Climate change essentials for pediatric residents: Towards curricular implementation

APPD Virtual Café

December 3, 2020

Overview

- Introductions
- ***Why?*** The Need for Climate Change in Pediatric Resident Education
- ***What?*** The Curricular Framework
- ***How?*** Opportunities and Challenges for Implementation
- Questions

Introductions

- Becca Philipsborn – Emory University
- Perry Sheffield – Icahn School of Medicine at Mt. Sinai
- Andrew White – Washington University School of Medicine
- Amanda Osta – University of Illinois
- Marsha Anderson – University of Colorado School of Medicine
- Ari Bernstein – Harvard Medical School & Boston Children’s Hospital

U.S. CALL TO ACTION
ON CLIMATE, HEALTH, AND EQUITY: A POLICY ACTION AGENDA



Climate change is one of the greatest threats to health America has ever faced—it is a true public health emergency. The health, safety and wellbeing of millions of people in the U.S. have already been harmed by human-caused climate change, and health risks in the future are dire without urgent action to fight climate change. As former Surgeon Generals Richard Carmona and David Satcher said: "We're all at risk and our leaders must lead on global warming. Now." But the health crisis caused by climate change also presents a major health opportunity. Building healthy energy, transportation, land use, and agriculture systems now will deliver immediate and sustained health benefits to all and reduce future health risks from climate change.

https://climatehealthaction.org/cta/climate-health-equity-policy/

June 2019

June 2019

AMA Policy: CLIMATE CHANGE EDUCATION ACROSS THE MEDICAL EDUCATION CONTINUUM

(American Medical Association resolution #A19-302, adopted as official policy June 2019)

1. That our American Medical Association (AMA) supports teaching on climate change in undergraduate, graduate, and continuing medical education such that trainees and practicing physicians acquire a basic knowledge of the science of climate change, can describe the risks that climate change poses to human health, and can counsel patients on how to protect themselves from the health risks posed by climate change; and

2. That our AMA will make available a prototype presentation and lecture notes on the intersection of climate change and health for use in undergraduate, graduate, and continuing medical education; and

3. That our AMA will communicate this policy to the appropriate accrediting organizations such as the Commission on Osteopathic College Accreditation and the Liaison Committee on Medical Education.

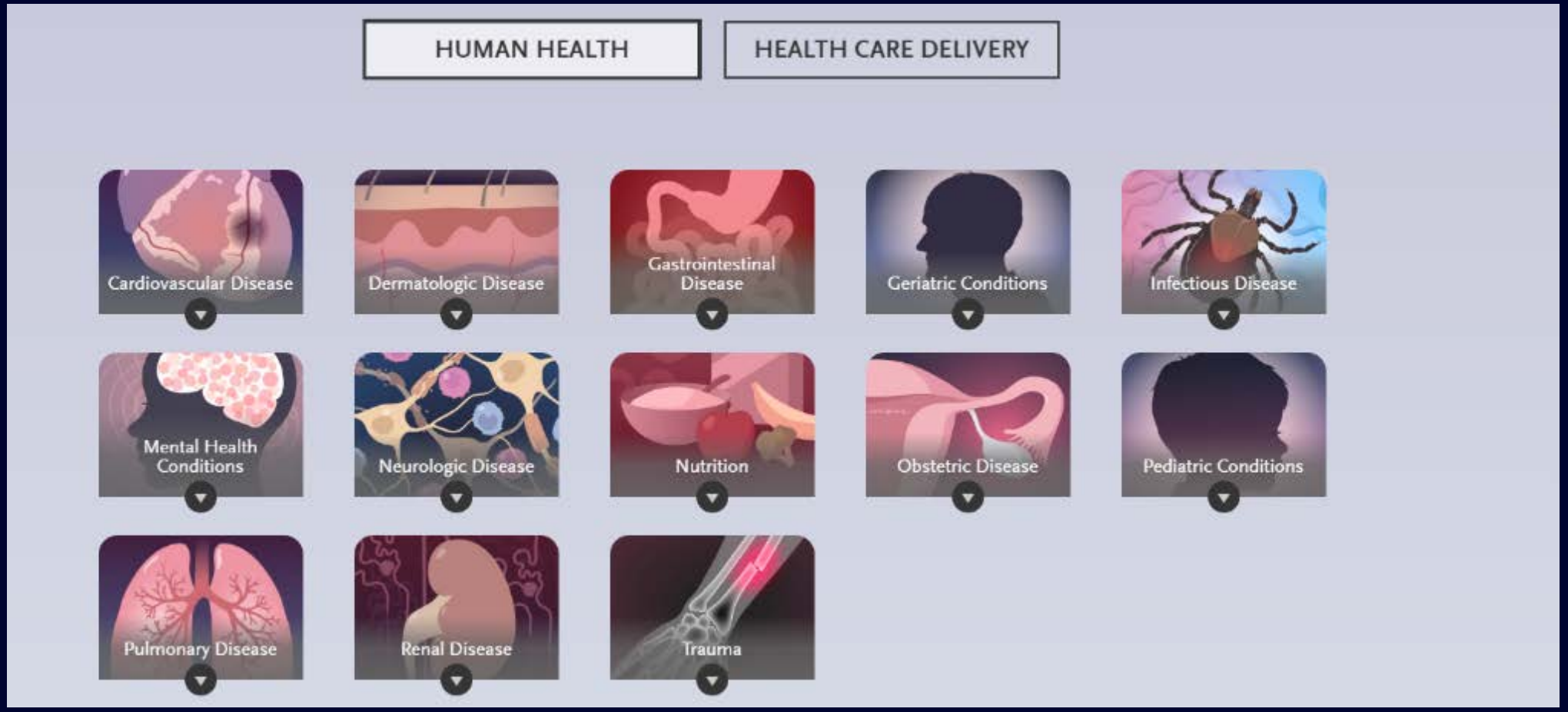
https://www.psr.org/wp-content/uploads/2019/07/ama-climate-change-education-policy-2019.pdf

INTERACTIVE PERSPECTIVE

The Climate Crisis — Health and Care Delivery

Renee N. Salas, M.D., M.P.H., and Caren G. Solomon, M.D., M.P.H.

The NEW ENGLAND JOURNAL of MEDICINE

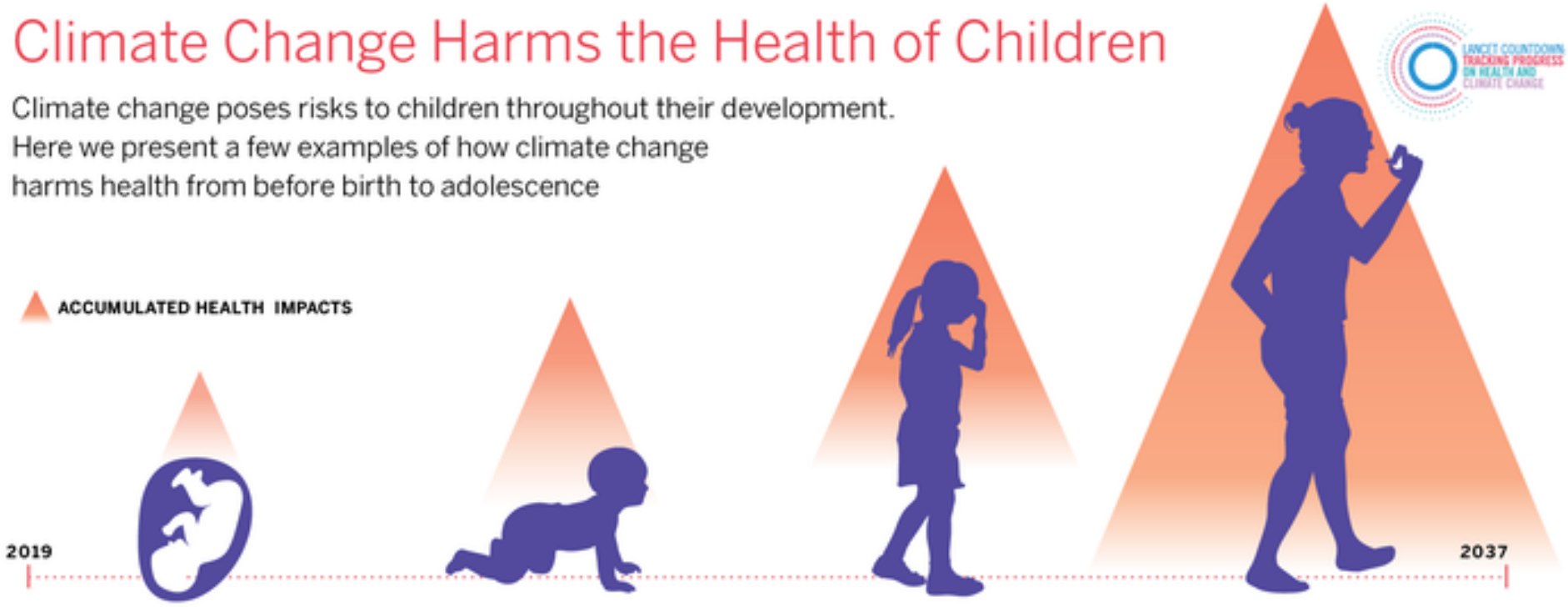


https://www.nejm.org/doi/full/10.1056/nejmp1906035

August 2019

Climate Change Harms the Health of Children

Climate change poses risks to children throughout their development. Here we present a few examples of how climate change harms health from before birth to adolescence



Prenatal

Poor pregnancy outcomes like low birth weight and pre-term delivery

Increased risk of **low birth weight** and **neonatal death**

Infancy

Higher risk for heat-related illness because developing bodies are less able to control temperature

Heightened risk of **water- and food-borne infections** while immune system is developing

Childhood

Long-term **lung problems** and more frequent **asthma attacks**

Outdoor exposure increases risk of diseases from insects, like **Lyme disease**

Adolescence

Post-traumatic stress and **anxiety** in survivors

Negative impacts on **ability to think, outdoor recreation** and the **ability to play sports**

December 2019

Lancet Countdown, 2019: 2019 Lancet Countdown on Health and Climate Change Policy Brief for the US. Salas RN, Knappenberger P, Hess JJ. Lancet Countdown U.S. Policy Brief, London, United Kingdom.

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

This policy is a revision of the policy in **120(5):1149**

From the American Academy of Pediatrics Policy Statement, Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

Global Climate Change and Children's Health

"...Failure to take prompt, substantive action would be an act of injustice to all children."

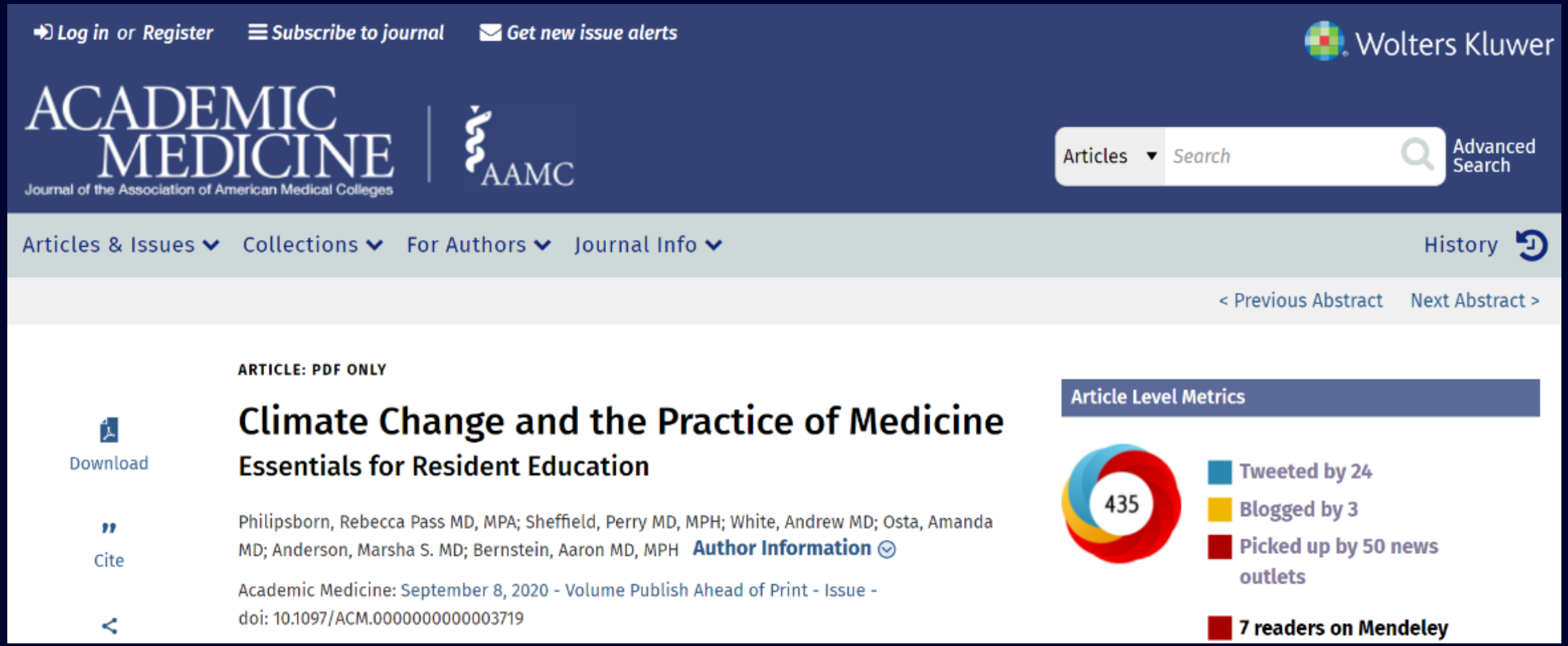
November 2015

1. Work to promote medical educational opportunities regarding the effects of climate change on the environment and child health. Programs during medical school and residency, as well as continuing medical education, can inform pediatricians on current and anticipated effects.

November 2007

5. Work to ensure that concepts related to the pediatric health implications of climate change are part of pediatric training and curricula.

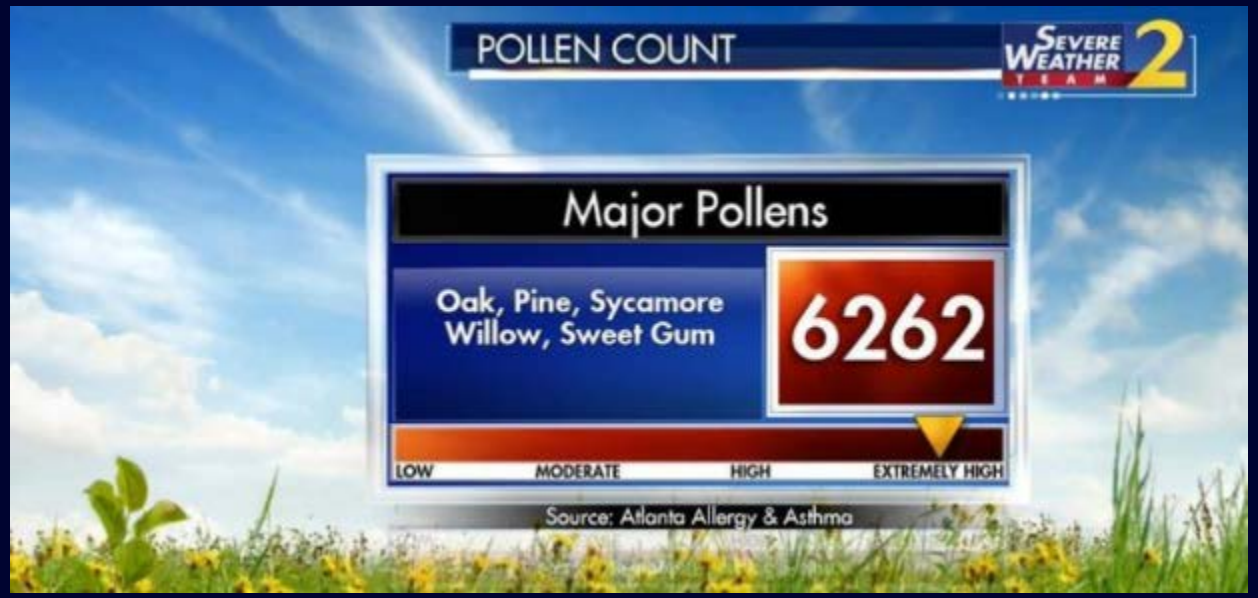
https://pediatrics.aappublications.org/content/136/5/992

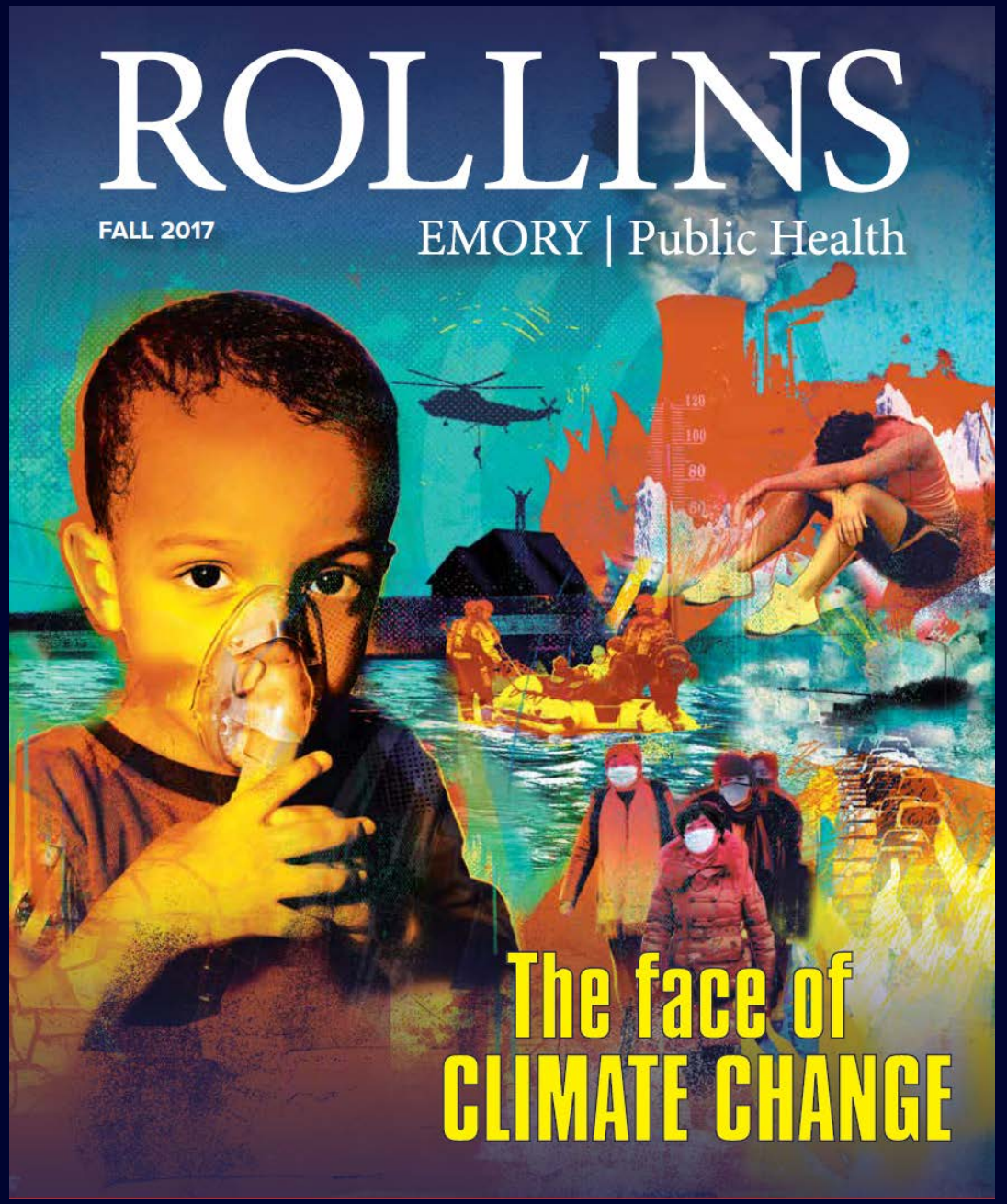


September 2020

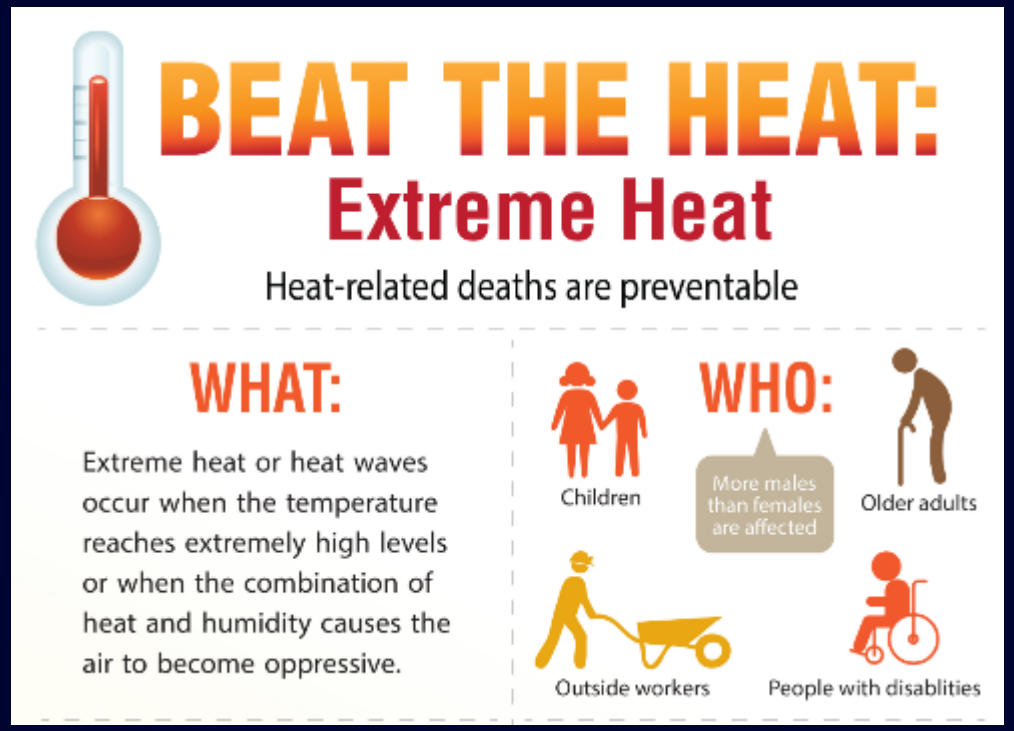
A curricular framework linked to ACGME core competencies,

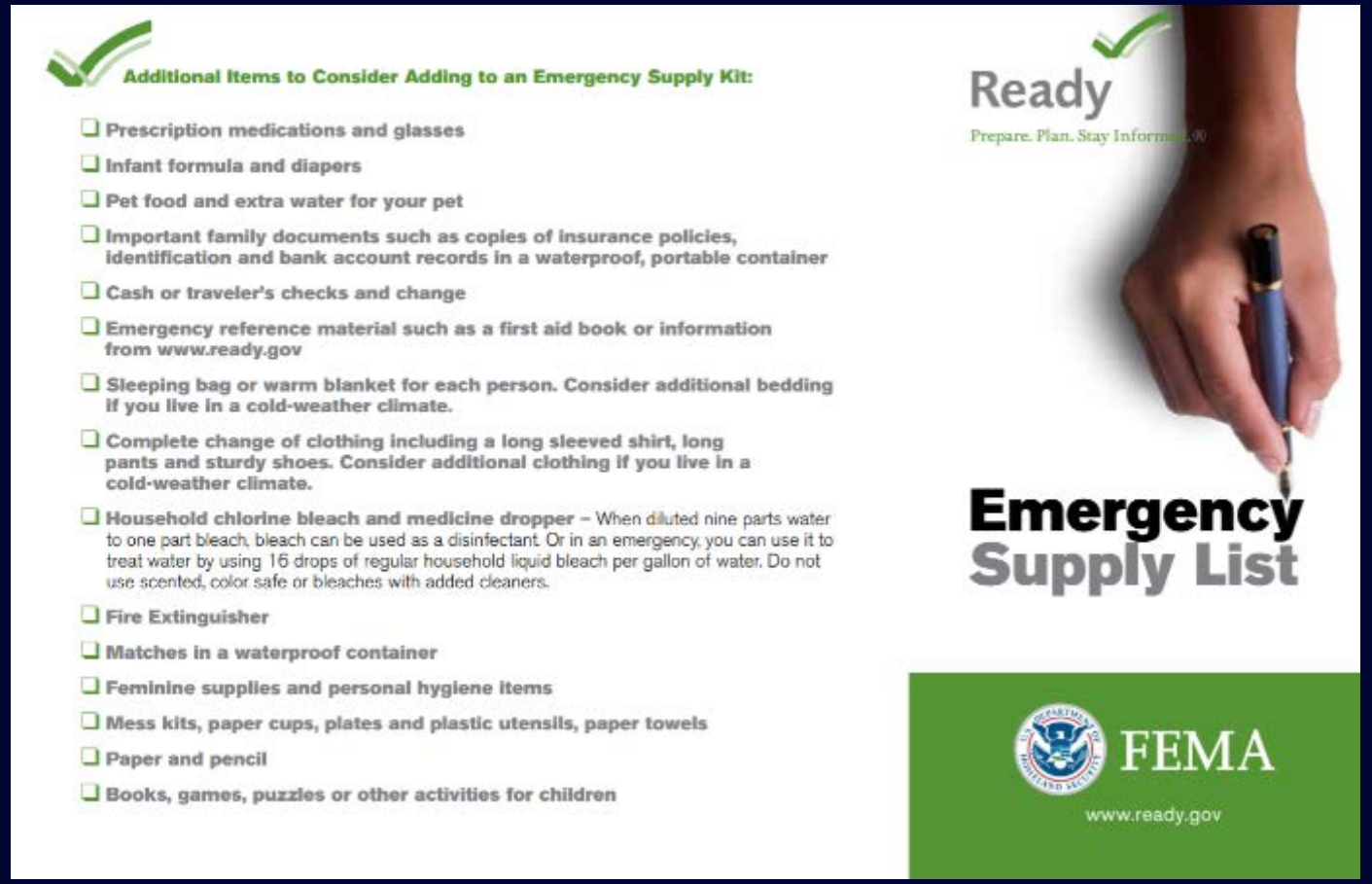
detailing how climate change harms health…





Requires adaptation in our clinical practice…





NYU Langone Health



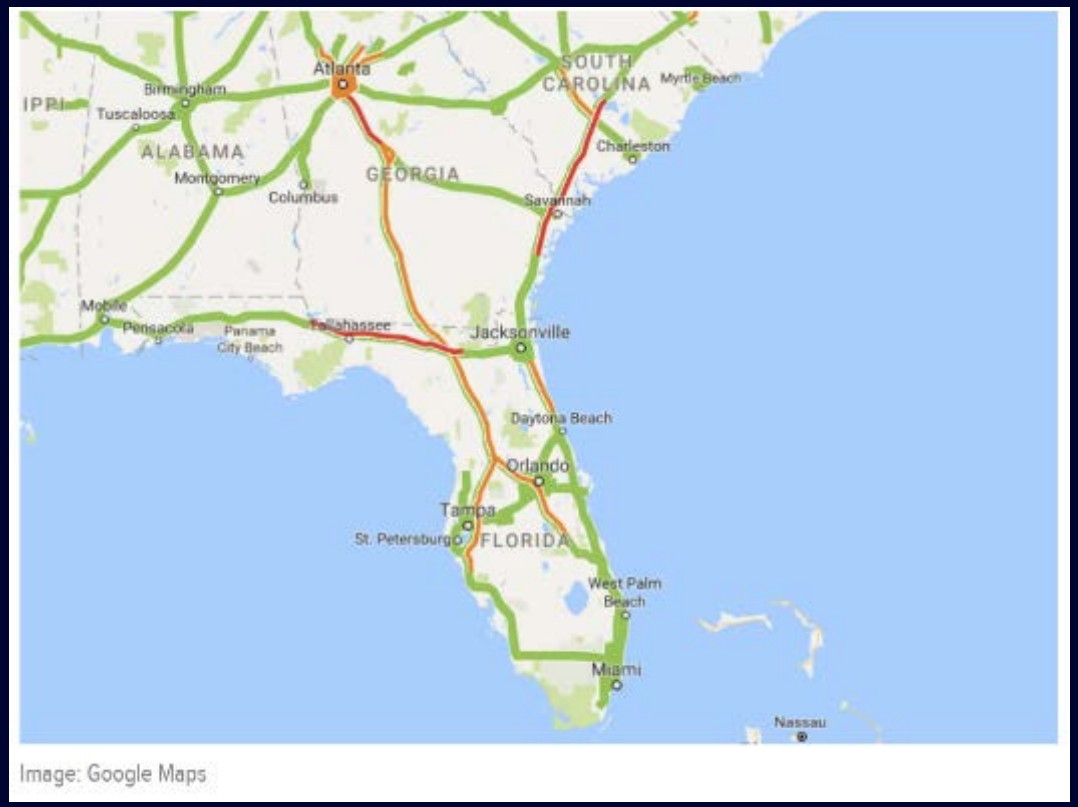


Image: Google Maps

Hospitals face critical shortage of IV bags due to Puerto Rico hurricane

Hurricane Maria crippled a key maker of fluid bags, and as 'wellness' clinics pay a 600% markup, hospitals unable to afford them scramble to make do without



…and disrupts healthcare delivery.



Preparing Residents for Practice in the Face of Climate Change

Marsha Anderson, MD

Associate Pediatric Residency Program Director

University of Colorado School of Medicine

“By failing to prepare, you are preparing to fail.”
— Benjamin Franklin



Goal

- **Develop a framework for a climate change and health curriculum that residency training programs could implement locally to prepare our future physicians to care for climate-induced health problems**
  - **Sensitive to differences in resources (i.e. faculty expertise, time)**
  - **Could be adapted for a variety of settings (e.g. community based, academic health center based training programs)**
  - **Created for primary care residency training programs but some elements can be used in all training programs**

Climate Change and Health

- Curriculum was informed by “climate change and health experts” and educators with experience in curriculum implementation
  - Learning objectives
    - Mapped to ACGME competencies
    - Designated as “core” or “advanced”
  - Learning formats
  - Examples of assessment methods
  - “Notes” that identify key elements of each learning objective that could help faculty who are not climate change health experts to deliver curriculum to meet the objectives

Curriculum Developed in 3 Domains

- Knowledge of climate change and its effects on health
- Climate change-related adaptations for clinical practice
- Implications of climate change for health care delivery

Sample LOs in Domain "Knowledge of Climate Change and Its Effects on Health"

Learning objective	ACGME Competency	Core or Advanced Objective	Learning Formats	Assessment Strategies	Notes and Curricular Points
Describe the negative effects of extreme heat exposure on health	MK	Core	• Lecture • Small group	• MCQs • Oral questions	Extreme heat is associated with: • Asthma exacerbations • Fluid and electrolyte disturbances • Heat related nephropathy • Congenital anomalies • Infant mortality, poorer pregnancy outcomes • Skin and soft tissue infections • Suicide
Discuss the links between air pollution (including wildfires), climate change, and their relationship to health	MK	Core	• Lecture • Small group	• MCQs • Oral questions	• Heat increases ground level ozone • Wildfires increase particulate matter air pollution • Ozone exposure increases the severity of asthma and COPD exacerbations, and decreases lung function in children • Particulate matter pollution worsens asthma and COPD, results in preterm and low birthweight infants, and impairs cognitive development

Sample LOs in Domain "Climate Change-Related Adaptations for Clinical Practice"

Learning objective	ACGME Competency	Core or Advanced Objective	Learning Formats	Assessment Strategies	Notes and Curricular Points
Identify individual specific risk factors for climate-related illnesses	MK, PC	Core	• Small group • Clinical rotations • Standardized patients	• Standardized patient checklist • Oral presentations (rounds) • Clinical evaluations • Chart audits	Individual factors that put patients at greater risk for climate-related illnesses include: • Young or older age • Pregnancy • Sports participation; outdoor occupation • Exertion • Chronic medical conditions • Linguistic isolation • Structural inequities in the built environment and structural racism • Lack of family resources (poverty, homelessness, lack of reliable, safe transportation, lack of adequate air conditioning, heating and ventilation)
Counsel patients on the risks and appropriate use of medications when patients and/or medications are exposed to extreme heat	MK, PC, C	Core	• Small group • Clinical rotations • Role play • Standardized patients	• MCQs • Oral questions • Direct observation • Standardized patient checklist • Clinical evaluations	• Extreme heat may alter pharmacologic properties of medications (e.g. insulin, levothyroxine, epinephrine) • Some medications increase the risk of heat-related illnesses (e.g., beta blockers, diuretics, antidepressants, antihistamines) • Aerosolized or pressurized canisters (e.g., albuterol inhalers) may burst at temperatures > 120°F.

Sample LOs in Domain "Implications of Climate Change for Healthcare Delivery"

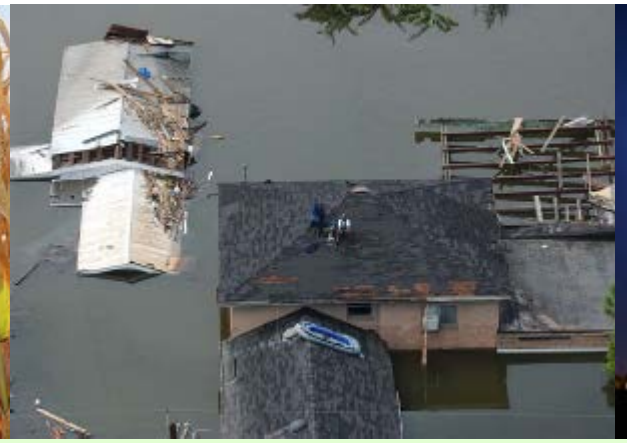
Learning objective	ACGME Competency	Core or Advanced Objective	Learning Formats	Assessment Strategies	Notes and Curricular Points
Review the hospital's or practice's disaster plan and discuss strategies to maintain patient care at a facility compromised by systems failures (power outages, electronic medical record disruption)	SBP	Core	• Small- or large group review of plans • Preparatory exercise for disaster training (e.g. module)	• Standardized patient checklist • Module MCQs	• Know how to access the hospital's or practice's disaster preparedness plan and review or practice this plan • Demonstrate competence in following medical record downtime procedures and work flows (e.g., writing paper prescriptions) • Know, review, and practice roles and responsibilities during different types of disaster scenarios.
Advocate and participate in activities that advance low- or no-carbon solutions in the provision of health care and the practice of medicine	MK, C, SBP, P	Advanced	• Advocacy rotation/elective • Health care administration or business of medicine elective • Committee member for health care sustainability	• Review of written advocacy communication • Direct observation of oral advocacy communication • Self-report of participation • Review of QI outcomes	Examples of ways to promote clean air and reductions in greenhouse gases include: • Writing a letter to the editor in support of car-pooling and greater utilization of public transportation to decrease carbon footprint • Advocating for institutional commitments to decreasing greenhouse gas emissions and participating in QI projects on this topic (e.g., energy efficiency, waste reductions, power purchase agreements)

Article Access: Climate Change and the Practice of Medicine: Essentials for Resident Education

PDF download free-includes a table with all learning objectives

https://journals.lww.com/academicmedicine/Abstract/9000/Climate_Change_and_the_Practice_of_Medicine_.97003.aspx






How to implement a climate curriculum



Image: PuertoRicoDamage

Amanda D. Osta, MD
Associate Professor of Clinical Internal Medicine and Pediatrics
University of Illinois-Chicago

Implementation in subspecialty rotations

Rotation	LO:	Curricular Points	References
Pulmonary	1. Describe the negative effects of extreme heat exposure on health 2. Discuss the links between air pollution (including wildfires), climate change, and their relationship to health 3. Counsel patients on the risks and appropriate use of medications when patients and/or medications are exposed to extreme heat	1. Extreme heat is associated with increased asthma exacerbations 2. Heat increases ground level ozone. Wildfires increase particulate matter air pollution. Ozone exposure increases the severity of asthma and decreases lung function in children 3. Aerosolized or pressurized canisters (e.g., albuterol inhalers) may burst at temperatures > 120°F.	1. Guarnieri, M and Balmes, J Outdoor air pollution and asthma. Lancet. 2014;383:1581-1592. 2. Gauderman WJ, Avol E,Gilliland F, et al. The effect of air pollution on lung development from 10 to 18 years of age. NEJM. 2004;351:1057-1067. 3. Hoyne WL, Mogolian EM, Myrdal PB. Effects of extreme temperatures on drug delivery of albuterol sulfate hydrofluoroalkane inhalation aerosols. Am J Health Syst Pharm. 2005;62:2271-2277.

Implementation in subspecialty rotations

Rotation	LO:	Curricular Points	References
Cardiology	1. Describe the negative effects of extreme heat exposure on health 2. Counsel patients on the risks and appropriate use of medications when patients and/or medications are exposed to extreme heat 3. Identify individual specific risk factors for climate-related illnesses.	1. Extreme heat is associated with fluid and electrolyte abnormalities 2. Some medications increase the risk of heat-related illnesses (e.g., beta blockers, diuretics) 3. Patients with heart failure are at high risk, as are those who are dependent on oxygen	https://health2016.globalchange.gov/climate-change-and-human-health

Additional Specialty Rotations

- Allergy/Immunology
- Infectious disease
- Nephrology
- NICU
- Child psychiatry
- ED rotation
- Longitudinal primary care

- Request a climate advocate in each division
- Role for junior faculty or fellow
  - Grand Rounds – mention of impact of climate change on patients
  - Implementation of climate related readings into rotation

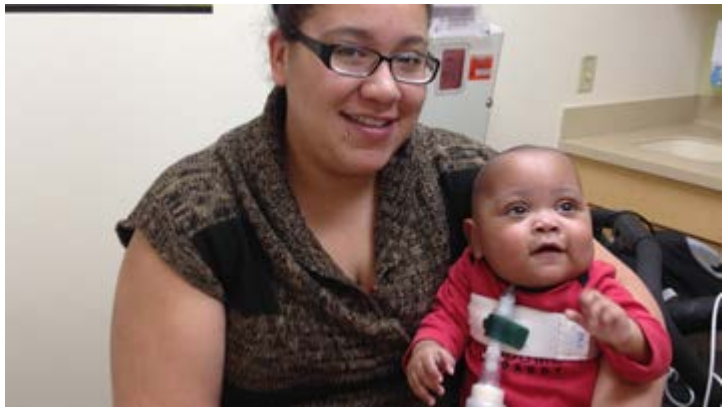
Participation of trainees in hospital wide committees

Disaster Planning:

- **Review the hospital's or practice's disaster plan and discuss strategies to maintain patient care at a facility compromised by systems failures (power outages, electronic medical record disruption)**

Disaster planning with patients: Residency/Fellowship Wide QI project

- LO: Create patient-tailored disaster preparedness plans, with consideration of local climate risks
- Focus on those who are medically complex
  - Written disaster plan
  - Supply of medications
  - Power supply – children who depend on technology
  - Food supply – children with allergies



https://www.mottchildren.org/conditions-treatments/ped-respiratory-care/ped-home-vent

- AAP and Disaster

Advocacy and Community Health Rotation

- **Addition of climate related activities to existing community rotations (evaluation of built environment as part of wind-shield project)**



https://toolkit.climate.gov/topics/built-environment

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https://journals.lww.com/academicmedicine/Abstract/9000/Climate_Change_and_the_Practice_of_Medicine_.97003.aspx



