HEQ 1.1

Children and Adolescent Susceptibility to Climate Change

Writers:
Taryn Sirias, BFA, Medical Student, University of California School of Medicine

Faculty Advisor:
Mollie Grow MD MPH, Professor of Pediatrics, University of Washington

Peer Reviewer:
Antea DeMarsilis, MD, Beth Israel Deaconess Medical Center

Expert Reviewer:
Amanda Millstein, MD, Division of General Pediatrics, UCSF Benioff Children's Hospital Oakland, Oakland, CA

Resource Map:
PHRC Metrics:
[insert PHRC Metric(s) your final case applies to.
Ex: 2023 PHRC Medical School, Curriculum, 1.2. Please put each metric on a separate line.]

GCCHE Core Concepts
[insert the GCCHE Core Concept codes your final case applies to.
Ex: 2023 GCCHE Concept 1.2.1. Please put each core concept on a separate line.]

Medicine for a Changing Planet
MCP 7 Extreme Heat.

Keywords: *here*
Environmental Exposure Pathways:

Clinical:

Societal:

Mitigation and Adaptation:
Policy advocacy. Patient Education.

FACILITATOR GUIDE

Goal:
Educate healthcare trainees on the association between climate change, pediatric health and healthcare disparities, and appropriate responses.

Learning objectives:

1. Discuss children's unique susceptibility to environmental stressors and how climate change exacerbates existing health disparities
2. Identify ways that healthcare trainees can advocate for equitable climate change action and environmental justice

Clinical Vignette

You are rotating through the pediatric emergency room at a large urban hospital during a record-breaking heat wave. You are asked to see the newest patient on the board, a fourteen-year-old male. Triage notes that he is here for "severe upper back pain," and in a quick chart review, you see that he follows with a local sickle cell clinic. After your history and physical, you and your attending have a high suspicion that this is a vaso-occlusive pain presentation and have low concern for associated comorbidities. You admit your patient for acute pain management. Additionally, you speak to the patient's mother and learn that they have no air-conditioning in their apartment after it broke three months ago, and that the landlord is neglecting much-needed repairs.

The next patient you see is a three-year-old girl presenting for "diarrhea." She is unknown to the hospital system, and there is nothing you can find in the electronic health record (EHR). Reviewing her vitals, you are reassured they are within normal limits. You are able to get a comprehensive history from her mother and older sister, using an interpreter, and learn that this patient recently immigrated from Guatemala, arriving two days prior, and that the family is stably housed with a maternal aunt. Her history is notable for two days of abrupt onset diarrhea and vomiting. She has no blood in the stool. Her physical exam shows only mild dehydration. You and your attending feel this is most consistent with mild gastroenteritis and are able to provide reassurance and guidance to the family. You also connect them with social work and care coordination with plans to discharge home.

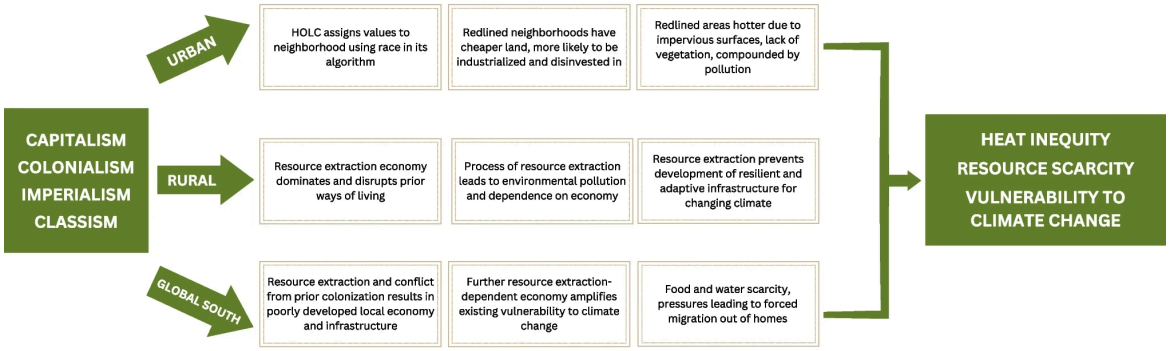
Finally, your last patient of the day is an eighteen-year-old woman presenting with "loss of consciousness at the gym." His vital signs are within normal limits. History and physical exam are most consistent with heat syncope. He is already back at baseline without other signs or symptoms suggestive of other etiologies or severe exertional heat illness, and you and your attending are re-assured that he will be safe at home with anticipatory guidance to prevent future heat or exertional illness.

Discussion

Your patients today presented with vaso-occlusive pain in sickle cell disease, gastroenteritis, and exertional heat syncope. Together, they represent a broad swath of pediatric diseases. What environmental factors could have contributed to each of them presenting today?

In addition to heat, how might climate change have a disparate impact on pediatric populations?

The following graph, created by Zhang e. al. (2024)[5] illustrates the variable pathways by which historical marginalization may differentially impact various populations (urban, rural, global south) but still lead to increased climate change vulnerability.



How might climate change have unequal impacts on different communities? In each of the patients you saw today, consider what socio-economic or population-based factors might increase their susceptibility to heat-related illness or heat-related exacerbation?

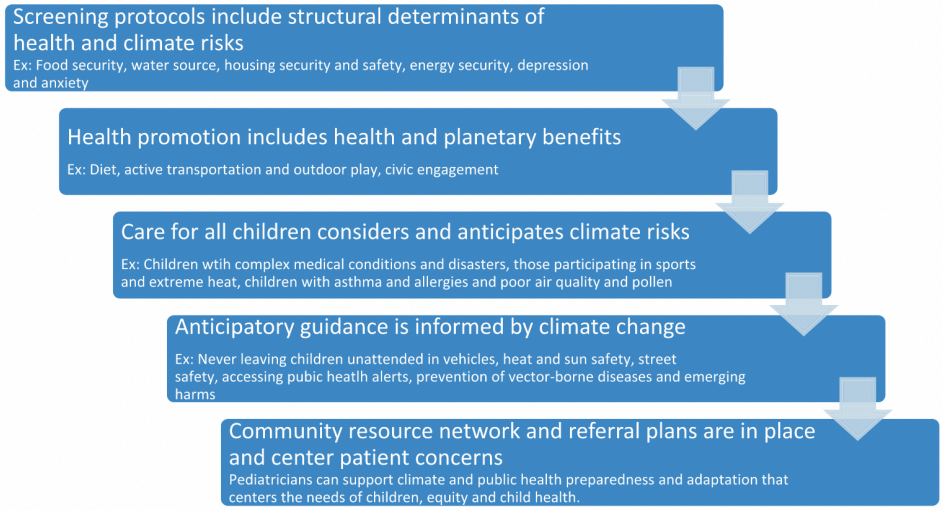
As you are discussing climate change and pediatric health, you think about the patient and family education that might be most appropriate for each of your patients today.

1. What might you have said to your patient presenting with vaso-occlusive pain in sickle cell disease to help them be prepared for the next heat wave?
2. What might you say to your patient's family about acute gastroenteritis to help them better understand ways to prevent this illness?
3. What might you say to your patient with exertional heat syncope about how to manage their health and fitness safely?

Based on advice from the American Academy of Pediatrics (AAP), we recommend basing your discussion about the impacts of climate change and health upon your patient's age, and involving or encouraging parents, guardians, or support systems to likewise discuss these issues with young patients. For example, the patient in our first vignette is a teenager and, per the AAP, is likely "more aware of how issues may influence all aspects of their lives." Discussion that ties together climate change or what the patient is experiencing with society,

culture, and systems-at-large "can spark scientific curiosity and introduce the idea of civic responsibility."

Other aspects of climate-informed care are outlined in the graphic below, reproduced from Philipsborn et al. (2021)[6], which includes additional practical screening questions, suggested climate conversation starters, and further recommendations and resources.



Mini Case

You see three separate patients in the pediatric emergency room during the midst of a major heat wave in your area. These include a fourteen year-old with vaso-occlusive pain in sickle cell disease, a three year-old with acute gastroenteritis, and an eighteen-year old with exertional heat syncope. You are concerned that each of these presentations could be exacerbated by record breaking heat caused by climate change and that each of these patients exhibit socio-economic factors that increase their risk for climate-change related vulnerabilities.

Suggested Resources

- HealthyChildren.Org - How to Talk With Children About Climate Change
- EPA Summary For Clinicians on Climate Change and Children's Health and Well-Being in the United States
- Cribsiders Podcast: #101: Tiny Patients, Big Planet: Pediatric Prescriptions for a Changing Climate
- A Discussion of Climate-Informed Pediatric Care with Rebecca Philipsborn, MD, MPA and NH HWCA
- A Neighborhood Walk Worksheet by the Pediatric Environment Health Specialty Unit to help healthcare professionals and trainees understand a given neighborhood's environmental impact on a child's life
- Infographics on heat and hot weather by the World Health Organization (WHO)

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