Dealing with Diabetes During Disasters

STEFANIE C. NIGRO, PHARMD, BCACP, CDE
ASSOCIATE CLINICAL PROFESSOR
UCONN SCHOOL OF PHARMACY
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Disclosures
I have no actual or potential financial conflicts related to this activity.

Learning Objectives
Pharmacists & Technicians
At the conclusion of this presentation, the learner should be able to:
1. Describe the impact of previous disasters on glycemic control
2. Discuss strategies for public health preparedness to address short term and long term needs of people with diabetes during disasters
3. Outline an emergency preparedness care plan for a patient with diabetes

Question:
For patients with diabetes, common causes for ER visits acutely after a disaster include all of the following EXCEPT:
A. Retinopathy
B. Hypoglycemia
C. Diabetic ketoacidosis
D. Diabetic foot infection

Question:
Which of the following should be part of an emergency kit for a patient with DM? SELECT ALL THAT APPLY
A. List of active medications and supplements
B. 3 months worth of medications
C. Diabetes testing supplies
D. Glucose tabs
E. Water
F. Soda

Dealing with Disasters

Disaster impact influenced by:
• Size
• Type
• Duration
• Local infrastructure
• Socioeconomic factors
• Nature of the affected area
• People’s experiences with disasters

Types of Disasters
Survivors of disasters are often left without:

- **Means of communication or transportation**
- **Electricity / refrigeration**
- **Access to (healthy) food**
- **Access to water**
- **Access to shelter**
- **Access to meds / medical care**

### Pause and ponder

*Based on your experience, what has been the greatest threat to patient care during the COVID-19 pandemic?*

### What is the impact to patients with diabetes?

- **Diabetic ketoacidosis**
- **Diabetic foot infections**
- **Hypoglycemia**
- **Increased ER utilization**

- **Stress** + **Worsening of glycemic control**
- **Lack of access**


**Arrieta M.** *Disaster Med Public Health Prep.* 2009;(3): 174-182

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### Gulf War, 1991

#### Table 1: Glycosylated hemoglobin levels in patients before and after the Gulf War

<table>
<thead>
<tr>
<th>Group</th>
<th>A1c (%)</th>
<th>n</th>
<th>Mean</th>
<th>S.D.</th>
<th>Median</th>
<th>Lower</th>
<th>Upper</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before War</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-insulin</td>
<td>7.3</td>
<td>15</td>
<td>6.2</td>
<td>1.1</td>
<td>6.0</td>
<td>4.8</td>
<td>7.5</td>
<td>15</td>
</tr>
<tr>
<td>Insulin</td>
<td>9.8</td>
<td>18</td>
<td>8.3</td>
<td>2.4</td>
<td>9.0</td>
<td>4.0</td>
<td>11.2</td>
<td>18</td>
</tr>
<tr>
<td>After War</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-insulin</td>
<td>7.0</td>
<td>22</td>
<td>5.8</td>
<td>1.1</td>
<td>5.5</td>
<td>3.3</td>
<td>7.5</td>
<td>22</td>
</tr>
<tr>
<td>Insulin</td>
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<td>22</td>
<td>8.2</td>
<td>1.9</td>
<td>8.0</td>
<td>5.3</td>
<td>11.5</td>
<td>22</td>
</tr>
</tbody>
</table>

**Rubenstein A.** *Diabetic Medicine.* 1993;10:774-776

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### Kobe Earthquake, 1995 (Magnitude 7.2)

#### Table 2: Glycosylated hemoglobin levels in patients before and after the Kobe earthquake

<table>
<thead>
<tr>
<th>Group</th>
<th>A1c (%)</th>
<th>n</th>
<th>Mean</th>
<th>S.D.</th>
<th>Median</th>
<th>Lower</th>
<th>Upper</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Earthquake</td>
<td>6.3</td>
<td>15</td>
<td>6.0</td>
<td>0.9</td>
<td>5.7</td>
<td>4.7</td>
<td>7.0</td>
<td>15</td>
</tr>
<tr>
<td>After Earthquake</td>
<td>7.8</td>
<td>34</td>
<td>7.7</td>
<td>1.8</td>
<td>7.0</td>
<td>5.1</td>
<td>9.3</td>
<td>34</td>
</tr>
</tbody>
</table>

**Inui A.** *Arch Intern Med.* 1998;158:274-278

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What is the impact to patients with diabetes?

- Levels of glycemic control (A1c) were compared to age-matched controls with diabetes in Osaka.
- Patients with non-insulin dependent diabetes and insulin-dependent diabetes were evaluated.
- Stress and tension were cited as reasons for worsening control.
- Levels returned to baseline after the war.

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What is the impact to patients with diabetes?

- Patients with diabetes in Kobe were compared to age-matched controls with diabetes in Osaka.
- A1c levels were significantly higher in the patients from Kobe compared to Osaka following the earthquake.
- A1c levels peaked 3 to 4 months after the earthquake.
- Believed to be highly influenced by psychological stress.
What is the impact to patients with diabetes?

- Levels of glycemic control (A1c), blood pressure, and lipids were compared 6 months before and 6-16 months after Hurricane Katrina.
- Patient charts from 3 different diabetes care centers were evaluated.
- The impact affected diabetes management, exacerbated disparities, and had health and economic implications.

Key lessons learned from previous disasters:

- Disaster planning/coordinated relief efforts are often insufficient.
- Lack of access to medications is the most pressing issue facing patients during/after a disaster.
- Patient (and provider) education and preparedness planning is lacking.
- Older adult populations are most vulnerable to declining health after a disaster.
- Disaster planning should include psychosocial interventions for patients with chronic diseases.

Preparation is key!

Early planning may increase the resiliency of people with diabetes before, during, and after disasters.

“If you fail to plan, you are planning to fail”
- Benjamin Franklin

Pause and ponder

How can pharmacists help patients prepare for natural disasters?

Addressing short-term needs: Access to medication

**BEFORE**
- Use medication synchronization programs
- For chronic meds, get 90-day supplies
- Stockpile 5-14 days worth of meds
- Invest in watertight containers and coolers for medication storage

**DURING/AFTER**
- Contact drug plan for extended/emergency supplies
- Inquire about samples from provider’s office
- Inquire with local community organizations to see what types of supplies have been donated
- Emergency legislative acts
Addressing short-term needs: Hypoglycemia

**Hypoglycemia**

**SIGNS AND SYMPTOMS**

- Check glucose if < 70 mg/dL...
- Consume 15-20 g of carbs (4 oz. or ½ cup of fruit juice, 1 tsp sugar, 3-4 glucose tabs, etc.)
- Repeat until glucose normalizes

**SEVERE HYPOGLYCEMIA (< 54 mg/dL)**

- Glucagon kit

**MANAGEMENT**

Apply the 15:15 rule

1. Check glucose. If < 70 mg/dL...
2. Consume 15-20 g of carb (4 oz. or ½ cup of fruit juice, 1 tsp sugar, 3-4 glucose tabs, etc.)
3. Recheck glucose 15 minutes later
4. Repeat until glucose normalizes

**Addressing short-term needs: Hyperglycemia**

**SIGNS AND SYMPTOMS**

- Make sure all patients have a sick day plan:
  1. Test your blood sugar every 2 – 4 hours.
  2. Continue to take your diabetes medications as prescribed.
  3. Drink plenty of sugar-free liquids to prevent dehydration.
  4. Eat your regular meal plan (if possible) to prevent hypoglycemia.
  5. Check urine ketones if you have type 1 diabetes and/or blood sugars that remain elevated over 250 mg/dL.
  6. Notify your primary care provider (PCP) that you are sick. Your PCP can provide you additional information about when to seek emergency care and how to safely adjust your medications if needed.

**Addressing short-term needs: Dehydration & infection**

**DEHYDRATION**

- Stay well hydrated
- Water
- Sugar-free liquids
- Avoid strenuous activity
- Avoid extreme heat environments

**INFECTION RISK**

- Make sure vaccines are up-to-date
- Influenza, pneumococcal, Hepatitis B, and others
- Bath regularly
- Practice hand and oral hygiene
- Sterilize injection sites/use new needles
- Wear protective shoes and masks

**Addressing short-term needs: Switching between insulin preparations**

### Clinical scenario | Insulin conversion
--- | ---
NPH → detemir | 1:1 conversion given once daily
NPH → glargine U-100, glargine U-300, degludec | Once daily NPH: 1:1 conversion given once daily
| Twice daily NPH: 80% of TDD given once daily
Glargine ↔ detemir | 1:1 conversion
Glargine U-100 OR detemir ↔ glargine U-300 OR degludec U-100 or U-200 | 1:1 conversion given once daily
Glargine U-100 OR detemir ↔ NPH | 1:1 conversion; give NPH twice a day
Can consider 20% dose reduction to be conservative
Rapid OR short acting ↔ short OR rapid acting | 1:1 conversion; watch for meal timing

**Addressing short-term needs: Insulin storage**

- Insulin be stored in a refrigerator at approximately 36°F to 46°F
- Most insulin products contained in vials supplied by the manufacturers (opened or unopened) may be left unrefrigerated at a temperature between 59°F and 86°F for up to 28 days and continue to work (See supplemental insulin handout)
- An insulin product that has been altered for the purpose of dilution or by removal from the manufacturer’s original vial should be discarded within two weeks
- Insulin loses some effectiveness when exposed to extreme temperatures
- Under emergency conditions, you might still need to use insulin that has been stored above 86°F
- Do not use insulin that has been frozen
- Keep insulin away from direct heat and out of direct sunlight

**Addressing long-term needs**

- Infrastructure changes
- Community resources
- Formation of medical volunteer teams
- Continued education and training
Addressing long-term needs:

**Infrastructure**

- Create flexible drug-dispensing policies
- Build partnerships among key stakeholders
- Investment in facilities, utilities, & communication networks
- Manage increased demand for healthcare workers
- Enhance patient follow-up and outreach

**Community resources**

- Patients with special needs should register with their respective towns/cities if possible
- Town webpages provide local information on shelters, locations for showering, charging stations, internet access, water, food pantries, and more
- State/government webpages provide information on how to prepare for emergencies
- Shelter information available at: https://www.redcross.org/get-help/disaster-relief-and-recovery/services/find-an-open-shelter.html
- 1-800-DIABETES for patient support and information
- 1-314-INSULIN for providers to request support or report supply shortages
- 1-800-985-5990 for the Disaster Distress Hotline

**Volunteer groups**

- Team composed of various volunteer HCPs
- Triage patients based on "Tier" risk:
  - High risk for hypoglycemia, DKA, death
  - Deteriorating glycemic control
  - Routine maintenance & depression screen

**Continuing education & training**

- Continued education programs for health care providers
- Competency requirements for CDE training programs
- Integration of emergency planning into DSME curricula
- Develop training manuals for healthcare facilities

Pause and ponder

**BASED ON YOUR EXPERIENCE(S), WHAT ARE OTHER WAYS DISASTER PLANNING & RELIEF EFFORTS CAN BE IMPROVED?**

Developing an emergency preparedness care plan
Disaster Preparedness for patients

1. Obtain good diabetes education that emphasizes self-management skills and stresses management.
2. Be up to date with all immunizations, including tetanus.
3. Keep a waterproof and insulated disaster kit ready with:
   - Glucometer, test strips, and lancets
   - Medications, including insulin, syringes, and/or pen needles
   - Glucose tab or quick source of sugar
   - Glucagon emergency kit
   - Prepared snacks
   - Ketone strips
   - Antibiotic ointments or creams (e.g., first aid kit)

Disaster Preparedness cont.

- Up-to-date, active medication list including doses and directions
- Photocopies of relevant medical information, particularly recent lab tests/procedures, if available
- List of contacts for local and/or national organizations/resources (See previous slides)

4. Evacuate early, if possible, taking the items listed above with you.

Other emergency preparedness considerations

- Wear protective clothing and sturdy shoes
- Stay well hydrated and avoid excessive outdoor activity in the heat
- Increase food and water intake during periods of increased exertion or physical activity
- Avoid periods of hunger and overindulgence
- Know nutrition options that will be useful in a disaster

Snack & food options

- Large box of unopened crackers
- One jar of peanut butter
- One small box of powdered milk
- One gallon of water per day
- Two packages of cheese and crackers or one jar of soft cheese
- One package dry unsweetened cereal or single serving boxes
- Six cans of sugar-free soda
- Six pack of canned fruit juice or sports drink
- Cans of tuna, salmon, chicken and nuts
- Can opener

Summary

- Patients with diabetes are at increased risk of complications from natural disasters.
- The impact will be determined by a variety of factors.
- Proper planning helps patients build self-efficacy and resilience.
- Pharmacists can help educate patients and build preparedness plans.
- Greater efforts are needed for improving the infrastructure/ coordinating relief efforts.

Additional resources

- Lilly: 1-800-545-5979
- Sanofi-Aventis: 1-800-633-1610
- Novo Nordisk: 1-800-727-6500
- Otsuka: 1-800-591-3455
- Boehringer: 1-800-366-3646
- Medtronic: 1-800-633-8766
- Diabetes Disaster Response Coalition: 1-765-314-3372 or https://diabetesdisasterresponse.org
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FEEL FREE TO EMAIL ANY QUESTIONS TO:
STEFANIE.NIGRO@UCONN.EDU