12 weeks or more.

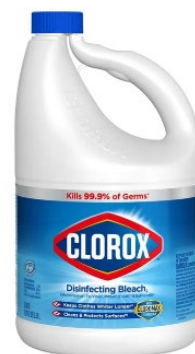
Never mix bleach with any other cleaners as this can generate toxic gases. Bleach reacts with ammonia, which is common in many glass cleaners and also with acids like vinegar (and some toilet bowl, drain, and automatic dishwashing detergents).²

Water purification filters or tablets

A range of water purification filter systems of various sizes are available, often from camping or army surplus stores or online. Examples include a personal use straw-like system to a pump for larger volumes.

For a review of some models: <https://bestreviews.com/best-water-filter-straws>

There are many brands of water purification tablets, often available at chemists, travel or hiking stores; e.g., Aquatabs Water Purification 50 Tablets, each of which contains 3.5mg triclosene sodium. Always follow the instructions for the brand in use. In general, each tablet treats 1 litre of water. If water is clear add 1



tablet and leave for 30 minutes before use. If the water is dirty, allow the sediment to settle or filter it through a fine cloth, then add 2 tablets per litre of water and wait 30 minutes.

Home-made rehydration solution

Rehydration fluid, water with added 'salts' or electrolytes, may be preferable to clean water alone if a person is dehydrated, such as due to fever, high glucose levels, vomiting or diarrhoea, perspiration due to hot weather and/or prolonged exercise or if they are not eating well.

Commercial (but bulky) bottles of rehydration fluids, including those with sugar and no added sugar versions are available. There are also sachets or tablet forms of salts which are mixed with the recommended amount of water. These are often available from chemists or sports stores or included in some first aid kits. A recipe for a home-made version is below:

- 1 litre of clean drinking water
- 2 tablespoons sugar
- $\frac{1}{4}$ teaspoon salt
- $\frac{1}{4}$ teaspoon baking soda; if baking soda is unavailable, substitute another $\frac{1}{4}$ teaspoon of salt.³

Mix

Optional: Additional potassium can be added by including a half cup of orange juice, coconut water, or a mashed ripe banana.

If a person is too weak to drink or is repeatedly vomiting and medical care, such as for intravenous fluids, is not available, drip-feeding the person fluid drop by drop is recommended. This can be life-saving.



Home-made hand sanitisers and surface disinfectants

Home-made hand sanitisers

Soap and water, even with cold water, is very effective at killing micro-organisms if done properly. Washing all hand surfaces for at least 20 seconds is required. Solid or liquid soaps are suitable, though soap is more effective. Using hot water is no more effective than cold water and can dry out the skin more and may not be readily available in a disaster. Soap and water is recommended if there is visible soiling. As an added precaution and for use when soap, water and towels are not available, alcohol-based hand sanitisers are a good option.

Alcohol-based hand sanitisers

Alcohol based sanitisers are usually not very costly, but during pandemics and other disasters costs of commercially available sanitisers can increase greatly and their availability decline. There are several versions of proven effective home-made sanitisers and cleansers. It is recommended that the ingredients, such as concentrated alcohol for the sanitiser or the concentrated bleach for the cleanser, be acquired prior to a disaster, kept securely (out of reach of children) at home and the solutions for use made up just prior to or during a disaster.

Often the strength of a solution or liquid is given as a percent. This refers to the number of mls of the ingredient per each 100 mls of the liquid is required. For example, a 10% alcohol solution is 10 mls of the concentrated alcohol and 90 mls of water.

Alcohol is the active ingredient in most hand sanitisers

Many microbes are killed by 30% alcohol, but others, such as COVID-19, need a higher alcohol concentration, with recommended alcohol concentrations being at least 70% (for example 70 mls of alcohol and 30 mls of water).

In the WHO 2862 guidelines for home-made hand sanitisers, alcohol is the usual active ingredient. To prevent skin drying some glycerin (also known as glycerine or glycerol) and a preservative such as hydrogen peroxide to prevent bacterial growth may be added but are not essential. The addition of hydrogen peroxide though will prolong the shelf-life of the sanitiser.

The addition of aloe vera (as a moisturiser) is not recommended as it may reduce antiviral efficacy.⁴ Some people consider adding essential oils, such as tea tree, lemon or lavender, but these are not essential, can be costly and reduce the strength of the alcohol solution.

A usually widely available concentrated form of alcohol recommended is that of 95% ethanol, also known as ethyl alcohol, grain alcohol or rectified spirit. Another alternate is 99% isopropyl alcohol or 75% rubbing alcohol (often available at a chemist or supermarket).

One can use rubbing alcohols, (usually 70–75%) or even high proof alcohol (for drinking) neat, without further dilution with water, just adding small volumes of glycerin and/or hydrogen peroxide if desired.

Concentrated alcohol solutions, including the sanitisers ready for and in use, are highly flammable and are also toxic if ingested, so seal and label them accordingly and store them in a safe place away from flames and from children.

See below for recipes for an approximately 70–75% alcohol sanitiser based on various strengths of concentrated alcohol based on the WHO recipe:

Volumes are given in mls and also in brackets in household cooking measures.

Starting Strength Alcohol	99%	95%	70%
Volume of alcohol	250 ml (1 cup)	275 mls (1 cup+1 tbs+1 tsp)	300 mls (1 cub+2.5 tbs)
Volume 3% hydrogen peroxide	20 ml (1 tbs)	20 (1 tbs)	20
Volume glycerine	5 ml (1 tsp)	5 (1 tsp)	(1 tbs)
Distilled water	55 ml (2.5 tbs+1 tsp)	45 ml (2 tbs+1 tsp)	No water needed

- tbs = tablespoon; tsp = teaspoon
- Add all ingredients to a clean container and gently mix.
- Label including warning that it is flammable and poison if ingested and store away from flames and young children
- Preparation time: 5 minutes

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Home-made household disinfectants

Bleach-based disinfectants

On inanimate surfaces, such as tables, cupboards or kitchen benches, a 1 in 50 dilution (1 ml of bleach and 49 mls of water) of household bleach; that is, a 5% sodium hypochlorite solution is recommended. For larger volumes (250 ml), this is 5 ml 5% bleach and 245 ml water, or approximately 1 teaspoon of bleach per cup of water.

Household bleach is sold in different strengths so a table to make up about 50 ml of a household disinfectant from different strength bleach solutions is below:

Starting Strength Bleach	2.5%	5%	10%
Volume of bleach	2 ml	1 ml	0.5 ml
Volume of water	48 ml	49 ml	49.5 ml

Fresh solutions work best. Store the diluted bleach in a dark closed container at room temperature for up to one month.¹

To disinfect a surface, e.g., a table, wet the surface and leave it for at least 10 minutes.

If a surface is very dirty, such as contaminated by the body fluids of an ill person a stronger bleach solution, left on the surface for 10 minutes, is recommended. For example, a 1 in 10 solution of 5% bleach (e.g., 10 mls of 5% bleach and 90 mls of water).^{2,3}

Non-bleach-based disinfectants

Alcohol can be used on surfaces that aren't suitable for bleach, such as metal, which bleach can stain or even corrode.⁴

Dishwashing detergent or hand soap (1 ml soap, 49 ml water)—which can take 5–15 minutes to kill infectious agents.^{2,5}

Wine vinegar (6% acid).

Commercial disinfectants

- Povidone-iodine (7.5 percent)
- Chloroxylenol (0.05 percent), chlorhexidine (0.05 percent)
- Benzalkonium chloride (0.1 percent)
- Lysol disinfectant spray
- Pine-Sol (1:64 dilution).⁶

These disinfectants are usually left on a surface for 5–10 minutes. Follow the specific instructions for the detergent of choice.

DO NOT MIX DISINFECTANTS OR BLEACH AS THIS CAN GENERATE TOXIC GASES and it will not increase effectiveness.

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Masks

To protect others from someone who is infected with a respiratory-borne infection masks may be recommended. They may also provide some protection against the wearer becoming infected.

Surgical masks are more effective than even home-made cloth multi-layer masks.¹⁻³ Surgical masks should be changed every 4 hours and also when they get wet with saliva or other fluid.⁴ However, due to shortages and costs cloth face coverings (or alternates) for those not in healthcare or first responder setting settings may be helpful.^{3,5,6}

Surgical masks are usually recommended for those who are sick or exposed to others who are sick or who are cleaning an area that has been exposed to a virus.

A visual guide for wearing a mask is shown in Figure 1. Hands should be washed or sanitised before putting the mask on and after taking it off. Only the loops and ties, not the face-covering mask, should be touched, including when taking the mask off and disposing of it.

Suitable homemade masks include scarves, pillowcases, socks, and 100% cotton T-shirts, but they are less effective than surgical masks and the even more effective N95 respirators. At the particle size at which N95 masks block over 95%, a mask made out of a T-shirt blocks about 10%, a scarf about 20%, a sweatshirt about 30%, and a towel closer to 40%.^{7,8} All cloth face coverings should be washed regularly after each use.⁹

World Health Organization (WHO) advice for wearing a mask

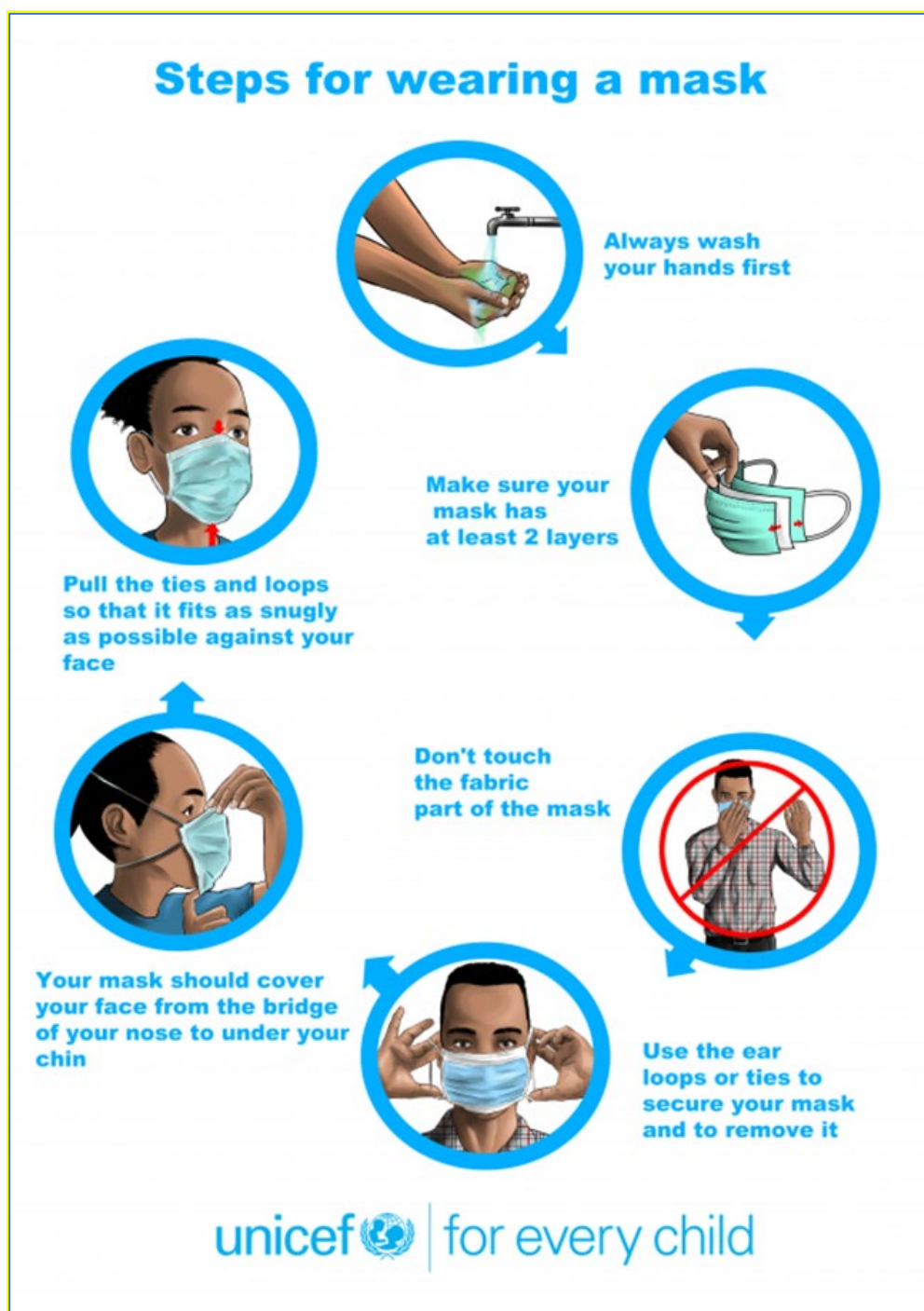
From: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-masks>

How to put on and take off a medical mask:

- Before touching the mask, clean your hands with an alcohol-based hand rub or soap and water.
- Inspect the mask for tears or holes; do not use a mask that has previously been worn or is damaged.
- Verify which side is the top—this is usually where the metal strip is.
- Then, identify the inside of the mask, which is usually the white side.
- Place the mask on your face covering your nose, mouth and chin, making sure that there are no gaps between your face and the mask. Place the straps behind your head or ears. Do not cross the straps because this can cause gaps on the side of the mask.
- Pinch the metal strip so it moulds to the shape of your nose.
- Remember, do not touch the front of the mask while using it to avoid contamination; if you accidentally touch it, clean your hands.

How to take off a medical mask:

- Before touching the mask, clean your hands with an alcohol-based hand rub or soap and water.
- Remove the straps from behind the head or ears, without touching the front of the mask.
- As you remove the mask, lean forward and pull the mask away from your face.
- Medical masks are for single use only; discard the mask immediately, preferably into a closed bin.
- Clean your hands after touching the mask.
- Be aware of the condition of the mask; replace it if it gets soiled or damp.



N95 respirators (type masks)

N95 respirators are more tightly-fitting masks that protect the wearer from respiratory-borne infective agents.¹⁰ The N in N95 stands for N/OSH—the U.S. National Institute for Occupational Safety and Health. The 95 reflects the mask's filtering efficiency, effectively filtering out 95% of particles of a certain size.¹¹ These N95 respirators only work at peak efficiency if they conform completely to the face, and ideally professional fittings and testing should be done, particularly for healthcare workers and first responders. N95 masks are less effective even with 1–2 days of beard growth.^{12,13}

P2 masks and KN95 masks are similar efficacy to N95 masks.

N94 and KN94 masks have only slightly less filtration efficiency than N95 and KN95 and P2 masks.

Mask recycling

Mask reuse is not recommended but is sometimes needed due to shortages or to high costs. Guidelines for reuse are available such as from the CDC.

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html>

There are also publications with a range of protocols for cleaning and reusing an individual's N95 masks. An excellent reference with detailed methods available for free via PubMed is: Juang PSC, Tsai P. N95 Respirator Cleaning and Reuse Methods Proposed by the Inventor of the N95 Mask Material. *J Emerg Med.* 2020;58(5):817–820. doi: 10.1016/j.jemermed.2020.04.036. This paper states that N95 masks can be rotated every 3–4 days, heated for 60 minutes, steamed or boiled for 5 minutes and then air-dried. Using these methods as described the masks retain 92.4–98.5% filtering efficiency.

Other options for individual mask reuse are to store them in a paper bag or box for 1 week.

Other protection for medical workers

Medical workers should also wear goggles or a face shield, as well as a mask, gloves and gown.

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Pregnant women

There will likely be pregnant women with Type 1, Type 2 or gestational diabetes who are near-term during a disaster. A baby delivery kit should be available at shelters in case a woman about to deliver a baby cannot be relocated. Advice should be sought from local obstetricians and midwives as to a suitable kit.

Depending on local resources consideration should be given to providing a woman in the late stages of her pregnancy, particularly if she lives in an area that could be isolated during a disaster. Consider discussing a basic kit with local obstetricians.

A basic delivery kit used by Doctors Without Borders:

- A piece of soap for cleaning the birth attendant's hands and the mother's perineum.
- A plastic sheet about one square meter for use as a clean delivery surface.
- Clean string for tying the umbilical cord (usually two pieces).
- A clean razor blade or disposable scalpel for cutting the umbilical cord.
- Pictorial instructions that explain how to use each item in the kit.



Contact details of such expert clinicians who can provide assistance in person or advice over telecommunications should be available as appropriate to evacuation centres, shelter, first responders and relevant clinical services.

Notes



Resources for Glucose Management in People with Diabetes During a Disaster



Resources for Glucose Management in People with Diabetes During a Disaster

During a disaster people with diabetes, clinics and hospitals may lose their insulin supplies, their cool storage systems for medicines (such as insulin), their insulin delivery systems (e.g., syringes, pens or insulin pumps), their glucose monitoring systems and tests strips and/or glucose sensors.

This may necessitate the use of insulin that has not been refrigerated as recommended. Experience and several studies show that the use of non-refrigerated insulin is safe during an emergency. Insulin storage options are considered.

People may need to use an alternate insulin than their usual medication, hence insulin swapping information can be helpful.

The reuse (by individuals only) of their own 'single-use' syringes, pen needles and lancets in an emergency is a reasonable option. Safe sharps waste disposal is also important.

Donated glucose-meters during a disaster may be in alternate glucose units, hence conversion charts (mg/dl to mmol/l) can be helpful. Charts to estimate HbA1c levels from continuous glucose monitoring time-in-range (TIR) are also available.

This section provides relevant information, including references and information sheets from diabetes organisations.

Insulin use during disasters

Insulin cool storage

Common clinical recommendations for insulin-using patients are to store their not-in-use insulin vials in a refrigerator, and that they can keep their insulin vial in use at room temperature (and usually less than 30 degrees C) for up to 28 days, a time during which most people would finish the vial. Injecting cold insulin is more uncomfortable than that of room-temperature insulin. **Insulin should never be frozen, as once thawed it will be inactive.** Insulin that has been stored at room temperature or in hot environments or is out-of-date does not usually become toxic and very gradually loses potency.

It is recognised that many people with diabetes in disadvantaged regions do not have access to a refrigerator. Many traditional cool storage methods, which usually rely on evaporative cooling, such as non-glazed clay pots and wet animal skins, are effective at keeping insulin cooler than ambient temperature and to a similar level as commercially available chemical-based reusable cool-packs (e.g., FRIO pack, www.frioaustralia.com).

An excellent research study evaluating the efficiency of traditional storage methods for insulin is:

Ogle GD, Abdullah M, Mason D, Januszewski AS, Besançon S. Insulin storage in hot climates without refrigeration: temperature reduction efficacy of clay pots and other techniques. *Diabetic Medicine* 2016;33(11):1544–1553. doi: 10.1111/dme.13194.

The related abstract follows.

Insulin storage in hot climates without refrigeration: temperature reduction efficacy of clay pots and other techniques.

Ogle GD⁽¹⁾⁽²⁾, Abdullah M⁽³⁾, Mason D⁽⁴⁾⁽⁵⁾, Januszewski AS⁽⁶⁾, Besançon S⁽⁷⁾.

Author information: (1) International Diabetes Federation Life for a Child Program, Sydney, NSW, Australia. grahamo@diabetesnsw.com.au. (2) Diabetes NSW, Glebe, NSW, Australia. grahamo@diabetesnsw.com.au. (3) Sudan Childhood Diabetes Centre, Khartoum, Sudan. (4) International Diabetes Federation Life for a Child Program, Sydney, NSW, Australia. (5) Macquarie University, Sydney, NSW, Australia. (6) NHMRC Clinical Trials Centre, University of Sydney, Sydney, NSW, Australia. (7) Santé Diabète, Bamako, Mali.

AIM: Insulin loses potency when stored at high temperatures. Various clay pots part-filled with water, and other evaporative cooling devices, are used in less-resourced countries when home refrigeration is unavailable. This study examined the cooling efficacy of such devices.

METHODS: Thirteen devices used in Sudan, Ethiopia, Tanzania, Mali, India, Pakistan and Haiti (10 clay pots, a goat skin, a vegetable gourd and a bucket filled with wet sand), and two identical commercially manufactured cooling wallets were compared. Devices were maintained according to local instructions. Internal and ambient temperature and ambient humidity were measured by electronic loggers every 5 min in Khartoum (88 h), and, for the two Malian pots, in Bamako (84 h). Cooling efficacy was assessed by average absolute temperature difference (internal vs. ambient), and % maximal possible evaporative cooling (allowing for humidity).

RESULTS: During the study period, mean ambient temperature and humidity were 31.0°C and 32.0% in Khartoum and 32.9°C and 39.8% in Bamako. All devices reduced the temperature ($P < 0.001$) with a mean (SD) reduction from $2.7 \pm 0.5^\circ\text{C}$ to $8.3 \pm 1.0^\circ\text{C}$, depending on the device. When expressed as % maximal cooling, device efficacy ranged from 20.5% to 71.3%. On cluster analysis, the most efficacious devices were the goat skin, two clay pots (from Ethiopia and Sudan) and the suspended cooling wallet.

CONCLUSIONS: Low-cost devices used in less-resourced countries reduce storage temperatures. With more efficacious devices, average temperatures at or close to standard room temperature (20–25°C) can be achieved, even in hot climates. All devices are more efficacious at lower humidity. Further studies are needed on insulin stability to determine when these devices are necessary.

During a disaster power may be lost, for days or more, and refrigerator storage may not be possible.

Options for storing insulin if traditional refrigeration is not available:

- Generator-powered refrigerator
- Battery or solar powered portable refrigerator
- Small USB powered refrigerator (often a 'gadget' to cool a can of soda, powered by a USB cord connected to a laptop or portable battery such as used to recharge a phone or laptop.
- FRIO™ pack (<https://www.frioinsulincoolingcase.com/>). Coming in a range of sizes, FRIO® insulin coolers can keep insulin and other temperature-sensitive medications cool (18–26°C (64.4–78.8°F) for at least 45 hours, even in environment temperatures of 37.8°C (100°F). These chemically activated reusable packs last five times longer than icepacks.
- Portable insulated box or lunch bag with ice bricks or cold (frozen gel) bricks or a bag of frozen vegetables (e.g., peas) from the freezer. The reusable gel bricks usually only remain cool for half to one day after removed from the fridge or freezer, and frozen vegetables would likely last even less time. Ensure insulin is not directly against the ice, brick, or frozen vegetables as it may freeze the insulin, rendering it inactive.
- Traditional cooling methods; e.g., clay pots (Ogle G et al. *Diabetic Medicine* 2016, see page 87)

In an emergency do not discard or not use insulin that has not been refrigerated unless or until adequate supplies of replacement insulin is available.

Experience and publications support the use of insulin that has been stored at higher than recommended temperatures during disasters (Grajower et al., *Diabetes Care* 2003;26(9):2665–2666; Kaufman et al., *PloS One* 2021;16(2):e0245372). Both these papers can be downloaded for free via PubMed.

The USA DDRC advises healthcare professionals as follows re unrefrigerated insulin:

Insulin storage notes:

- Insulin should be kept away from direct heat and sunlight. DO NOT use insulin that has been frozen.
- Unopened insulin vials and pens should be stored in a refrigerator at 36° F to 46°F and are good until expiration date on the vial or pen.
- Opened vials and pens may be left unrefrigerated at 59°F to 86°F for up to 28 days.

- Insulin loses potency when exposed to extreme temperatures which can result in loss of blood glucose control; however—under emergency conditions—insulin that has been stored above 86°F may be used if necessary. Once properly stored insulin becomes available, insulin that has been exposed to extreme conditions should be discarded.

Similarly, the USA DDRC advises on their patient leaflet (full copy on pages 52–53): If you lose power and you have unused insulin, don't throw it out! In an emergency, it is usually okay to use expired or non-refrigerated insulin.

Lack of insulin may be deadly.

A study by Doctors Without Borders and the University of Geneva show good stability of insulin in tropical conditions.



**Insulin can be
stored out of
refrigeration even
in hot settings!**

A team from UNIGE and
MSF has shown that a vial of
insulin can be stored for
4 weeks after opening
and at up to 37°C,
without losing efficacy.

The abstract is on the next page, page 90, and some key data are on page 91. The full paper can be downloaded from PubMed for free.

Heat-stability study of various insulin types in tropical temperature conditions: New insights towards improving diabetes care.

Kaufmann B⁽¹⁾, Boule P⁽²⁾, Berthou F⁽³⁾, Fournier M⁽³⁾, Beran D⁽⁴⁾, Ciglenecki I⁽²⁾, Townsend M⁽²⁾, Schmidt G⁽²⁾, Shah M⁽²⁾, Cristofani S⁽²⁾, Cavailler P⁽²⁾, Foti M⁽³⁾, Scapozza L⁽¹⁾.

Author information: (1) Pharmaceutical Biochemistry, School of Pharmaceutical Sciences, University of Geneva, Geneva, Switzerland. (2) Médecins Sans Frontières Switzerland, Geneva, Switzerland. (3) Faculty of Medicine, Department of Cell Physiology and Metabolism, University of Geneva, Geneva, Switzerland. (4) Division of Tropical and Humanitarian Medicine, University of Geneva and Geneva University Hospitals, Geneva, Switzerland.

Strict storage recommendations for insulin are difficult to follow in hot tropical regions and even more challenging in conflict and humanitarian emergency settings, adding an extra burden to the management of people with diabetes. According to pharmacopeia unopened insulin vials must be stored in a refrigerator (2–8°C), while storage at ambient temperature (25–30°C) is usually permitted for the four-week usage period during treatment.

In the present work we address a critical question towards improving diabetes care in resource-poor settings, namely whether insulin is stable and retains biological activity in tropical temperatures during a four-week treatment period.

To answer this question, temperature fluctuations were measured in Dagahaley refugee camp (Northern Kenya) using log tag recorders. Oscillating temperatures between 25 and 37°C were observed. Insulin heat stability was assessed under these specific temperatures which were precisely reproduced in the laboratory. Different commercialized formulations of insulin were quantified weekly by high performance liquid chromatography and the results showed perfect conformity to pharmacopeia guidelines, thus confirming stability over the assessment period (four weeks). Monitoring the 3D-structure of the tested insulin by circular dichroism confirmed that insulin monomer conformation did not undergo significant modifications. The measure of insulin efficiency on insulin receptor (IR) and Akt phosphorylation in hepatic cells indicated that insulin bioactivity of the samples stored at oscillating temperature during the usage period is identical to that of the samples maintained at 2–8°C.

Taken together, these results indicate that insulin can be stored at such oscillating ambient temperatures for the usual four-week period of use. This enables the barrier of cold storage during use to be removed, thereby opening up the perspective for easier management of diabetes in humanitarian contexts and resource poor settings.

Data from the manuscript, reproduced with permission:

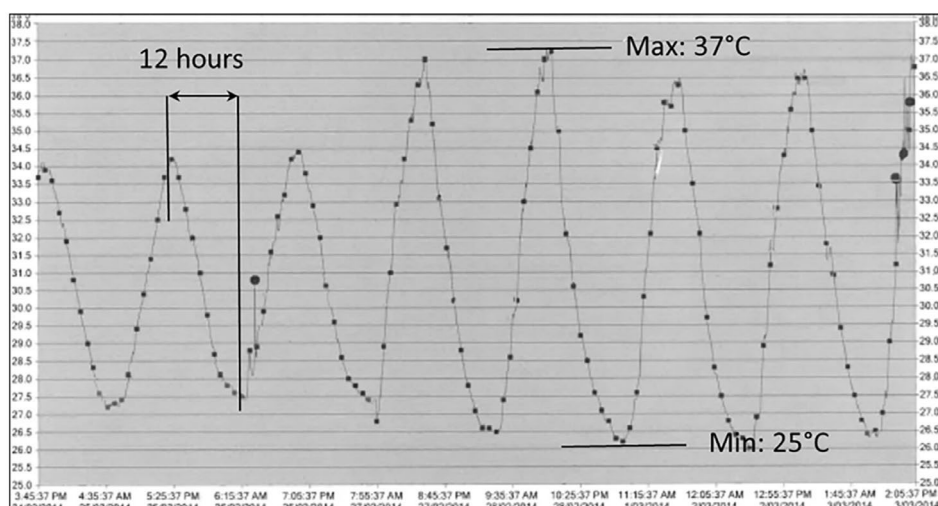


Fig 1. Field ambient temperature measurement over a period of seven days at a patient's home using log tag monitoring (data provided by MSF).

<https://doi.org/10.1371/journal.pone.0245372.g001>

Table 1. Recoveries of insulin at T = 4 and 12 weeks of temperature cycling, expressed as percentages of values measured at T = 0.

Insulin type	T 4 week Recovery [% of T0 value]	T 12 week Recovery [% of T0 value]
Lispro analog	101.7 +/- 5.3	99.4 +/- 0.7
Mixed lispro analog	103.3 +/- 2.5	102.7 +/- 6.1
Glargine analog	98.4 +/- 2.4	99.8 +/- 1.0
Aspart analog	99.7 +/- 1.6	100.2 +/- 0.9
NPH isophane	101.3 +/- 1.3	101.6 +/- 8.9
Rapid	100.1 +/- 0.5	101.3 +/- 2.3
Mixed	100.6 +/- 1.6	101.9 +/- 3.5

(in bold characters: the three human insulins used on the field).

<https://doi.org/10.1371/journal.pone.0245372.t001>

Reuse of insulin syringes, pen needles and lancets by individuals during a disaster and safe sharps disposal

During disasters individuals may need to reuse their own insulin syringes and lancets. This is not uncommon even during non-disaster times in disadvantaged regions due low availability and or high costs of these important consumables.

If a lancet is not available to draw blood an insulin syringe or pen needle could be used for that purpose. Suitable sites include fingertips, the sides of fingers and ear lobes. Ideally, due to the risk of dirt and infection feet should not be used.

Ideally sharps should be cleaned with an alcohol swab after and before reuse.

Due to the risk of blood borne infections, including serious illness such as HIV/AIDs and hepatitis B and C, sharps should not be shared between individuals.

The academic literature has studies reporting sharps reuse. Two examples:

- Using insulin pen needles up to five times does not affect needle tip shape nor increase pain, Puder et al., *Diabetes Res Clin Pract.* 2005;67(2):119–23.
- Reuse of disposable insulin syringes. 17 T1D subjects reused 111 single-use syringes for 1–80 days, mean 21.3 (range: 2–126) injections. There were no infections or local reactions. Stepanas et al., *Med J Aust.* 1982;1(7):311–3.

Stated risks in these studies are:

- Increased discomfort due to a distorted needle
- Needle tip may break off
- Fat hypertrophy if prolonged use
- Infection

Irrespective of single use or reuse sharps should be safely disposed of to prevent needle-stick injury to others, including those involved in garbage disposal.



If proper sharps containers are not available an alternate option is a thick firm plastic household container, such as a laundry detergent bottle, with a lid that can be taped shut. Soft drink bottles and cans are less than ideal.

Sharps containers must not be over-filled. Ideally, they should be less than $\frac{3}{4}$ full. Place needle points downward, and don't put hands in the bin.



Containers should be labelled accordingly as a sharps bin and a biohazard, and not for recycling. Unless a proper sharps bin is available to dispose of the smaller sharps container, place it in the middle of a bin that is not for recycling.

A document outlining a home-made version from a thick plastic laundry detergent or similar is provided next.



Helping Hand™

Sharps Containers at Home

A 'sharp' is any medical device that could cut or stick a patient, caregiver, or anyone else. There are reasons that your child may have to use sharps while at home. It is very important to know how to throw away (dispose of) syringes, needles and any other sharp device in a safe way. By disposing of sharps in the right way, you are keeping yourself, your child, other family members and your home care worker safe.

Kinds of sharps

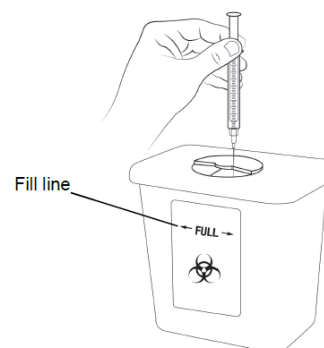
- Needles and needle connectors with attached or fixed needles
- Syringes
- Lancets
- Auto-injectors (like for insulin)

Kinds of home sharps containers

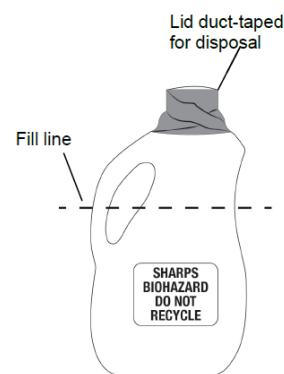
- Medical-issue sharps container (Picture 1)
- Heavy-duty plastic laundry detergent bottle (Picture 2)

How to get rid of sharps at home

1. If you do not have a hospital-issued sharps container, use a container made of heavy-duty plastic. **This can be a laundry detergent bottle or liquid laundry softener bottle.** It must close with a tight lid that screws on. Needles should not be able to poke through (puncture) the lid. The container must be leak-proof, and able to sit up and not fall over (stable).



Picture 1 Medical-issued sharps container with biohazard symbol.



Picture 2 Hard plastic laundry detergent bottle and fill line.

Continued on page 2

How to get rid of sharps at home, continued

2. **DO NOT** use milk containers, water bottles, clear plastic containers, glass containers or soda cans.



3. Put the used syringe with the needle into the “sharps” container or a hard heavy-duty household plastic container. Make sure the sharp end, or the pointed end, goes into the container first and is not sticking out of the top of the container.
4. Carry a portable sharps container when traveling.
5. If you are using a household container, close the lid and duct tape it shut when the container gets no more than $\frac{3}{4}$ full. Label the container “**SHARPS - DO NOT RECYCLE.**” Put it in the middle of a full trash bag. **In the state of Ohio**, you are allowed to put the trash bag out for regular trash pick-up. If you live in a state that has a sharps disposal program, take the sealed and marked container to the right disposal center. **DO NOT** put the container in the recycling or return to a store to recycle.



YES



NO

Continued on page 3

How to get rid of sharps at home, continued

6. Talk to the doctor and pharmacist when your child gets a prescription for any shot (injection). Some medicine companies have programs that let you mail back your sharps container. See http://www.epa.state.oh.us/portals/34/document/guidance/gd_462.pdf for more information.
7. Keep all syringes, needles, and sharps containers out of the reach of children and others who may misuse them.

Important to know

- Do not let your container get too full.
- Do not re-use needles, syringes or lancets.
- Do not recap the needle.
- Do not touch the needle.
- Do not bend or break off the needle.
- Do not take the needle off of the syringe.
- Do not put your hand in the sharps container **EVER**.
- For more information about safe sharps disposal in your state, go to the FDA's website at www.fda.gov/safesharpsdisposal.

When to call the doctor

- If anyone is stuck by a used needle, call your doctor as soon as possible. Your doctor should let you know if you need treatment.

Blood or interstitial fluid glucose level conversion charts

As individuals or clinics may lose their glucose meter during a disaster, or may have never had one, they may receive a glucose meter or strips in different units than they are familiar with. Many apps and on-line calculators exist, but power may be lost so paper charts can be helpful.

Glucose units are either SI units mg/dl or in mmol/L.



To convert glucose levels from mmol/L to mg/dl multiply by 18.

To convert glucose levels from mg/dl to mmol/L divide by 18 or multiply by 0.055.

Two example charts are given, which cover different ranges.

DiabetesChart Chart design ©2010-2014 DiabetesChart.org										
Convert Glucose (mg/dl) to Glucose (mmol/L)										
mg/dl	40	42	44	46	48	50	52	54	56	58
mmol/L	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.1	3.2
mg/dl	60	62	64	66	68	70	72	74	76	78
mmol/L	3.3	3.4	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3
mg/dl	80	82	84	86	88	90	92	94	96	98
mmol/L	4.4	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4
mg/dl	100	102	104	106	108	110	112	114	116	118
mmol/L	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5
mg/dl	120	122	124	126	128	130	132	134	136	138
mmol/L	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.7
mg/dl	140	142	144	146	148	150	152	154	156	158
mmol/L	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.7	8.8
mg/dl	160	162	164	166	168	170	172	174	176	178
mmol/L	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.7	9.8	9.9
mg/dl	180	182	184	186	188	190	192	194	196	198
mmol/L	10.0	10.1	10.2	10.3	10.4	10.5	10.7	10.8	10.9	11.0
mg/dl	200	202	204	206	208	210	212	214	216	218
mmol/L	11.1	11.2	11.3	11.4	11.5	11.7	11.8	11.9	12.0	12.1
mg/dl	220	222	224	226	228	230	232	234	236	238
mmol/L	12.2	12.3	12.4	12.5	12.7	12.8	12.9	13.0	13.1	13.2
mg/dl	240	242	244	246	248	250	252	254	256	258
mmol/L	13.3	13.4	13.5	13.7	13.8	13.9	14.0	14.1	14.2	14.3
mg/dl	260	262	264	266	268	270	272	274	276	278
mmol/L	14.4	14.5	14.7	14.8	14.9	15.0	15.1	15.2	15.3	15.4

Conversion Table for Blood Glucose Monitoring

People from outside the US may find this table convenient for converting US blood glucose values which are given in mg/dl into values generated by their blood glucose meters, which are generated in mmol/L.

mmol/L	mg/dl	mmol/L	mg/dl	mmol/L	mg/dl
0.06	1	6.7	120	16.0	288
0.28	5	7.0	126	16.6	300
0.55	10	7.2	130	17.0	306
1.0	18	7.5	135	18.0	325
1.5	27	7.8	140	19.0	342
2.0	36	8.0	145	20.0	360
2.2	40	8.3	150	20.8	375
2.5	45	8.9	160	22.2	400
2.8	50	9.0	162	23.0	414
3.0	54	9.4	170	24.0	432
3.3	60	10.0	180	25.0	450
3.9	70	10.5	190	26.4	475
4.0	72	11.0	196	27.7	500
4.4	80	11.1	200	30.0	540
4.7	85	12.0	216	33.3	600
5.0	90	12.5	225	38.8	700
5.5	100	13.9	250	40.0	720
6.0	106	14.4	260	44.4	800
6.1	110	15.0	270	50.0	900

Converting estimated average glucose levels or time in range from interstitial fluid glucose levels into an estimated HbA1c level

If people with diabetes are using interstitial fluid glucose monitoring systems, such as flash glucose monitoring or continuous glucose monitoring (CGM) as stand-alone systems or linked with an insulin pump it can be helpful to estimate HbA1c levels.

It must be noted that the estimated average glucose (eAG) is usually measured over several weeks, whilst HbA1c reflects glucose levels over 2–3 months. A chart which estimates HbA1c from an average glucose is usually presented on uploads of CGM data is below.



HbA1c (%)	eAG (mg/dL)	eAG (mmol/l)
5	97	5.4
6	126	7.0
7	154	8.6
8	183	10.2
9	212	11.8
10	240	13.4
11	269	14.9
12	298	16.5

$$eAG(mg/dl) = (28.7 * HbA1c) - 46.7, r^2 = 0.84$$

Modified from Nathan et al., *Diabetes Care* 2008;31(8):1473–1478.

Relating time in range from CGM to HbA1c levels

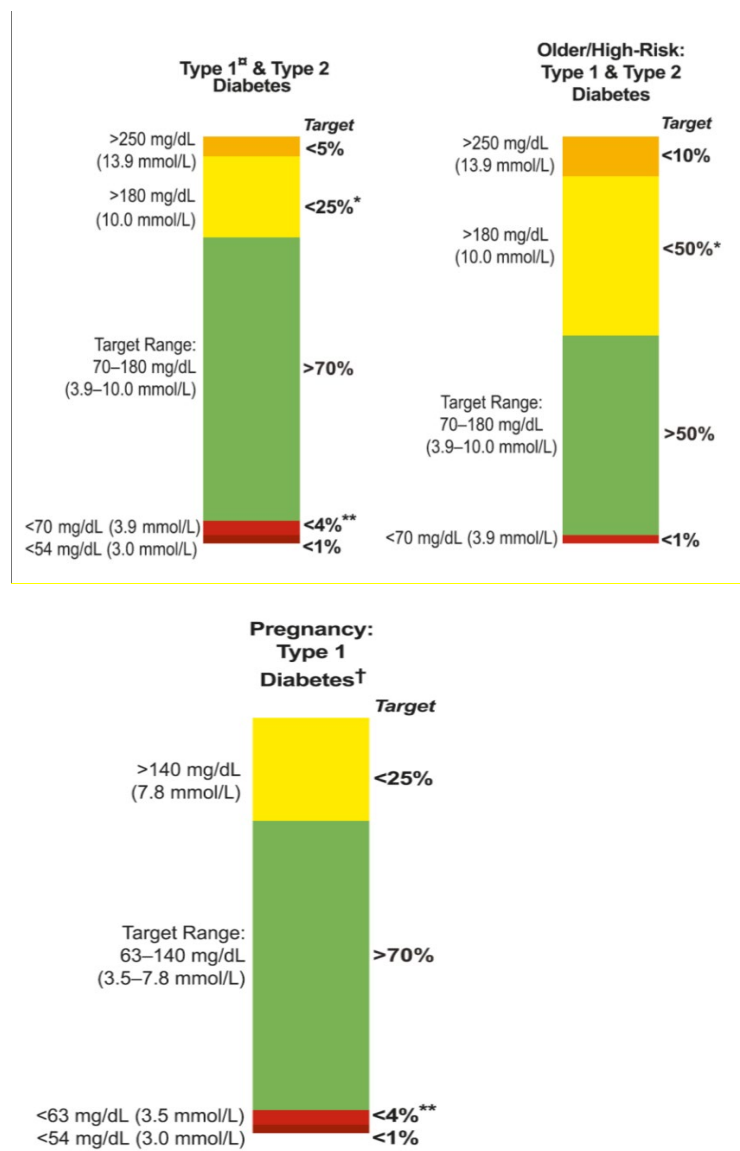
Estimates of HbA1c levels from time in range (TIR) (glucose levels 3.9–10mmol/l), which is calculated from an interstitial fluid continuous glucose monitor (CGM).

It has been published from 18 studies including 1137 subjects with Type 1 or Type 2 diabetes that TIR (3.9–10.0 mmol/l) correlates with concurrent HbA1c ($r^2=0.81$). It is estimated that a 10% increase in TIR is associated with a 0.8% decrease in HbA1c levels, and vice versa. A table is shown below.

TIR 70–180 mg/dL (3.9–10.0 mmol/L)	A1C, % (mmol/mol)
20%	10.6 (92)
30%	9.8 (84)
40%	9.0 (75)
50%	8.3 (67)
60%	7.5 (59)
70%	6.7 (50)
80%	5.9 (42)
90%	5.1 (32)

Reference: Vigersky et al., *Diabetes Technol Ther* 2019;21(2):81–85.

Recommended levels for time in range and times above and below range for people with Type 1 or Type 2 diabetes are below.



Reference: Battelino et al., *Diabetes Care* 2019;42:1593–1603

General advice for medical professionals regarding different types of insulin and insulin swapping

Individuals and clinics and hospitals may need to use a different insulin that that usually used by the person with diabetes, or with which they are familiar.

Insulin strengths

Insulin comes in various strengths, with IU (or U)100 being the most common. The IU stands for international units and the U for units. The number is how much insulin (the number of units of insulin) is in 1 ml. U40 strength insulin is most often used in animals and has been phased out of human use. Some more concentrated insulins U200 or U500 exist for the few people needing very high insulin doses.

The matching insulin syringe should be used to deliver the insulin. For example, U100 insulin syringes should be used to deliver U100 insulin. Never use a U40 syringes to deliver U100 insulin.

Pens vs. vials

There is usually no need to change insulin types if the insulin format of presentation is different; for example, it is available as an insulin pen rather in a 10 ml insulin vial, but patients and clinical staff will need to be provided with the correct delivery systems e.g., pen needles and instructions for their use.

Example 1. If patients are used to drawing up their insulin from a 10 ml vial of insulin and they are given 3 ml penfills then can draw the insulin from the 3 ml vial using their usual syringe. As there is a stopper at the base of the penfill that rises as insulin is withdrawn there is no need to pre-inject air into the penfill vial prior to withdrawing insulin, as is usually done with 10 ml vials.

Example 2. When using a disposable or a reusable insulin pen, hold the pen upright and perform an “air shot” by dialling up at least 2 units and pressing the plunger to expel the test shot of insulin. This clears any bubbles out of the needle and helps ensure an accurate injected dose. If the airshot is not a steady stream, repeat the air shot until it is, then dial up the required dose and inject it under the skin.

Different tradenames of insulin

Insulins which may be donated from overseas may have a different tradename. For example, Novorapid insulin in Australia is the same preparation as Novolog in the USA.

Insulin action charts and common brands

In general insulin is described according to its action time and several companies may provide a similar type of insulin.

Insulin types are usually classified as: 1. Ultra-rapid; 2. Rapid-acting; 3. Short-acting; 4. Intermediate-acting; 5. Long-acting; 6. Mixed (usually an admixture of a rapid and intermediate acting insulin) and 7. Ultra-concentrated (i.e., more than 100 IU strength).

Typical Insulin Profiles

Insulin Type	Proprietary Name – use when prescribing	Manufacturer	Device	Taken	Onset	Peak	Duration	Typical activity profiles
Rapid-acting analogue insulins								
Insulin Aspart	NovoRapid®	Novo Nordisk	Vial, Flexpen, cartridge	Just before, with or just after food	10-20 mins	1-3 hrs	2-5 hrs	
Insulin Lispro	Humalog®	Lilly	Vial, Kwikpen, cartridge					
Insulin Glulisine	Apidra®	Sanofi-Aventis	Vial, Solostar pen, cartridge for Optopen					
Short-acting insulins								
Insulin – soluble/neutral	Actrapid®	Novo Nordisk	Vial					
	Humulin S®	Lilly	Vial, cartridge					
	Insulin® Rapid	Sanofi-Aventis	Cartridge					
	Hyurin® Bovine Neutral	Wockhardt	Vial, cartridge					
Intermediate-acting insulins								
Isophane insulin	Hyurin® Bovine Isophane	Wockhardt	Vial, cartridge					
	Hyurin® Porcine Isophane	Wockhardt	Vial, cartridge					
	Insulatard®	Novo Nordisk	Vial, Innolet pen, cartridge	About 30 mins before food or bedtime	80-90 mins	2-12 hrs	12-24 hrs	
	Humulin I®	Lilly	Vial, Kwikpen, cartridge					
Long-acting analogue insulins								
Insulin Determir	Levemir®	Novo Nordisk	Flexpen, cartridge	Once or twice a day	2-4 hrs	6-14 hrs	16-20 hrs	
Insulin Glargine	Lantus®	Sanofi-Aventis	Solostar pen, cartridge		2-4 hrs	No peak	20-24 hrs	
Insulin Degludec	Tresiba®	Novo Nordisk	Flextouch Pen	Once a day	30-90 mins	No peak	Over 42 hours	
Mixed insulins – biphasic								
Biphasic insulin aspart (analogue)	NovoMix® 30	Novo Nordisk	Flexpen, cartridge	Just before, with or just after food	10-20 mins	1-4 hrs	Up to 24 hrs	
Biphasic insulin Lispro (analogue)	Humalog® Mix 25	Lilly	Kwikpen, cartridge					
	Humalog® Mix 50	Wockhardt	Vial					
	Hyurin® Porcine 30/70 Mix	Lilly	Vial, Kwikpen, cartridge					
	Humulin M3®	Sanofi-Aventis	Cartridge					
Biphasic isophane insulin	Insulin® Comb 15	Sanofi-Aventis	Solostar Pen	15-30mins before food	30mins	1-4 hrs	12-24 hrs	
	Insulin® Comb 25	Sanofi-Aventis						
	Insulin® Comb 50	Sanofi-Aventis						

U500 insulin (Humulin R®)

This insulin is unlicensed and is five times more concentrated than standard (U100) insulin; it should be initiated by a diabetes consultant only.

It is prescribed in 'marks' and needs to be administered via a 0.3 or 0.5ml insulin syringe.

(One 'mark' on one of these syringes is equivalent to 5 units of insulin).

All patients admitted on U500 insulin should be referred to the diabetes team via electronic referral

Diabetes Team In-Hours Contact Details
DSN (diabetes specialist nurse): via electronic referral or beep via switchboard
Diabetes SpR: via switchboard

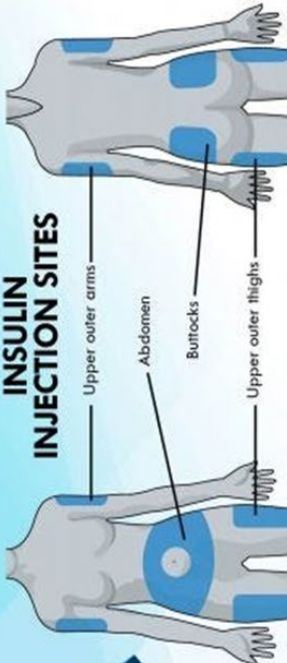
Out of hours please contact on-call medical SpR



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INSULIN COMPARISON CHART

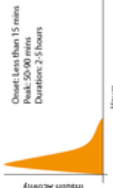
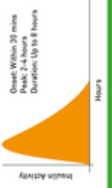
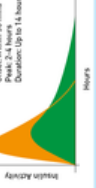
INSULIN INJECTION SITES



TYPE OF INSULIN	BRAND NAME	ONSET	PEAK	DURATION	COMMENTS
RAPID	Humalog or Lispro	< 1.5 min	60-90 min	3-5 hrs	- Inject 10-15 minutes before meals - Typically used in conjunction with longer-acting insulin
	Novolog or Aspart Apidra or Glulisine	< 1.5 min < 1.5 min	40-120 min 60-90 min	3-5 hrs 1-2.5 hrs	
SHORT	Regular (R) Humulin, Actrapid, or Novolin	30-40 min	2-5 hrs	6-8 hrs	Inject at least 20-30 minutes before meals
	Velosulin	30-40 min	2-3 hrs	2-3 hrs	
INTERMEDIATE	NPH (N)	1-2 hrs	4-12 hrs	18-24 hrs	- Commonly used twice daily - Often combined with rapid or short-acting insulin
	Lente (L)	1-2.5 hrs	3-10 hrs	18-24 hrs	
LONG	Ultralente (U)	30 min - 2 hrs	10-20 hrs	20-36 hrs	- Covers insulin needs for 24 hours - If needed, often combined with rapid or short-acting insulin
	Lantus or Glargine Levemir or Determir	1-1.5 hrs 1-2 hrs	No peak 6-8 hrs	20-24 hrs Up to 24 hrs	
PRE-MIXED	Humulin 70/30	30 min	2-4 hrs	14-24 hrs	- Combination of intermediate- and short-acting insulin - Commonly used twice daily before meals
	Novolin 70/30	30 min	2-12 hrs	Up to 24 hrs	
	Novolog 70/30	10-20 min	1-4 hrs	Up to 24 hrs	
	Humulin 50/50	30 min	2-5 hrs	18-24 hrs	
	Humalog 75/25	1.5 min	30 min - 2.5 hrs	16-20 hrs	

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SALES: 1-800-225-1600

BRAND NAME	GENERIC	DEVICE			TIME PROFILE	DOSING SCHEDULE
		Vial	Disposable pen	Cartridge		
RAPID ACTING INSULIN ANALOGUES/SHORT ACTING SOLUBLE INSULINS						
Novorapid	Insulin Aspart	✓	FLEXPEN & FLEXTOUCH	✓		Usually THREE times a day IMMEDIATELY before, or just after food or When required for Hyperglycaemia
Humalog	Insulin Lispro 100 units/ml 200 units/ml	✓	KWIKPEN	✓		
Apidra	Insulin Glulisine	✗	KWIKPEN	✗		
Fiasp	Insulin Aspart	✓	SOLOSTAR	✓		
Actrapid	Insulin Aspart	✓	FLEXTOUCH	✓		
Humulin S	Human soluble insulin	✓	✗	✗		Usually THREE times a day 30 minutes before, or just after food
Insuman Rapid	Human soluble insulin	✗	✗	✓		
LONG ACTING INSULIN ANALOGUES/INTERMEDIATE ACTING INSULINS						
Levemir	Insulin Detemir	✗	FLEXPEN & INNOLET	✓		ONCE or TWICE a day
Abasaglar	Insulin Glargine	✗	KWIKPEN	✓		
Lantus	Insulin Glargine	✓	SOLOSTAR	✓		
Toujeo	Insulin Glargine 300 units/ml	✗	SOLOSTAR	✗		
Tresiba	Insulin Degludec 100 units/ml 200 units/ml	✗	FLEXTOUCH	✓		
Insuman Basal	Isophane insulin	✓	SOLOSTAR	✓		ONCE or TWICE a day
Insulatard	Isophane insulin	✓	INNOLET	✓		
Humulin I	Isophane insulin	✓	KWIKPEN	✓		
PRE-MIXED BIPHASIC INSULIN ANALOGUES/ PRE-MIXED BIPHASIC INSULIN						
Novomix 30	Biphasic insulin Aspart	✗	FLEXPEN	✓		TWICE or THREE times a day 15 minutes before, or just after food
Humalog Mix 25	Biphasic insulin Lispro	✓	KWIKPEN	✓		
Humalog Mix 50	Biphasic insulin Lispro	✗	KWIKPEN	✓		
Humulin M3	Biphasic insulin Lispro	✗	KWIKPEN	✓		
Insuman Comb 15	Soluble and Isophane insulin	✗	✗	✓		
Insuman Comb 25	Soluble and Isophane insulin	✓	SOLOSTAR	✓	Time profile varies on the proportion of short acting insulin	TWICE daily 30 minutes , before food
Insuman Comb 50	Soluble and Isophane insulin	✗	✗	✓		
V1.0 22.02.18						

From the RACGP Type 2 Diabetes handbook



Type	Brand name	Manufacturer	Nature
Mealttime or prandial insulins			
Ultra rapid-acting (onset in 5–10 minutes, peak at 30 minutes, duration for 3.5–4 hours)			
Faster insulin aspart	FiAsp	Novo Nordisk	Analogue
Rapid-acting (onset in 15–20 minutes, peak at one hour, duration for 3.5–4.5 hours)			
Insulin lispro	Humalog	Lilly	Analogue
Insulin aspart	NovoRapid	Novo Nordisk	Analogue
Insulin glulisine	Apidra	Sanofi	Analogue
Short-acting (onset in ~1 hour, peak at two to five hours, duration for six to eight hours)			
Neutral	Actrapid	Novo Nordisk	Human
	Humulin R	Lilly	Human
Basal insulins			
Intermediate-acting			
Isophane	Humulin NPH	Lilly	Human
	Protaphane	Novo Nordisk	Human
Insulin detemir Onset in three to four hours, peak at three to eight hours, duration for 20–24 hours	Levemir	Novo Nordisk	Analogue
Insulin glargine (U100) Onset in one to two hours, flat, duration for 18–24 hours	Optisulin	Sanofi	Analogue
	Semglee	Alphapharm	Analogue
Insulin glargine (U300) Onset in one to two hours, flat, duration for 24–36 hours	Toujeo	Sanofi	Analogue
Premixed insulins			
Lispro 25%/lispro protamine 75% Onset in 15–20 minutes, peak at one hour, duration for 14–24 hours	Humalog Mix 25	Lilly	Analogue
Lispro 50%/lispro protamine 50% Onset in 15–20 minutes, peak at one hour, duration for 14–24 hours	Humalog Mix 50	Lilly	Analogue



Type	Brand name	Manufacturer	Nature
Insulin aspart 30%/insulin aspart protamine 70% Onset in 15–20 minutes, peak at one hour, duration for 14–24 hours	NovoMix 30	Novo Nordisk	Analogue
Neutral 30%/isophane 70% Onset in one to two hours, peak at two to five hours, duration for 12–18 hours	Humulin 30/70	Lilly	Human
	Mixtard 30/70	Novo Nordisk	Human
Neutral 50%/isophane 50% Onset in one to two hours, peak at two to five hours, duration for 12–18 hours	Mixtard 50/50	Novo Nordisk	Human
Insulin co-formulation			
Insulin degludec 70% and insulin aspart 30% Onset in 5–20 minutes, peak at one hour, duration for 36–48 hours	Ryzodeg 70/30	Novo Nordisk	Analogue
Ultra-rapid acting insulin should be administered from up to two minutes before a meal, or at the start of a meal, or up to 20 minutes after starting a meal. Rapid-acting, pre-mixed and co-formulated insulin should be administered 15 minutes prior to a meal. Short-acting insulin should be administered 20–30 minutes prior to a meal. Intermediate- and long-acting basal insulins can be given irrespective of a meal.			

On the next four pages are a list of insulin formulations divided by time course, presentation (pen or vial), company and (price in US pharmacies). The latter is unlikely to be relevant during a disaster, but the table may guide the use of donated insulin supplies.

Source: www.diabetesincontrol.com

2020 List of Insulin Products

Insulin Dosage Form	Brand (generic)	Manufacturer	Onset (hours)	Peak (hours)	Duration (hours)	Estimated Cost per vial, pen, or inhaler (dollars) ¹
Rapid-Acting Insulins						
Insulin Vials	Apidra (glulisine)	Sanofi - aventis	0.2 – 0.5	1.6 – 2.8	3 – 4	375
	Admelog (lispro)	Sanofi - aventis	0.25 – 0.5	0.5 – 2	3 – 5	250
	Fiasp (aspart)	Novo Nordisk	0.2 – 0.3	1.5 – 2	5 – 7	275
	Humalog (lispro)	Eli Lilly	0.25 – 0.5	0.5 – 2	3 – 5	310
	Novolog (aspart)	Novo Nordisk	0.2 – 0.3	1 – 3	3 – 5	350
	Lyumjev (lispro-aabc)	Eli Lilly	0.2 – 0.3	2 – 3	4.5 – 7.5	310
Insulin Pens	Apidra Solostar (glulisine)	Sanofi - aventis	0.2 – 0.5	1.6 – 2.8	3 – 4	115
	Admelog Solostar (lispro)	Sanofi - aventis	0.25 – 0.5	0.5 – 2	3 – 5	85
	Fiasp FlexTouch (aspart)	Novo Nordisk	0.2 – 0.3	1.5 – 2	5 – 7	135
	Humalog U-100 KwikPen (lispro)	Eli Lilly	0.25 – 0.5	0.5 – 2	3 – 5	105
	Humalog U-100 Junior KwikPen (lispro)	Eli Lilly	0.25 – 0.5	0.5 – 2	3 – 5	115
	Humalog U-200 KwikPen (lispro)	Eli Lilly	0.25 – 0.5	0.5 – 2	3 – 5	235
	NovoPen Echo (aspart)	Novo Nordisk	0.2 – 0.3	1 – 3	3 – 5	85

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2020 List of Insulin Products

	Novolog FlexPen (aspart)	Novo Nordisk	0.2 – 0.3	1 – 3	3 – 5	70
	Lyumjev U-100 KwikPen (lispro-aabc)	Eli Lilly	0.2 – 0.3	2 – 3	4.5 – 7.5	115
	Lyumjev U-200 KwikPen (lispro-aabc)	Eli Lilly	0.2 – 0.3	2 – 3	4.5 – 7.5	235
Insulin Inhaler	Afrezza (regular)	Mannkind	0.15 – 0.5	0.5 – 1	1.5 – 2.5	425
Short-Acting Insulins						
Insulin Vials	Humulin R U-100 (regular)	Eli Lilly	0.25 – 0.5	2 – 4	4 – 12	180
	Humulin R U-500	Eli Lilly	0.25 – 0.5	4 – 8	13 – 24	1560
	Novolin R (regular)	Novo Nordisk	0.5 – 1	2 – 4	4 – 12	150
Insulin Pens	Humulin R U-500 KwikPen (regular)	Eli Lilly	0.25 – 0.5	4 – 8	13 – 24	600
	Novolin R FlexPen (regular)	Novo Nordisk	0.5 – 1	2 – 4	4 – 12	150
Intermediate-Acting Insulins (NPH)						
Insulin Vials	Humulin N	Eli Lilly	1 – 2	6 – 12	14 – 24	180
	Novolin N	Novo Nordisk	1 – 2	4 – 12	14 – 24	70
Insulin Pens	Humulin N KwikPen (NPH)	Eli Lilly	1 – 2	6 – 12	14 – 24	120
	Novolin N FlexPen (NPH)	Novo Nordisk	1 – 2	4 – 12	14 – 24	120
Long-Acting Insulin						
Insulins Vials	Lantus (glargine)	Sanofi - aventis	1 – 2	None	>24	300
	Levemir (detemir)	Novo Nordisk	1 – 2	3 – 9	10 – 24	330
	Tresiba (degludec)	Novo Nordisk	1 – 1.5	9	>24	340

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2020 List of Insulin Products

Insulin Pens	Lantus Solostar (glargine)	Sanofi - aventis	1 – 2	None	>24	90
	Toujeo Solostar (glargine)	Sanofi - aventis	5 – 6	None	>24	155
	Toujeo Max Solostar (glargine)	Sanofi - aventis	5 – 6	None	>24	310
	Basaglar KwikPen (glargine)	Eli Lilly	1 – 2	None	>24	80
	Tresiba U-100 FlexTouch (degludec)	Novo Nordisk	1 – 1.5	9	>24	120
	Tresiba U-200 FlexTouch (degludec)	Novo Nordisk	1 – 1.5	9	>24	200
	Levemir FlexTouch (detemir)	Novo Nordisk	1 – 2	3 – 9	12 – 24	110
	Pre-Mixed Insulins					
Insulins Vials	Humalog 50/50	Eli Lilly	0.25 – 0.5	1 – 4	12 – 24	750
	Humalog 75/25	Eli Lilly	0.25 – 0.5	1 – 4	12 – 24	360
	Novolog 70/30	Novo Nordisk	0.25 – 0.5	1 – 4	12 – 24	180
	Humulin 70/30	Eli Lilly	0.5 – 1	3 – 12	12 – 24	180
	Novolin 70/30	Novo Nordisk	0.5 – 1	3 – 12	10 – 20	150
Insulin Pens	Humalog 50/50 KwikPen	Eli Lilly	0.25 – 0.5	1 – 4	12 – 24	110
	Humalog 75/25 KwikPen	Eli Lilly	0.25 – 0.5	1 – 4	12 – 24	110
	Novolog 70/30 FlexPen	Novo Nordisk	0.25 – 0.5	1 – 4	12 – 24	120
	Humulin 70/30 Kwikpen	Eli Lilly	0.5 – 1	3 – 12	12 – 24	100

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2020 List of Insulin Products

	Novolin 70/30 FlexPen	Novo Nordisk	0.5 – 1	3 – 12	10 – 20	120
	Ryzodeg 70/30 FlexTouch	Novo Nordisk	0.25 – 0.5	0.5 – 2	>24	Unknown
Combination Product Long-Acting Inulin and Incretin Mimetics						
Combo Pens	Soliqua (glargine + lixisenatide)	Sanofi - aventis	1 – 3	None	>24	175
	Xultophy (degludec + liraglutide)	Novo Nordisk	1 – 3	None	>24	260

1. Price reflected as the average cash price among pharmacies

Insulin company chart types with images of insulin types

Ideally if people with diabetes have lost their drug supplies, they should have a list of their usual medications and doses, such as on a sheet of paper, or on their emergency kit pamphlet example on page 59.

People and organisations helping identify usual medicines for replacement should prepare a chart with images of the vials and pens for all the available types of insulin and other glucose control medications in your region. Your local pharmacy guild, pharmacists, and drug companies may assist.

Lilly Insulin Portfolio

Insulin	Type	Time-action characteristics	Presentation	Item	PIP code
 Insulin lispro (5000 units/ml) solution	Rapid-acting analogue		 10ml  3ml	Humalog® KwikPen™ 3rd Cartridge 3rd Ref.	SDP-1844 2AP-1389 SDP-0899
 50% Insulin lispro (5000 units/ml) solution 50% Insulin lispro protamine suspension	Analogue mixture		 10ml  3ml	Humalog® KwikPen™ 3rd Cartridge 3rd Ref.	SDP-1626 SDP-1628 SDP-0950
 50% Insulin lispro (5000 units/ml) solution 50% Insulin lispro protamine suspension	Analogue mixture		 10ml  3ml	Humalog® KwikPen™ 3rd Cartridge 3rd Ref.	SDP-1854 SDP-1855
 Isophane human insulin (part)	Isophane		 10ml  3ml	Humulin® I KwikPen™ 3rd Cartridge 3rd Ref.	SDP-0991 SDP-0992 SDP-0567
 Human insulin (part)	Soluble		 10ml  3ml	Humulin® KwikPen™ 3rd Cartridge 3rd Ref.	SDP-0886 SDP-0725
 Human insulin (part) 36% soluble insulin 70% isophane insulin	30/70 mixture		 10ml  3ml	Humulin® KwikPen™ 3rd Cartridge 3rd Ref.	SDP-1075 SDP-1076 SDP-1214

Durable Pens

Compatible with all Lilly insulin 3rd cartridges







Humulin I KwikPen




Humulin S KwikPen



BD

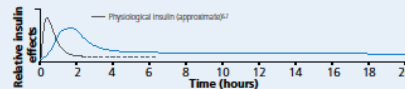
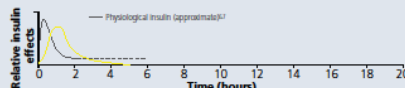
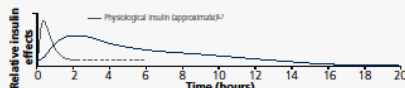
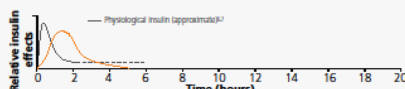
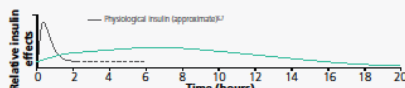
All Lilly pens are recommended for use with BD Microfine gauges, 30 and 32 gauge needles.

To access a wide range of information and resources to support both you and your patients, please visit www.lillydiabetes.co.uk

Humulin® Helpline: 0800 703 6766



Novo Nordisk Insulin Treatment Range

	BRANDS	PRESENTATIONS ¹⁻⁴				ACTIVITY ¹⁻⁴			ACTION PROFILE ^{1-7*}	DELIVERY DEVICES
		FlexTouch® 3mL	FlexPen® 3mL	Penfill®	Vial 10mL	Onset of action	Duration of action	Half-life		
New-Generation Insulins	RYZODEG® 70/30 70% ultra-long acting basal insulin degludec 30% rapid-acting insulin aspart ¹	✓	✗	✓	✗	10-20 min	>24 hours	~25 hours		Ryzodeg® FlexTouch®
	Fiasp® insulin aspart Ultra-fast acting formulation ¹ Ultra-fast acting insulin aspart (rys) ²	✓	✗	✗	✓	5-10 min	~3-5 hours	57 min		Fiasp® FlexTouch®
Modern Insulins	NovoMix® 30 30% rapid-acting insulin aspart (rys) 70% protaminated insulin aspart (rys) ³	✗	✓	✓	✗	10-20 min	~24 hours	8-9 hours		NovoMix® 30 FlexPen®
	NovoRapid® Rapid-acting insulin aspart (rys) ³	✗	✓	✓	✓	10-20 min	3-5 hours	81 min		NovoRapid® FlexPen®
	Levemir® Long-acting insulin detemir (rys) ⁴	✗	✓	✓	✗	-	Up to 24 hours	-		NovoPen® 4 NovoPen® Echo
*Time-action profiles shown above are approximate and are for illustrative purposes only – please refer to Approved Australian Product Information for pharmacokinetic information.										

To find out more about Ryzodeg® 70/30, contact your Novo Nordisk representative or scan the QR code:



Before prescribing, please review Product Information available from Novo Nordisk at www.novonordisk.com.au

References: 1. Ryzodeg® Product Information. 2. Fiasp® Product Information 3. NovoRapid®/NovoMix® 30 Product Information. 4. Levemir® Product Information. 5. Hesse T, et al. Diabetes Obes Metab. 2015; 17(7): 659–64. 6. Home PD. Diabetes Obes Metab. 2015; 17(11): 1011–20. 7. Wong J, Tabet E. Aust Fam Physician. 2015; 44(5): 278–83.





KNOW YOUR INSULIN

Products in this chart are not shown to scale. These materials have been prepared by Eli Lilly Australia Pty Ltd 112 Wharf Rd, West Ryde, NSW 2114.

All companies (Aspen, Novo Nordisk and Sanofi) have given Lilly permission to use images of their respective products for these materials.

All trademarks are the property of their respective owners. AUD0100512b Prepared January 2016 FR6570.

The product information is current at the date of preparation (January 2016).

All Australian Insulin preparations (except Toujeo®) contain 100 units/mL.

DO NOT SUBSTITUTE BRANDS OF INSULIN

INSULIN QUICK IDENTIFICATION CHART

Insulins are clustered into 5 groups depending on onset of action and duration

ANALOGUES

	BRAND NAME	GENERIC NAME(S)
RAPID ACTING	Apidra®	glulisine
	Humalog®	lispro
	NovoRapid®	aspart (rys)
LONG ACTING (<i>basal insulins</i>)	Lantus®	glargine 100 units/mL
	Levemir®	detemir (rys)
	Toujeo®	glargine 300 units/mL
	Humalog® Mix25™	lispro 25% / lispro protamine 75%
PREMIXES	Humalog® Mix50™	lispro 50% / lispro protamine 50%
	NovoMix® 30	30% rapid-acting / 70% protaminated insulin aspart (rys)

HUMAN

SHORT ACTING	Humulin® R	neutral
	Actrapid®	neutral
INTERMEDIATE ACTING	Humulin® NPH	isophane
	Protaphane®	isophane
	Humulin® 30/70	neutral 30% / isophane 70%
PREMIXES	Mixtard® 30/70	neutral 30% / isophane 70%
	Mixtard® 50/50	neutral 50% / isophane 50%
	Mixtard® 50/50	neutral 50% / isophane 50%
		BOVINE
SHORT ACTING	Hypurin® Neutral	neutral
INTERMEDIATE ACTING	Hypurin® Isophane	NPH

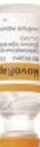
Apidra® SoloStar® insulin *glulisine* RAPID ACTING INSULIN ANALOGUE

Presentation Apidra® SoloStar® 3mL prefilled multidose disposable injection device.			
Apidra® 10mL glass vial.			Apidra® 3mL cartridge
Apidra® 3mL cartridge (suitable for use with ClickStar® reusable device)			
Clear colourless solution.			
Formulation Rapid acting human insulin analogue. Also known as insulin glulisine.	Type Human insulin analogue	Manufacturer Sanofi	Time to maximal effect / peaktime Approximately 1 hour.
			Duration (time effect terminates) Approximately 4 hours.
			Administration Guide Give immediately (up to 15 minutes) before a meal. When necessary, can be given soon after meals (within 20 minutes of the start of the meal).

Humalog® insulin *lispro* RAPID ACTING INSULIN ANALOGUE

Presentation Humalog® 3mL KwikPen™ prefilled multidose disposable injection device.			
Humalog® 10mL glass vial.			Humalog® 3mL cartridge
Humalog® 3mL cartridge (suitable for use with HumaPen® Savvio™ and Luxura™ HD reusable devices).			
Clear colourless solution. Commonly used in Continuous Glucose Monitoring PUMPS.			
Formulation Rapid acting human insulin analogue. Also known as insulin lispro solution.	Type Human insulin analogue	Manufacturer Lilly	Time to maximal effect / peaktime Earlier peak of action compared to regular insulin. Insulin lispro solution - maximal effect is reached at approximately 1 hour.
			Duration (time effect terminates) Shorter duration of activity compared to regular insulin - approximately 3.5 to 4.5 hours.
			Administration Guide Very rapid onset of action within 15 minutes. Give immediately (up to 15 minutes) before a meal. When necessary, can be given soon after meals (within 20 minutes of the start of a meal).

NovoRapid® insulin *aspart (rys)* RAPID ACTING INSULIN ANALOGUE

Presentation NovoRapid® 3mL FlexPen® prefilled multidose disposable injection device.			
NovoRapid® 10mL glass vial.			NovoRapid® 3mL Penfill®
NovoRapid® 3mL Penfill®			
Clear colourless solution. Commonly used in Continuous Glucose Monitoring PUMPS.			
Formulation Rapid acting human insulin analogue. Also known as insulin aspart.	Type Human insulin analogue	Manufacturer Novo Nordisk	Time to maximal effect / peaktime Between 1 to 3 hours.
			Duration (time effect terminates) 3 to 5 hours, a shorter duration of action compared to soluble human insulin.
			Administration Guide Faster onset of action than soluble human insulin - within 10 to 20 minutes. Should be given immediately before a meal or, when necessary, after the start of the meal.

ANALOGUES

RAPID ACTING
Apidra® (*glulisine*)
Humalog® (*lispro*)
NovoRapid® (*aspart*)

Lantus® insulin glargine LONG ACTING BASAL INSULIN ANALOGUE				
Presentation Lantus SoloStar® 3mL prefilled disposable injection device. Lantus® 10mL glass vial. Lantus® 3mL cartridge (suitable for use with the ClickSTAR® reusable device). Clear colourless solution.				
	Lantus® SoloStar® disposable injection pen		Lantus® 3mL vial	
	Formulation	Type	Time to maximal effect / peaktime	Duration (time effect terminates)
	Long acting basal human insulin analogue. Also known as insulin glargine.	Human insulin analogue	There is a lack of a peak.	24 hours.
Administration Guide				
At morning or bedtime. Administer same time every day.				
Toujeo® insulin glargine LONG ACTING BASAL INSULIN ANALOGUE				
Presentation Toujeo® SoloStar® 1.5mL prefilled disposable injection device. Clear colourless solution.				
	Toujeo® SoloStar® disposable injection Pen			
	Formulation	Type	Time to maximal effect / peaktime	Duration (time effect terminates)
	Long acting basal human insulin analogue. Also known as insulin glargine. 300 units/mL	Human insulin analogue	There is a lack of a peak.	Up to 36 hours.
Administration Guide				
At morning or bedtime. Administer same time every day.				
Levemir® insulin detemir (rys) LONG ACTING BASAL INSULIN ANALOGUE				
Presentation Levemir® 3mL FlexPen® prefilled multidose disposable injection device. Levemir® 3mL Penfill®. Clear colourless solution.				
	Levemir® FlexPen®		Levemir® 3mL Penfill®	
	Formulation	Type	Time to maximal effect / peaktime	Duration (time effect terminates)
	Long acting human insulin analogue. Also known as insulin detemir.	Human insulin analogue	3 to 14 hours.	Up to 24 hours.
Administration Guide				
Once or twice daily. At evening meal, bedtime or breakfast.				

ANALOGUES

LONG ACTING (basal)
 Lantus® (glargine)
 Levemir® (detemir)
 Toujeo® (glargine)
 300 units/mL

Humalog® Mix 25™ 25/75 PREMIXED BIPHASIC INSULIN ANALOGUE

Presentation
Humalog® KwikPen™ prefilled multidose disposable injection device.
Humalog® Mix 25™ 3mL cartridge (suitable for use with Humapen® Savvio™ reusable devices).
White suspension.



Humalog® Mix25 KwikPen™



Humalog® Mix25 3mL cartridge

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Premixed combination of rapid acting and intermediate-acting insulin (insulin lispro 25% and insulin lispro protamine suspension 75%)	Biphasic human insulin analogue	Lilly	Earlier peak of action compared to regular insulin. Insulin lispro solution maximal effect is reached at approximately 1 hour.	16 to 18 hours.	Very rapid onset of action within 15 minutes. Give immediately (up to 15 minutes) before a meal. When necessary, can be given soon after meals (within 20 minutes of the start of a meal).

Humalog® Mix 50™ 50/50 PREMIXED BIPHASIC INSULIN ANALOGUE

Presentation
Humalog® KwikPen™ prefilled multidose disposable injection device.
Humalog® Mix 50™ 3mL cartridge (suitable for use with Humapen® Savvio™ reusable devices).
White suspension.



Humalog® Mix50™ KwikPen™



Humalog® Mix 50™ 3mL cartridge

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Premixed combination of rapid acting and intermediate-acting insulin (insulin lispro 50% and insulin lispro protamine suspension 50%)	Biphasic human insulin analogue	Lilly	Earlier peak of action compared to regular insulin. Insulin lispro solution maximal effect is reached at approximately 1 hour.	16 to 18 hours.	Very rapid onset of action within 15 minutes. Give immediately (up to 15 minutes) before a meal. When necessary, can be given soon after meals (within 20 minutes of the start of a meal).

NovoMix® 30 30/70 PREMIXED BIPHASIC INSULIN ANALOGUE

Presentation
NovoMix® 30 3mL FlexPen® prefilled multidose disposable injection device.
NovoMix® 30 3mL Penfill®.
White, cloudy suspension.



NovoMix® 30 FlexPen®



NovoMix® 30 3mL Penfill®

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Premixed combination of rapid acting and intermediate-acting insulin (30% soluble insulin aspart, 70% protaminated insulin aspart)	Biphasic human insulin analogue	Novo Nordisk	1 to 4 hours.	Up to 24 hours.	Within 10 to 20 minutes - should be given immediately before a meal or, when necessary, after the start of a meal.

ANALOGUES

PREMIXES
Humalog® Mix 25™ (25/75)
Humalog® Mix 50™ (50/50)
NovoMix® 30 (30/70)

Humulin® R neutral, soluble or regular insulin SHORT ACTING HUMAN INSULIN

Presentation Humulin® R 10mL glass vial Humulin® R 3mL cartridge (suitable for use with Humapen® Savio™ and Luxura™ HD reusable devices). Clear colourless solution.



Humulin® R 10mL vial



Humulin® R 3mL cartridge

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Short acting human insulin. Also known as neutral, soluble or regular insulin.	Human	Lilly	2 to 4 hours	6 to 8 hours	30 minutes before meals.

Actrapid® neutral, soluble or regular insulin SHORT ACTING HUMAN INSULIN

Presentation Actrapid® 10mL glass vial. Actrapid® 3mL Penfill®. Clear colourless solution.
--



Actrapid® 10mL vial



Actrapid® 3mL Penfill®

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Short acting human insulin. Also known as neutral, soluble or regular insulin.	Human	Novo Nordisk	2.5 and 5 hours.	8 hours.	30 minutes before meals.

HUMAN

SHORT ACTING
Humulin® R
Actrapid®

Humulin® NPH isophane INTERMEDIATE ACTING HUMAN INSULIN

Presentation
Humulin® NPH 10mL glass vial.
Humulin® NPH 3mL cartridge (suitable for use with Humapen® Savvio™ and Luxura™ HD reusable devices).
Suspension of white, crystalline precipitate.



Humulin® NPH 10mL vial



Humulin® NPH 3mL cartridge

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Intermediate acting human insulin. Also known as isophane insulin.	Human	Lilly	Approximately 1 hour / 4 to 10 hours	16 to 18 hours	Can be administered once or twice daily as an evening and/or morning injection.

Protaphane® isophane INTERMEDIATE ACTING HUMAN INSULIN

Presentation
Protaphane® 3mL InnoLet® plastic disposable delivery device.
Protaphane® 10mL vial.
Protaphane® 3mL Penfill®
White, cloudy suspension.



Protaphane® 3mL InnoLet®



Protaphane® 10mL vial



Protaphane® 3mL Penfill®

Formulation	Type	Manufacturer	Time to maximal effect / peaktime	Duration (time effect terminates)	Administration Guide
Intermediate acting human insulin. Also known as isophane insulin.	Human	Novo Nordisk	Approximately 1.5 hours / 4 and 12 hours.	Up to 24 hours.	Can be administered once or twice daily as an evening and/or morning injection.

HUMAN

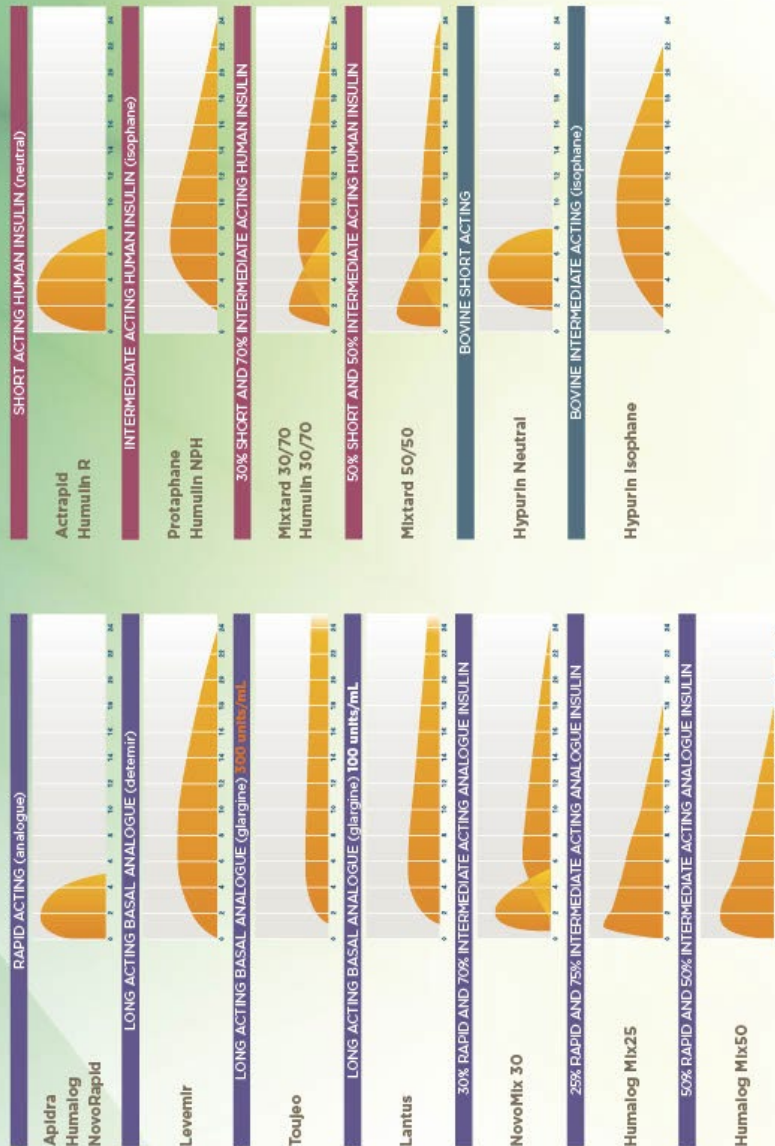
INTERMEDIATE ACTING

Humulin® NPH
Protaphane®

Humulin® 30/70 PREMIXED BIPHASIC HUMAN INSULIN				
Presentation	 Humulin® 30/70 10mL vial		 Humulin® 30/70 3mL cartridge	
Humulin® 30/70 3mL cartridge (suitable for use with Humapen® Savvio™ reusable device).	Suspension of white, crystalline precipitate.			
	Formulation	Type	Manufacturer	Time to maximal effect / peaktime
	A mixture consisting of 30% Humulin R (regular/neutral insulin) and 70% Humulin NPH (isophane insulin).	Human	Lilly	2 to 12 hours
				Duration (time effect terminates)
				16 to 18 hours
Administration Guide				
Intermediate acting insulin with more rapid onset of action than NPH alone. Approximately 30 minutes before a meal.				
Mixtard® 30/70 PREMIXED BIPHASIC HUMAN INSULIN				
Presentation	 Mixtard® 30/70 3mL InnoLet®		 Mixtard® 30/70 3mL Penfill®	
Mixtard® 30/70 3mL InnoLet® plastic disposable delivery device.	Mixtard® 30/70 3mL Penfill®.			
White, cloudy suspension.	Formulation	Type	Manufacturer	Time to maximal effect / peaktime
	A mixture consisting of neutral, short-acting insulin (30%) and isophane, intermediate-acting insulin (70%).	Human	Novo Nordisk	2 and 12 hours.
				Duration (time effect terminates)
				24 hours.
Administration Guide				
Approximately 30 minutes before a meal.				
Mixtard® 50/50 PREMIXED BIPHASIC HUMAN INSULIN				
Presentation	 Mixtard® 50/50 3mL Penfill®			
Mixtard® 50/50 3 mL Penfill®.	White, cloudy suspension.			
	Formulation	Type	Manufacturer	Time to maximal effect / peaktime
	A mixture consisting of neutral, short-acting insulin (50%) and isophane, intermediate-acting insulin (50%).	Human	Novo Nordisk	4 and 8 hours.
				Duration (time effect terminates)
				24 hours.
Administration Guide				
Approximately 30 minutes before a meal.				

HUMAN

PREMIXES
 Humulin® 30/70
 Mixtard® 30/70
 Mixtard® 50/50



INSULIN TIME ACTION PROFILES

Adapted from Clinical Practice Guidelines: Type 1 Diabetes in Children and Adolescents by Australasian Paediatric Endocrine Group. Approved by National Health and Medical Research Council, 9 March 2005. Copyright Commonwealth of Australia. Plus appropriate product information. All companies (Aspen, Novo Nordisk and Sanofi) have reviewed this content.

Advice for swapping insulins during a disaster

From the USA DDRC

Information for Health Care Professionals
Switching between Insulin Products in Disaster Response Situations
Approved by the American Diabetes Association, the Endocrine Society and JDRF - August 2018

- **These recommendations are intended to be used only in disaster response situations when patients are not on their usual schedule, may have limited monitoring capabilities, or don't have access to their prescribed insulins.**
- **Individuals with Type 1 diabetes have priority for receiving insulin. Even a few hours of interrupted insulin therapy can result in life-threatening Diabetic Ketoacidosis (DKA).**
- **These guidelines do not replace clinical judgement and are intended to assist with short-term diabetes management until a patient can resume their prescribed care regimen.**
- **A reduction in insulin dose by 20%** is recommended when switching to another insulin under disaster response situations to avoid hypoglycemia. This may result in short-term, mild hyperglycemia until the patient is back to a normal routine and insulin regimen.

Consultation with an experienced healthcare professional is advised for patients with complicated insulin needs, e.g. pregnancy, dialysis, insulin pump, or concentrated insulins (i.e., U200, U300, and U500).

Insulin Storage Notes:

1. Insulin should be kept away from direct heat and sunlight. DO NOT use insulin that has been frozen.
2. Unopened insulin vials and pens should be stored in a refrigerator at 36° F to 46°F and are good until expiration date on the vial or pen.
3. Opened vials and pens may be left unrefrigerated at 59°F to 86°F for up to 28 days.
4. Insulin loses potency when exposed to extreme temperatures which can result in loss of blood glucose control; however- under emergency conditions- insulin that has been stored above 86°F may be used if necessary. Once properly stored insulin becomes available, insulin that has been exposed to extreme conditions should be discarded.

Rapid-acting and Regular Insulins are typically given before meals to regulate the rise in glucose after a meal.

- Rapid-acting insulins should be injected no more than 15 minutes before the start of a meal
- Regular insulin can be injected up to 30 minutes before the start of a meal

If patient is taking this:

RAPID-ACTING INSULINS:

Humalog® (insulin lispro U-100 & U-200)
Novolog® (insulin aspart)
Apidra® (insulin glulisine)

SHORT-ACTING INSULINS:

Regular insulin brand name examples
Humulin®R
Novolin®R
ReliOn R from Walmart

Interchange Recommendations:

Rapid- and Short-acting insulins may be interchanged with a 20% reduction in the dose

Example: Humalog® 10 units before meals can be switched to Regular 8 units before meals (80% of 10 units = 8 units)

Example: Regular 10 units before meals can be switched to Novolog® 8 units before meals (80% of 10 units = 8 units)

Intermediate-acting and Basal insulin analogs are typically given once or twice daily to provide basal insulin needs (to prevent high glucose between meals and overnight).

If patient is taking this:

INTERMEDIATE-ACTING INSULINS:

NPH insulin brand name examples
Humulin®N
Novolin®N
ReliOn NPH from Walmart

Interchange Recommendations:

Intermediate-acting insulins may be interchanged with another intermediate-acting insulin or Basal insulin analog with a 20% reduction in dose

NPH ONCE daily to a Basal insulin analog

Example: NPH 20 units daily can be switched to Levemir® 16 units daily

NPH TWICE daily to a Basal insulin analog

- Add all the units of NPH injected per day and give 80% as a single dose of a Basal insulin analog daily

Example: NPH 34 units AM and 16 units PM can be switched to Lantus® 40 units daily (80% of 50 units daily = 40 units)

Information for Health Care Professionals
Switching between Insulin Products in Disaster Response Situations
Approved by the American Diabetes Association, the Endocrine Society and JDRF - August 2018

If a patient is taking this: BASAL INSULIN ANALOGS: Levemir® (detemir) Lantus®, Basalgar® (glargine U-100) Toujeo® (glargine U-300) Tresiba® (degludec U-100 & U-200)	Interchange Recommendations: Basal insulin analogs may be interchanged with NPH with a 20% reduction in dose and divided based on predicted meal frequency if eating 2 meals per day- Split the new dose into ½ NPH with first meal of the day and ½ NPH with second meal of the day Basal insulin analogs (with the exception of Tresiba®) may be interchanged with another Basal insulin analog with a 20% reduction in dose Tresiba® (80 units or less) may be interchanged with another Basal insulin analog with a 20% reduction in dose Tresiba® (greater than 80 units) may be interchanged with another Basal insulin analog with a 20% reduction in dose, but the other Basal insulin must be split into two equal doses given 12 hours apart. Example: Tresiba® 100 units daily can be switched to Basalgar® 40 units (80% of 100 units = 80 units/2) every 12 hours
Premixed insulins combine an intermediate-acting insulin or basal insulin analog with a rapid or regular insulin. The ratio of the mixture is indicated in the name. e.g. 70% intermediate or long-acting with 30% rapid or short-acting.	
If patient is taking this: PREMIXED INSULINS with Regular insulin NPH/Regular (Humulin® 70/30, Novolin® 70/30, or ReliOn 70/30) PREMIXED INSULINS with rapid-acting insulin Humalog® Mix 75/25 Humalog® Mix 50/50 Novolog® Mix 70/30 PREMIXED INSULIN with rapid- and ultra-long acting insulins Ryzodeg® 70/30 (degludec/aspart)	Interchange Recommendations: Regular and Rapid-acting PREMIXED insulins may be interchanged with another PREMIXED insulin with a 20% reduction in the dose - Insulin mixes containing a rapid-acting insulin should be injected <u>no more</u> than 15 minutes before the start of a meal - Insulin mixes containing Regular insulin can be injected up to 30 minutes before the start of a meal PREMIXED insulin may be interchanged with NPH using a 20% reduction in dose
Unique Insulin Therapies	
Concentrated insulin: Humulin® R U500 Insulin Strongly recommend consulting a healthcare professional with experience in U500 insulin if switching to another insulin	
Insulin Pump Insulin pump patients may only substitute Humalog®, Novolog®, Apidra®, or Regular insulin in the pump - Substitutions cannot include an intermediate-acting insulin or a Basal insulin analog or concentrated insulin (i.e., U200, U300, or U500) Individuals with Type 1 diabetes have priority for receiving insulin. Even a few hours of interrupted insulin therapy can result in life-threatening Diabetic Ketoacidosis (DKA). <u>If the patient does not have a plan for pump failure</u>, consult with a healthcare professional experienced in insulin pump management When the insulin pump cannot be used, basal insulin is the primary need with rapid- or short-acting insulin a desirable addition: - Give 0.3 units/kg of a Basal insulin analog as a once daily dose Example: patient weighs 60 kg, give 18 units of a Basal insulin analog once daily - If rapid or short acting insulin is available, give 0.3 units/kg divided by 6 at each meal Example: patient weighs 60 kg, give 3 units of rapid or short-acting insulin with each meal The recommendations do not replace clinical judgment. www.DiabetesDisasterResponse.org	
Authors: Barbara Kocurek, PharmD, BCPS, CDE, FAADE; Keith Cryar, MD, FACE, ECNU Reviewer: Stephen Ponder, MD, FAAP, CDE	

Example of insulin swapping chart from 2009 (Pharmacists Letter)



Detail-Document #251005
 -This Detail-Document accompanies the related article published in-
PHARMACIST'S LETTER / PRESCRIBER'S LETTER
 October 2009 ~ Volume 25 ~ Number 251005



How to Switch Between Insulin Products

Switching insulins should always be done with prescriber approval and close monitoring. Advise patients to closely monitor blood glucose levels after switching insulins. If switching between human insulin brands (e.g., *Humulin R* to *Novolin R*, *Humulin N* to *Novolin N*, or *Humulin R/N* to *Novolin R/N* to "store brand" *R/N*), keep the number of units each day the same. However, because these brands are not AB rated you may need to contact the prescriber for approval to switch between brands. See our *Comparison of Insulins* chart for meal timing, onset, peak, duration of action, and other information. Also see our algorithm *Initiation and Adjustment of Insulin Regimens for Type 2 Diabetes*.

Clinical Scenario	Recommendation/Comments
NPH to Long-acting	
NPH to insulin detemir (<i>Levemir</i>)	- Convert unit-per-unit.¹ - Some patients on basal-bolus insulin may require more <i>Levemir</i> than NPH.¹ - Give <i>Levemir</i> once daily, or divided twice daily if necessary for control.¹ - Do not mix <i>Levemir</i> with other insulins.¹
NPH to insulin glargine (<i>Lantus</i>)	- NPH once daily: convert unit-per-unit and give once daily.² - NPH twice daily: reduce daily dose by 20% and give once daily.² - Do not mix <i>Lantus</i> with other insulins.²
Long-acting to NPH	
Insulin detemir (<i>Levemir</i>) to NPH	- Convert unit-per-unit.³ - NPH at bedtime (for type 2 patients when combined with oral antidiabetes meds).¹⁶ OR - NPH twice daily (e.g., 50:50 or 2/3 in AM and 1/3 before dinner or at bedtime).^{3,5}
Insulin glargine (<i>Lantus</i>) to NPH	- Convert unit-per-unit.³ - NPH at bedtime (for type 2 patients when combined with oral antidiabetes meds).¹⁶ OR - NPH twice daily (e.g., 50:50 or 2/3 in AM and 1/3 before dinner or at bedtime).^{3,5}

More...

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Advice from the Japanese Guidelines re other glucose control oral agents (JDI 2019)

Table 1 | Dose adjustments for oral hypoglycemic agents under emergency circumstances

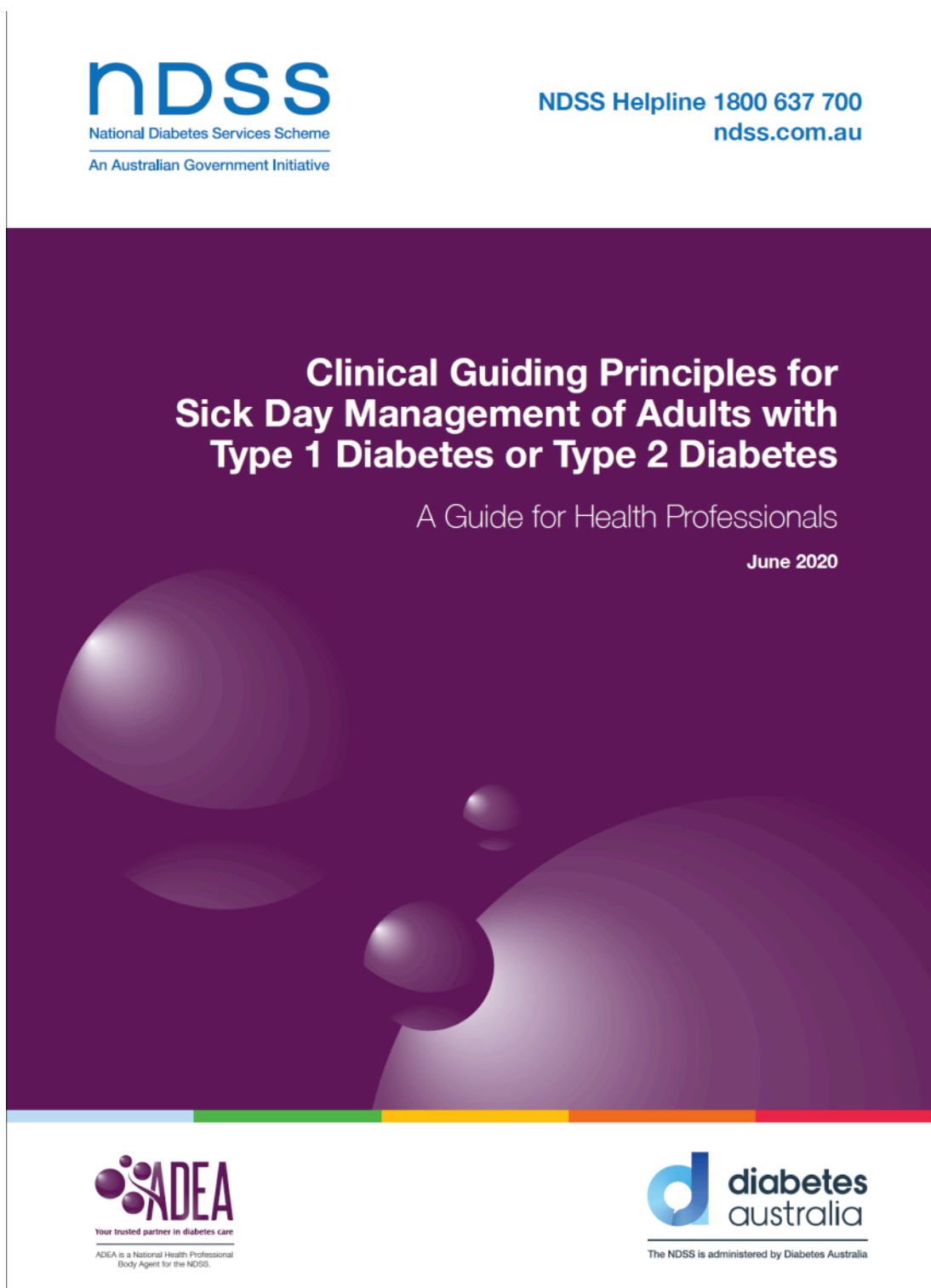
	Insulin secretagogues (SU, glinides)	α-glucosidase inhibitors	Glucanides	Thiazolidinediones	DPF-4 inhibitors
Dose adjustment under emergency circumstances	Dose should be reduced to 1/2 in those with 1/2 their normal dietary intake; drug should be discontinued in those with < 1/3 their normal dietary intake	Drug may be discontinued in those with abdominal symptoms	Drug may be discontinued in those thought likely to be at risk of dehydration due to diarrhea or fever	Drug may be discontinued in those presenting with edema	No dose adjustment required in some DPF-4 inhibitors
Adverse reactions thought likely to occur in times of disaster	Hypoglycemia	Gastrointestinal symptoms	Lactic acidosis due to dehydration Gastrointestinal symptoms	Edema Cardiac failure	Potential hypoglycemia depending on drug used in combination

Notes

Sick Day Care Advice for Healthcare Professionals, Including Resources for Basic Diabetic Ketoacidosis Care



This section of guidelines for healthcare professions is from the 2020 Guidelines from the Australian Diabetes Educators Association Committee.



The full guidelines are available free at https://www.adea.com.au/wp-content/uploads/2020/09/Sickdays-_12.pdf

Key concepts for sick day management – type 1 diabetes

1. A sick day management plan should be tailored to the individual needs of the person with diabetes and be initiated at the first signs of an illness that impacts their metabolic status (i.e. causing hyperglycaemia and/or ketosis) and/or their ability to self-manage their diabetes.
2. People with type 1 diabetes (and/or their carers) should be alert to the signs and symptoms of significant hyperglycaemia and DKA including:
 - nausea, vomiting and/or abdominal pain
 - increased thirst and/or a dry mouth
 - polyuria
 - deep and laboured breathing (Kussmaul breathing)
 - a fruity-smelling breath
 - feeling drowsy, weak or confused.
3. More frequent blood glucose monitoring is needed during episodes of illness:
 - every 1-2 hours if blood glucose levels are elevated (above 15.0 mmol/L) and/or ketones are present
 - every 15 minutes if blood glucose levels are 4.0 mmol/L or below and then hourly for 3-4 hours once levels are back above 4.0 mmol/L.
4. Ketone levels should be measured during episodes of illness:
 - when blood glucose levels have been above 15.0 mmol/L for 6 hours or more (2-4 hours in those on an insulin pump or women who are pregnant)
 - every 2-4 hours while blood glucose levels remain above 15.0 mmol/L
 - every 1-2 hours once ketones have been detected or the person has symptoms suggestive of DKA
 - if the person has persistent vomiting and/or diarrhoea or poor oral intake, regardless of blood glucose levels.
5. Blood ketone levels above 1.0 mmol/L (or 0.6 mmol/L for those on an insulin pump or pregnant women) or positive urine ketones indicate the development of ketosis and the need to take appropriate action to prevent DKA.
6. Blood ketone testing is the preferred method of measuring ketosis (see page 18). Urine ketone monitoring may be used where blood ketone testing is not available.
7. People with type 1 diabetes (and or their carers) should be reminded to never discontinue taking insulin, especially basal insulin. However, adjustments to insulin doses may be required, as follows:
 - those on insulin injections should take supplemental doses (see page 12) of rapid-acting insulin according to the flowchart on page 13.
 - those using an insulin pump should adjust their insulin doses/basal rates according to the flowchart on page 14.
 - pre-meal short/rapid-acting insulin may need to be reduced if dietary carbohydrate intake is poor and blood glucose levels are not elevated.
8. Maintenance of food and fluid intake is important to reduce the risk of dehydration and to prevent hypoglycaemia and the development of ketones.
9. Individuals using an insulin pump should be advised:
 - to change their cannula and infusion set if blood glucose levels are elevated and ketones present
 - that they may need to switch back to manual mode if they are using a hybrid closed loop pump and the pump algorithm is unable to manage the change in insulin requirements for illness.

Supplemental insulin

Supplemental doses of insulin are defined as:

- » Doses of rapid or short-acting insulin given in addition to usual insulin dose(s) – usual doses include prescribed correction doses for those managed with flexible insulin therapy using insulin pump therapy (IPT) or multiple daily injections (MDI).
- » Insulin to be given immediately (but not closer than two hours to the previous dose of rapid-acting insulin) and not delayed until the time that the next prescribed usual insulin dose is due.

Supplemental insulin doses are calculated as a percentage of the total daily dose i.e. percentage of the total of rapid/short and intermediate/long/ultralong-acting usually taken in a 24-hour period.

Example of how to calculate extra insulin dose:

Usual daily doses	Morning	Lunch	Dinner	Evening
Rapid/short-acting insulin	6	4	8	
Long-intermediate acting insulin	10			12
Total daily dose (TDD)	40U			

10% of TDD	4U
15% of TDD	6U
20% of TDD	8U

Insulin dose adjustment table

Total Daily Dose (TDD) units	Extra 10% rapid or short-acting insulin	Extra 15% rapid or short-acting insulin	Extra 20% rapid or short-acting insulin
1 to 10	0.5-1 units	0.5 -1 units	0.5-1 units
11 to 20	1-2 units	2-3 units	2-4 units
21 to 30	2-3 units	3-4 units	4-6 units
31 to 40	3-4 units	4-6 units	6-8 units
41 to 50	4-5 units	6-7 units	8-10 units
51 to 60	5-6 units	7-9 units	10-12 units
61 to 70	6-7 units	9-10 units	12-14 units
71 to 80	7-8 units	10-12 units	14-16 units
81 to 90	8-9 units	12-13 units	16-18 units
91 to 100	9-10 units	13-15 units	18-20 units

Sick day management flowchart – Insulin injections



1. 0.6 mmol/L if pregnant or elderly

2. If vomiting, wait for 30 minutes after eating to inject insulin for carbohydrate (to make sure food is kept down)

3. Refers to rapid-acting insulins (e.g. Novorapid, Humalog, Fiasp, Apidra) and not short-acting insulins (e.g. Actrapid and Humulin R) which have a longer duration of action

4. Don't correct more often than every 2 hours

Sick day management flowchart – Insulin pump therapy



1. If vomiting, wait for 30 minutes after eating to bolus for carbohydrate (to make sure food is kept down)

2. Don't correct more often than every 2 hours

Adjustment of diabetes medications – type 2 diabetes

In individuals with type 2 diabetes managed with oral or non-insulin injectable diabetes medications¹²⁻¹⁴:

- » In individuals with nausea, vomiting and/or diarrhoea consider temporarily stopping metformin and GLP-1 receptor agonists which may aggravate these symptoms, worsening dehydration and hypovolaemia, and may increase the risk of acute renal impairment due to dehydration.
- » If there is acute gastrointestinal illness, cease SGLT2 inhibitors, which may further aggravate dehydration and hypovolaemia and increase the risk of DKA.
- » If illness is causing loss of appetite and marked reduction of carbohydrate intake, SGLT2 inhibitors should be reviewed and/or ceased to reduce the risk of DKA/euglycaemic DKA.
- » DKA/euglycaemic DKA should be suspected and investigated in those who are taking SGLT2 inhibitors if they develop abdominal pain, nausea, vomiting, fatigue or metabolic acidosis.
- » If illness is causing loss of appetite and reduction of carbohydrate intake, there is an increased risk of hypoglycaemia from sulphonylureas, which may require dose adjustment or temporary cessation.
- » Other diabetes medications should usually be continued.
- » Consider the temporary use of insulin for persistent and symptomatic hyperglycaemia (this may require hospital admission).

In individuals with type 2 diabetes managed with insulin¹²⁻¹⁴:

- » If blood glucose levels are persistently elevated, an increase in intermediate or long-acting insulin dose by 10–20% may be needed, with further adjustment of subsequent doses of rapid-acting insulin during the day if the glucose levels remain elevated.
- » Those taking rapid or short-acting insulin need advice on adjusting doses according to blood glucose levels and carbohydrate intake.
- » For those taking ultra-long-acting basal insulins, such as glargine U300 (Toujeo) and degludec (Ryzodeg 70/30) advice may need to be sought from an appropriate clinician regarding dose adjustment, as dose changes may take 4–7 days for effect.
- » Those taking basal only or premixed insulin require appropriate medical advice and may need a prescription for additional rapid-acting insulin to use as a supplemental insulin dose – this should be considered as part of their sick day management plan.

For individuals managed with diet alone who have worsening glycaemia, the introduction of medication and management of symptomatic hyperglycaemia may be considered.

Other medications

Many people with diabetes may be taking other medications that may need to be ceased if they have significant vomiting and/or diarrhoea, including diuretics, some blood pressure medications (angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers and anti-inflammatory pain medications (nonsteroidal anti-inflammatory drugs). They should be encouraged to discuss with their general practitioner whether they need to stop taking any of these if they become unwell.

Corticosteroids cause acute hyperglycaemia and increase medication needs in people with diabetes. Risk factors for the development of hyperglycaemia include a previous history of diabetes, a higher prevalence of comorbidities, older age and a higher dose and/or prolonged treatment with steroids^{15,16}. While management of steroid-induced hyperglycaemia is beyond the scope of these guidelines, people with diabetes who require treatment with corticosteroids should be made aware of the impact on their blood glucose level profile and the need for appropriate monitoring and adjustment or commencement of medication while undergoing corticosteroid treatment^{16,17}.

Many people with diabetes choose to take complementary and alternative medicine (CAM), including nutrition and herbal supplements, and may be more likely to take these during times of illness.

A small Australian study of adults with diabetes found that almost half the respondents (46.3%) used CAM and 28% used CAM specifically to treat their diabetes¹⁸. Individuals born overseas were significantly more likely to use CAM than those born in Australia. It is important that health professionals ask about the use of complementary medicines and that people with diabetes are made aware of the potential interactions and adverse effects, particularly when taken in combination with diabetes medications. While most herbal medications are relatively safe, they have the potential to alter the pharmacokinetic and/or pharmacodynamic properties of some diabetes medications and to increase the risk of hypoglycaemia¹⁹.

Monitoring

Ketone monitoring

Ketone bodies (formed naturally in the body) are produced by the liver when glucose is not readily available, providing the body with an alternative source of energy²⁰.

There are three ketones produced in the body²⁰:

- » Acetoacetate (AcAc)
- » 3-beta-hydroxybutyrate (3HB)
- » Acetone.

When glucose is not readily available, fat is broken down by the liver into fatty acid molecules. In the process of ketogenesis, the fatty acids are broken down further into acetoacetate which is then converted into either 3HB or acetone. Acetone is responsible for the sweet odour on the breath of individuals with DKA but is produced in only small amounts²⁰. AcAc and 3HB are the main two ketone bodies produced.

There are two methods available to measure ketones. First is the estimation of acetoacetate (AcAc) levels in urine. The second method for monitoring ketone levels is using a capillary blood sample that measures 3-beta-hydroxybutyrate (3HB) based on a specific enzyme reaction²⁰.

Blood ketone testing is recommended over urine ketone testing for detecting and monitoring ketones in people with diabetes, for the following reasons²⁰⁻²⁴:

- » In DKA, the ratio of 3HB:AcAc rises from normal levels (1:1) to 3:1 or higher (as high as 10:1) making blood ketone monitoring a more accurate way of assessing ketone levels during illness in people with diabetes.
- » Urine testing is more likely to give false negative and false positive results (than blood ketone monitoring). This can occur in the presence of certain medications, when the test strips have been exposed to air for an extended period of time and following ingestion of large doses of ascorbic acid, or vitamin C. Hydration status can also affect accuracy.
- » In response to insulin therapy, 3HB levels usually decrease well before AcAc levels, which makes urine testing less reliable for monitoring recovery due to the fact that ketone bodies may be detected in urine long after blood concentrations have returned to normal levels.
- » Urine testing can be unpleasant and more time-consuming, which can be a barrier to ketone testing.
- » Urine testing involves reading a colour change on the test strip, which can be a problem for those with poor vision.
- » Urine ketone testing is a semi-quantitative test, only indicating if large, moderate, small or trace amounts of ketones are present, and this can introduce user variability in interpretation.
- » Blood ketone testing has been shown to facilitate earlier identification and treatment of ketosis than urine ketone testing and to reduce diabetes-related hospitalisations and emergency visits.

The capacity to test for ketones is crucial for all individuals with type 1 diabetes and those with type 2 diabetes who are at risk of ketosis.

There are currently only a few meters available that can be used for blood ketone testing (FreeStyle Optium Neo, FreeStyle Libre Reader, CareSens Dual and LifeSmart Twoplus Blood Glucose & Ketone Meter). It is important that individuals with type 1 diabetes have access to one of these meters, even if it is not their preferred meter for day-to-day blood glucose monitoring. Test strips can be purchased through pharmacies but are not currently subsidised through the NDSS.

If blood ketone testing is not available, urine ketone testing can be used. For those using urine ketone testing, it is important that they are aware that the integrity of the urine ketone strips may be a problem if the canister lid had not been firmly closed after opening and that strips need to be discarded three months after opening the canister, regardless of expiry date.

Interpretation of ketone levels^{24,25}

Blood ketone level	Urine ketone level	Interpretation
Less than 0.6 mmol/L	Negative	Normal
0.6-1.5 mmol/L	Trace or small	Increased ketone production
1.5-3.0 mmol/L	Moderate	Impending DKA
Over 3.0 mmol/L	Large	Probable DKA

Maintenance of hydration and carbohydrate intake

People with diabetes should be encouraged to maintain oral carbohydrate intake during illness to reduce the risk of hypoglycaemia, maintain energy requirements and prevent the development of ketones (in those with type 1 diabetes and those with type 2 diabetes who have low insulin production or who are taking SGLT2 inhibitors). Antiemetic therapy may be required to ensure adequate hydration and carbohydrate intake.

Recommendations for food and fluid intake:

- » Unless otherwise stated by a medical practitioner, 125–250 mls of fluid (1/2 to 1 cup) per hour is suggested during acute illness.
- » If unable to eat regular meals, encourage a regular intake of carbohydrate-containing foods – around 15g of carbohydrate per hour during waking hours. Easy to digest foods include bread or toast, plain cracker biscuits, plain sweet biscuits, plain rice or pasta, mashed potato, and bananas.
- » If the person is unable to consume food, it is recommended that:
 - Carbohydrate-containing fluids be consumed if blood glucose levels are below 10.0 mmol/L
 - Carbohydrate-free fluids be consumed if blood glucose levels are 10.0 mmol/L and above unless fluids are replacing their usual carbohydrate-containing meals and/or insulin is given to cover the carbohydrate.
- » Oral rehydration solutions (ORS), such as Gastrolyte® and Hydralyte®, should be considered, to help replenish fluid and electrolytes lost through vomiting and/or diarrhoea, particularly in the elderly³⁹. They have a relatively low concentration of carbohydrate and therefore additional carbohydrate may be required to avoid hypoglycaemia. ORS are available in sachets to be added to water and ice blocks.
- » Sports drinks e.g. Gatorade® or Powerade® can be a good alternative to ORS, however they are slightly higher in carbohydrate (see table on following page).
- » Hypertonic or sweetened fluids should be taken in small quantities or avoided if diarrhoea is present or develops as these beverages can exacerbate this condition. They may require dilution of up to 1-5 times for optimum tolerance and absorption. This needs to be taken into consideration when calculating carbohydrate intake.
- » Fluids should be sipped slowly over a period as rapid consumption when unwell can result in increased vomiting and/or diarrhoea.
- » Carbonated fluids should be left to go flat prior to consumption as effervescence can result in increased nausea and/or vomiting.
- » Excessive intake of caffeinated drinks should be discouraged as these may make dehydration worse and caffeine is a gastric irritant thus has the potential to exacerbate nausea and vomiting.

Carbohydrate-containing and carbohydrate-free fluids

Carbohydrate-containing fluids*	Carbohydrate-free fluids
Fruit juice (10g/100 mls)	Water
Regular lemonade (9g/100 mls)	Diet lemonade
Regular cordial (10g/20 mls concentrate)	Diet cordial
Gatorade original (6g per 100 mls)	Broth
Tea with sugar (5g per teaspoon sugar)	Tea without milk or sugar
Milk (5g/100 mls)	Herbal tea
Regular jelly (15g per half cup)	Sugar-free jelly
Lemonade ice-block (~11g per 75g serve)	Hydralyte ice-block (~1g per serve)

*approximate carbohydrate values given in brackets – may vary between brands

Management of hypoglycaemia during sick days

While illness often leads to hyperglycaemia, illness associated with nausea, vomiting and diarrhoea (e.g. gastroenteritis) may lower blood glucose levels and result in hypoglycaemia rather than hyperglycaemia⁶. The person with diabetes (and/or their carers or support team) should remain alert to the signs and symptoms of hypoglycaemia during illness.

- » People with diabetes who develop hypoglycaemia while unwell should be encouraged to treat their hypoglycaemia according to their usual management guidelines, where possible.
- » Some people will also need a reduction in their insulin or medication to reduce the risk of, or to help in managing hypoglycaemia during illness, but it is important that insulin is never ceased, particularly in those with type 1 diabetes, due to the risk of DKA.
- » People with diabetes who are at risk of hypoglycaemia should be encouraged to keep a range of rapid-acting carbohydrate foods and fluids in their sick day management kit. This could include glucose tablets, glucose gels, jellybeans and ordinary (sugar-sweetened) soft drink or cordials.
- » People with diabetes at risk of severe hypoglycaemia should have an in-date glucagon injection available and their family members/ carers and/or support persons must be provided with education on how and when to administer glucagon in response to severe hypoglycaemia.
- » Pregnant women with diabetes are at higher risk of hypoglycaemia if emesis occurs and should be provided with appropriate guidance on managing morning sickness⁶.

Discontinuation of a sick day management plan and presentation to acute medical service

The following situations are an indication for seeking immediate medical attention:

- » Blood glucose levels have not improved or have deteriorated despite two supplemental insulin doses. In some cases (for example if blood glucose levels are below 20.0 mmol/L and the person does not feel particularly unwell) it may be appropriate to wait until additional supplemental insulin doses are given.
- » Blood ketone levels have not improved or have deteriorated following two doses of supplemental insulin. In some cases (for example if blood ketone levels are below 3.0 mmol/L and the person does not feel particularly unwell) it may be appropriate to wait until additional supplemental insulin doses are given.
- » Signs of DKA or HHS such as vomiting, drowsiness, confusion, disorientation, hyperventilation, dehydration or severe abdominal pain.
- » Vomiting that is persistent, especially if greater than four hours, or becomes blood or bile stained.
- » Signs of severe dehydration including increased thirst, dry mouth and swollen tongue, weakness, dizziness/fainting, palpitations, headache, confusion/delirium, reduced sweating and reduced urine output (oliguria or anuria).

- » Persistent hypoglycaemia.
- » If the individual or support person(s) are unable to carry out the sick day plan and required additional support.
- » If the diagnosis of the underlying illness is unclear.
- » If the person has a known complex medical history, end-stage organ failure, is frail and/or elderly.
- » If physical or cognitive impairment occurs making the implementation of the sick day management plan impossible.

Note: the person with diabetes should not drive in this situation. If they require emergency care and do not have someone to drive them to the hospital, they should call 000 for an ambulance.

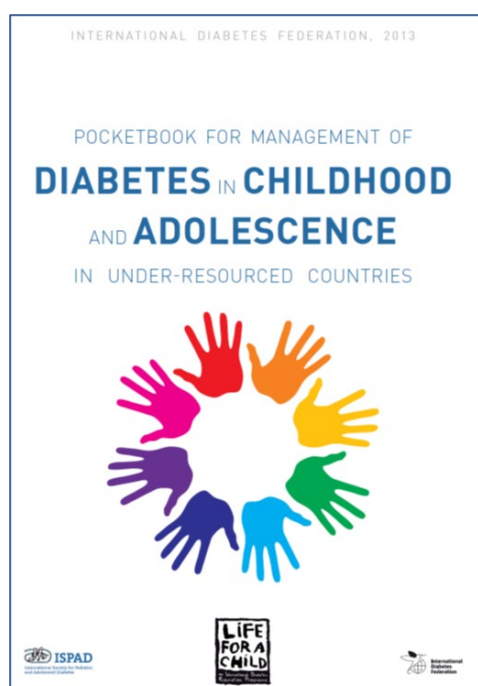
Treating diabetic ketoacidosis in an under-resourced setting

People with Type 1 diabetes may develop diabetic ketoacidosis (DKA) during a disaster, and people with Type 2 diabetes may develop severe hyperglycaemic states with or without ketosis, and including hyperosmolar non-ketotic coma, or euglycaemic ketoacidosis if they are on SGLT2 inhibitor drugs. These life-threatening conditions may also occur in people not previously known to have diabetes.

If the usual resources for care are not available there are publications and protocols related to the treatment of DKA using subcutaneous or intramuscular insulin instead of the usual intravenous insulin.

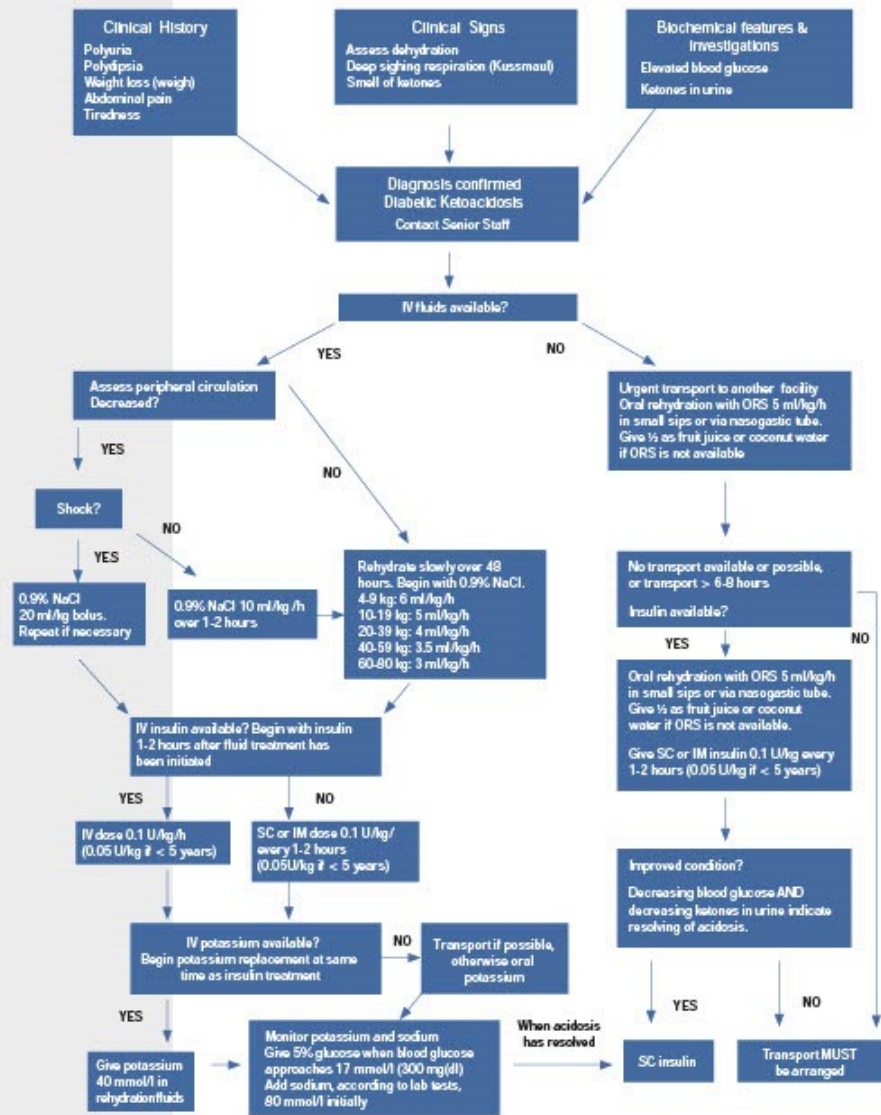
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In this excellent resource about diabetes care in youth in under-resourced settings by the Life For a Child program there is a protocol for DKA treatment. A flow chart from it is shown on the next page.

Figure 2
DKA Management – Limited Care



Notes

Resources for Sick Day Care for People Living with Diabetes



These resources are available for free download from www.ndss.com.au and are available in many languages (listed below). Those most relevant to disasters are reproduced in English here.

اَرَبِيَّةُ Arabic;	ਪੰਜਾਬੀ Punjabi
বাংলা Bengali	Faasamoa Samoan
简体中文, Chinese (simplified)	සිංහල Sinhalese
繁體中文 Chinese (traditional)	Soomali Somali
دري Dari	Español Spanish
فارسی Farsi	Tagalog Tagalog
Ελληνικά Greek	தமிழ் Tamil
हिंदी Hindi	ภาษาไทย Thai
Italiano Italian	lea faka-Tonga Tongan
unD Karen	Türkçe Turkish
ភាសាខ្មែរ Khmer	وَرْدَا Urdu
한국어 Korean	Việt Vietnamese
Македонски Macedonian	
नेपाली Nepali	

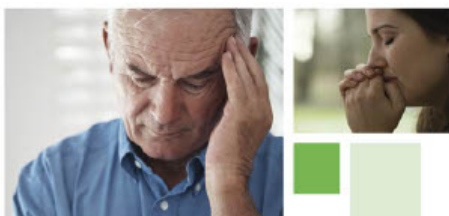
Managing hypoglycaemia

Hypoglycaemia, also known as a hypo, occurs in people with diabetes when their blood glucose level drops below 4mmol/L. Hypos can occur in people with diabetes who take insulin or other types of glucose-lowering medications.

What are the main causes of a hypo?

Hypos can be caused by one or more of the following:

- » too much insulin or other glucose-lowering medication
- » injecting insulin into skin that has lumps from repeatedly injecting into the same area (called lipohypertrophy)
- » delaying or missing a meal
- » not eating enough carbohydrate foods
- » unplanned physical activity
- » more strenuous exercise than usual
- » drinking too much alcohol
- » drinking alcohol without eating enough carbohydrate food.



What are the symptoms of a hypo?

While symptoms vary from person to person, common feelings are:

- » weakness, trembling or shaking
- » sweating
- » lightheadedness or dizziness
- » headache
- » lack of concentration or behaviour change
- » tearfulness or crying
- » irritability
- » hunger
- » numbness around the lips and fingers
- » a fast heartbeat
- » blurred vision.

If you feel any of these symptoms, check your blood glucose level. If you can't do this, treat these symptoms as if you are having a hypo.

How is a hypo treated?

It's important to treat a hypo quickly to stop your blood glucose level from falling even lower. Untreated hypos can be dangerous and can put you at risk of becoming unconscious.

The first thing to do is to be sure you are safe. For example, if you are driving a vehicle, pull over to the side of the road.

Find this resource at ndss.com.au

Version 3 February 2020. First published June 2018.
NDSSFB029

STEP 1 – Most important!

Have some easily absorbed carbohydrate (that you find easy to swallow) such as:

- » glucose tablets equal to 15g of carbohydrate **OR**
- » 6–7 regular jellybeans or 4 large glucose jellybeans **OR**
- » 1 tube of oral glucose gel (equal to 15g of carbohydrate) **OR**
- » 1/2 a can (150mL) of regular (not 'diet') soft drink **OR**
- » 100mL of Lucozade® **OR**
- » 3 teaspoons of sugar or honey **OR**
- » 1/2 a glass (125mL) of fruit juice.

After 10–15 minutes, recheck your blood glucose level to make sure it has risen above 4mmol/L. If it hasn't, repeat step 1.

If you are taking diabetes medication that can cause hypos in combination with a medication called acarbose (Glucobay®), you must treat the hypo with pure glucose such as glucose tablets, glucose gel or Lucozade®.

**STEP 2**

Once your blood glucose level is above 4mmol/L, you will need to eat some extra carbohydrate. If your next meal is more than 20 minutes away, eat some carbohydrate food such as:

- » 1 slice of bread **OR**
- » 1 glass (250mL) of milk or soy milk **OR**
- » 1 piece of fruit **OR**
- » 4 dried apricots **OR**
- » 1 tablespoon sultanas **OR**
- » 1 small tub (100g) fruit yoghurt.

For individualised advice on hypo treatment, talk to your doctor or diabetes health professional.

Insulin pumps, continuous glucose monitoring (CGM) and flash glucose monitoring (Flash GM): if you are using an insulin pump, CGM or Flash GM, talk to your diabetes health professionals about how to treat and manage hypos.

What happens if a hypo is not treated?

If left untreated, blood glucose levels will continue to drop, and this may lead to a severe hypoglycaemia (unconsciousness or seizures). A severe hypo is one that you can't treat yourself and where you need help from someone else. It's important that your family and friends know you have diabetes and what to do in case of a severe hypo.

Your doctor or diabetes educator may recommend you always carry glucagon with you in case of a severe hypo. You or your diabetes health professionals can show your family or friends how to use it. Glucagon is a hormone, given by injection that raises the blood glucose level.

If you have experienced a severe hypo, notify your doctor as soon as possible to discuss the cause of the hypo and to review your diabetes management plan. You can also discuss when you should return to your normal activities, such as driving.

What to do if the person is unconscious, drowsy or unable to swallow

THIS IS AN EMERGENCY! Do not give any food or drink by mouth.

- » Place the person on their side and make sure their airway is clear.
- » Give an injection of glucagon if available and if you are trained to give it.
- » Phone for an ambulance (dial 000) and explain that the person is unconscious and has diabetes.
- » Wait with the person until the ambulance arrives.

Hypo unawareness

This occurs when people don't feel the early warning symptoms of a hypo and only realise they are having a hypo when their blood glucose levels drop very low or when they check their level.

If you have had diabetes and hypos for many years, the risk of not feeling the symptoms of hypos is more likely. Hypo unawareness can be dangerous because by the time you realise you are having a hypo you may find it hard to treat it and you could become unconscious.

If you have hypos without symptoms, or your symptoms change, you may need to check your blood glucose levels more often. Always treat a hypo when your blood glucose level is less than 4mmol/L, even if you feel fine. If your blood glucose levels are low without any symptoms, you need to discuss this with your doctor or diabetes health professional.

Other things to consider

- » Wear identification that says you have diabetes.
- » Always carry hypo treatment with you.
- » Make a note of any hypos you have so you can discuss these with your doctor or diabetes health professional.
- » It's important not to over-treat hypos, for example, by eating more than the recommended amount of carbohydrate, as this may cause your blood glucose level to rise too high and make it difficult to manage your diabetes.
- » Make sure the people around you – such as your family, friends, co-workers, school staff or carers – know how to recognise and treat hypos.
- » Alcohol can increase the risk of hypos. Make sure you have a meal containing carbohydrate foods before drinking alcohol, or have snacks that contain carbohydrate while drinking. Check your blood glucose level and eat a carbohydrate snack before going to bed. Talk to your doctor or diabetes health professional about alcohol and diabetes.
- » Before driving a motor vehicle, check your blood glucose level using a blood glucose meter and make sure it's above 5 mmol/L. If you have had a hypo it is recommended that you wait at least 30 minutes before driving to ensure you are safe. For more information, refer to the NDSS booklet: Diabetes and driving.



The NDSS and you

A wide range of services and support is available through the NDSS to help you manage your diabetes. This includes information on diabetes management through the NDSS Helpline and website. The products, services and education programs available can help you stay on top of your diabetes.

Managing sick days for type 1 diabetes

When you have type 1 diabetes, everyday illnesses or infections can cause both high and low blood glucose levels.

It is important to be prepared before you get sick – have a personalised sick day action plan and sick-day management kit ready to use at the earliest sign of illness.

Discuss putting together your sick-day action plan and kit with your diabetes team.

What is a sick day?

A sick day is when you have an illness or infection and need to make changes to your usual diabetes management plan to keep blood glucose levels from going too high or too low. These changes are usually only needed until you are well again.



Why it's important to manage sick days

When you have type 1 diabetes and are unwell, you are at risk of high blood glucose levels and/or ketones. This can lead to diabetic ketoacidosis (DKA), which can be life threatening.

What are ketones?

When there is not enough insulin in the body, glucose can't enter the body's cells to provide energy. Instead, the body breaks down fat as a source of energy. This breakdown of fat produces ketones, which, in large amounts, are toxic to the body.

What is diabetic ketoacidosis?

DKA is a serious condition that occurs when the levels of glucose and ketones in the blood are too high. The build-up of ketones makes the blood too acidic and leads to a loss of body salts and fluids. If you have large amounts of ketones in your blood or urine, you may have DKA and could need urgent medical attention.

Signs of DKA include the below.

- » Nausea, vomiting and/or stomach pain
- » Rapid breathing or breathlessness
- » Drowsiness, confusion or weakness
- » Increased thirst or dry mouth
- » Reduced or no urine output
- » Breath that smells 'fruity'.

Seek urgent medical attention if you have any of these symptoms.

Find this resource at ndss.com.au

Version 3 February 2020. First published June 2018.
NDSSP601

You can help prevent DKA by following your sick-day action plan. This should include information about managing your diabetes when you are unwell, which you have discussed with your health professionals.

What to do when you are sick

Follow your sick day action plan

Follow your plan if:

- » you feel unwell
- » your blood ketones are positive (over 0.6mmol/L), or
- » your blood glucose levels are higher than 15mmol/L for six hours or more (even if you feel ok)*.

Let someone know you are unwell

Let a friend or family member know that you are unwell. Tell them about your sick-day action plan in case you need any help. If required, have someone stay with you or check on you frequently.

Check your blood glucose levels more often

Check your blood glucose levels every two hours until they are back in your target range. Your blood glucose levels will help work out any insulin adjustments you may need.

If you are using continuous glucose monitoring (CGM), it is important to double check your CGM levels with finger prick tests. Remember there is a lag time between a finger prick test and CGM glucose levels.

Check for ketones

The most accurate way to check for ketones is using a blood glucose meter that also checks for ketones. If this is not an option, you can check your urine using urine ketone test strips.

You should check for ketones every two to four hours when you are unwell. A blood ketone

level under 0.6mmol/L – or a negative result when testing your urine – is considered within the normal range. If your ketones are above this level, follow your sick-day action plan.

If your blood glucose levels are above 15mmol/L, check your blood glucose and ketone levels at least every two hours.

Expect to increase your insulin dose(s)

Your body usually needs extra insulin when you are unwell, even when you are not eating much, or if you are vomiting or have diarrhoea.

Always take your usual doses of insulin, and then check your blood glucose and ketone levels to decide whether you need to take extra insulin**. Extra insulin taken for sick days will be rapid-acting or short-acting insulin, which you will need to take in addition to your usual dose.

Your sick-day action plan can help you work out if you need to take extra insulin, as well as how much. Contact your diabetes health professional for advice on changing your insulin dose.

Seek medical help

Seek medical advice to treat the underlying illness. Contact your doctor early to avoid becoming more unwell and needing emergency care. You may need to contact your diabetes health professional for advice about adjusting your insulin dose during periods of illness.



* If you are using an insulin pump it's important to check for ketones when your blood glucose levels are high (in case of pump failure/cannula occlusion). It's important to manage high blood glucose levels by using a correction dose.

** Occasionally, blood glucose levels may be low during illness. In this case, a reduction in insulin doses may be needed. Refer to your sick-day action plan or talk to your diabetes health professional for advice on insulin adjustments.

Keep drinking and (if possible) eating

It's very important to keep up your fluid and carbohydrate intake when you are feeling unwell, to avoid dehydration and low blood glucose levels (hypoglycaemia, or hypo).

- » Try to eat – but if you can't eat normally, have some easy-to-manage carbohydrate drinks, snacks or small meals. This can include dry toast, plain rice, dry biscuits or crackers, mashed potato, plain ice cream or custard.
- » Try to have a cup of fluid (250 mL) every hour.
- » If your blood glucose levels are 15mmol/L or lower and you can't eat, drink one cup of fluid that contains carbohydrate every hour. These include regular cordial or soft drink, juice, sports drinks, weak tea with sugar/honey, jelly or sweet ice blocks.
- » If your blood glucose levels are higher than 15mmol/L, drink one cup of fluid that doesn't contain carbohydrate every hour, such as water diet cordial or diet soft drink, weak tea with no sugar/honey, diet jelly or broth.
- » If you are vomiting or have diarrhoea, you can replace fluids and salts with drinks such as Gastrolyte® or Hydralyte®.

Seek medical attention IMMEDIATELY if you:

- » are drowsy or confused
- » have deep, rapid breathing or shortness of breath
- » have stomach pain
- » have a 'fruity' odour to your breath (a sign of DKA)
- » can't keep food or fluids down and are experiencing persistent vomiting or diarrhoea
- » are showing signs of dehydration (such as extreme thirst, weakness, confusion, lack of urination)

- » have blood glucose levels that continue to rise even though you have had at least two extra doses of insulin (with at least two hours between each extra dose of rapid-acting insulin)
- » have blood ketone levels greater than 1.5mmol/L, even though you have had at least two extra doses of insulin (this may be DKA)
- » are having trouble keeping your blood glucose levels above 4mmol/L, or you have had a severe hypo
- » are not well enough to follow your sick day action plan or you don't have anyone to help you.



Sick day check list

Follow your sick-day action plan and use your sick-day management kit

- ☒ Let someone know you are unwell
- ☒ Check your blood glucose levels every two hours
- ☒ Check for ketones every four hours
- ☒ Always take your insulin, and expect to increase the dose
- ☒ Ask for help – see your doctor or contact your diabetes educator
- ☒ Drink plenty of fluids and keep eating (if possible)
- ☒ Seek urgent medical care if needed

Tips to stay healthy

- » Get immunised against the flu and pneumonia.
- » Take care with personal hygiene to avoid the spread of germs.
- » Keep your blood glucose levels within your target range to help reduce the risk of illness and infections.



Sick day kit

The following items should be included in your sick-day kit:

- a copy of your sick day action plan
- a guide to extra insulin doses for sick days
- a blood glucose meter that can also monitor ketones
- in-date blood glucose testing strips
- in-date blood ketone testing strips or urine ketone test strips
- your blood glucose diary
- a thermometer
- pain relief medication
- food and drinks for sick days
- hypo treatment
- in-date rapid-acting or short-acting insulin
- insulin syringes or pen
- spare insulin pump consumables (if relevant)
- telephone numbers for medical and support people.

Check your kit every six months to make sure it is still in date and restock your kit if you have used it.



More information

For a sample sick day action plan and management kit, refer to the Australian Diabetes Education Association's **Sick day management of adults with type 1 diabetes – consumer resources**.

These guidelines are available online at adea.com.au



The NDSS and you

A wide range of services and support is available through the NDSS to help you manage your diabetes. This includes information on diabetes management through the NDSS Helpline and website. The products, services and education programs available can help you stay on top of your diabetes.

This information is intended as a guide only. It should not replace individual medical advice. If you have any concerns about your health, or further questions, you should contact your health professional.

4 of 4

Living with type 2 diabetes – what to do when you are sick

Like everyone, people with diabetes can get sick with the flu, a cold or other common infections or illnesses.

When you have type 2 diabetes, everyday illnesses or infection can affect your blood glucose levels. It's important to be prepared and to know what to do if you get sick. This includes having a personalised sick day action plan and sick day management kit ready to use at the earliest sign of illness. You should discuss your sick day action plan and kit with your General Practitioner (GP), Credentialed Diabetes Educator (CDE) and diabetes team.

What is a “sick day”?

A sick day is when you have an illness or infection to manage as well as your diabetes – such as a common cold, influenza, gastro or a respiratory infection. You may need to make changes to your usual diabetes management plan to help prevent your blood glucose levels from going too high or too low. These changes are usually only needed until you are well again.



Why it's important to manage sick days

Being unwell (e.g. with an infection) can make it more difficult to manage your diabetes. This is because your body releases stress hormones when you are sick. These hormones make your liver increase the amount of glucose in your bloodstream, and they can also make it difficult for insulin to do its job. This can cause your blood glucose levels to rise.

If you are sick and have high blood glucose levels, you may be at risk of severe dehydration. This can result in you feeling drowsy and confused, and needing urgent medical attention.

What to do when you are sick

Follow your sick day action plan

Start following your plan if you feel unwell or have any signs of sickness or an infection. If your blood glucose levels are higher than 15mmol/L for 8-12 hours or more, start following your sick day action plan even if you feel ok.

Let a friend or family member know that you are unwell. Tell them about your sick day action plan in case you need any help.

Check your blood glucose levels more often

When you are sick, check your blood glucose levels every two to four hours until levels are back in the target range recommended by your GP or CDE or other health professional.

Find this resource at ndss.com.au

Version 4, June 2020. First published June 2018.
NDSSP602

Keep taking your diabetes medications or insulin dose(s)

If you have vomiting or diarrhoea, most diabetes medications can continue, with some exceptions. If vomiting and diarrhoea is significant (multiple episodes, or lasting more than a few hours), consult your GP or other health care professional.

There are two types of oral medicine that you may need to stop taking – these are Metformin and SGLT-2 inhibitors. So ask your doctor or pharmacist about these if you have significant vomiting or diarrhoea.

If you are taking insulin, expect to increase your dose(s)

If you are taking insulin, you may need extra insulin when you are unwell, even when you are not eating much, and even with vomiting or diarrhoea. You should monitor your blood glucose levels regularly and this will help indicate if you need extra insulin. If you do, it will be an additional dose of short-acting insulin.*

Refer to your sick day action plan or talk to your GP or diabetes health professional for advice on making changes to your insulin dose or type of insulin when you are sick.

If your blood glucose levels are above 15mmol/L for 8 – 12 hours or more, check your blood glucose levels every two hours.

Ask for help

Seek medical help to treat the illness or infection. Contact your doctor early to avoid becoming more unwell and needing emergency care. You may need to contact your CDE or other diabetes health professional for advice about adjusting your insulin dose or medications during periods of illness, especially if your glucose levels stay above 15mmol/L or below 4mmol/L.

If possible, have a friend or relative either stay with you or check on you frequently. Seek urgent medical attention if you have symptoms such as shortness of breath, chest pain or a foot infection.

Keep drinking and (if possible) eating

It's very important to keep up your fluid and carbohydrate intake when you are feeling unwell, to avoid dehydration and low blood glucose levels (hypoglycaemia, or hypo).

- Try to eat normally. If you can't, have some easy-to-manage carbohydrate drinks, snacks or small meals, such as dry toast, plain rice, dry biscuits or crackers, mashed potato, plain ice cream or custard.
- Try to have a cup of fluid (250 mL) every hour.
- If your blood glucose levels are 15mmol/L or lower and you can't eat, drink one cup of fluids containing carbohydrate every hour. These include regular cordial or soft drink, juice, sports drinks, weak tea with sugar/ honey, jelly or sweet ice blocks.
- If your blood glucose levels are higher than 15mmol/L, drink one cup of fluids that does not contain carbohydrate every hour, such as water, diet cordial or diet soft drink, weak tea with no sugar/ honey, diet jelly or broth.
- If you are vomiting or have diarrhoea, oral rehydration fluids such as Gastrolyte® or Hydralyte® can help replace fluid and electrolytes.

Your diabetes health professionals can help you manage your illness until you are well again.

*Occasionally blood glucose levels may be low during illness. In this case, a reduction in insulin doses may be needed.



Seek medical attention IMMEDIATELY if you:

- » are drowsy or confused
- » have deep rapid breathing or shortness of breath
- » chest pain
- » foot infection
- » can't keep food or fluids down and are experiencing persistent vomiting, diarrhoea and/or stomach pain
- » are showing signs of dehydration (such as extreme thirst, weakness, confusion, lack of urination)
- » have blood glucose levels that continue to rise even though you have been following your sick day management plan
- » have difficulty keeping your blood glucose levels above 4mmol/L
- » are not well enough to follow your sick day action plan or you don't have anyone to help you.



Sick day checklist

-  Follow your sick day action plan and use your sick day kit.
-  Let someone know you are unwell.
-  If you use insulin, check your blood glucose levels more often.
-  Keep taking your diabetes medications or insulin dose(s).
-  If you are taking insulin, expect to increase your dose(s).
-  Ask for help – see your doctor or contact your CDE/diabetes educator.
-  Drink plenty of fluids and keep eating (if possible).
-  Seek urgent medical care if needed.

Tips to stay healthy

- » Get immunised for flu and pneumonia.
- » Take care with personal hygiene to avoid the spread of germs.
- » Keep your blood glucose levels within your target range to help reduce the risk of illness and infections.



Sick day kit

The following items should be included in your kit:

- a copy of your sick day action plan
- a blood glucose meter
- in-date blood glucose testing strips
- your blood glucose diary
- a thermometer
- pain relief medication
- food and drinks for sick days
- hypo treatment
- if you use insulin – in-date rapid-acting or short-acting insulin
- insulin syringes or insulin pen (if you use insulin)
- telephone numbers for medical and support people.
- a list of relevant medical information, for example Medicare number, NDSS number, medical insurance information.

Check your kit every six months to make sure it is still date and restock your kit if you have used it.



More information

For a sample sick day action plan and management kit, refer to the Australian Diabetes Education Association's Sick day management of adults with type 2 diabetes consumer resource.

These guidelines are available online at adea.com.au

Well managed blood glucose levels can help reduce the risk of illness and infection.



The NDSS and you

A wide range of services and support is available through the NDSS to help you manage your diabetes. This includes information on diabetes management through the NDSS Helpline and website. The products, services and education programs available can help you stay on top of your diabetes.

Diabetes-Related Sick Day Care for First Responders



Three resources, one from New Zealand, one from the USA and one from Australia are provided. The Australian resource includes some guidelines regarding mental healthcare and volunteer care.

ANZCOR Guideline 9.2.9 – First Aid Management of a Diabetic Emergency

Summary

Who does this guideline apply to?

This guideline applies to adults and children.

Who is the audience for this guideline?

This guideline is for use by bystanders, first aiders and first aid training providers.

Recommendations

The Australian and New Zealand Committee on Resuscitation (ANZCOR) makes the following recommendations:

1. When available, and trained to do so, use a blood glucometer to check the person's blood glucose level. [Good Practice Statement]
2. We recommend the use of oral glucose (swallowed) for individuals with suspected hypoglycaemia who are conscious and able to swallow.¹ [strong recommendation, very low certainty of evidence]
3. We suggest against buccal glucose administration compared with oral glucose administration for individuals with suspected hypoglycaemia who are conscious and able to swallow.¹ [weak recommendation, very low certainty of evidence]
4. If oral glucose (tablet) is not immediately available, we suggest a combined oral + buccal glucose (glucose gel) administration for individuals with suspected hypoglycaemia who are conscious and able to swallow.¹ [weak recommendation, very low certainty of evidence]
5. We suggest the use of sublingual glucose administration for suspected hypoglycaemia for children who may be uncooperative with the oral (swallowed) glucose administration route.¹ [weak recommendation, very low certainty of evidence]
6. When available, and trained to do so, use a glucagon injection to manage suspected hypoglycaemia in an unconscious or seizing person. [Good Practice Statement]
7. If unsure of the blood glucose level, manage the person as having suspected hypoglycaemia. [Good Practice Statement].

Guideline

1 Introduction

Diabetes is a chronic, lifelong medical condition which occurs when the pancreas fails to produce sufficient insulin or the body develops a resistance to the action of its own insulin. Untreated, the absolute or relative lack of insulin will lead to a high blood glucose level. There are two main types of diabetes. 'Type 1 diabetes' is an auto-immune disease that often develops in childhood, and requires lifelong treatment with insulin. 'Type 2 diabetes' is more commonly recognised in adulthood, and requires a treatment combination of diet, exercise, oral medication, and sometimes insulin. 'Gestational diabetes' is a relatively common condition specific to pregnancy, and diabetes can also occur as a consequence of another disease or as a side effect of medication.

Normally the body tightly controls its blood glucose level within a 'normal' range. Having diabetes interferes with this control system, and people living with diabetes need to manage their own blood glucose levels by monitoring what they eat, adjusting their insulin or other medication doses, and frequently testing their own blood glucose levels.

When blood glucose levels become too high or too low, people with diabetes (and some other people without diabetes) may become unwell and need first aid, or treatment at a medical facility.

2 Low blood glucose (*hypoglycaemia* or 'a hypo')

2.1 Introduction

People with diabetes may develop low blood glucose levels as a result of:²

- too much insulin or other blood glucose lowering medication;
- inadequate or delayed carbohydrate intake after their usual insulin or oral medication dose;
- exercise without adequate carbohydrate intake; possibly delayed for up to 12 hours or more after exercise.
- in the setting of other illness; or
- excessive alcohol intake.

Competitors in ultra-marathon endurance events, who do not have diabetes, can also become energy deplete and develop low blood glucose levels requiring first aid management.

Hypoglycaemic events range from those that can be self-managed, to severe episodes, where medical help is needed.

2.2 Recognition

The brain requires a continuous supply of glucose to function normally. When blood glucose levels fall below normal levels symptoms and signs may include:

- sweating,
- pallor (pale skin), especially in young children¹
- a rapid pulse;

- shaking, trembling or weakness;
- hunger;
- light headedness or dizziness;
- headache;
- mood or behavioural changes, confusion, inability to concentrate;
- slurred speech;
- inability to follow instructions;
- unresponsive; or
- seizure

2.3 Management

If a person with diabetes has a diabetes management plan, then that plan should be followed.

If a person with diabetes reports low blood glucose level or exhibits symptoms or signs of *hypoglycaemia*:

- Stop any exercise, rest and reassure;
- If the person is able to follow simple commands and swallow safely, we recommend that first aid providers administer 15-20 grams glucose tablets (4 - 5 x 4 gram glucose tablets) for treatment of symptomatic hypoglycaemia.^{1, 3, 4, 5} [ILCOR CoSTR 2020 strong recommendation, very low certainty of evidence] If glucose tablets are not available, we suggest administering:
 - Confectionary including:
 - jelly beans (5 to 20 beans depending on the brand)
 - Skittles® (20 to 25 candies)
 - Mentos® (5 to 10 mints)³ [ILCOR CoSTR 2015, weak recommendation, very low certainty of evidence]
 - Sugary drinks or sugar-sweetened beverages (approx. 200 mL), but DO NOT administer 'diet' or 'low-cal' or 'zero' or 'sugar free' beverages;
 - Fruit juices (approx. 200 mL);
 - Honey or sugar (3 teaspoons);
 - Glucose gels (15 g of glucose gel)⁶; and
- Monitor for improvement. Resolution of symptoms would be expected within 15 minutes.

If symptoms or signs of hypoglycaemia persist after 10 to 15 minutes, and the person is still able to follow simple commands and swallow safely, administer a further 4 x 4g glucose tablets or alternatives as listed above. Once recovered, give a snack with longer acting carbohydrate, for example: 1 slice of bread OR 1 glass of milk OR 1 piece of fruit OR 2 to 3 pieces of dried fruit OR 1 snack size tub of yoghurt (not diet or 'sugar free' yogurt). If it is a usual meal time, then eat that meal.

If the person deteriorates, does not improve with treatment, is seizing or is unconscious, call for an ambulance.

- If the person is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [Refer to ANZCOR Guideline 8].
- If the person is unconscious but breathing, lie the person on their side and ensure the airway is clear [Refer to ANZCOR Guideline 3]

Insulin Pumps

If the person is wearing an insulin pump, then they themselves may 'suspend' their own pump if part of a personal diabetes management plan.

First aiders should *not* touch any insulin pump being worn by the person. They should manage and provide treatment for hypoglycaemia as listed above.

2.4 Use of glucagon to treat severe hypoglycaemia

Family members of, and carers for, people with diabetes may be trained in the use of the GlucaGen® HypoKit®. These kits contain an injection of glucagon, which works by triggering the liver to release stored glucose, resulting in raised blood glucose levels. The glucagon is administered by injection.

If trained to do so, give Glucagon in the case of a severe hypoglycaemic event, when the person is unconscious or seizing, and/or is unable to swallow safely.⁴



3 High blood glucose (*hyperglycaemia*)

3.1 Introduction

Hyperglycaemia means having a high blood glucose level. Common causes of hyperglycaemia include inadequate levels of insulin or incorrect doses of diabetes oral medications, infections, excess carbohydrate intake, and stressful situations. Hyperglycaemia can develop over hours or days, and many people do not experience symptoms from hyperglycaemia until their blood glucose levels are extremely high. Hyperglycaemia can also occur at the time of initial diagnosis of diabetes, and may go unrecognised until the person is clearly unwell. If untreated, the person gradually deteriorates, and can go into a coma.

3.2 Recognition

When blood glucose levels remain above normal levels symptoms and signs may include:

- excessive thirst;
- frequent urination;
- dry skin and mouth, with sunken eyes (signs of dehydration);
- recent weight loss;
- rapid pulse;
- nausea and vomiting;
- abdominal pain;
- rapid breathing;

- fruity sweet smell of acetone on the breath (similar to paint thinner or nail polish remover); and
- confusion, a deteriorating level of consciousness, or unresponsiveness.

3.3 Management

If a person with diabetes has a diabetes management plan then that plan should be followed. If the person has no management plan and has symptoms or signs of *hyperglycaemia* they should be assessed by a health care professional.

- If the person is unresponsive and not breathing normally, commence resuscitation following the Basic Life Support Flowchart [Refer to ANZCOR Guideline 8]
- If the person is unconscious but breathing, lie the person on their side and ensure the airway is clear [Refer to ANZCOR Guideline 3].

4 Management when unsure if the blood glucose level is high or low

When unsure if the person has a high or low blood glucose level, the safest option is to treat as for *hypoglycaemia* (low blood glucose level). Treatment may lead to a marked improvement if the blood glucose level is low, and is unlikely to do harm if the blood glucose level is high. [Refer to ANZCOR Diabetes fact sheet - appendix]

4.1 Use of blood glucose measuring devices (Glucometers)

If trained to do so and a glucometer is available, checking the person's blood glucose level will guide management, and can confirm *hypoglycaemia* or *hyperglycaemia*. Normal blood glucose concentrations are between 4.0 mmol/L and 7.8 mmol/L.

A blood glucose level between 3.0 mmol/L and 4.0 mmol/L is an “alert value”, meaning that to prevent progression to a more serious, clinically important hypoglycaemia, it is time for a normal food intake, either a snack or meal, depending on the time of day and usual food intake habits.⁵

Clinically important *hypoglycaemia* is defined as a blood glucose level less than 3.0 mmol/L, where there is decreased neuro-cognitive function (reasoning ability or orientation) and increased morbidity (illness) and mortality.⁵

Symptoms of hypoglycaemia may be mimicked by other conditions such as stroke, epilepsy, or migraine. If trained, checking a blood glucose will improve the accuracy of diagnosing hypoglycaemia. We suggest that if the blood glucose concentration is normal, and symptoms and signs of hypoglycaemia persist, other diagnoses need to be considered.³ [CoSTR 2015: weak recommendation/low quality evidence]

Hyperglycaemia is defined as a blood glucose level above the normal reference range. Severe hyperglycaemia is defined as a blood glucose level greater than 15 mmol/L.

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6. International Hypoglycaemia Study Group. Glucose Concentrations of Less Than 3.0mmol/L (54mg/dL) Should Be Reported in Clinical Trials: A Joint Position Statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care*. Jan 2017, 40 (1) 155-157; DOI: 10.2337/dc16-2215

Further Reading

- ANZCOR Guideline 2 - Managing an Emergency
- ANZCOR Guideline 3 - Recognition and First Aid Management of the Unconscious Victim
- ANZCOR Guideline 8 - Cardiopulmonary Resuscitation
- ANZCOR Guideline 9.2.2 – Stroke

About this Guideline

Search date/s	August 2018
Question/PICO:	<i>Population:</i> Adults and children with suspected hypoglycaemia (out-of-hospital, including healthy volunteers). Neonates are excluded, as we believe the identification of hypoglycaemia in this age group is a specialized diagnostic and treatment process well beyond First Aid.



Caring for People with Diabetes – Tips for First Responders

Helping people with diabetes in an emergency situation such as a hurricane or other disaster requires additional attention. Here are some of the most important issues to look for when caring for someone with diabetes.

1. Watch Out for Low Blood Glucose (hypoglycemia)

People with diabetes can develop hypoglycemia (blood glucose that has dropped too low) if they take certain medications, particularly insulin and also medications called sulfonylureas. For those at risk for hypoglycemia, you should have ready access to something containing sugar (glucose tablets, fruit juice or hard candy) to treat hypoglycemia if it occurs. Symptoms of hypoglycemia include:

- Shakiness
- Nervousness
- Sweating
- Irritability, stubbornness, or combativeness
- Impatience
- Chills and cold sweats
- Fast heartbeat
- Light-headedness or dizziness
- Drowsiness
- Lack of coordination
- Nausea
- Headaches
- Confusion
- Passing out

Due to serious concerns regarding hypoglycemia and the unusual circumstances faced in the aftermath of hurricanes – particularly if someone is not able to monitor their blood glucose level because they do not have access to a blood glucose meter – it may be best to not strive to keep blood glucose levels as close to normal as possible (as we generally advise) but to allow glucose levels to be somewhat higher. It is important to consider that the requirements for the various medications used to treat diabetes may be very different for someone in a situation such as a hurricane due to significant changes in diet, availability of water, physical activity levels and stress.

2. Proper Hydration

Getting enough fluid to meet the body's needs is especially important for people with diabetes. Their hydration needs may be even higher in an emergency if power outages lead to high temperatures because air conditioning isn't working or if they need to physically exert themselves more than usual.

Dehydration is an even bigger risk if their blood glucose levels rise too high (hyperglycemia) because of a shortage of medication. During hyperglycemia, the body needs even more fluids than usual to help it flush excess glucose from the body through urination. Plain water is ideal, or other sugar-free fluids.

www.DiabetesDisasterResponse.org • Questions? Call 765-314-DDRC (765-314-3372)

Caring for People with Diabetes – Tips for First Responders

3. Medications

People with type 1 diabetes are at greatest risk because they are completely dependent on injected insulin. These patients usually take insulin a number of times per day. If insulin is not available, the consumption of carbohydrates should be reduced as much as possible.

If a person with type 1 diabetes does not have any access to insulin, the most important priority should be to maintain adequate intake of fluids to avoid dehydration (as discussed above) and avoiding intake of carbohydrates (sugar and starches). As soon as insulin becomes available, these individuals need to return to their usual insulin regimen, keeping in mind that their requirements for insulin may be quite different at this particular time. If the individual's usual type and brand of insulin is not available, using a different type or brand of insulin as directed by medical personnel is generally safe.

For a person with type 2 diabetes, who may or may not be on insulin, not receiving their medications on a regular basis presents fewer problems than in the person with type 1 diabetes but should be restarted as soon as possible. Again, avoiding hyperglycemia, which can lead to dehydration, is a priority.

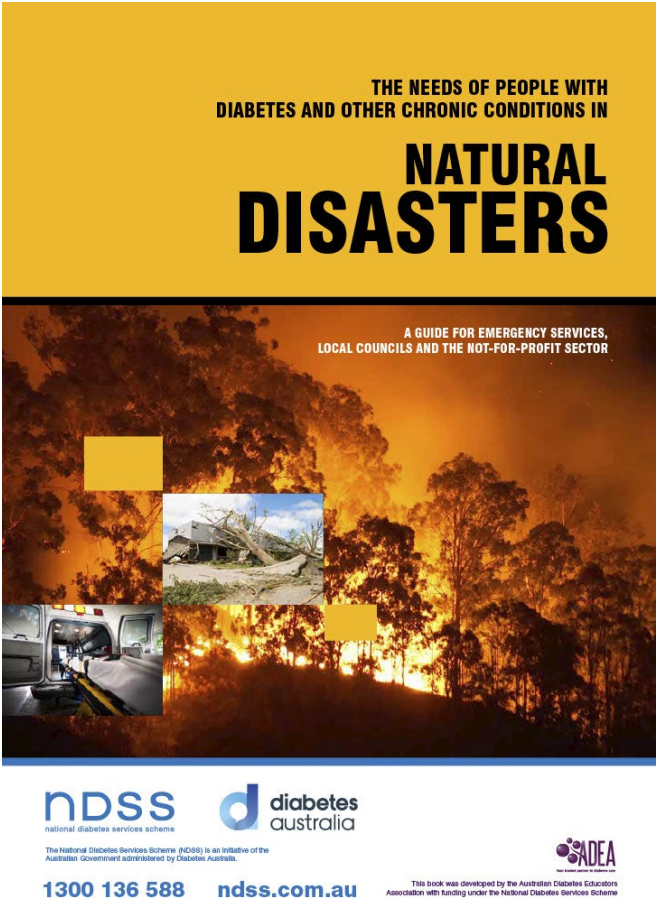
As medications become available, they should be restarted cautiously, keeping in mind that a person's needs for a particular medication and dosage may have changed if significant weight loss has occurred or a person has gone without adequate intake of food for a significant period of time.

In emergency situations, pharmacies may be dispensing medication without a prescription.

4. Infections

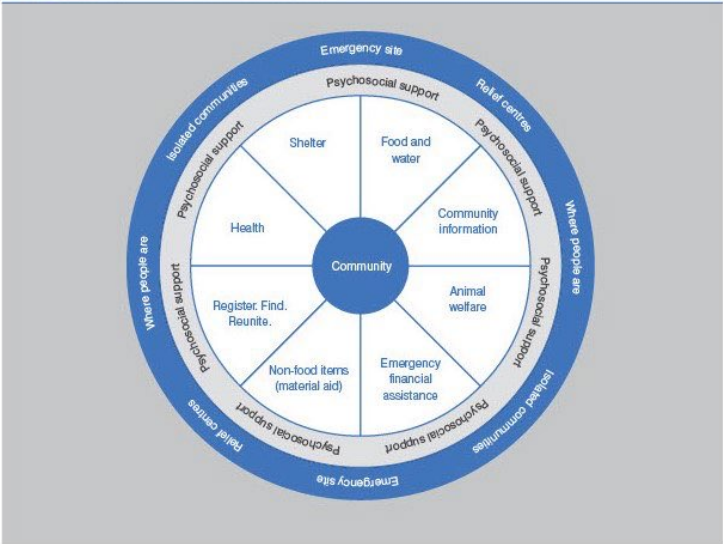
Another area of concern is the prevention of infectious disease, particularly foot infections. People with diabetes are at higher risk of developing infections of the feet due to nerve and blood vessel damage, so it is very important that they do their best to avoid walking through contaminated water or injuring their feet. Feet should be inspected visually on a regular basis to look for any cuts, sores or blisters so proper care can be obtained as quickly as possible. Should any of the usual signs of infection (swelling, redness, and/or discharge from a wound) be seen, immediate medical help should be obtained.

From the Australia Guideline (2016) available from www.ajenkinsdiabetes.org and www.ndss.com.au



Examples of planned activities:

Figure 1: Planned Activities and Support for Disaster Relief



Source: Victorian Government Dept. Health and Resources, (2013) *

BLOOD GLUCOSE MONITORING

An essential task of diabetes care during and after a natural disaster or emergency, involves regular monitoring of blood glucose levels (BGL's).

Blood glucose levels are measured in millimoles per litre of blood (mmol/L).

Target ranges may differ depending on age, duration of diabetes, the type of medication being taken and if there are any other medical problems.

Normal blood glucose levels are between 4.0 – 7.8 mmol/L

Monitoring is done using equipment such as finger-stick devices (lancets) and blood glucose meters.

Usually the person with diabetes will monitor their own blood glucose levels, however it may be necessary for a carer to assist in an emergency situation.

When in a group setting (e.g. a temporary shelter) during a disaster, strict observance to infection control is required to prevent transmission of blood borne conditions such as hepatitis B, hepatitis C, and HIV. This includes access to medical supplies such as sharps safety bins, gloves, alcohol hand gel, wipes and clean areas.



Diabetes care procedures & techniques for carers

- Medications such as insulin should be prepared in a designated medication area. Insulin vials need to be labelled appropriately. This should include a person's full name, and the date the insulin was opened.
- Never reuse needles. If available, use retractable needles when using insulin, or use retractable syringes/pen devices with retractable syringe.
- Restrict use of finger stick blood sampling devices to individuals. Consider selecting single-use retractable lancets.
- Dispose of used finger stick devices and lancets at the point-of-use in a sharps container. If a sharps container is not available, another empty container should be designated for the use of sharps disposal and marked accordingly.
- Blood glucose meters should ideally be assigned only to an individual. If this is not possible, the device must be cleaned and disinfected with 1:10 dilution of household bleach and clean water.

Hand hygiene for carers

- Wear gloves during finger stick blood glucose monitoring, administration of insulin, and during any other procedure that involves potential exposure to blood or body fluids.
- Change gloves between individual contacts. Change gloves that have touched potentially blood-contaminated objects or finger stick wounds before touching clean surfaces.
- Remove and discard gloves in an appropriate manner after every procedure that involves potential exposure to blood or body fluids.
- Perform hand hygiene (that is wash hands with soap and water or use of an alcohol hand gel) immediately after removal of gloves and before touching other medical supplies.

MENTAL HEALTH

Disasters affect individuals and communities in a range of ways and can cause major disruptions to people's lives, both emotionally and physically. Most communities and individuals draw on their strengths during disasters and are often very resilient, but the impact of disasters can be felt by communities and individuals over an extended time period.

The effects of a disaster can be widespread for individuals as it can mean the loss of family, friends, their home, their workplace, their school, business, community, their health and access to services. Those affected by disasters may report feelings of grief, fear and anxiety, anger, guilt, numbness or depression and some may not communicate their feelings at all. Disasters may also impact on people's belief systems as they may experience a sense of loss of control over their life and future.

There is evidence to suggest that those affected by disasters may also be at increased risk of developing increased substance use and post-traumatic stress disorder (PTSD).⁴⁵ The majority of people recover from disasters without long-term mental health impacts but may benefit from some basic and psychological support during and/or after a disaster.

It is not uncommon for people with diabetes to also have conditions such as depression and anxiety.⁴⁶ This suggests that those living with diabetes may require some additional monitoring of mental health during and after a natural disaster or emergency.

Who is more at risk of mental health issues from a disaster?

Individuals at greater risk include:

- those with pre-existing mental or physical health conditions including diabetes
- those who believe they or a close loved one might die
- those who actually lose such a person
- those who experience a severe injury from the event
- those at socio-economic disadvantage
- children
- elderly
- those who are socially isolated.

What are normal initial reactions to such extreme events?

- Distress, denial and disbelief are all normal early stress reactions to disasters.
- People may be shocked and stunned. Difficulty thinking clearly and trouble remembering things, especially in the initial hours and days following the disaster or emergency.
- Trouble sleeping, ongoing alertness or hyper-awareness, frequent tearfulness, irritability, anger, numbness or withdrawal can all be normal reactions to a disaster.
- There is no one correct way to react. Everyone is different. As time progresses these feelings should diminish as normal activities resume.

What are possible longer-term mental health conditions?

- The majority of people recover and do not develop mental health conditions following a disaster or emergency. Psychological stress may contribute to the development of chronic mental and physical health effects.
- Anxiety, depression and increased substance use/abuse, are some of the more common conditions that may develop, or worsen after a disaster or emergency. Post-traumatic stress disorder (PTSD) may also sometimes occur with research showing that such a diagnosis is associated with poorer diabetes control after a disaster.^{14-16,19}

What can help recovery?

- Recovery can be facilitated by a return to normal routine. This is particularly important for children as it gives a sense of safety. Undertaking small achievable practical tasks can give a sense of effectiveness in a situation that feels out of control. These 'tasks' can be created to help keep someone who is distressed occupied, such as taking responsibility for looking after a pet.
- Maintenance of good diabetes control with early medical review is important as medication requirements may change.^{20,21} Keeping physically fit, eating a healthy, regular diet and limiting alcohol intake, will help mental health recovery.

Assisting people to access support

Consider the following:

- ensure that a quiet and private area is available
- maintain a calm manner and allow sufficient time for people to talk
- keep families together
- be honest – avoid making promises and know that it is okay to say you do not know
- be friendly and compassionate even if people are being difficult – if you feel threatened ask for assistance
- be mindful and respectful of cultural considerations, ethnic or clan differences
- respect the privacy of every individual
- some people may be suspicious of your intentions to help.

Further support – personal services

- In an evacuation centre, refer people who need further support to agencies providing personal services.
- This may include Red Cross or other nominated agencies/community health services such as Lifeline or beyondblue.

When is extra help needed?

- Any ongoing distress following a disaster should be reviewed by a healthcare professional.
- Management of any mental health conditions should be concurrent with the physical conditions, as each affects the other.
- General Practitioners are skilled at treating a wide range of medical conditions and where necessary can coordinate referrals as needed. This includes referrals to mental healthcare professionals such as a psychologist or psychiatrist or an endocrine specialist for diabetes review.
- See *Appendix 5 looking after yourself (volunteers and support people)* for further information on how to care for your own mental health during a natural disaster or emergency.

APPENDIX 5: LOOKING AFTER YOURSELF (VOLUNTEER AND SUPPORT PEOPLE)

Emergency relief staff can be affected by trauma due to:

- listening to people's stories and
- observing the impact of the disaster.

Seek help if needed from:

- your GP
- colleagues

Strategies to support yourself

- Manage the amount of time you spend doing your role.
- Take scheduled breaks – and avoid working back for long hours.
- Eat healthy meals.
- Use available support services – peer support, employee assistance programmes.
- Develop posters with simple messages on ways staff can look after themselves.
- Ask yourself:
 - how am I going?
 - what do I need?
- Check on your family and friends in disaster-affected areas to ensure their safety: this will help to alleviate potential anxiety and concern for loved ones.
- Accept appropriate assistance offered to allow yourself time away from work.
- Monitor your own distress level.
- Identify when you start to notice stress and attend to your physical needs as much as possible.
- Maintain good general health with regular exercise, good nutrition and regular sleep habits.
- Use your personal and family support network.
- Maintain contact with friends and family, and talk to support people about your experiences and feelings.
- Increase interaction with professional peers.
- Engage in activities that balance work and non-work life.
- Maintain connections with organisations or activities that are meaningful to you.

The Role of Palliative Care in Disasters and Humanitarian Crises

With a focus on the care of people living with diabetes mellitus



Dr Frank Brennan, MBBS, FRACP

Palliative care physician and lawyer with an interest in human rights

Sydney, Australia, July 2022

People have access to palliative and end of life care that relieves pain and suffering, maximizes the comfort, dignity and quality of life of patients, and provides support for family members.

The Sphere Handbook. Humanitarian Charter and Minimum Standards in Humanitarian Response, 2018. Palliative Care Standard 2.7.

The principles of humanitarianism and impartiality require that all patients receive care and should never be abandoned for any reason, even if they are dying.

Naoko Yamamoto, Assistant Director General, Universal Health Coverage and Health Systems, World Health Organization

It is our hope that this new section in the IDF-WPR Diabetes and Disaster Management Guidelines, will increase knowledge and dialogue regarding inclusion of planning for palliative care related to diabetes and disaster management.

Introduction

Disasters and humanitarian crises are marked by enormous trauma, chaos, panic and suffering. They include natural disasters, epidemic and disease outbreaks, major armed conflict and forced displacement. Invariably, during these events, a substantial number of people will be seriously ill or dying. Immediately, this raises a series of questions: who will care for them, what is their standard of care, and where does that caring best occur? This section will address those issues. The structure of the section will follow two seminal documents. The first is the World Health Organization (WHO) guide: *Integrating palliative care and symptom relief into the response to humanitarian emergencies and crises* (hereafter the “WHO Guide”)¹ directed to governments. The second is *The Sphere Handbook – Humanitarian Charter and Minimum Standards in Humanitarian Response*² (hereafter “The Sphere Handbook”), the internationally endorsed standards on the humanitarian response to disasters and humanitarian crises directed to aid agencies. In addition to the general response to healthcare, specific reference will be made to diabetes care in disasters and humanitarian crises.

Humanitarianism and palliative care

There is strong overlap between the ethos of humanitarianism, the founding philosophy of international aid in times of crises, and the discipline of palliative care. Humanitarianism is “the benevolent response to the suffering and needs of others.” Palliative care is a discipline that emerged and grew in response to the suffering and needs of patients with life-limiting illnesses and their families. The WHO definition of palliative care is:

Palliative care is an approach which improves the quality of life of patients and their families facing life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.

Both humanitarianism and palliative care are founded on a recognition of the dignity of the human person. The principles underlying the Humanitarian Charter “derive their force ultimately from the fundamental moral principle of humanity: that all human beings are born free and equal in dignity and rights.”³

What is the role of palliative care during disasters and humanitarian crises?

During disasters and humanitarian crises, palliative care may apply to several groups of patients. It is important to note that the definition of palliative care quoted above includes the *early* involvement, where necessary, in life-limiting illness. Palliative care, in other words, is not simply terminal care. In disasters, therefore, palliative care may apply to three main cohorts of persons:

- i. Persons with a life-limiting illness already seen by palliative care prior to the event;
- ii. Persons with a life-limiting illness, unrelated to the disasters and humanitarian crisis, who are referred to palliative care during the event;

- iii. Persons who have a life-limiting illness or injury caused, directly or indirectly, by the disaster or humanitarian crisis.

For some time, the triage system of approach to disasters and humanitarian crises prioritised those people who were most likely to survive. In recent years, however, there has been a growing recognition of the importance of the care of those less likely to survive and the dying. That recognition is now manifest in The Sphere Handbook, a set of standards developed and endorsed by all the major international and national aid and humanitarian organisations. The most recent Sphere Handbook contains a palliative care standard that applies in disasters and humanitarian crises. That standard is set out at the beginning of this paper. It also contains “key actions” and guidance notes on this standard. A brief commentary on each follows in later sections.

Practically, what is the responsibility of governments and aid organisations in the provision of palliative care?

In disasters and humanitarian crises, it is the responsibility of governments, individually and collectively, and UN agencies to provide disaster relief and humanitarian assistance.⁴ Specifically, in relation to palliative and end-of-life care, there are several elements of that responsibility. Those elements are set out in the WHO Guide. The Sphere Standards apply to national and international aid agencies. The following section synthesises the basic elements that apply to all participants in crises. These elements, as they relate to palliative care, will now be outlined. This will be followed by the Sphere Standards as they relate to diabetes care during disasters and humanitarian crises.

Establish guidelines and policies to support consistent palliative care

This “key action” in the Sphere Standards places an obligation on aid organisations to develop their own palliative and end-of-life guidelines. Ideally, those guidelines commence by examining universal principles and international practice in palliative care. They will also need to expressly acknowledge that local factors necessitate a flexibility in approach. An important step, therefore, in any overall palliative care plan is investigating the presence and capacity of local palliative care services. Their practice will guide organisations in the local issues of medication access, standards of practice and the cultural and linguistic norms of end-of-life care.

Many nations have few or no palliative care services and do not have national guidelines or policies on palliative care.⁵ A national policy on palliative care is fundamental in both ordinary times and times of disasters and humanitarian crises. It sets a tone. For those nations with limited palliative care, a policy, at the very least, sets out what currently exists and future objectives. Assistance in creating and developing national guidelines could come from examining the policies of other nations and liaising with international palliative care associations. Ideally, all nations should have a plan for disasters and humanitarian crises. With the recent adoption by the Sphere group of palliative care as a standard, those guidelines should now include the role of palliative care.

Develop a care plan and provide palliative care to patients who are dying

The care of a person with a life-limiting illness, up to and including their death and the bereavement of their family, are core skills in palliative care. Those skills can be learnt and adopted by non-palliative care clinicians. This is important as, in the midst of a disaster or humanitarian crisis, there is likely to be a limited number of palliative care clinicians.

To assist clinicians, the content of care of the deteriorating and dying patient can be conveniently organised under several tasks of equal importance: the care of the patient, the family and the health professionals/aid workers.

Care of the patient

Preventing and relieving the suffering of the dying is an essential task of all humanitarian responses to humanitarian emergencies and crises. Failure to provide this service is medically and ethically indefensible and should not be delayed or considered optional.⁶

The critical first step in care of a dying patient is recognising the fact. Generally, that is apparent when a person with a life-limiting illness or injury has irreversibly deteriorated. The key general elements of the care of the dying patient are set out in Table 1. They include the physical, emotional and psycho-spiritual needs of the patient and their family.

Referring to all chronic illnesses, such as diabetes, the WHO Guide states:

When a health system is overloaded with injured, acutely ill or malnourished patients, then illness prevention, patients with chronic illness...typically become deprioritised or completely neglected. The result is increasing suffering and mortality in these populations.

The management of a person living with diabetes who is deteriorating and dying during a disaster or humanitarian crisis is set out in Table 2. Specific issues apply and management needs to be responsive and coherent. The table sets out the most common clinical scenarios. The general approach to diabetes care in a crisis is given in the following section.

Table 1. The care of the dying patient and their family

All the recommendations are predicated on what is accessible and possible. Of course, in a disaster/crisis situation, significant innovation and creativity may need to occur. Each medication mentioned is on the WHO Essential Medicines List.

- Preferably a quiet space for the privacy and intimacy of the dying person and family.
- A pressure mattress.
- Meticulous mouth care—cotton wool sticks dipped in water to clean and lubricate the mouth can be useful. Encourage families to participate in this care. Avoid intravenous fluids in dying patients as it can precipitate pulmonary oedema or worsening of terminal secretions.
- An in-dwelling catheter as a comfort measure.
- When the patient is sleeping for long periods with reduced oral intake, consider ceasing oral medications or converting necessary medications to a subcutaneous route.
- Symptom management in the dying patient:
 - Pain: it should never be assumed that an unconscious patient does not experience pain. Ask the family or nursing staff if there are any signs of pain (groaning or grimacing) upon being turned in bed. Morphine can be given via a subcutaneous injection (sci) either every 4 hours or through a syringe driver over 24 hours. If the patient is already taking opioids convert from oral to sci doses. If opioid-naïve, commence with a small dose of morphine and quickly build up according to patient needs. If dying of trauma, use a morphine dose that is commensurate with the level of pain. If the patient has renal impairment, morphine in usual doses will cause toxicity so use an opioid that is not morphine or prescribe morphine in small doses or if intermittently more widely spaced apart than normal (q 6 hours rather than q 4 hours).
 - Terminal agitation: Midazolam (starting dose of 2.5–5 mg subcutaneously q 4 hourly or its equivalent dose in a syringe driver over 24 hours). If not settling, consider escalating dose to match the severity of agitation.
 - Terminal secretions: Reposition patient. If not settling, consider glycopyrrolate 400 to 800 mcg subcutaneously q 1–2 hourly.
 - Nausea: Metoclopramide (10mg tds sci) or haloperidol (0.5–1mg bd sci).
- Emotional and psychological support of the patient and their family.
- Religious cleric.

Table 2. The care of the person living with diabetes who is deteriorating and dying

There are several possible clinical scenarios:

1. The person living with diabetes has a life-limiting illness (e.g., metastatic malignancy, end-stage organ failure, dementia) and is deteriorating and dying.*

- The principal objective is symptom control and comfort.
- Aim is to prevent symptomatic hypoglycaemia and hyperglycaemia.
- Recommend to maintain blood sugar levels between 6 and 15 mmol/L.

Symptomatic hypoglycaemia

- The symptoms of hypoglycaemia are sweats, palpitations, difficulty concentrating, confusion, hunger, seizures.
- If patient conscious and can swallow, give glucose drinks, food.
- If patient conscious and cannot swallow, give glucose 20 % IVI or via enteral feeds.
- If patient unconscious, give glucagon 1mg IMI or 70–80 ml of glucose 20 % IVI over 10–15 minutes.
- Review diabetes management.

Symptomatic hyperglycaemia

- The symptoms of hyperglycaemia are thirst and polyuria. If persists may lead to diabetic ketoacidosis (DKA) with severe dehydration, acidotic breathing and confusion.
- Insulin, where available.
- Where no insulin available, see Scenario 2 below.

General management

- Wean steroids if being given for underlying condition (e.g., malignancy).
 - For Type 1 diabetes: as patient's intake decreases and ceases, continue blood sugar level testing once or twice daily to ensure patient's symptoms are not caused by hypoglycaemia or hyperglycaemia. In the final days to weeks of life commence a daily dose of a long-acting insulin.
 - For Type 2 diabetes: as patient's intake decreases, cease glucose lowering medications and blood sugar level testing.
2. Due to the disaster or humanitarian crisis, the person living with diabetes requiring insulin does not have access to insulin and is deteriorating and dying from diabetic ketoacidosis.
- Do everything that is possible to access insulin, even if it has not been kept refrigerated or is out of date. If that is not possible, plan for and treat the symptoms of diabetic ketoacidosis. This may require a combination of morphine and midazolam subcutaneously every 4 hours or in syringe driver over 24 hours.

*These recommendations are based on the Diabetes (UK) Diabetes and End of Life Clinical Care Recommendations (2018).

Care of the family

The death of a family member is a tragedy. In a disaster or humanitarian crisis, more than one relative may die. The manner and circumstances of these deaths will be remembered forever by the family. Priorities include clear and precise communication to the family explaining what is unfolding, what to expect and whom to contact with questions and encouragement that they take care of themselves and each other through this period. With any plan or intervention, a crucial threshold enquiry is whether a community palliative care service or other support networks already exist. Those services have the best local knowledge, practically, linguistically and culturally. As the WHO Guide states: *“It is especially important for international emergency medical team members to seek local guidance in designing and providing services, such as ... breaking bad news and decision-making about life sustaining treatment or end-of-life-care.”*⁷

The COVID-19 pandemic is an example of the challenges to family involvement in this process *due to the nature of the crisis itself*. Quarantining, isolation and strict visitor restriction in hospitals have all played havoc with the normal gathering of a family in a vigil around a dying person. The distress this caused was compounded, following the death, by strict official limitations on attendance at funerals.

Care of the health professionals/aid workers

An important aspect of the care of the dying person is the wellbeing of health professionals involved in that care. This can be ignored or neglected and can erode the capacity of these workers to continue their work. Overwhelmed, without anywhere to place that distress, they may burn out, become emotionally detached and lose the very ethos of humanitarianism that brought them to this work in the first place. The tragedy of the disaster may be compounded by the tragedy of indifference.

It is important that all organisations and governments recognise the distress caused by the exposure to major disasters and crises and plan for and provide individual and team care. The WHO Guide sets out examples of this care.

Integrate palliative care into all levels of health system

The Sphere Standards point to two important aspects of palliative care in crises:

- a) Establishing strong referral networks to provide continuity of support and care, and
- b) Prioritise community-based management involving home-based care.

Train healthcare workers to provide palliative care, including pain and symptom control, and mental health and psychological support.

The WHO Guide sets out a tiered approach to palliative care training for all members of an emergency medicine team (EMT). The Guide also recommends the minimum number of clinicians with a prescribed level of training in palliative care for the three different types of emergency teams (outpatient emergency care (Type 1 EMT); inpatient surgical emergency care (Type 2) and complex referral surgical care including intensive care (ICU) (Type 3)).⁸ Ideally, a palliative care

physician or nurse practitioner with training in disaster medicine would be present to “provide or supervise palliative care for a large number of patients.”⁹

Provide essential medical supplies and equipment

In disasters and humanitarian crises, there are several sources of essential medicines:

1. WHO Essential Medicines held by the country in normal times. For years, WHO has published a list of Essential Medicines. These include opioids analgesics for the control of pain and respiratory distress and sedative and anxiolytic medications such as midazolam. In terms of diabetes care, insulin is also a WHO Essential Medicine. Many nations have limited access to essential medications generally. In times of disasters/crises any pre-existing access often collapses with issues of transportation and health infrastructure.
2. Medical kits in disasters. These are kits that contain prequalified essential medicines and medical devices that vary according to the health intervention. According to the Sphere Handbook, “these kits are useful for early phases of a crisis but are not suitable for protracted situations where more sustainable systems should be established.”¹⁰ WHO is the lead provider for:
 - a) Interagency Emergency Health Kits (IEHK). These are made up of Basic Modules (primary care for 1000 people over 3 months) and Supplementary Modules (10,000 people over 3 months). Table 3 sets out the palliative and diabetes care medicines and equipment in the modules and explains the process of procurement.
 - b) Non-communicable Disease (NCD) Kits. WHO has developed a health kit to support treatment for chronic non-communicable diseases, including diabetes, in disasters and humanitarian crises. The NCD Kit is intended for use in primary healthcare settings. It contains a variety of medicines and equipment relevant to diabetes care. Their selection was aligned with the WHO package of essential non-communicable disease interventions (WHO PEN) for primary care in low-resource settings. For a list of medicines and equipment relevant to diabetes care see Table 4.
 - c) WHO Essential Package of Palliative Care for Humanitarian Emergencies and Crises (EP Hum). The WHO Guide describes it as “the minimum package that should be accessible by anyone affected by a health emergency or crisis and is designed to address the palliative care needs of both adults and children.” The package is intended to guide policymakers and managers “in equipping and preparing responders to prevent and relieve the most common and severe types of suffering associated with Humanitarian emergencies and crises.”¹¹ It consists of a set of effective, inexpensive medicines, simple equipment and basic social supports. Depending on the type and budget of response organisations and the type of health emergency or crisis, the EP Hum may be augmented in various ways e.g., for mass casualty situations. The basic elements of the EP Hum are set out in Table 5.

Opioids and other controlled substances in times of disasters and humanitarian crises

Disasters expose the perils of a profound international deficit: approximately 80 % of the world's population, mainly in low and middle-income nations, consumes only 13 % of the total amount of morphine for medical purposes.¹² This fact makes nations suffering disasters and humanitarian crises extraordinarily vulnerable. Low stocks of opioids, fragile importation and supply chains may be all compounded by unduly restrictive regulations controlling access to opioids.¹³ Recognising the above deficits and the relatively slow process of nations trying to procure controlled substances (such as morphine), WHO developed model guidelines for the international provision of controlled medicines for emergency medical care to enable adequate and more rapid procurement of controlled substances in disaster relief.¹⁴ These procedures allow suppliers to ship controlled medicines internationally in emergency situations at the request of recognized agencies providing humanitarian assistance, without prior export/import authorizations. The defined procedures are acceptable to the control authorities and the International Narcotics Control Board (INCB).

Table 3. The Interagency Emergency Health Kit

Content of IEHK supplementary module relevant to palliative care and diabetes care

Palliative care

Morphine injectable and immediate release tablets; paracetamol; ibuprofen; ketamine; lignocaine

Diabetes care

Soluble insulin (and insulin syringes) for stabilization of acute life-threatening hyperglycaemia or diabetic ketoacidosis; intermediate-acting insulin; injectable glucose for severe hypoglycaemia; glucometer including glucose strips and blood lancets.

Ordering the kits

The kits can be ordered through different agencies that make them available for their own programs and for third-party organizations. They can also be obtained from commercial wholesalers. Additional details on the provision of IEHK and on the procedures for ordering can be found at the following links and by contacting the organizations using the email addresses indicated.

WHO email: procurement@who.int

Weblink: <http://intranet.who.int/tools/wcat/Categories.aspx?catid=71739>

UNICEF email: psid@unicef.org.

Weblink: <https://www.unicef.org/supply/>

MSF logistique email: office@bordeaux.msf.org.

Weblink: <https://www.msflogistique.org/>

MSF supply email: office-msfsupply@brussels.msf.org
msfsupply.order@brussels.msf.org. Weblink: <https://www.msfsupply.be>.

Before ordering the IEHK:

- Undertake a rapid assessment of the local situation to confirm that the emergency health kits are needed, which types are needed and where they are needed. The IEHK could also be stockpiled in reasonable quantity and for specific purposes. When stockpiling it is essential to monitor expiry dates and ensure that the storage conditions are in line with WHO good storage practices.
- Base the quantity and type (basic and/or supplementary modules) of emergency health kits requested on the size of the population to be served, the location and type of health centres and the skills of healthcare providers in these centres.
- Ensure that necessary funds are available to cover the cost of clearance, distribution and safe storage.

Table 4. Non-communicable Diseases (NCD) Kit

The NCD Kit seeks to address non-communicable diseases within a population of 10,000 for 3 months focuses on the provision of essential care at the primary healthcare level. Two modules are available:

- The basic module is for management of the most common NCDs, including diabetes, at the primary healthcare level. The kit contains metformin, glibenclamide, cold chain insulins including human insulin NPH, human insulin mix, human insulin R100, insulin syringes, blood test strips, blood lancets, blood glucose meter, glucagon.
- The supplementary module is for management of acute exacerbations of NCDs including acute life-threatening hyperglycaemia and diabetic ketoacidosis/stabilization of patients before their referral to a higher level of care.

This kit is available through the WHO. Further information on this kit can be found at: WHO <http://www.who.int/emergencies/kits/en/>

Table 5. The WHO Essential Package of Palliative Care for humanitarian emergencies and crises (EP Hum)¹⁵

Interventions	Social supports	Medications	Equipment	Human resources
Prevention and relief of pain and suffering, acute or chronic, related to the crises		Basic analgesics including morphine Anti-emetics Anti-secretory agents Laxatives Anti-fungals Diuretics Proton pump inhibitors Oxygen	Pressure-reducing mattresses, urinary catheters etc. Adult diapers or cotton and plastic	Doctors and nurses with basic palliative care training. Community health workers (if available)
Prevention and relief of psychological suffering, acute or chronic, related to the crises			Adult diapers or cotton and plastic	Doctors and nurses with basic palliative care training. Social workers Psychologists
Prevention and relief of social suffering, acute or chronic, related to the crises	Income and in-kind support			Social workers Community health workers (if available)
Prevention and relief of spiritual suffering, acute or chronic, related to the crises				Local spiritual counsellors

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Notes

Human Rights Aspects of Health Care During a Disaster

With a focus on the care of people living with diabetes mellitus



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Sydney, Australia, July 2022



Human Rights Aspects of Health Care During a Disaster

Introduction

Healthcare, including that related to disasters is a right, not a privilege. As well as related national and international obligations this new addition to the IDF-WPR Diabetes and Disasters Guidelines outlines the relevant human rights and also organisations that may be of assistance. Diabetes Associations and other individuals and organisations may find this section helpful in their dialogue with other agencies to assist in disaster prevention, preparedness, response and recovery. Particularly with the centenary of the discovery of insulin for human clinical use in 2021/2022 many national and international diabetes bodies, and the United Nations and World Health Organization.

There are two parts to this section:

Part 1 describes the relevant human rights laws.

Part 2 provides responsible for the well-being of people with diabetes in relationship to a disaster. These agencies can be asked to provide support as needed.

We have also published a related manuscript, which includes as an on-line appendix a detailed “White Paper” related to the use of human rights approach to improve access to insulin and other aspects of diabetes care at all times, not just in relationship to disasters.

Brennan F, Williams P, Armstrong K, Klatman E, Donelan N, Ogle GD, Eussen A, Jenkins AJ. A human rights-based approach to improve access to insulin and other aspects of diabetes care. *Diabetes Res Clin Pract.* 2022;183:109153. doi: 10.1016/j.diabres.2021.109153. This paper may also be available at www.ajenkinsdiabetes.org

Human rights and health care during a disaster

Disasters and humanitarian crises have the most profound and traumatic effect on a population. This short overview examines the human rights of people living with diabetes during disasters and humanitarian crises.

What rights do individuals possess generally and in times of crises?

During crises do governments and the international community have other obligations to fulfil?

Under international law, access to the provision of diabetes care in disasters and humanitarian crises has several sources, which is summarised in Table 1 and each expanded upon thereafter:

- International Human Rights Law
- International Humanitarian Law
- International Refugee Law

Summary

Part 1:

During disasters and humanitarian crises, the provision of diabetes care is vital. Under international law, access to this provision in disasters and humanitarian crises has several sources:

- International human rights law
- International humanitarian law
- International refugee law

These laws inform the international standards (the Sphere Standards) that apply to national and international aid organisations.

International Human Rights Law

- Under international human rights law, healthcare is a right not a privilege.
- Diabetes care forms part of healthcare.
- The right to healthcare, including diabetes care, is an obligation for governments to respect, protect and fulfil.
- The right to healthcare, including diabetes care, contains a series of essential elements, including availability, accessibility, cultural acceptability and quality of healthcare.
- The right to healthcare contains a series of core obligations on nations, irrespective of their resources, including:
 - the provision of healthcare without discrimination;
 - the provision of WHO Essential medicines, including insulin, and
 - the creation of a national public health policy.
- In addition to the right to health, other international human rights that are relevant to diabetes care are the right to life, the right to information and the right to be treated without discrimination.
- During disasters and humanitarian crises, further obligations in healthcare, including diabetes care, fall on:
 1. governments, individually and collectively;
 2. authorities within the United Nations, including the WHO, and
 3. civil society.

International Humanitarian Law

This applies in times of armed conflict and military occupation and is contained in the Geneva Conventions. It obliges parties to provide healthcare, including diabetes care, to wounded combatants, civilians and prisoners of war.

International Refugee Law

The *Convention Relating to the Status of Refugees* (the Refugee Convention) lays down minimum standards for the treatment of refugees, including the provision of healthcare (including diabetes care) to all refugees without discrimination. Refugees also have rights that apply universally under international human rights law.

Part 1: International human rights law

Following the atrocities of World War II, the international community articulated a series of basic human rights commencing with the Universal Declaration of Human Rights. This was followed by a series of international conventions of human rights. Under these conventions, the principal obligation on the fulfilment of human rights falls on individual governments. How do these rights apply in times of disasters and humanitarian crises? In these times of crisis, there are:

1. Human rights that apply always and continuously, irrespective of the circumstances, and
2. Obligations that apply during humanitarian disasters.

Human rights that apply continuously

Relevant to diabetes care, people living with diabetes possess several rights under international human rights law at all times, including during disasters and humanitarian crises. These rights include:

- a) A right to health;
- b) A right to life;
- c) A right to information, and
- d) A right to be treated without discrimination.

Each of these rights shall be described. The summary table at the commencement of this chapter sets out how these rights apply to diabetes care.

A right to health

From the inception of the United Nations, the international community recognised a universal right to health. The principal expression of the right to health is contained in the *International Covenant on Economic, Cultural and Social Rights* (ICESCR).¹ Other conventions have also stated the right to health.²⁻⁵ The right to health applies continuously, including during humanitarian disasters. What is the content of the right? What obligations do governments have in fulfilling the right to health? There are several:

- The right is universal and is founded on recognition of the “inherent dignity and the equal and inalienable rights of all members of the human family”.⁶
- Governments are expected to take steps to realize the right to health “to the maximum of its available resources”.⁷
- Nevertheless, there are “core obligations” on governments, irrespective of their resources, including:
- access to essential medicines,
 - a) the provision of health services on a non-discriminatory basis, and
 - b) the adoption of a national public health strategy.⁸
- In addition, there are obligations of “comparable priority” including the provision of “education and access to information concerning the main health problems in the community, including methods of preventing and controlling them.”

- The right to health contains the “interrelated and essential elements” of availability, accessibility, acceptability and quality of healthcare facilities, goods and services.⁹
- State obligations fall into three categories, namely the obligation to respect, protect and fulfil the right to health.¹⁰ The obligation to respect requires states to refrain from interfering with or limiting access to health services; the obligation to protect requires states to prevent third parties from interfering with the right to health and access to medicines and the obligation to fulfil requires states to adopt appropriate legislative, administrative and other measures to fully realise the right to health.
- The right to health has been authoritatively interpreted to include obligations on non-government bodies to act consistently with the realisation of the right to health. That includes non-government organisations (NGOs) and pharmaceutical companies. For the latter, this is especially relevant to access to essential medicines.

The right to life

This right has several sources: the *International Convention on Civil and Political Rights* (ICCPR),¹¹ the *Convention on the Rights of the Child* (CRC)¹² and the *UN Declaration on the Rights of Indigenous Peoples* (UNDRIP).¹³ The UN Human Rights Commission explained that the right to life “should not be interpreted narrowly” or “in a restrictive manner” and its protection “requires that States adopt positive measures...to increase life expectancy.”¹⁴ This broad interpretation perfectly fits within diabetes care. The lack of access to insulin in a person with Type 1 diabetes mellitus is especially relevant to children with Type 1 diabetes mellitus. The UN Special Rapporteur on Health expressly linked the right to health and the right to life in the context of children and, relevant to Type 1 diabetes, stated “The right to health is ... closely linked to the right to survive of young children.”¹⁵

The right to information

International human rights law states there is right to information concerning health issues. The right to information is critical to persons living with diabetes and their families and carers. The sources of that right are the *International Convention on Civil and Political Rights*,¹⁶ the *Convention on the Rights of the Child* (CRC).¹⁷ The Committee that oversees ICESCR in their General Comment No. 14 on the right to health stated that:

Healthcare accessibility “includes the right to seek, receive and impart information and ideas concerning health issues.”¹⁸

The right to be treated without discrimination

The right to healthcare without discrimination is a central tenet of General Comment No 14 on the international right to health. It stated that health facilities, goods and services have to be accessible to everyone without discrimination “and especially to the most vulnerable and marginalized sections of the population.”¹⁹ This general principle applies to diabetes care. In addition to direct discrimination, there is the concept of indirect discrimination. An example of a government policy that is indirectly discriminatory would be one that only supplies insulin to certain

major centres and not to rural and remote areas. Another example would be the affordability of diabetes care. In General Comment No.14, the Committee overseeing the ICESCR, stated that “poorer households should not be disproportionately burdened with health expense as compared to richer.”¹⁹

Obligations that apply during humanitarian disasters

During humanitarian disasters, do further obligations apply? In this section, obligations on governments, individually and collectively, international organisations and civil society during disaster and humanitarian crises are described. Table 1 sets out these obligations as they relate to diabetes care.

The responsibility of governments

The steps to be taken by governments to achieve the full realization of health includes “the creation of a system of urgent medical care in cases of accidents, epidemics and similar health hazards and the provision of disaster relief and humanitarian assistance in emergency situations.”²⁰ It is the responsibility of each nation to contribute to disaster relief and humanitarian assistance “to the maximum of its capacities.”²¹ The “priority in the provision of international medical aid, distribution and management of resources, such as ... medical supplies ... should be given to the most vulnerable and marginalized groups of the population.”²¹ Realistically, a disaster places a tremendous burden on the capacity of any nation to fulfil their obligations, including the right to health. Recognising that many nations possess limited resources, the ICESCR expressly refers to governments acting “individually and through international assistance and co-operation”.²² Therefore, there is a “joint and individual responsibility” to “cooperate in providing disaster relief and humanitarian assistance in times of emergency...”²³ The Committee also states that “economically developed State parties have a special responsibility and interest to assist poorer developing States in this regard.”²⁴

The responsibility of United Nations agencies, including the World Health Organization

The Committee that oversees the ICESCR recognised the critical importance of United Nations agencies, including WHO and UNICEF in “realizing the right to health”. Indeed, in the context of humanitarian disasters, the Committee envisaged a broadly held responsibility:

The role of WHO, the Office of the United Nations High Commissioner for Refugees, the International Committee of the Red Cross/Red Crescent and UNICEF ... is of particular importance in relation to disaster relief and humanitarian assistance in times of emergencies, including assistance to refugees and internally displaced persons. Priority in the provision of international medical aid, distribution and management of resources, such as safe and potable water, food and medical supplies, and financial aid should be given to the most vulnerable or marginalised groups of the population.²⁵

The responsibility of civil society

The Committee that oversees the ICESCR identified that a further locus of responsibility of healthcare lay with non-government organisations, especially in relation to disasters:

The role of ... non-governmental organizations and national medical associations, is of particular importance in relation to disaster relief and humanitarian assistance in times of emergencies...²⁶

Arguably, this includes the role pharmaceutical companies during disasters and humanitarian crises in assistance.

Table 1. Responsibilities of governments, United Nations and civil society in diabetes care during disasters and humanitarian crises
(in addition to continuous human rights that apply, as in the Summary Table)

The responsibility of governments

- The right to health includes “the creation of a system of urgent medical care in ... the provision of disaster relief and humanitarian assistance in emergency situations.”²⁷ This includes diabetes care.
- It is the responsibility of each nation to contribute to disaster relief and humanitarian assistance “to the maximum of its capacities.”²⁸
- The “priority in the provision of international medical aid, distribution and management of resources, such as ... medical supplies (including insulin) ... should be given to the most vulnerable and marginalised groups of the population.”²⁸ This would apply to people with Type I diabetes who will die without a reliable supply of insulin.
- Governments have a “joint and individual responsibility” to “cooperate in providing disaster relief and humanitarian assistance in times of emergency...”²⁸ For governments to work together in supply and provision of all aspects of diabetes care, including insulin.
- “Economically developed State parties have a special responsibility and interest to assist the poorer developing States in this regard.”²⁸ This responsibility includes all aspects of health, including diabetes care.

The responsibility of United Nations agencies, including the World Health Organization

The Committee expressly stated that the priority is “the provision of international medical aid, distribution and management of resources, such as safe and potable water, food and medical supplies, and financial aid should be given to the most vulnerable or marginalized groups of the population.”²⁹ This applies to diabetes care.

The responsibility of civil society

The Committee stated that: “The role of ... non-governmental organizations and national medical associations, is of particular importance in relation to disaster relief and humanitarian assistance in times of emergencies...”³⁰ Arguably, this includes the role pharmaceutical companies during disasters and humanitarian crises in assistance.

International humanitarian law

International humanitarian law is a body of law developed for situations of armed conflict and military occupation. It regulates the methods of conducting hostilities and treatment of the victims of warfare. The principal instruments of international humanitarian law are the four Geneva Conventions. Collectively, they provide rules for the treatment of the wounded, sick and shipwrecked (the First and Second Geneva Conventions), prisoners of war (the Third Geneva Convention) and civilians (the Fourth Geneva Convention). Other protocols have been subsequently added. Table 2 summarises the sections of the Conventions and Protocols relevant to healthcare, including diabetes care, in times of armed conflict and military occupation.

Table 2. Summary of obligations under international humanitarian law in the provision of healthcare, including diabetes care, in times of armed conflict and/or military occupation

Parties to a conflict are obliged to respect and care for the wounded, sick and shipwrecked whether military or civilian. "They shall not wilfully be left without medical assistance and care..."³¹

In "all circumstances" they shall "be treated humanely."³⁷

This applies to armed conflicts occurring within a country³² or between countries.³³

With an internal conflict, all parties "shall be bound to apply, as a minimum ... the wounded and sick shall be cared for"³⁴, "respected and protected"³⁵ and "in all circumstances ... treated humanely and shall receive, to the fullest extent practicable and with the least possible delay, the medical care and attention required by their condition."³⁵

With an international conflict, this care should be universally applied and not discriminate against persons according to gender, religion, nationality or political reasons.³⁶

The distinction regarding treatment will be medical: "only medical reasons will authorise priority in the order of treatment..."^{36,37}

If it becomes necessary for a party to the conflict to abandon the wounded and sick, the party must, as far as military considerations permit, leave with (the wounded and sick) a part of its medical personnel and material to assist in their care."³⁸

Rules on the establishment of hospital and safety zones.³⁹

Rules on protecting the wounded and sick.⁴⁰

Rules on protecting hospitals.⁴¹

Rules on protecting hospital staff.⁴²

Consignments of medical supplies are permitted through occupied territory.⁴³

"To the fullest extent of the means available to it, the Occupying Power has the duty of ensuring ... medical supplies of the population; it should in particular bring in the necessary ... medical stores ... if the resources of the occupied territory are inadequate."⁴⁴

"To the fullest extent of the means available to it, the Occupying Power has the duty of ensuring and maintaining, with the cooperation of national and local authorities, the medical establishment and services..."⁴⁵

International refugee law

The Universal Declaration of Human Rights recognised the right of persons to seek asylum from persecution in another country.⁴⁶ In international law, a refugee is defined as “a person who is unable or unwilling to return to their own country owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular group or political opinion.”⁴⁷ The *Convention Relating to the Status of Refugees* (the Refugee Convention) lays down minimum standards for the treatment of refugees. Such standards or expectations are not statements of rights and are not enforceable. Nevertheless, apart from the above, refugees still have protections and rights that are recognised in international law. In terms of health, including diabetes care, those protections and rights include:

1. The overarching responsibility for the protection of the welfare of refugees is held by the UN High Commission for Refugees.
2. Refugees have universal rights declared by the Universal Declaration of Human Rights.
3. The Committee that oversees the right to health in the ICESCR stated that “States are under obligation to respect the right to health by, inter alia, refraining from denying or limiting equal access for all persons including...asylum seekers to preventive, curative and palliative health services...”⁴⁸ The UN Special Rapporteur on Health has stressed that ill asylum-seekers should not be denied their human right to healthcare.⁴⁹
4. A nation cannot return a refugee to the country from which they have fled if to do so would threaten their life or freedom.

International law in disasters and humanitarian crises—to what extent do they apply in practice?

In the tumult and the tragedy of disasters and humanitarian crises, the idea and content of international human rights standards can easily be swept aside. One way they may remain relevant is if they are embedded in the very response to these crises. The main modern statement ensuring this relevance, theoretically and practically, are the Sphere Standards.

The Sphere Standards

The Sphere Standards are a set of authoritative, international standards for aid agencies that act in disaster and humanitarian crises. The Sphere Standards are set out in the Humanitarian Charter and Minimum Standards in Humanitarian Response.⁵⁰ It is not a UN or WHO document. Rather, it is a collective statement by the community of international aid agencies on the ethos and principles of international aid and the minimum standards they have uniformly accepted. These standards are based on evidence, expert opinion and best practices.

To what extent are the Sphere Standards based on international human rights law?

The Sphere Standards have several sources. One is international human rights law. The others are international humanitarian law (the law that applies in conflict), refugee law and extra-legal sources such as humanitarian action (in essence, the consensus view of international aid agencies drawn from decades of experience).

The Sphere Standards that apply to diabetes care were examined in the previous chapter entitled: “The role of palliative care in disasters and humanitarian crises, with a focus on the care of people living with diabetes mellitus.”



Part 2: Diabetes care in disasters and humanitarian crises, and who to ask for help

Disasters and humanitarian crises may partially or completely disrupt the care needs of people living with diabetes. The collapse of a health system, the severing of chains of supply of essential medicines, including insulin and diabetes equipment, the lack or absence of food, water and housing, and the death, illness or absence of health professionals with an expertise in diabetes care may all contribute to major morbidity and mortality. The Sphere Standards contain several key actions with regard to non-communicable diseases in disasters and humanitarian crises. In the context of diabetes care, those actions include:

- a) Identify the diabetic health needs of a community and analyse the availability of services pre-crisis. This includes identifying those at risk of life-threatening complications such as diabetic ketoacidosis (DKA);
- b) Implement phased-approach programmes based on life-saving priorities and relief of suffering. This includes ensuring patients diagnosed with life-threatening DKA receive appropriate care and, if this is not available, offer palliative and supportive care;
- c) Integrate diabetes care into the health system at all levels. This includes providing basic treatment for diabetes at a primary healthcare level. It also means establishing a referral system to manage acute complications and complex cases in secondary or tertiary care, including supportive and palliative care. Also, to refer patients for nutrition and food security, where appropriate, and
- d) Establish national preparedness programmes for diabetes care. This includes ensuring that essential medicines such as insulin and diabetic equipment are included in pre-positioned or contingency emergency medical supplies, such as the NCD Kits and Inter-Agency Emergency Health Kits (IEHK) described above, and prepare individual patients with a backup supply of medications and instructions on where to access emergency care should a crisis occur.

Preparation for disasters

Well before the onset of disasters and humanitarian crises, a wise nation prepares. Equally, wise humanitarian organisations prepare. That preparation should mirror the reality of such events: that a significant number of people may become very ill, due directly or indirectly, to the crisis. The International Strategy for Disaster Reduction (ISDR), mandated by UN General Assembly resolution, is based on the recognition that much of the devastation of major natural hazards could be prevented through preparedness, surveillance and early warning.⁵¹ In 2015, the UN General Assembly endorsed the *Sendai Framework for Disaster Risk Reduction 2015–2030*, a voluntary, non-binding agreement that recognises that, although the state has the primary role to reduce disaster risk, the responsibility should be shared by local government, the private sector and other stakeholders.⁵²

Given the publication of the new Sphere Standards incorporating palliative care and the WHO Guidelines on palliative care in crises, disaster risk reduction should, in the modern era, include palliative care. That preparation should include

all the aspects discussed above. Equally, the Sphere Standards are relevant to disaster preparation in the context of non-communicable diseases, including diabetes. Several of the key points on standards in NCDs in crises outlined above, relate to the need for preparation in advance of those crises.

Who can you call upon in disasters and humanitarian crises?

In the tumult and chaos of a disaster or humanitarian crises, it is extremely important that governments, civil society and the general community have a clear sense of whom to turn to for aid, support and co-ordinate. There are two broad overlapping answers: understanding the response structure and access to vital medicines and medical equipment. These are set out in Figures 6 and 7, respectively.

Response structure

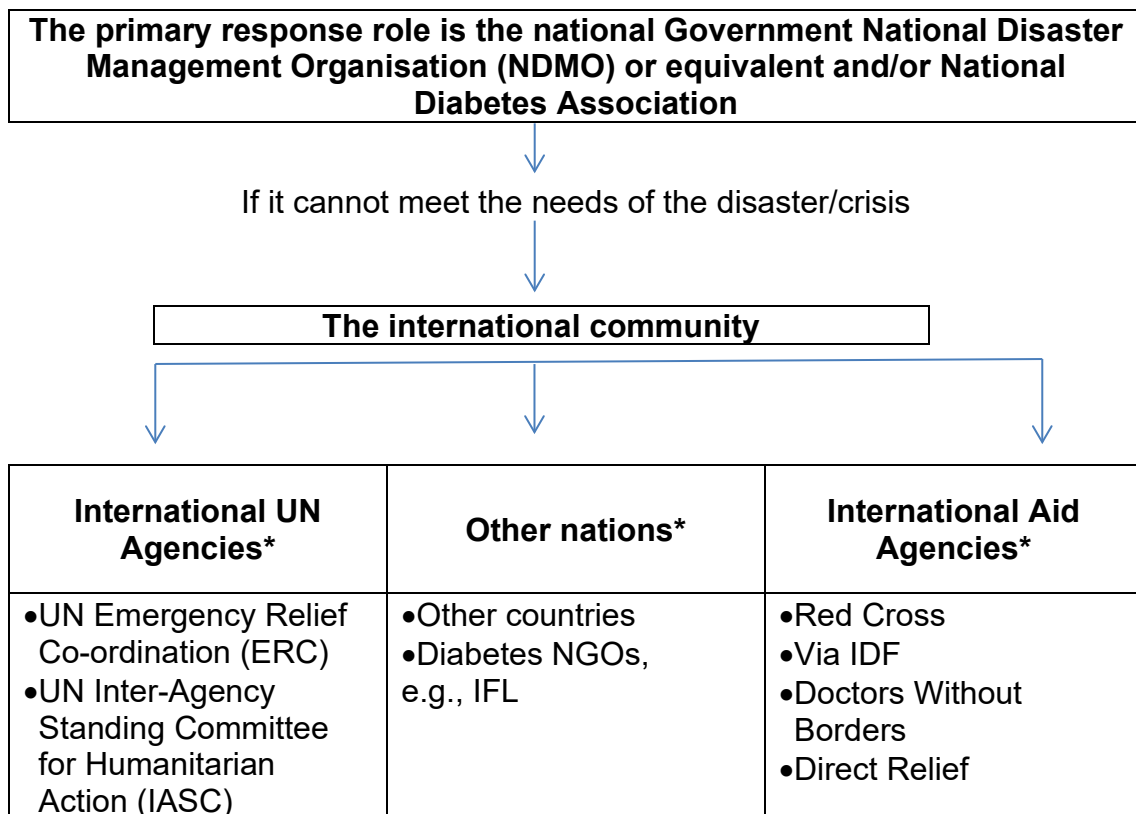
In a disaster or humanitarian crisis, the first and central body to turn to is the national government itself. Usually, the government will appoint a National Disaster Co-ordinating Authority, or equivalent, to oversee the response. If it is clear a nation is not coping alone, a series of international bodies, agencies, governments and organisations may become involved. All guidelines and standards emphasise the importance of the co-ordination of these organisations and agencies. That is a critical issue in all disasters and crises. Table 3 lists a summary of the response of main institutions, agencies and aid organisations.

To whom can you turn?

If one's medical clinic or hospital is unable to meet their diabetes-related demands during a disaster the structure of responders is as summarised in Figure 1.



The structure of the response to disasters and humanitarian crises



*In collaboration with local national disaster authorities.

IFL = Insulin For Life (www.insulinforlife.org)





Request for diabetes aid in a disaster template

First Name _____
Last Name _____
Organisation _____
Address _____
City / State _____
Country _____
Phone _____ Alternate phone _____
Email(s) _____
Social media _____

What is the emergency

What is required / e.g. types of medicines, how many people, how long for



Request for diabetes aid in a disaster template

Contact Person / Delivery Address (accessible during disaster)

First Name _____
Last Name _____
Organisation _____
Dates / times available _____
Address _____
City/State/Zip _____
Country _____
Phone _____ Alt Phone _____
Email(s) _____
Social media _____

Special requests / local clearance instructions / partner organisations / other

One's national diabetes association may consider contacting the International Diabetes Federation Regional and/or International office for assistance. They may interact with or refer to contacts in other relevant agencies. In addition to the usual agencies, during a major disaster, such as occurred during the COVID-19 pandemic a temporary working party involving representatives from many diabetes and aid organisations and industry may be formed. They can respond to or refer to other sources requests from individuals with diabetes or healthcare systems. The IDF-WPR or international office will usually know who the relevant contact people are.

Access to vital medicines and equipment

This is critical. As stated above, the nation that experiences a disaster or crisis may have little or no access to vital medicines and medical equipment in ordinary times. Now, in a crisis they are overwhelmed, and those deficits are tragically exposed. What other sources of medicines may be possible? Commencing with internal reserves and moving to external sources, these have been set out above and summarised in Figure 2.

Figure 2. Sources of vital medicines in disasters and humanitarian crises

1. WHO Essential Medicines that are currently available in the country.
2. WHO *Model Guidelines for the international provision of controlled medicines for emergency medical care* to enable adequate and more rapid procurement of controlled substances (e.g., opioids) in disaster relief.
3. Kits for disasters and humanitarian crises
 - The Interagency Emergency Health Kit (IEHK); see Table 5.
 - Non-communicable Diseases (NCD) Kit; see Table 6
 - WHO Essential Package of Palliative Care for humanitarian emergencies and crises (EP Hum); see Table 7
4. Diabetes NGOs
5. Industry

Provide essential medical supplies and equipment

In disasters and humanitarian crises, there are several sources of essential medicines:

1. WHO Essential Medicines held by the country in normal times.

For years, WHO has published a list of essential medicines. These include opioids analgesics for the control of pain and respiratory distress and sedative and anxiolytic medications such as midazolam. In terms of diabetes care, insulin is also a WHO essential medicine. Many nations have limited access to essential

medications generally. In times of disasters/crises any pre-existing access often collapses with issues of transportation and health infrastructure.

2. Medical kits in disasters.

These are kits that contain prequalified essential medicines and medical devices that vary according to the health intervention. According to the Sphere Handbook “these kits are useful for early phases of a crisis but are not suitable for protracted situations where more sustainable systems should be established.”⁵³ The WHO is the lead provider for three types of kits:

- i. *Interagency Emergency Health Kits (IEHK)*. These are made up of basic modules (primary care for 1000 people over 3 months) and supplementary modules (10,000 people over 3 months). Table 3 sets out the palliative and diabetes care medicines and equipment in the modules and explains the process of procurement.
- ii. *NCD Kits*. WHO has developed a health kit to support treatment for chronic non-communicable diseases, including diabetes, in disasters and humanitarian crises. The NCD Kit is intended for use in primary healthcare settings. It contains a variety of medicines and equipment relevant to diabetes care. Their selection was aligned with the WHO Package of Essential Non-communicable disease interventions (WHO PEN) for primary care in low-resource settings. For a list of medicines and equipment relevant to diabetes care see Table 4.
- iii. *WHO Essential Package of Palliative Care for Humanitarian Emergencies and Crises (EP Hum)*. The WHO Guide describes it as “the minimum package that should be accessible by anyone affected by a health emergency or crisis and is designed to address the palliative care needs of both adults and children.” The package is intended to guide policy-makers and managers “in equipping and preparing responders to prevent and relieve the most common and severe types of suffering associated with Humanitarian emergencies and crises.”⁵⁴ It consists of a set of effective, inexpensive medicines, simple equipment and basic social supports. Depending on the type and budget of response organisations and the type of health emergency or crisis, the EP Hum may be augmented in various ways; e.g., mass casualty situations. The basic elements of the EP Hum is set out in Table 5.

3. Opioids and other controlled substances in times of disasters and humanitarian crises.

Disasters expose the perils of a profound international deficit: approximately 80% of the world’s population, mainly in low and middle-income nations, consumes only 13% of the total amount of morphine for medical purposes.⁵⁵ This fact makes nations suffering disasters and humanitarian crises extraordinarily vulnerable. Low stocks of opioids, fragile importation and supply chains may be all compounded by unduly restrictive regulations controlling access to opioids.⁵⁶ Recognising the above deficits and the relatively slow process of nations trying to procure controlled substances (such as morphine), WHO developed *Model Guidelines for the International Provision of Controlled Medicines for Emergency Medical Care* to enable adequate and more rapid procurement of controlled substances in disaster

relief.⁵⁷ These procedures allow suppliers to ship controlled medicines internationally in emergency situations at the request of recognised agencies providing humanitarian assistance, without prior export/import authorisations. The defined procedures are acceptable to the control authorities and the International Narcotics Control Board (INCB).

Table 3. The Interagency Emergency Health Kit

Content of IEHK supplementary module relevant to palliative care and diabetes care

Palliative care

Morphine injectable and immediate release tablets; paracetamol; ibuprofen; ketamine; lignocaine

Diabetes care

Soluble insulin (and insulin syringes) for stabilization of acute life-threatening hyperglycaemia or diabetic ketoacidosis; intermediate-acting insulin; injectable glucose for severe hypoglycaemia; glucometer including glucose strips and blood lancets.

Ordering the kits

The kits can be ordered through different agencies that make them available for their own programs and for third-party organizations. They can also be obtained from commercial wholesalers. Additional details on the provision of IEHK and on the procedures for ordering can be found at the following links and by contacting the organizations using the email addresses indicated.

WHO email: procurement@who.int

Weblink: <http://intranet.who.int/tools/wcat/Categories.aspx?catid=71739>

UNICEF email: psid@unicef.org.

Weblink: <https://www.unicef.org/supply/>

MSF logistique email: office@bordeaux.msf.org.

Weblink: <https://www.msflogistique.org/>

MSF supply email: office-msfsupply@brussels.msf.org
msfsupply.order@brussels.msf.org. Weblink: <https://www.msfsupply.be>.

Before ordering the IEHK:

- Undertake a rapid assessment of the local situation to confirm that the emergency health kits are needed, which types are needed and where they are needed. The IEHK could also be stockpiled in reasonable quantity and for specific purposes. When stockpiling it is essential to monitor expiry dates and ensure that the storage conditions are in line with WHO good storage practices.

- Base the quantity and type (basic and/or supplementary modules) of emergency health kits requested on the size of the population to be served, the location and type of health centres and the skills of healthcare providers in these centres.
- Ensure that necessary funds are available to cover the cost of clearance, distribution and safe storage.

Table 4. Non-communicable Diseases (NCD) Kit

The NCD Kit seeks to address non-communicable diseases within a population of 10,000 for three months and focuses on the provision of essential care at the primary healthcare level. Two modules are available:

- The basic module is for management of the most common NCDs, including diabetes, at the primary healthcare level. The kit contains metformin, glibenclamide, cold chain insulins including human insulin NPH, human insulin mix, human insulin R100, insulin syringes, blood test strips, blood lancets, blood glucose meter, glucagon.
- The supplementary module is for management of acute exacerbations of NCDs including acute life-threatening hyperglycaemia and diabetic ketoacidosis/stabilization of patients before their referral to a higher level of care.

This Kit is available through the WHO. Further information on this kit can be found at: WHO <http://www.who.int/emergencies/kits/en/>

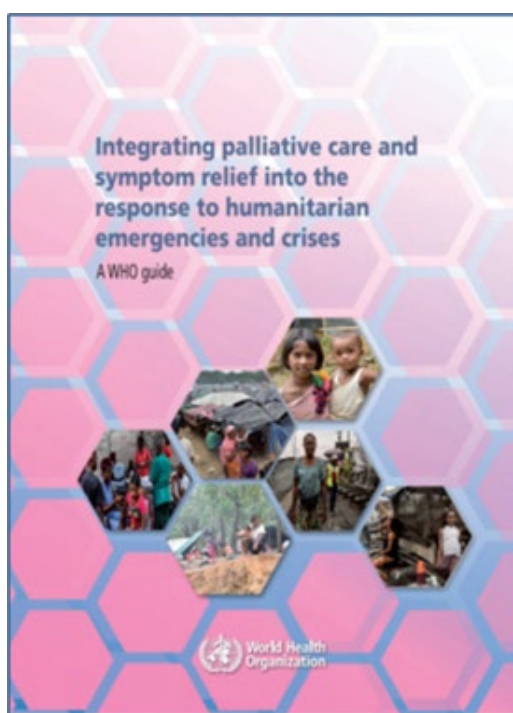


Table 5. The WHO Essential Package of Palliative Care for humanitarian emergencies and crises (EP Hum)⁵⁸

Interventions	Social supports	Medications	Equipment	Human resources
Prevention and relief of pain and suffering, acute or chronic, related to the crises		Basic analgesics including morphine Anti-emetics Anti-secretory agents Laxatives Anti-fungals Diuretics Proton pump inhibitors Oxygen	Pressure-reducing mattresses, urinary catheters etc. Adult diapers or cotton and plastic	Doctors and nurses with basic palliative care training. Community health workers (if available)
Prevention and relief of psychological suffering, acute or chronic, related to the crises			Adult diapers or cotton and plastic	Doctors and nurses with basic palliative care training. Social workers Psychologists
Prevention and relief of social suffering, acute or chronic, related to the crises	Income and in-kind support			Social workers Community health workers (if available)
Prevention and relief of spiritual suffering, acute or chronic, related to the crises				Local spiritual counsellors

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Past Experiences of Natural Disasters and Diabetes Management in the IDF-WPR



Natural disasters and diabetes management

Anecdotes and learnings from some previous natural disasters in the IDF-WPR are presented, including updated versions of those presented in the first edition of the IDF-WPR Diabetes and Disaster Management Guidelines, and more recent events that were presented at the AASD meeting in Sendai, Japan, in 2019 or contributed during the development of this manual.

Tohoku earthquake and tsunami in Japan, 2011

Natural disasters are disruptive to glycaemic control in people with diabetes.⁶⁻¹³ Previous studies observed significantly increased blood glucose, glycated haemoglobin (HbA1c), systolic and diastolic blood pressure in people with diabetes after the Great East Japan Earthquake and Tsunami in 2011.^{6-9,14} Several factors, such as changes in diet, interruption of drug intake, and psychological stress are proposed to deteriorate blood glucose in acute disaster events.^{8,14} Fresh food tends to be in particularly short supply after a natural disaster, and thus causes patients to predominantly subsist on preserved foods such as sweets, pastries, canned products, instant noodles, and boil-in-the-bag foods, and that can disrupt glycaemic control. In addition, the use of antihyperglycaemic drugs is reported to be decreased by 30–40% because many patients are separated from their diabetes 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 fully recovered to the usual levels. Besides, post-disaster emotional stress adversely affects glycemic control.

In the afternoon of 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.

Observations in the affected area

After the Great East Japan Earthquake, it took a long time to restore lifelines such as supplies of electricity, water, and gas, as well as telephone and transportation. Periods for the restorations were: approximately three days in Iwate, approximately 20 days in Miyagi, and approximately five 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 services (SMS) were often unusable.

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.

Medication

Due to the destruction of roads, railways, and airports, shortages in supplies of insulin, needles and self-monitoring blood glucose (SMBG) sensors were problems for those who required insulin injections. Approximately 20% of patients with type 1 diabetes on the coastal 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).

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.

Mental health

Many of the survivors experienced post-disaster mental trauma.

Suggestions

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

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

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.

Coordinate healthcare professionals including pharmacists, dieticians and nurses, to support refugees with chronic diseases.

Update

Comprehensive national Japanese guidelines for diabetes management in disasters were released in 2014, with an English version released in 2019.



Typhoon Haiyan in the Philippines, 2013

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, 2013.¹⁻² Many people with type 2 diabetes did not have access to medicine, and their supplies of insulin had been exhausted prior to the disaster.¹⁵ According to Dr Richard Elwyn V. Fernando, President of Diabetes Philippines (DP), several challenges existed. The first was sending the vials of insulin to people with diabetes 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 glucose control, hypertension, and heart disease were in low supply.

Partnership with Insulin for Life

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



Suggestions

Following Typhoon Haiyan, Dr Fernando and his team developed two objectives for Diabetes Philippines to improve outcomes for people with diabetes surviving disasters. The first was to create a national standard operating procedure 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 (these costs are usually covered by other sources, such as the IDF in a disaster).

Update

National disaster response guidelines exist but do not specifically mention diabetes

Diabetes Philippines has featured disaster preparedness and response in their annual meeting in Nov 2021, and have started planning to produce local guidelines, accelerating momentum with availability of the 2nd edition of the IDF-WPR disaster guidelines.

The now even larger IFL network (www.insulinforlife.org) is able to assist directly and/or directly assist with diabetes resources during and after disasters in the IDF-WPR and other regions.

Christchurch earthquake in New Zealand, 2010 and 2011

Christchurch suffered a major earthquake in September 2010, which in effect acted as a training ground for the more damaging earthquake occurring in February 2011.¹⁶ 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 were competing for reduced resources, and in such cases this remained a low priority in the overall re-planning of clinical services.

Suggestions

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 childcare, as many schools were closed for several weeks. If one or more staff members can do a reconnaissance of diabetes needs, including inpatient needs, this may reveal opportunities for reallocation of resources.

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 questions: 'How can we be of help?' and 'What do you need?', then listen carefully to the answers and respond accordingly.

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), 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.

Update

Excellent advice is available at the Diabetes New Zealand website: <https://www.diabetes.org.nz/managing-diabetes-emergencies>. There are links to other New Zealand sites with general disaster response advice in multiple languages for individuals, including emergency kits and how to store water.

Aceh earthquake tsunami in Indonesia, 2004

Observations on medical care in the affected areas

The Aceh tsunami is considered one of the most devastating natural disasters in the history of Indonesia, triggered by a 9.15 magnitude earthquake in the Indian Ocean.¹⁷ Based on data from the Indonesian government released a year after the disaster, it is estimated that 129,775 people were killed and 38,786 were missing.¹⁸ There were 1,458 trauma/wound victims of the Aceh tsunami reported to the WHO, starting from the disaster until around May 2005.¹⁹ Communicable diseases such as acute respiratory tract infections were the most highly diagnosed cases, with a total of 37,492 diagnoses reported to the WHO from right after the event till five months post-tsunami.¹⁹ After the disaster, there were issues in food and clean water distribution in affected areas.¹⁹ Hygiene became the main problem, along with medical supplies and basic needs, such as clothing.¹⁹ Based on the cross-sectional, record-based study performed in the International Committee of the Red Cross (ICRC) Hospital, diagnosis of chronic diseases, such as hypertension and diabetes, was 17.3% from a total number of 1188 cases analysed.²⁰

Suggestions

1. Natural disasters with huge impact will have a devastating effect on people with diabetes, especially those who need insulin administration. These effects are also long-lasting, including both negative economic and health consequences. **A good database containing at least people who need insulin administration, and any diabetes complications**, will help substantially in the management of people with diabetes during disasters. Therefore, good collaboration between the government through the Minister of Health and related institutions regarding natural disaster, national organization of diabetes, local hospital and non-governmental organization, should be managed and created.

2. The coordinating institution, preferably the national diabetes organisation, should have **updated data of diabetic patients with important characteristics, such as insulin usage and dosing, type of insulin used, the level of HbA1c for at least the past three months, and any diabetes-related complications** they have. This information will help the coordinating organisations in disaster events to manage the distribution of goods and specific needs for people with diabetes affected by the disaster.

3. Drug supplies are usually affected during disaster events, due to the damaged transportation access and business activity, which is stopped for a while. **Good communication with the pharmaceutical industries** involved should ensure that these supports can be provided. 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 conditions are back to normal.

4. **Routine education of people with diabetes** should be provided with several options of media choice, such as posters, leaflets, seminars etc. What to

do, what to prepare, and whom to contact are a few points that should be raised. With good preparation in the normal situation, and solid collaboration during and after a disaster, we can at least minimise the impact of natural disasters on people with diabetes.

Update

There is a 2020 analysis of disaster risk reduction in Indonesia, without mention of diabetes plans.

[Indonesia-22.01.2021.indd \(reliefweb.int\)](#)

Disaster Risk Reduction in Indonesia

Disaster Report 2020



More recent disasters in the IDF-WPR

In addition to the previously published and updated experiences above, contributions of recent disaster experiences from Australia and China are outline below.

Australia

Australia has experienced widespread bushfires, particularly in the east coast region during the summer of 2019/2020, episodes of flooding due to torrential rains in the northern state of Queensland and the multiple waves of the COVID-19 pandemic.

Key learnings

- **What were the major challenges**

During the bushfire and flooding disasters the warning time for those at risk was relatively short, and the very sudden nature of the disaster left some individuals exposed, with near escapes and loss of life, including of some of the emergency service personnel. There were no major diabetes related incidences that the standard national disaster response services, including medical, nursing and pharmacy services could not deal with. Nevertheless, individual and system preparedness is essential to mitigate risk.

During the COVID-19 pandemic Australia fared relatively well, with case numbers and deaths compared to many countries. This was likely due initially to nationally co-ordinated restrictions regarding social distancing, stay at home orders, widely heeded hygiene measures (e.g., hand sanitisers, and mask wearing), a national program of vaccination and booster doses and a widespread good quality public health care system. Cases numbers greatly increased with the omicron COVID variant in late 2021, which coincided with reductions in social distancing, travel restrictions, stay at home orders and mask wearing requirements, re-enforcing the benefit of such measures.

As in other countries, people with diabetes were at higher risk of adverse outcomes, including need for hospitalisation, Intensive Care Unit (ICU) care and death. As vaccines against COVID-10 were initially limited, the roll-out of (free and voluntary) vaccines (Astra-Zeneca and Pfizer) was ordered, first to people in aged care facilities and front-line (e.g., ICU, emergency department, ambulance officers) being first priority, then other healthcare workers and people with a chronic health condition, which included all people with diabetes. Challenges related to reluctance by many people to have the offered vaccine, as due to limited vaccine supplies, with the majority initially being Astra-Zeneca, the government restricted certain vaccine types to certain age groups. Individuals did not have a choice as to which vaccine they could receive, which created reluctance and increased anxiety in many people with diabetes.

Many hospitals diabetes clinics and general practices changed to providing care by telehealth, which the government provided new subsidies for. This was preferred by most patients with diabetes during the pandemic, and as of late 2021, the government has extended telehealth subsidies for telehealth

consultations. Many people with diabetes avoided pathology laboratories due to fear of COVID exposure, hence have had limited tests (e.g., HbA1c, lipids, renal function) over the past two years.

A major challenge during the bushfires was communication to those in remote areas, particularly when traditional telephone communications were lost, and due to the widespread large-scale nature of the fires, evacuation of large groups of people trapped in coastal areas where roads were cut off. The navy assisted with evacuations.

- **What was unexpected**

The initial attempted stockpiling of prescription medicines by people risked temporary shortages, which was limited by directions to pharmacists that only one month of medicines could be dispensed at a time.

There was a temporary shortage of ketone test strips as many people without diabetes were using them to monitor ketogenic weight loss diet regimens. This was alleviated by pharmacists being asked to verify that those wishing to purchase ketone strips had Type 1 diabetes (such as via their insulin script).

HbA1c levels of some people, particularly with Type 1 diabetes, improved due to their desire to reduce their risk of adverse COVID-related outcomes.

- **What worked well**

Telehealth was well-received, with formal surveys suggesting strong patient preference for phone or telehealth visits during COVID, and for a hybrid model of some face-to-face and some telehealth visits post-pandemic.

The capacity of people with Type 1 diabetes to upload their insulin pumps, continuous or flash glucose monitoring or blood glucose meter device data increased, based on our own experience and dialogue with colleagues. Prior to this many people only had their devices uploaded by clinic staff at a clinic visit. A common issue that persists is that many people with Type 1 diabetes do not review their uploaded data or feel confident to make changes in their insulin regimen.

There were no major shortages of diabetes medicines or glucose test items.

National SMS messaging, apps, and messaging to the general population re disaster preparedness increased.

- **What did not work well**

Many people with diabetes gained weight during the pandemic and did not have scales (for measuring body weight) or blood pressure monitors at home and did not attend pathology labs for their regular testings. Home HbA1c tests are not available in Australia.

During the bushfires many rural communities were isolated due to loss of regular telecommunications. This has led to satellite phone being installed (via Government grants) in community centres in at-risk areas.

Many healthcare professionals provided large amounts of diabetes advice by phone or email to worried people with diabetes, for no charge, which was a financial disadvantage for them and contributed to some clinician burnout.

During the pandemic the highest rates of illness and death were in the aged care sector. As diabetes incidence increases in the elderly diabetes is common in care facilities such as nursing homes. During the early waves people in aged care facilities who became COVID positive were kept in their nursing home and not taken to hospitals.

- **What would you advise others preparing for disaster care in a similar disaster**

People with diabetes should have a go-bag or bag to shelter at home such as during a pandemic. This should include at least two weeks supply of their medicines and a list of their health conditions, medications, professional and personal contacts and recent blood and urine test results (or the lab at which they were performed). They should know how to upload their glucose monitoring and or insulin pump device data.

Australia has a national 24-hour nurse on call hotline and has a 24-hour COVID hotline, but sometimes the diabetes-related information desired by people with diabetes is beyond their level of knowledge. A daytime hours National Diabetes Services Scheme advice lines exists, and hours were extended during COVID. Such help lines for people with diabetes, ideally 24-hr, would be helpful. This would also help reduce the burden on the ambulance service as many worried people called an ambulance for health advice or to seek a COVID test.



China

Disaster medicine and diabetes management experience from China

Weiping Jia

- **What were the major challenges?**

1. China is one of the countries severely affected by natural disasters, including floods, earthquakes, typhoons and rainstorms. The characteristics of natural disasters in China include variety, high frequency, and being wide-spread. Natural disasters severely damaged public health system, and affected development of economy and society. For example, Tangshan Earthquake, the earthquake happening in 1976, had the 2nd largest death toll in earthquake history in the 20th century.

2. There exist big gaps in different areas of China in terms of the economic levels and medical resources in China. The number of health personnel per 1000 population are 11.1 in urban areas and 4.96 in rural areas in 2019.

3. There is a lack of education of preparedness for diabetes care in terms of natural disasters and emergencies, not only for patients and family members, but also for health personnel.

- **What was unexpected?**

1. After the disaster, the disruption or closure of health care facilities, loss of medical records, a lack of diabetes medication like insulin and abrupt change in dietary intake were particularly difficult for those with chronic diseases, including diabetes. It caused significant disruption in glycaemic control among people with diabetes, acute complications such as hyperosmolar states and severe hypoglycemia. Besides, it also affected associated conditions, such as hypertension.

2. Besides, financial loss, loss of personal belongings, and occasionally bereavement led to severe depression, strongly impacting diabetes incidence and worsening of risk factors in many patients with diabetes. This stressful state led to new-onset diabetes and to acute complications in some people with diabetes.

3. During the outbreak of the pandemic of COVID-19, the impact of public health emergencies on NCDs management like diabetes care was substantial and prolonged. Patients with diabetes are susceptible to infection. Most with diabetes are middle-aged or elderly patients. Poor blood glucose control often worsened outcomes for patients. Thus, it's important and essential to improve education on diabetes care during emergencies and natural disasters for the whole society.

- **What worked well?**

1. A rapid responsive national rescue system. For example, during the very beginning of the outbreak of COVID-19, China mobilised all its medical resources to support the efforts in Wuhan and other locations in Hubei. To treat patients, the construction of the 1000-bed Huoshen-shan Hospital was completed in just 10 days, and that of the 1600-bed Leishen-shan Hospital in just 12 days. Health staff with experience and enough medications are

allocated to the affected areas in a very timely manner.

2. The use of new technologies was useful. For example, during the rescue work in the Leishen-shan Hospital, patients with diabetes were equipped with an interstitial fluid Continuous Glucose Monitor (CGM, FreeStyle Libre Flash glucose monitoring system). The monitoring data were uploaded to a hospital-wide cloud platform with the capability of incorporating the clinical characteristics of patients. This was especially useful to help improve diabetes care during this special period. In addition the internet connected hospital made it easier for patients to get health consultations and access to medication.

3. The rapid health education like expert consensus and guidelines for the whole society, especially patients with diabetes, during the emergencies and natural disasters are important.

This included for patients:

A waterproof and insulated disaster kit ready with a list of essential items.

A list of contacts for national organizations, such as Red cross, Chinese Medical Association of Disaster Medicine, or Chinese Diabetes Society, through their help lines or the Internet.

Photocopies of relevant medical information, particularly recent lab tests/procedures,

Up-to-date information on all oral medications and insulin, regarding formulation and dosing.

For people with diabetes, getting well prepared for potential disaster is necessary and important.

- **What did not work well?**

1. The traditional model of NCDs care, like diabetes care, should be changed. It's useful to establish remote diabetes care.

2. Lack of education on diabetes self-care and stress management during emergencies and disasters was sub-optimal. Obtaining good diabetes education that emphasizes self-management skills and stress management is important. Diet guidance for people of diabetes should be strengthened.

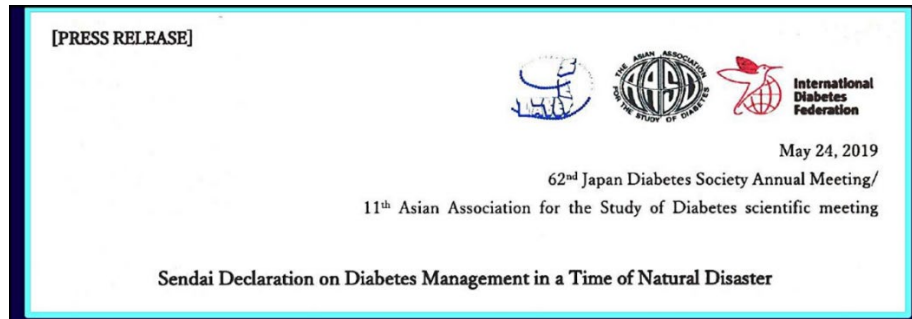
- **What would you advise others preparing for a similar disaster?**

1. Improve education on diabetes care during emergencies and natural disasters for the whole society, including patients and health staff, especially for those living in areas suffering from natural disasters often.

Sendai Declaration Japan 2019

Sendai Declaration on Diabetes Management in Time of Natural Disaster

29 May 2019



In recent years, the IDF Western Pacific Region has encountered an increasing number of natural disasters. These include the Southeast-Asia Tsunami in 2004, the Sichuan earthquake in 2008, the earthquake in Christchurch, New Zealand in 2010, the Great East Japan Earthquake and Tsunami in 2011, the Haiyan Typhoon in the Philippines in 2013, the earthquakes in Tainan and Kumamoto in 2016, and the floods in Indonesia in 2019. Diabetes management can become fatally difficult during a natural disaster, both in the short and long term. People with diabetes and health professionals working in the field of diabetes care must prepare well before natural disasters occur.

The IDF Western Pacific Region (IDF-WPR), in collaboration with its members and the Asian Association for the Study of Diabetes (AASD), has been actively working on the development of disaster preparation and medical care strategies for the region since 2014. To minimize the effects of [disaster events](#) on the lives of people with diabetes, individuals with the disease, healthcare providers, and official emergency departments should always be prepared. Such preparedness can lessen the impact of natural disasters on people with diabetes.

In 2019, the Japan Diabetes Society (JDS)/AASD/IDF-WPR Joint Symposium on Diabetes Management and Natural Disasters was held in Sendai, Japan, a city which was heavily affected by the Great East Japan Earthquake and Tsunami in 2011. On the occasion of the symposium, JDS, AASD and IDF-WPR jointly declared their commitment to actively disseminating the high importance of disaster preparation for people with diabetes throughout the region.



Contact list templates

Personal contact list template

Organisation	Name	Relationship	Address	Phone	Email	Website/LinkedIn/Twitter
Self						
Health Care						
GP/Family Dr						
Specialist 1						
Specialist 2			q			

Nurse							
Dietician							
Organisation	Name	Relationship	Address		Phone	Email	Website/LinkedIn/Twitter
Foot care							
Eye care							
Pharmacy							
Hospital							
Ambulance							
Health insurance							
Emergency Services							
Police							

National contact list template

Organisation	Name	Address	Phone 1	Phone 2	Email	Website/LinkedIn/Twitter
Diabetes (Medical)						
Diabetes (Nurses)						
Diabetes (Lay)						
Dietitian Society						
Podiatry Society						
Pharmacist Society						
Doctors Organisation						
Hospital 1						
Hospital 2						
Hospital 3						
Ambulance						
Emergency Response Committee						
National Government						
Local Government						
Police						

Military						
Organisation	Name	Address	Phone 1	Phone 2	Email	Website/LinkedIn/Twitter
Phone Company (Co.)						
Power Co.						
Water Co.						
Gas Company						
Courier Co. 1						
Courier Co. 2						
Shelter 1.						
Shelter 2.						
Shelter 3.						
Aid Organisations (local rep)						
Red Cross						
UNICEF						
UN						
WHO						

International contact list template

Organisation	Name	Address	Phone 1	Phone 2	Email	Website/LinkedIn/Twitter
IDF Region						
IDF Global						
Aid Organisations						
Insulin For Life					insulinforlifeglobal@gmail.org	www.insulinforlife.org
Red Cross						
UN						
WHO						
Drs. Without Borders						
Direct Relief						
Project Hope						
Courier Companies						
FEDEX						
DHL						
UPS						
Organisation	Name	Address	Phone 1	Phone 2	Email	Website/LinkedIn/Twitter

Notes

“Diabetes and disasters – not if but when”
Prevent, Prepare, Respond and Recover



Detailed and timely preparation
will lessen the negative impact of disasters
on people with diabetes.