

HSS 3.11: Preparation for at-risk communities**Extreme Heat****Authors:*****Case Writers:***

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FACILITATOR GUIDE

Goal:

To evaluate a patient facing extreme heat and the unique environmental and social determinants of health

Learning objectives:

- Discuss how reduced mobility and dependence on electrical medical equipment increases some populations' vulnerability to extreme weather events
- Design interventions on a health systems level to increase preparedness and resilience for communities at risk of climate disasters
- Compare resources physicians can use to counsel or treat patients affected by pollution, extreme weather events, or other features associated with climate change.
 - The Medical Society Consortium on Climate & Health - posters, videos, and lessons for a breadth of conditions affected by climate
 - Public Health Institute - fliers for general climate action for the public and posters for specific medical conditions
 - Climate Psychiatry Alliance - mental health toolkits
- Demonstrate how to take a focused occupational and environmental history

Case Vignette

Michelle is a 76 year old patient with a past medical history of insulin dependent type 2 diabetes mellitus, stage 2 CKD, diabetic neuropathy, and prior myocardial infarction s/p CABG presenting with confusion and altered mental status brought to the emergency department by her next door neighbor, Sarah. Per Sarah, Michelle is a retired school teacher who lives in Florida. She lives in an apartment complex built in 1943 that relies on window units for air conditioning. She has large floor to ceiling windows that make her apartment quite hot during the summer months. Michelle missed her most recent electricity bill payment so she hasn't been able to use her window unit, or refrigerator.

Additionally, the city has faced an extreme heat spell reaching highs of 103 degrees the past week with 70 humidity. Sarah hasn't seen Michelle leave her home for the past 3 days so she stopped by to check in on her and found her drowsy, clammy, and confused. She didn't know who Sarah was and didn't know what year it was. Typically, Michelle relies on visits from her grand-daughter to bring her pharmacy medications and groceries biweekly. She is unable to walk without a walker secondary to her neuropathy. Her apartment building has multiple sets of stairs. Her grand-daughter hadn't been able to stop by since the heat wave started because her engine had overheated and she was unable to drive to visit her grandmother.

(Pause to ask your students what environmental health factors are impacting Michelle's diagnosis? What social determinants of health impact Michelle's disease course? What is on your differential diagnosis causing Michelle's presentation?)

Some possible responses: SDoH: living environment not having central air, being an older adult with limited mobility, access to emergency weather resources, financial stability impacting ability to pay electricity bill and accessibility of apartment building.

Differential diagnosis could include diabetic ketoacidosis or hyperglycemic hyperosmolar nonketotic syndrome, heat stroke, stroke, dehydration), Myocardial infarction, Pulmonary embolism, Acute respiratory failure

Vitals: 104.2 degrees F, HR: 122, RR: 24, BP: 100/63, SpO2: 99%

Based on these vitals and the history gathered thus far, what additional questions do you have regarding Michelle's history?

Possible answers: What is her insulin regimen? When did she last get insulin? Any other medical history? Baseline neurologic status? Last known normal? Full neurologic exam? Instructors can adlib the answers to this as it won't impact results of ace.

What labs and imaging would you want for Michelle?

CBC, CMP, POC glucose, Urine analysis, Toxicology screen, Beta-hydroxybutyrate, Creatine Kinase, Chest X-ray, Troponins EKG, CT Non-contrast would all be acceptable

What is your diagnosis?

Heat Stroke with superimposed diabetic ketoacidosis

Mini Case

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Answers to Learning Objectives

- Discuss how reduced mobility and dependence on electrical medical equipment increases some populations' vulnerability to extreme weather events ([Resource](#))
 - Michelle relied on her granddaughter to provide her with her insulin every few weeks because she lacked the mobility to leave her house. Her retirement status and struggle with paying electricity bills lends to a less accessible and weather resistant living accommodation. Additionally, she relies on access to refrigeration for her insulin. Older adults are shown to reside more typically in high risk climate zones and also be more impacted by climate disasters given mobility, financial status, and medical vulnerability (Gamble 2013).
- Design interventions on a health systems level to increase preparedness and resilience for communities at risk of climate disasters ([Resource](#))
 - Public health and nurse task force that can check on older adults during climate disasters. This could be within a public health division of the state.
 - Resiliency centers and cooling centers to house at risk population at local community centers
 - Provide disposable ice packs and coolers to individuals requiring insulin when it is dispensed at the pharmacy
- Compare resources physicians can use to counsel or treat patients affected by pollution, extreme weather events, or other features associated with climate change.
 - The Medical Society Consortium on Climate & Health - posters, videos, and lessons for a breadth of conditions affected by climate ([resources](#))
 - Public Health Institute - fliers for general climate action for the public and posters for specific medical conditions ([resources](#))
 - Climate Psychiatry Alliance - mental health toolkits ([resources](#))
- Demonstrate how to take a focused occupational and environmental history ([Resource](#))
 - Consider the following mnemonic for environmental and occupational history. It can also be relevant to discuss emergency weather plans (Marshall 2002).

Table 1: The CH²OPD² mnemonic for taking an environmental exposure history

Code	Category	Question
C	Community	Do you live near a hazardous waste site or any industrial facilities that give off chemical odours?
H	Home	Is your home more than 40 years old? Have you done renovations? Do you use pesticides in your home or on your garden or pets?
H	Hobbies	Do you work with stained glass or oil-based paints or varnishes?
O	Occupation	Describe your workplace air quality and what you do
P	Personal habits	Do you or family members smoke? What sort of personal care products do you use?
D	Diet	What is your source of drinking water? How often do you eat tuna or sportfish?
D	Drugs	Besides what I have prescribed, are you taking any over-the-counter or home remedies?

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Suggested Resources

Gamble, J. L., Hurley, B. J., Schultz, P. A., Jaglom, W. S., Krishnan, N., & Harris, M. (2013). Climate change and older Americans: state of the science. *Environmental health perspectives*, 121(1), 15–22. <https://doi.org/10.1289/ehp.1205223>

Marshall L, Weir E, Abelsohn A, Sanborn MD. Identifying and managing adverse environmental health effects: 1. Taking an exposure history. *CMAJ*. 2002 Apr 16;166(8):1049–55. PMID: 12002983; PMCID: PMC100881.

Citations

Gamble, J. L., Hurley, B. J., Schultz, P. A., Jaglom, W. S., Krishnan, N., & Harris, M. (2013). Climate change and older Americans: state of the science. *Environmental health perspectives*, 121(1), 15–22. <https://doi.org/10.1289/ehp.1205223>

Harrison RJ, Mulloy KB. The Occupational & Environmental Medical History. In: LaDou J, Harrison RJ. eds. *CURRENT Diagnosis & Treatment: Occupational & Environmental Medicine*, 5e. McGraw-Hill Education; 2013. Accessed March 17, 2025. <https://accessmedicine.mhmedical.com/content.aspx?bookid=1186§ionid=66478199>

Institute of Medicine (US) Committee on Curriculum Development in Environmental Medicine; Pope AM, Rall DP, editors. *Environmental Medicine: Integrating a Missing Element into Medical Education*. Washington (DC): National Academies Press (US); 1995. A, Taking an Exposure History. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK231990/#>

Marinucci GD, Lubet G, Uejio CK, Saha S, Hess JJ. Building Resilience Against Climate Effects—a novel framework to facilitate climate readiness in public health agencies. *Int J Environ Res Public Health*. 2014 Jun;11(6):6433–58. doi: 10.3390/ijerph110606433. PMID: 24991665; PMCID: PMC4078588.

Marshall L, Weir E, Abelsohn A, Sanborn MD. Identifying and managing adverse environmental health effects: 1. Taking an exposure history. *CMAJ*. 2002 Apr 16;166(8):1049–55. PMID: 12002983; PMCID: PMC100881.