Head Start Environmental Exposure Mapping Tool and Resource Library

Pam Winston and **Maretta McDonald**, ASPE/HHS (Champions)
Jesse Escobar, Office of Head Start/HHS (Data Steward)
Anne Junod, Urban Institute (Data Steward)

URBAN INSTITUTE · ELEVATE · THE · DEBATE

ASPE

Agenda

- Summary of Use Case Elements
- Head Start Environmental Exposure Mapping Tool
- Resource Dashboard
- Head Start Data
- Environmental/Disaster Data
- Uses of the Tool and Resource Dashboard
- Q&A and Discussion

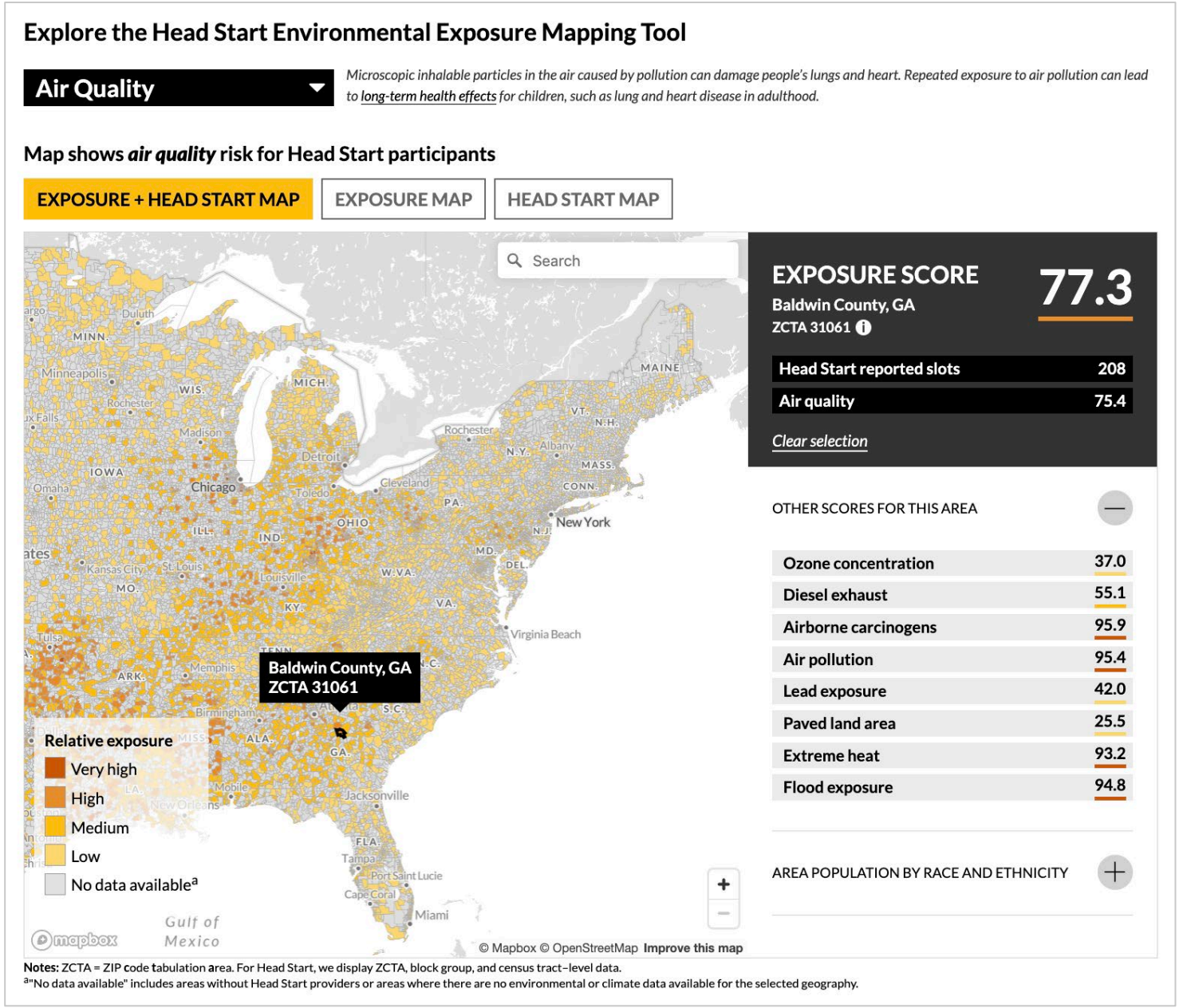
Summary of Use Case Elements

Use case summary	Low-income children are at disproportionate risk of harm from impacts of pollution, climate change, other environmental hazards (including disaster). Head Start serves about 800,000 low-income children/year. Could program and environmental data be used to better protect them?
Ultimate goal	To develop a user-friendly tool with accompanying resources to help Head Start service locations protect children from exposure to these hazards
Primary problem	Locating appropriate program administrative data and publicly available environmental exposure data, matching the data, and developing user-friendly materials
Exposure/disaster cycle phases	Preparedness and response
Data sources	Head Start administrative data, EPA EJScreen, First Street Foundation, American Community Survey, Trust for Public Lands and American Forests
Barriers	Identifying the most useful/appropriate data for goals, user-friendly tool development, data timeliness
Solutions	Pilot phase with community and user feedback, revisions, annual updates
Implications	Use for program planning, grant applications, research, partnership development, advocacy, fundraising. Potential for expansion to other programs.

Tool Development

- 2022: Pilot
  - **Review of literature and field**
  - **Pilot mapping tool**
  - **Interviews with potential users and other stakeholders for pilot tool preview and feedback**
  - **Stakeholder briefings for pilot tool preview and feedback**
- 2023: Head Start Environmental Exposure Mapping Tool
  - **Incorporated feedback** and learnings from pilot
    - **Updated data**: Head Start and environmental
    - Added **3 additional climate hazard/disaster metrics**
    - Built out **3 map views**: Head Start map, environmental hazard map, and combined map
    - Incorporated **race and ethnicity** data
    - Developed **companion resources**: case studies, fact sheets, resource library

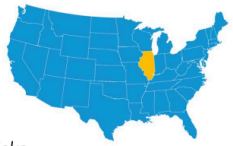
Sneak Peek


Explore the Head Start Environmental Exposure Mapping Tool
Air Quality
Microscopic inhalable particles in the air caused by pollution can damage people's lungs and heart. Repeated exposure to air pollution can lead to long-term health effects for children, such as lung and heart disease in adulthood.
Map shows air quality risk for Head Start participants
EXPOSURE + HEAD START MAP
EXPOSURE MAP
HEAD START MAP
Search
Baldwin County, GA
ZCTA 31061
Relative exposure
Very high
High
Medium
Low
No data available[a]
Gulf of Mexico
© Mapbox © OpenStreetMap Improve this map
EXPOSURE SCORE
77.3
Baldwin County, GA
ZCTA 31061
Head Start reported slots 208
Air quality 75.4
Clear selection
OTHER SCORES FOR THIS AREA
Ozone concentration 37.0
Diesel exhaust 55.1
Airborne carcinogens 95.9
Air pollution 95.4
Lead exposure 42.0
Paved land area 25.5
Extreme heat 93.2
Flood exposure 94.8
AREA POPULATION BY RACE AND ETHNICITY
Notes: ZCTA = ZIP code tabulation area. For Head Start, we display ZCTA, block group, and census tract–level data.
[a]"No data available" includes areas without Head Start providers or areas where there are no environmental or climate data available for the selected geography.

Resource Dashboard – Case Studies & Fact Sheets

URBAN INSTITUTE

Resourcing Head Start Providers to Mitigate Toxic Exposures



State Partnerships to Reduce Environmental Risks

Anne N. Junod and Amy Rogin

In 2019, Illinois passed a law requiring all licensed early care and education (ECE) providers to test their water for lead and, if lead was found, take action to reduce lead levels. At the time, there were no statewide resources or education tools to help ECE providers understand the new requirements and no supports to assist them in conducting needed testing, understanding the results, completing mitigation or abatement activities, and communicating with caregivers.

Elevate is a nonprofit organization delivering comprehensive programs and services to help ensure that people in Illinois have safe and affordable water, heat, and electricity in their homes and communities. Among its initiatives, Elevate administers LeadCare Illinois, a statewide program that provides Head Start programs and other ECE and child care providers with training about the dangers of lead, how to conduct lead testing, and what to do if lead is found in their facility's drinking water. They also help ECE providers identify and remove lead paint and asbestos, test air quality, and make air quality improvements by upgrading heating and cooling systems.

BENEFITS OF COORDINATION

Before Illinois passed statewide lead testing requirements, there was wide variation in lead testing quality and reporting, and many ECE providers struggled to conduct testing and interpret results. Additionally, most providers do not have the time for complicated logistics planning or the capacity to plan and manage infrastructure projects required for lead abatement. Elevate partners with ECE providers as a "one-stop shop" to provide testing, information and education resources, mitigation and abatement planning, and management support. They also provide resources and guidance for communicating with parents and caregivers about lead testing activities, including communication strategies and templates for outreach. Because of this coordinated support, Elevate has found that in addition to reducing lead levels, many providers become champions for reducing other toxins and environmental risks in their communities and take on leadership roles in educating and providing resources to parents, caregivers, and the broader community.

ADDITIONAL RESOURCES

Program Website
For more information about Elevate, visit www.elevatenp.org/lead-in-water.

Case Studies
To learn more about how Head Start programs are addressing environmental and climate risks, see the following case studies:
- Creating Outdoor Green Spaces
- Social-Emotional Programming for Families Exposed to Environmental Risks

Fact Sheets
To learn about how environmental and climate risks affect children, see the following fact sheets:
- Air Quality
- Extreme Heat
- Flooding
- Paved Area and Green Space
- Wildfires

Resources Library
For more information about environmental and climate risks and improving children's outcomes, see our resources library.

Mapping Tool
Explore environmental and climate hazards affecting children with our interactive map.

URBAN INSTITUTE

Flooding and Children's Health and Well-Being

Anne N. Junod and Amy Rogin

Flooding is generally defined as the inundation of water over any area of land that is normally dry. It can be catastrophic or, more commonly, "nuisance" flooding.

Catastrophic flooding can occur after severe weather events, such as hurricanes, as well as after more common events, such as heavy rains or snowmelts that exceed river or stormwater infrastructure capacity and cause them to overflow.

In coastal communities across the United States, flooding is increasing as sea level rise from climate change brings land areas closer to average ocean levels. Flooding risk, severity, and frequency are expected to increase as temperatures continue to rise. Flooding can also happen in areas burned by wildfires—which are also increasing as a result of climate change—because barren, burned ground lacks vegetation to help the soil absorb water. All types of flooding can disrupt daily life, strain public infrastructure systems such as roadways and water systems, cause property damage, and threaten public health and safety.

HOW FLOODS AFFECT CHILDREN

Crises like flooding can disrupt children's relationships with important caregivers—including early childhood educators—causing them to experience distress. Flooding can also force early care and education centers and schools to close, damage educational infrastructure, and disrupt children's well-being and daily lives.

- **Health:** After a flood event inundates a home or neighborhood, debris-filled areas and drinking water may be contaminated by hazardous materials such as asbestos, lead, gasoline, and oil. Because children are still growing, their immune, digestive, and nervous systems are more easily harmed by exposure to these substances than are those of healthy adults, even if immediate symptoms do not present. Mold can develop in buildings that flood, causing unhealthy indoor air quality, which also disproportionately affects children.
- **Behavior and psychology:** Children who experience displacement or significant losses from flooding can exhibit high levels of post-traumatic stress disorder and distress from lost friendships, lack of safe routes to care settings or school, and the loss of familiar and safe places. These effects are worse for younger children, children who experience multiple flood events, and children who experienced anxiety before a flood event.
- **Learning:** Maternal exposure to flooding during pregnancy can lead to increased risks of cognitive impairment for children as they grow. Research on children's learning outcomes in US contexts is limited, but any disruptions

ADDITIONAL RESOURCES

For more information on mitigating flood risks to children, see the resources library.

Fact Sheets
To learn about other environmental and climate hazards and their risks to children, see these fact sheets:
- Air Quality
- Extreme Heat
- Paved Area and Green Space
- Wildfires

Case Studies
To learn how Head Start programs are addressing environment and climate hazards for children, see these case studies:
- Creating Outdoor Green Spaces
- Resourcing Head Start Providers to Mitigate Toxic Exposures
- Social-Emotional Programming for Families Exposed to Environmental Risks

Mapping Tool
Explore flood risks as well as other environmental and climate change hazards affecting children in Head Start Programs using our interactive map.

URBAN INSTITUTE

Wildfires and Children's Health and Well-Being

Anne N. Junod and Amy Rogin

Wildfires are large, uncontrolled fires that burn through brush, grasslands, forests, and other vegetation. They can start naturally, such as from a lightning strike, or they can be caused by humans. Especially as people continue to develop housing and infrastructure in the "wildland-urban interface"—areas where community boundaries meet natural lands—wildfires often spread into areas where people live, resulting in property loss, health risks from smoke exposure, psychological distress, and death. Wildfire smoke can also spread many miles to otherwise unaffected areas.

Climate change is increasing the frequency and intensity of wildfires by creating warmer, drier weather that escalates fire risk and lengthens fire seasons. Since 1984, the number of large wildfires in the United States has doubled, and future projections estimate that continued rising temperatures could increase the median land area burned by as much as 600 percent.

An estimated 7.4 million children currently live in areas of disproportionate wildfire exposure, and people and communities across the country, especially in the West, will face increasing risk of direct losses and secondary physical and psychological harms from wildfires in the coming years.

HOW WILDFIRES AFFECT CHILDREN

Exposure to wildfires during early childhood can affect children's development, health, and achievement throughout their lifetimes.

- **Health:** Wildfire smoke can damage heart and lung health for people of any age, but compared with healthy adults, children are at greater risk of negative health outcomes from wildfire smoke because they spend more time outside, breathe faster, and breathe in more air as a proportion of their body size and weight. Because children's bodies are still growing, health effects from wildfire smoke can be lifelong, particularly for children with existing respiratory illnesses such as asthma.
- **Behavior and psychology:** Many children who live through wildfire disasters can experience high and prolonged incidences of psychological distress and abnormally high behavioral and mental health challenges months and years after wildfires occur. These effects are often worse for younger children and for children with physical and developmental disabilities. Negative effects can be compounded in the absence of psychological, educational, and emotional supports geared toward children with disabilities.

ADDITIONAL RESOURCES

For more information about mitigating wildfire risks to children, see the resources library.

Fact Sheets
To learn about other environmental and climate effects on children, see these fact sheets:
- Air Quality
- Extreme Heat
- Flooding
- Paved Area and Green Space

Case Studies
To learn how Head Start programs are addressing environment and climate hazards for children, see these case studies:
- Creating Outdoor Green Spaces
- Resourcing Head Start Providers to Mitigate Toxic Exposures
- Social-Emotional Programming for Families Exposed to Environmental Risks

Mapping Tool
Explore wildfire risks, as well as other environmental and climate change hazards affecting children, using our interactive map.

Resource Dashboard – Resource Library

Resource Library | Use this data — Airtable

Hide fields | Filter | Group | Sort

	Title	Environmental or Clima...	Link to Resource	Summary	Resource Source	Resource Activities	Resource Type	Other Environ
1	Children in Nature	Air quality	https://cehn.org/download/air-quality-fact-sheet-2/	Fact sheet for early childhood educators and child care providers with information about actions...	Children's Environmental Health Network	Mitigating exposures	Fact sheet	Wildfires
2	5-Step Guide to Checking Ventilation Rates in Classrooms	Air quality	https://schools.forhealth.org/ventilation-guide/	Guide to assess air ventilation quality in classroom settings.	Harvard T.H. Chan School of Public Health	Mitigating exposures	Fact sheet	
3	Get a Head Start on Asthma	Air quality	https://nursing.umn.edu/research/research-projects/get-head-start-asthma	Introductory information about asthma management for child care providers and caregivers.	University of Minnesota School of Nursing	Education and training	Website	Asthma
4	Reference Guide for Indoor Air Quality in Schools	Air quality	https://www.epa.gov/iaq-schools/reference-guide-indoor-air-quality-schools	Guidance for early learning settings and schools to mitigate indoor air quality hazards.	US Environmental Protection Agency	Mitigating exposures Screening and testing	Guidelines	Radon Mo
5	AirNow	Air quality	https://www.airnow.gov/	Website to find real-time air quality information for locations within the United States, including levels of...	AirNow.gov	Screening and testing		PM 2.5 PM Ozone
6	National Tribal Air Association's 2020 Update: A White Paper Detailing the Science and Connections...	Air quality	https://www.ntaatribalair.org/wp-content/uploads/2020/05/NTAAs-2020-White-Pape...	White paper compiling key research findings on the health impacts of air pollutants. Directs ...	National Tribal Air Association	Advocacy and systems ...	Report	Nitrous oxide Sulfur dioxid Particulate m
7	Healthy World, Healthy You	Air quality Toxic chemicals	https://icahn.mssm.edu/files/ISMMS/Assets/Departme	Story and activity e-book for children about how to	Mount Sinai Children's Environmental Health	Mitigating exposures Education and training	Children's e-book	

125 records

Head Start Service Location Datasets

Available Data

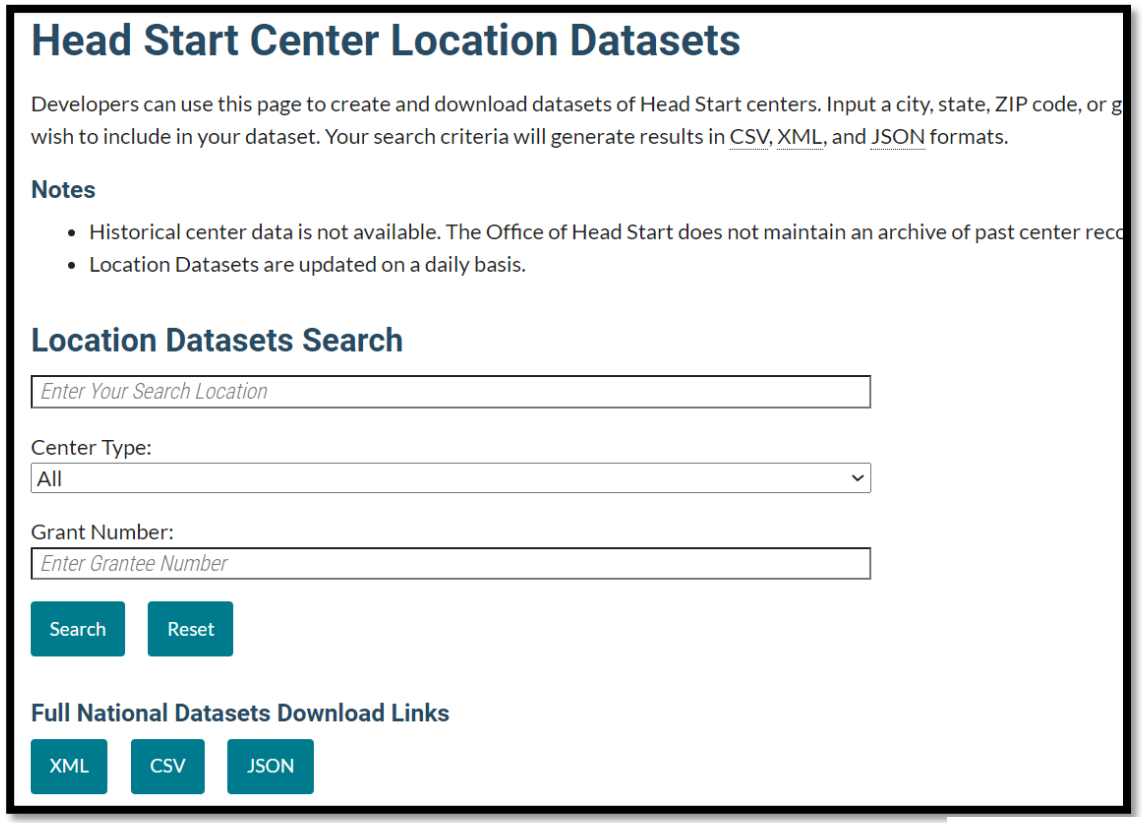
- 18,000 locations funded to serve nearly 800,000 children ages birth to 5

Format

- Available in XML, CSV, and JSON
- Include Long and Lat coordinates

Use Cases

- Development of tools merging location datasets
- Support emergency response efforts
- Research purposes
- Coordinate partnerships
- Administrative use by Office of Head Start



Environmental and Climate Hazards

Air quality

Microscopic inhalable particles in the air caused by pollution can damage people's lungs and hearts. Repeated exposure to air pollution can lead to long-term health effects for children, such as lung and heart disease in adulthood.

Ozone concentration

Although ozone in the atmosphere helps shield the planet from harmful ultraviolet rays, at ground level, higher concentrations of ozone can negatively affect people's lung function. For children, repeated exposure to high ozone levels can cause permanent damage to their still-developing lungs.

Diesel exhaust

Diesel exhaust, the soot produced by diesel engines, consists of more than 40 cancer-causing substances. Studies have shown that children who ride in diesel-fueled school buses or who live along major thoroughfares may have an increased risk of asthma and of developing cancer later in life.

Airborne carcinogens

Air toxins—hazardous air pollutants that have been shown to increase lifetime cancer risk—are produced by vehicular traffic, power plants, wildfires, and more. Children are more sensitive to these toxins because their bodies are still developing and they breathe more air relative to their body weight.

Air pollution

The Respiratory Hazard Index compares an area's exposure to hazardous air pollutants with the levels that can harm a person's health. Children are more susceptible to airborne pollution, which can lead to lung and health problems.

Lead exposure

In 1978, the federal government banned the use of lead in consumer products because of its harmful health effects, such as brain damage. Children's exposure to lead can stunt learning and development and cause hearing and speech problems.

Paved land area

Impervious surfaces, or areas paved over with asphalt and other substances that do not let rainwater through, are common in our car-dependent culture but are associated with many negative health effects. Studies show that exposure to paved surfaces may negatively affect children's development, while exposure to green spaces improves it.

Extreme heat

Over the past 60 years, heat waves have become longer, more frequent, and more intense in the United States. Because children have less body mass, they are more susceptible to dehydration and death during extreme heat events.

Flood risk

Flooding, which is increasing in frequency because of climate change, can cause power failures and contaminated groundwater, both of which pose health risks. Children are more vulnerable to any chemicals or toxins released into the water, as their bodies are still developing.

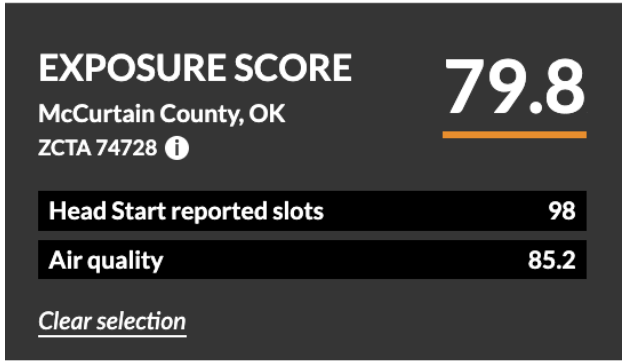
Wildfire risk

Wildfires release dozens of air pollutants and carcinogens into the atmosphere, all of which can cause long-term lung and heart damage. These risks are greater for children, as they tend to spend more time outdoors than adults and may inhale more smoke as a result.

How We Score Exposure

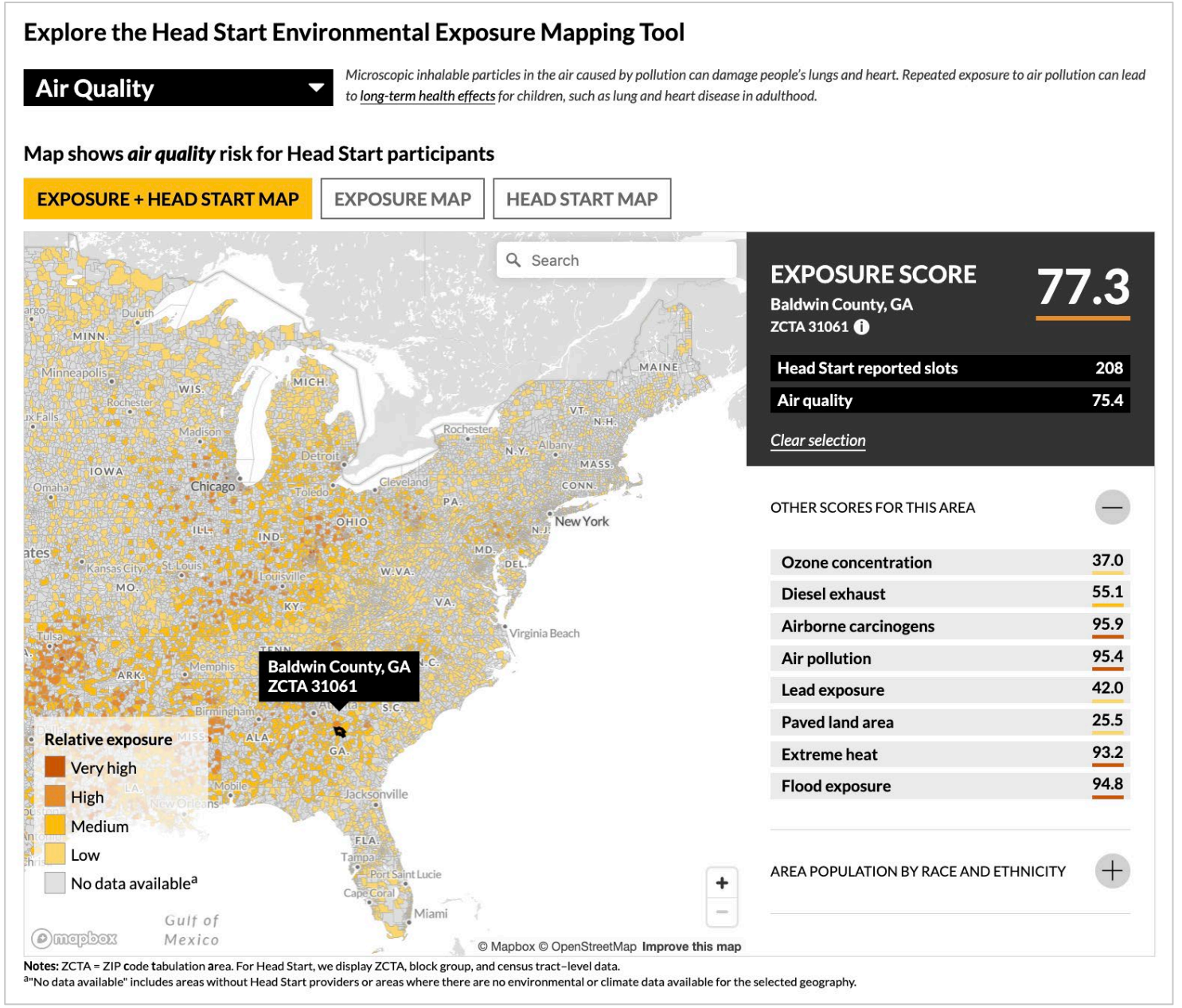
Exposure Score = Hazard Exposure *(.75) + # Program Participants *(.25)

The **Exposure Score** is a composite percentile score depicting the relative exposure to an environmental hazard for Head Start program participants in a chosen geography relative to other respective program participants nationwide.



Understanding ***relative exposure*** will help Head Start identify children that are more exposed to environmental and climate hazards in their footprint.

Walkthrough



Uses of the Mapping Tool and Resources Dashboard

Examples of uses cited by study respondents and Head Start staff

- **Understand the environmental and climate hazard exposures families and caregivers are facing** and support Head Start staff to have conversations with them about how they are affected
- **Support Head Start program planning** for future environmental and climate hazards (e.g., in community needs assessments)
- **Support Head Start and other programs to establish new and different partners** that care about environmental and climate hazards and children's health and wellbeing
- **Resource Head Start partner agencies and organizations** with information about environmental and climate issues impacting their shared work and potential strategies to address them
- **Make the case for local and state health agencies** to advance environmental and health equity
- **Spur further research** to understand community exposures and risks
- **Advocate for children and families to local and state officials** on these issues
- **Fundraise** for environmental and climate issues

Project Links

Head Start Environmental Exposure Mapping Tool

https://www.urban.org/data-tools/where-are-children-head-start-exposed-environmental-hazards

Head Start Environmental Exposure Resource Dashboard

https://www.urban.org/projects/where-are-children-head-start-exposed-environmental-hazards

Q&A and Discussion

Anne Junod, Urban Institute – ajunod@urban.org

Pam Winston, ASPE – pamela.winston@hhs.gov

Maretta McDonald, ASPE - maretta.mcdonald@hhs.gov

Jesse Escobar, Office of Head Start – jesse.escobar@acf.hhs.gov

Thank you!

URBAN INSTITUTE · ELEVATE · THE · DEBATE

ASPE