Climate Informed Pediatric Environmental Health: Tools for Prevention

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Outline

• The what and why of Climate and Environmental Health

• Healthcare Worker Resource: Pediatric Environmental Health Toolkit

• Patient Resource: Prescriptions for Prevention
Unique Vulnerability of Children

1. Behaviors and preferences that increase *exposure*

2. Differences in physiology such as *metabolism and excretion* that increase dose

3. Unique windows of development meaning they have *differential susceptibility* and *a longer life span*
Children’s Environmental Health in the News

Wildfire Disaster
Lahaina, Maui, Hawaii
August 2023

Tropical Storm Hilary
Los Angeles, CA
August 2023

July 2023

Wildfire Smoke from Canada
June 2023

You Don’t Need to Disinfect So Much

East Palestine, Ohio
February 2023

February 2023

PFAS ‘Forever Chemicals’ Are Turning Up in Menstrual Products. Here’s What You Need to Know

December 2022

No plans for nationwide ban of gas stoves, CPSC says following report, backlash

January 2023

The head of the Consumer Product Safety Commission announced she has no plans to ban natural gas after a report said officials with her agency were considering putting a ban on the use of gas.
PEHSU Consultations

• Each federal region (n=10) has a Pediatric Environmental Health Specialty Unit (PEHSU)
• Each PEHSU takes consult calls from healthcare providers & families
• Need for cohesive materials that span a broad array of topics to respond to major events
• Need to train HCPs on key materials *prior* to event occurrence
• Need to integrate key materials into *everyday* common practice
Pediatric Environmental Health Toolkit

peht.ucsf.edu
National Effort

• 37 content sections (18 hazards, 11 sources, 7 key concepts, Anticipatory Guidance)
• 14 different content section authors (from 5 different PEHSUs)
• 18 peer reviewers (from all 10 PEHSUs)
• Key support from Physicians for Social Responsibility
• 3rd edition
  • First edition (2006) was printed and included (paper!) prescriptions for prevention.
  • Second edition (2016) moved online
• Regional Projects that have been influenced by/grown out of the PEHT include the prescriptions for prevention (both NY and national)
Environmental Hazards
Specific toxic chemicals that a child might be exposed to (e.g., lead).

Anticipatory Guidance
Age-based guidance for improved pediatric environmental health

Exposure Sources
The substances that children are exposed to, which contain toxic chemicals (e.g., water).

Key Concepts
Foundational information for pediatric environmental health
Are There Still Heavy Metals in Baby Food?

Snacks and baby foods continue to contain toxic heavy metals such as lead, cadmium, and mercury.

Many common baby foods and fruit juices contain small amounts of toxic chemicals, including pesticides, heavy metals such as lead and arsenic, and plastic-related chemicals from packaging such as BPA and phthalates.

To minimize pesticide exposures from baby foods, purchase organic when possible, but not at the expense of a diet rich in a variety of fruits and vegetables.

Heavy metals can occur naturally in soil used to grow food, or can get into food through pesticides, industrial processing, and storage. The low levels of metals found in food are likely a small part of a child's overall exposure to metals; however, a child's total metal exposure from all sources can pose a risk to health — particularly brain development. The FDA does not currently set strict enforceable guidelines to limit levels of heavy metals in baby food, though they have ongoing plans to decrease these exposures.

Plastic-related chemicals such as BPA and phthalates can leach into food during the production process or from the food packaging. These chemicals can interfere with the body's endocrine system. Families can choose to store food in non-plastic containers (including glass, stainless steel, or food-grade silicone) and can avoid heating food in plastic containers.

Parents can reduce all of these toxic exposures in their child's diet by providing a diet rich in a variety of whole (wash thoroughly with cold water first) or pureed fruits and vegetables, lean proteins, and a variety of grains.

Need a Patient Handout?

Check out the [baby foods handout](https://wspehsu.org/) from WSPEHSU's Prescription for Prevention series.

For heavy metals questions specifically, try this [handout on Heavy Metals in Baby Foods](https://www.nycchild.org/environmental-health-network/), from the NY Children's environmental health network, or the [AAP](https://www.aap.org/) from the AAP.

Some specific hazards that may be found in Baby Foods:
No plans for nationwide ban of gas stoves, CPSC says following report, backlash

Jordan Mendoza  
USA TODAY  
Published 11:59 a.m. ET Jan. 11, 2023 | Updated 4:20 p.m. ET Jan. 11, 2023

US Consumer Product Safety Commission to consider banning gas stoves  
Gas stoves have been found to emit toxic chemicals that have been linked to cancer and childhood asthma. Anthony Jackson, Getty Images.

The head of the Consumer Product Safety Commission announced he has no plans to ban gas stoves days after a report said officials with the agency were considering putting a stop to the use of them.

<table>
<thead>
<tr>
<th>Particles and Nitrogen oxides</th>
<th>Health Effects</th>
<th>Exposure Sources</th>
<th>Prevention</th>
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<tbody>
<tr>
<td>Overview</td>
<td>Particulate Matter (PM) and Nitrogen Oxides (NOx) are common air pollutants that are created during combustion. Particles are defined by their size (such as PM2.5 which is less than 2.5 microns in diameter) rather than a specific chemical structure. Particles less than 10 microns in diameter pose a greater risk to human health than larger inhaled particles. Particles are produced when anything burns, can result from airborne dust, and from reactions of other pollutants in the atmosphere. Nitrogen oxides have one nitrogen molecule with one or more oxygens. The two most common nitrogen oxides are nitric oxide and nitrogen dioxide. Nitrogen oxides are created when carbonaceous fuels are burned. Many of the processes that produce particles and nitrogen oxides also produce greenhouse gases, which contribute to climate change. In addition, climate change is contributing to increases in natural disasters, such as large wildfires, which can increase particulate matter pollution substantially. Outdoor exposures to these pollutants are often much higher in communities with environmental justice concerns, many of which are situated near major roadways and/or industrial sites, including in urban industry as well as large agricultural operations in rural areas.</td>
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References/Additional Resources
Supplement to Bright Futures

Bright Futures
prevention and health promotion for infants, children, adolescents, and their families™

Environmental Health Guidance

These are suggestions of intervals when environmental health guidance could be given, but incorporate these as appropriate for your individual patient. These are meant as a supplement to the anticipatory guidance given in Bright Futures and further detail on suggested environmental health anticipatory guidance can be found in the chapter titled “Taking an Environmental Health History and Giving Anticipatory Guidance” in AAP’s Pediatric Environmental Health (often called “the green book”).

Applicable to Every Visit

- Parents and adult caregivers should avoid using tobacco/e-cigarettes. Keep car/home free of tobacco smoke/e-cigarette vapor. Call 800-QUIT-NOW (800-784-8686) for help to quit smoking. As the child gets older, they should also be encouraged to avoid smoking or vaping.

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<td>Prenatal Visit</td>
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<td>Newborn Visit</td>
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<td>First Week Visit (3-5 Days)</td>
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<td>1 Month Visit</td>
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<td>2 ½ Year Visit</td>
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<td>4 Year Visit</td>
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<td>5 and 6 Year Visits</td>
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<td>7 and 8 Year Visits</td>
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Companion Resources for Families

wspehsu.ucsf.edu/prescriptions-for-prevention

Free, online, available in English & Spanish
Prescriptions for Prevention

• Based on PEHT
• Powered by support from EaRTH
  • Funding, engaged ESPs & med students in initial drafts
• Doctor, healthcare professional & public health specialist reviewers
• 30 key environmental health topics
• Simple overviews w/ easy & actionable low/no-cost do’s & don’ts
• National level resources w/ space for regional ones
• English & Spanish
Climate Change

Did you know?

Climate change is causing more extreme temperatures and weather. It is also causing more frequent and severe natural disasters such as wildfires, droughts, flooding and hurricanes. Climate change is expanding the habitats and lengthening seasons of ticks, mosquitos, and other pests that can carry disease. Children depend on adults to keep them healthy and protect them from the physical and psychological effects of climate change.

Do

To protect your family’s health:

✓ Prepare your home for natural disasters in your area (such as wildfires, hurricanes and flooding):

✓ Prepare a “go bag” with medications and supplies that you can grab quickly if a disaster threatens your home. Make a plan to access and store medications during disasters.

✓ Monitor the Air Quality and temperature and take actions such as staying indoors when air quality is bad.

Don’t

✗ Don’t smoke or vape, especially indoors.

✗ Don’t open windows, play, or exercise outside on high pollution days.

✗ Never leave children alone in a car especially when it is hot outside.

✗ Don’t let pools of water collect: dump out buckets, vases, bird baths and trash containers weekly to reduce mosquitos.
Natural Disasters

Did you know?
Natural disasters including floods, hurricanes and wildfires pose immediate danger and can also have lasting impacts including exposures to toxic chemicals in our streets, yards and homes. Disruptions from disasters can sometimes limit our access to key resources like healthy food, safe water, medications, and power, putting families in dangerous situations.

<table>
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<th>Do</th>
<th>Don’t</th>
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<td>During a disaster:</td>
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- Have an emergency evacuation plan and a “go bag” with necessities to help keep your family safe.  
- Check out ready.gov for helpful information before, during and after many different kinds of disasters (like floods, wildfires, winter storms and many others).  
- Monitor local air quality:  
  - Stay inside if outdoor air quality is poor;  
  - When outdoors on bad air days, wear an NIOSH certified N95 mask. |  
- Do not use any gas or diesel-powered appliances (like grills or generators) indoors. Use generators safely to prevent carbon monoxide build up.  
- Do not return to your home after a disaster until it is safe to do so:  
  - Key cleanup should have been done;  
  - Power lines must be secured;  
  - Safe water, sanitation, and electricity should be restored. |
Outdoor Air Pollution

Did you know?

Outdoor air pollution exposure is associated with health issues such as asthma, heart disease, and cancer. Highways, ports, wildfires, volcanoes, power plants, refineries, and factories are major sources of pollution. Some communities, such as low income communities and communities of color, are more impacted by air pollution than others.

Do

- Check the EPA’s AirNow.gov for guidance on outdoor activities.
- Consider wearing a N95 mask when the air quality is unhealthy.
- Create a clean indoor air space that your family can use when air pollution is unhealthy.

To help improve outdoor air quality:

- Drive less, walk, carpool, bike, or use public transport if available.
- Choose energy-efficient appliances and light bulbs.
- Limit the use of gasoline-powered lawn mowers and leaf blowers. Invest in electric alternatives if possible.

Don’t

- Don’t rely solely on masks. Use your clean indoor air space as needed.
- Don’t leave doors and windows open on severe air pollution days.
- Don’t idle your car unnecessarily.
- Don’t burn wood or other materials in your fireplace or stove. Consider using space heaters or converting to a gas fireplace if needed. Follow the EPA’s Best Wood-Burning Practices.
Plastics

Did you know?

Our modern world uses a lot of plastic and most of it does not get recycled. Instead, it pollutes our environment and water. Children are exposed to plastics and harmful compounds in plastics through their baby bottles, toys, and personal care products (like lotions, shampoos, etc). When plastics break down, they can even form “microplastics,” tiny particles that can be eaten or inhaled.

Do

✔ Use or purchase products packaged in materials such as glass or metal instead of plastics.
✔ If you need to use plastics look for those with recycling codes 1, 2, 4, and 5. These are safer.
✔ Microplastics can get dislodged from synthetic clothing in the wash:
  ✔ Avoid fabrics such as “polyester,” “nylon,” “polyamide,” and “nylon”.

Don’t

✖ Avoid plastics with recycling codes 3 (phthalates), 6 (styrenes), and 7 (bisphenol A, or BPA) unless labeled “biobased” or “greenware”.
✖ Do not microwave food or beverages (including infant formula) in plastic.
✖ Do not microwave or heat plastic cling wraps. If you must use plastic wrap in the microwave, ensure it does
EMS Integration

• Initiative initialized by Dr. Marya Zlatnic

• Integration allows for ease of review in clinical encounters, & integration into aftercare summaries etc

• Climate Change & Pregnancy factsheet (5pgs) and Wildfires were first two priorities

• Reviewing & integrating entire Prescriptions for Prevention Series
  • Monthly reviews w/ UCSF Patient Education Committee
  • Quarterly uploads into EMS (Epic)
  • 24 reviewed and approved to date
Climate change is resulting in more extreme temperatures and weather, rising sea levels, more natural disasters (e.g., wildfires, hurricanes, droughts, and flooding), and population displacement. Pregnant people are especially vulnerable to the health harms resulting from climate change, with increased risks of adverse pregnancy complications, including preterm birth, small for gestational age, and hypertensive disorders of pregnancy.

Strategies to minimize harms include:
- **mitigation** (steps to decrease CO2 and other greenhouse gas levels to minimize the change in climate),
- **adaptation** (strategies to deal with a climate that is hotter and stormier), and
- **resilience** (sustainability).

Clinicians are in a unique position to protect the health of pregnant people and children by:
- advocating for policy changes that address climate change and
- providing clinical recommendations for patients to protect themselves from the effects of climate change.

- more sensitivity to air pollutants due to immature lung & immune function,
- more outdoor activities, higher ventilation rate, and frequent mouth breathing
- more frequent serious complications from infectious diseases, including vector-, water-, and food-borne diseases, which increase with extreme weather
- dependence on caregivers for basic health needs and safety

**Air pollution increases risks to reproductive health.**

Additional Educational Materials:
Story of Health, free, online, asynchronous continuing medical education modules

- Modules include: wildfires, asthma, children's cancer, cognitive decline, infertility & developmental disability
Resilience Module: 25 minute video on childhood development, resilience & the environment

https://wspehsu.ucsf.edu/main-resources/videos/childhood-development-resilience-environment/