Scan QR code to submit a question or comment

#ECHOSymposium2026



National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium: Translating Science to Action

Welcome

The Symposium will begin shortly!

Erin Luetkemeier, PhD



- Chief of Staff, NIH Environmental influences on Child Health Outcomes (ECHO)
- Symposium Host

National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science to Action

Agenda At-a-Glance









Time	Sessions
08:30 AM	Welcome & Opening Remarks
09:35 AM	Session 1: Plastics
10:55 AM	Session 1 Fireside Chat: Microplastics
11:35 PM	Lunch and Networking Break
12:30 PM	Session 2: Air Quality
01:50 PM	Break
02:05 PM	Crosscutting Panel: Translating Science to Action
03:30 PM	Networking Break
04:00 PM	Closing Remarks

Housekeeping

- Wi-Fi: NIH Guest Network available (log-in instructions provided at registration)
- Restrooms: Located just outside the meeting room, to both the left and right.
- Silence mobile devices during sessions
- Photos/social media: #ECHOSymposium2026, @ECHOChildHealth
- Slido polling throughout the day via QR code and link. Have your cellphones ready to participate!
- Ask questions via the URL in the footer and QR code displayed during each Q&A session
- Slides & materials will be shared after the meeting via the ECHO website: https://www.nih.gov/echo



Housekeeping

Meals and Breaks

- Coffee and light refreshments available in the lobby during scheduled breaks
- Lunch options: Cafeteria on upstairs level; **Chop't orders are due by 9:30 a.m.**
- Chop't pre-orders can be picked up by the Registration desk

HOW TO PLACE YOUR ORDER

To order lunch from Chopt Creative Salad Co., scan the QR code or visit **CHOPTDROP.COM/ECHOS** and place your order on **May 6th by 9:30 a.m.**

Pick up your order at 11:30 a.m.



Housekeeping

Transportation

- Strongly suggest using rideshare services (Uber, Lyft) and pre-scheduling your ride. Please see staff at Registration if you require additional assistance with your reservation.

Uber

Lyft



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Opening Remarks

Opening Remark Presenters

Setting the Stage



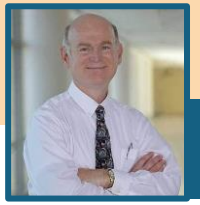
Dr. Matthew W. Gillman
Director, NIH Environmental influences on Child Health Outcomes (ECHO)

Keynote Address



Nsedu Witherspoon
Executive Director, Children's Environmental Health Network (CEHN)

Setting the stage



Matthew W. Gillman, MD, SM

Director, NIH Environmental influences on Child Health Outcomes (ECHO) Program



ECHO
Environmental influences on Child Health Outcomes
A program supported by the NIH

Do not edit
How to change the design



In one word, what comes to mind when you hear ‘science translation’?

ⓘ The Slido app must be installed on every computer you’re presenting from

slido

Welcome to ECHO's 2nd Annual Science to Action Symposium

- **Thanks** to everyone who made this day happen!
  - Planning Committee
    - ECHO participants
    - Professional organizations
    - NIH partners
    - Other federal partners
    - ECHO researchers
  - Behind the scenes
    - ECHO Program Office, NIH Event Staff, Lumina
  - All of you!
    - Chairs, speakers, panelists, networking partners
    - Attendees, both in person and online



Partners in Driving Change for Children's Health

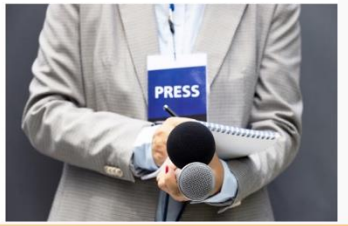
- American public
- Congress
- ECHO participants—children and families
- Educators
- Healthcare practitioners
- Media
- NIH Institutes, Centers, Offices and Programs
- Other federal agencies
- Professional societies and advocacy groups
- Scientists—national and international

…and more!









Do not edit
How to change the design



Which best describes your role? (Select all that apply)

ⓘ The Slido app must be installed on every computer you're presenting from

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Stage-setting Topics

- ECHO's Why: Inspiring Action Through Science
  - Enhancing the health of children for generations to come
- A Look Into the ECHO Program
  - Observational Research: The ECHO Cohort
  - Intervention Research: The ECHO IDeA States Pediatric Clinical Trials Network
- Setting the Stage for the Day
  - Agenda At-A-Glance
  - Key Themes of Each Session

National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science
to Action



ECHO's Why

Inspiring Action Through Science

What if every child had the chance to grow up healthy?



A good start to life can last a lifetime and over generations

Solution-Oriented Research in ECHO

The Intersection of…



- "So-what" research questions that lead to impactful interventions, public health programs, clinical practices, policies
- Do a research study only if
  - "you know what you will conclude from each possible result, and
  - the result may change how to intervene to address a clinical, policy, or public health problem."[1]

[1]Robinson & Sirard, 2005

How Partners Help Advance ECHO Research *and* How our Research Informs Partners' Actions

Front End

Identify actionable research gaps that ECHO can address



Back End

Disseminate results of solution-oriented research to relevant audiences,

to inform **actions that enhance health**



How ECHO Helps Translate Science to Action

We ***do***:

- ✓ Apply evidence, research, and scientific insights to **inform policies, programs, and practices**
- ✓ Partner **with interested parties** to shape how they interpret and use findings
- ✓ Enable **two-way communication** that promotes listening, adapting, and collaboration

We ***do not***:

- X Dictate what others must do
- X Push personal or organizational agendas under the guise of science
- X Assume publication alone is enough; translation requires engagement

Do not edit
How to change the design



In one word, what comes to mind when you hear ‘translating science to action’?

ⓘ The Slido app must be installed on every computer you’re presenting from

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A Look Into The ECHO Program

A National Research Resource

Celebrating a Decade of Discovery and Impact



- ECHO is in its 10th year!
- Nationwide research program
  - Understanding root causes and prevention of common childhood diseases
  - Promoting positive health and well-being for all U.S. children
- Solution-oriented research embedded since day one

ECHO Program

Mission

To enhance the health of children for generations to come



5 Key Areas with High Public Health Impact

Pre, Peri, & Postnatal
Preterm birth, maternal depression

Upper & Lower Airway
Asthma, allergies

Obesity
And its consequences

Neurodevelopment
Autism, ADHD, Mental Health

Positive Health
Well-being

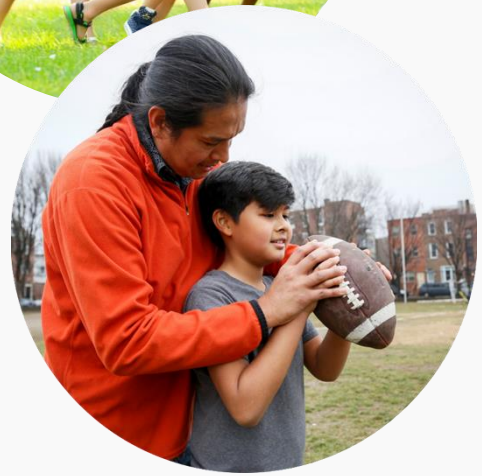
ECHO is dedicated to both

learning what factors affect child health

and

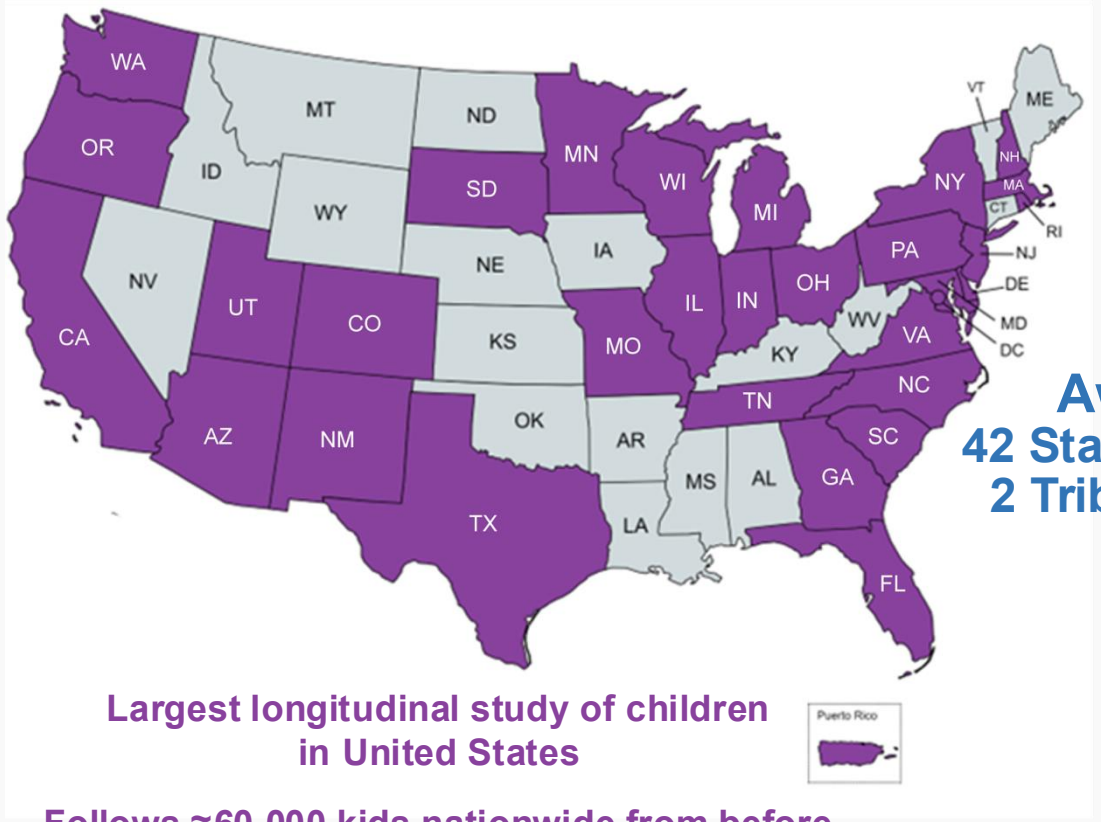
finding ways to enhance it





Observational & Intervention Research

ECHO Cohort

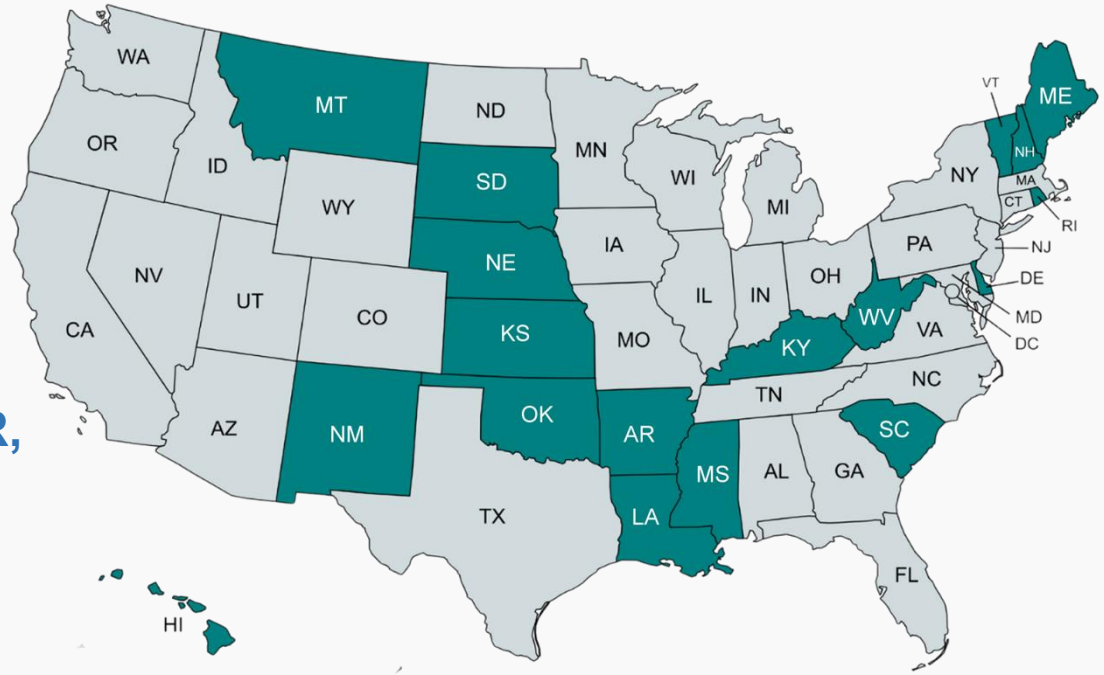


Largest longitudinal study of children in United States

Follows ≈60,000 kids nationwide from before conception to 21 y

Awards in 42 States, DC, PR, 2 Tribal Nations

ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN)



State-of-the art clinical trials for rural or underserved kids

18 states with low NIH funding

ECHO Cohort

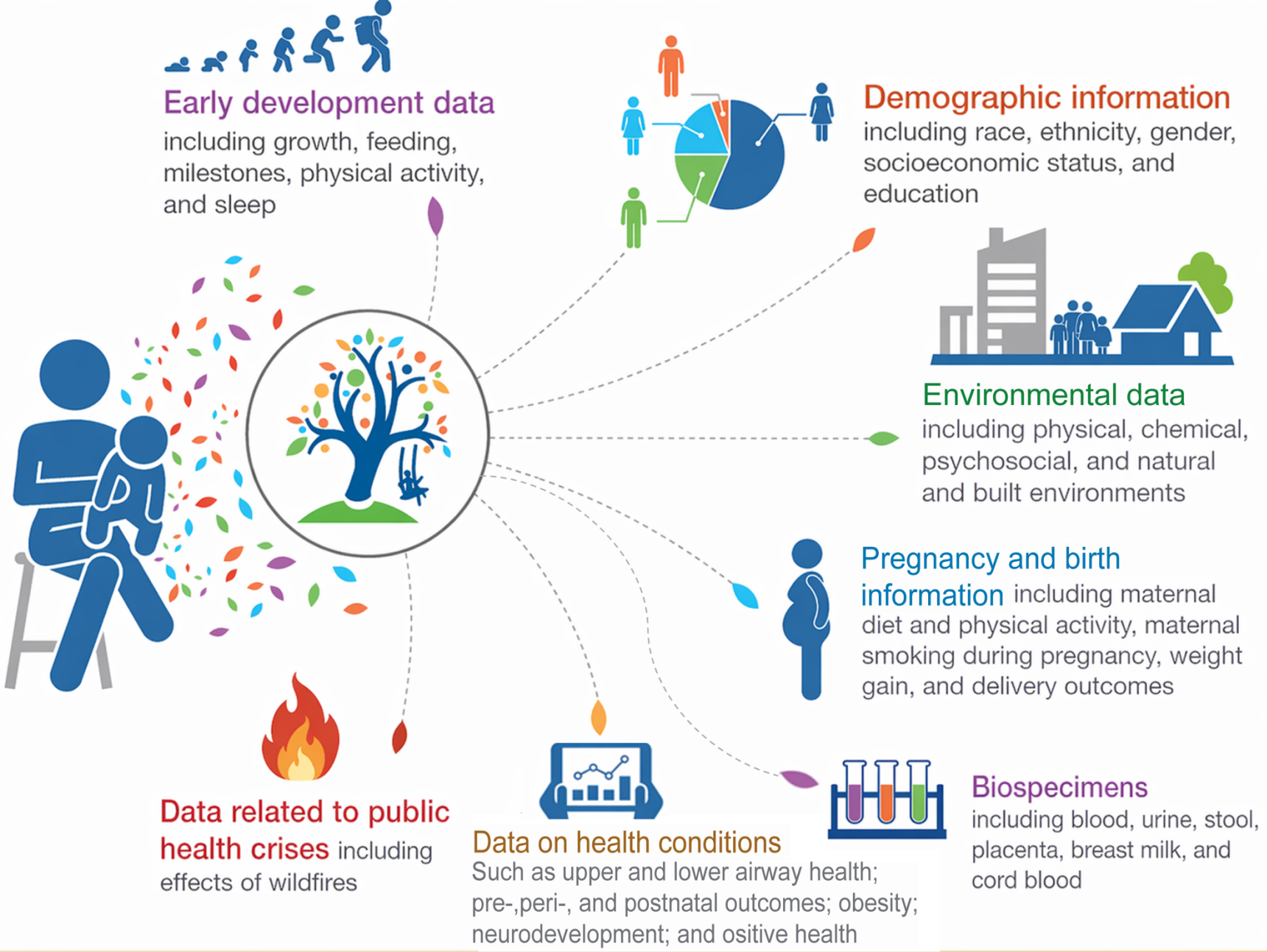
- Reflects **experiences of families** across the United States
- Data from ≈ **170,000 children and family members**
  - Data going back 30+ years, and going forward
    - From participants living in all 50 States + DC and PR
  - Information integrated into one powerful dataset
    - To understand how a broad range of early **environmental influences affects child health and development**
- Data now available to the broad scientific community to unlock new insights

Observational Research



Largest longitudinal study of children in the United States

ECHO Cohort Data



2 Ways ECHO Cohort Data are Available to the Broad Scientific Community

- **Controlled-Access Public-Use Data**
  - Secure de-identified data only, i.e., no personal information
  - https://echochildren.org/dash
  - Resumes August 2026

  OR

- **Ancillary Studies for More Detailed Data +/- Biospecimens**
  - Data with limited personal info, too, e.g., dates & residential history
  - More data security
  - https://echochildren.org/echo-ancillary-studies

ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN)

- Brings state-of-the-art **clinical trials** to children and families in rural or underserved areas
  - Focused on real-world issues like **childhood obesity, indoor air quality,** and the **opioid crisis.**
  - Expands research opportunities in states that have historically low levels of NIH funding.
- **Over 1 in 4** participants in ISPCTN trials come from rural communities, ensuring we address the challenges they face head-on.

Intervention Research



Only NIH Clinical Trials Network Focused on Children from Rural or Underserved communities

Select ECHO Research: Plastics

- Study Reveals **Rising Levels** of **Plastics, Pesticides, and Replacement Chemicals** in Pregnant Women
- ECHO Studies Find Links Between **Phthalate Exposure** During Pregnancy and
  - **Preterm Birth**
  - **Brain Development** in Infant Girls
  - **Higher Blood Pressure** in Infants
  - **Children's Behavior**
- Maternal **PFAS Exposure** During Pregnancy Associated with
  - **Smaller Babies** at Birth
  - Slightly Increased **Risk of Obesity** in Children
  - **Not Associated** with **Behavior Issues** in Children
- ECHO Cohort Researchers Find Association Between **Prenatal Chemical Exposures** and **Postpartum Depression**
- ECHO Review Finds **No Strong Link** Between Consumer Chemical Exposures and Time to Pregnancy



Select ECHO Research: Air Quality

- Prenatal Exposure to Air Pollution Associated with
  - **Lower Birthweight**
  - Higher Risk for **Childhood Asthma**
  - Higher Risk for **Autism-related Outcomes**
- Higher Prenatal and Infant $PM_{2.5}$ Linked to **Higher Childhood Blood Pressure**, While Prenatal NO_2 Associated with **Lower Blood Pressure**, ECHO Study Finds
- ECHO Study Shows Pregnant Women Living in **Historically Redlined Neighborhoods** Have Both **Higher $PM_{2.5}$** and **Smaller Babies** at Birth
- ECHO Research Suggests **Airborne Lead Exposure** Affects **Children's Cognitive Development**, Especially in Males
- ECHO Review Suggests **Air Pollution, Secondhand Smoke, Formaldehyde Exposure** Lengthen **Time to Get Pregnant**
- Wildfire Smoke Exposure Linked to Higher Risk of **Preterm Birth**
- High-Efficiency Particulate Air **(HEPA) Filters Decrease $PM_{2.5}$** Levels in Homes with **Infants who had Severe Bronchiolitis**



Previewing the Day Ahead



This 2nd ECHO Symposium…

- **Showcases** ECHO research on how early exposures to **plastics** and **air quality** are related to **child health**.
- **Identifies paths to translate science into action**
  - Inform policies, programs, and practices that benefit children
- **Connects varied perspectives** — researchers, clinicians, educators, policymakers, and more — to strengthen impact
- **Strengthens collaboration** and shapes the direction of **future symposia**

Keynote Partners

Opening Remarks

Keynote Address

Nsedu Witherspoon, MPH
Executive Director (CEHN)

Children's Environmental Health Network

Concluding Remarks

Closing Address

Andrew Racine, MD, PhD, FAA
President, AAP

American Academy of Pediatrics

The Three Sessions



Session 1: Plastics

Theme: Moving Plastics Science From Biological Mechanisms to Public Impact.



Session 2: Air Pollution

Theme: Moving Air Quality Research From Environmental Exposure to Advocacy and Action.



Crosscutting Panel: Translating Science to Action

Theme: Building Trust and Communicating Environmental Health Science to Various Audiences

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Enjoy the Symposium!

Protecting Children's Environmental Health: Activating Vital Actions Through the Use of Science



Nsedu Obot Witherspoon, MPH
Executive Director
5/6/2026

ECHO Conference

Children's Environmental Health Network



Protecting Our Children



John Routt Reigart II, MD
Pediatrician, researcher, life-long advocate!
Toxicology / Lead poisoning / Pesticides

Our Mission and Work

Our Mission:
To protect the developing child from environmental hazards and changing climate. Promote a healthy environment.

Our Work:
Lead the CEH Movement!

- Promote preventive research
- Translate, Educate, and Train
- Child protective policies

Celebrating 34 years!



Globally, 1 in 4 deaths among children younger than 5 are associated with polluted environments

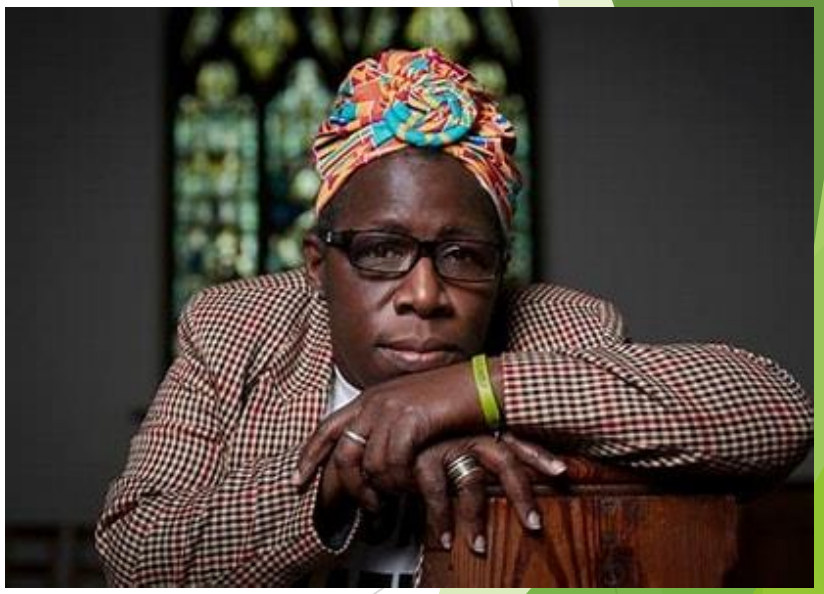


Inheriting a sustainable world? Atlas on children's health and the environment. Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO.

Ella Adoo-Kissi-Deborah
First Person in the World with Air Pollution Listed as Cause of Death







Rosamund Adoo-Kissi-Deborah

Children's Environments in the U.S.

Up to 10 million homes have LSLs

> 1 billion pounds of pesticides used annually

30 million live in areas of poor air quality

30 million homes considered unhealthy



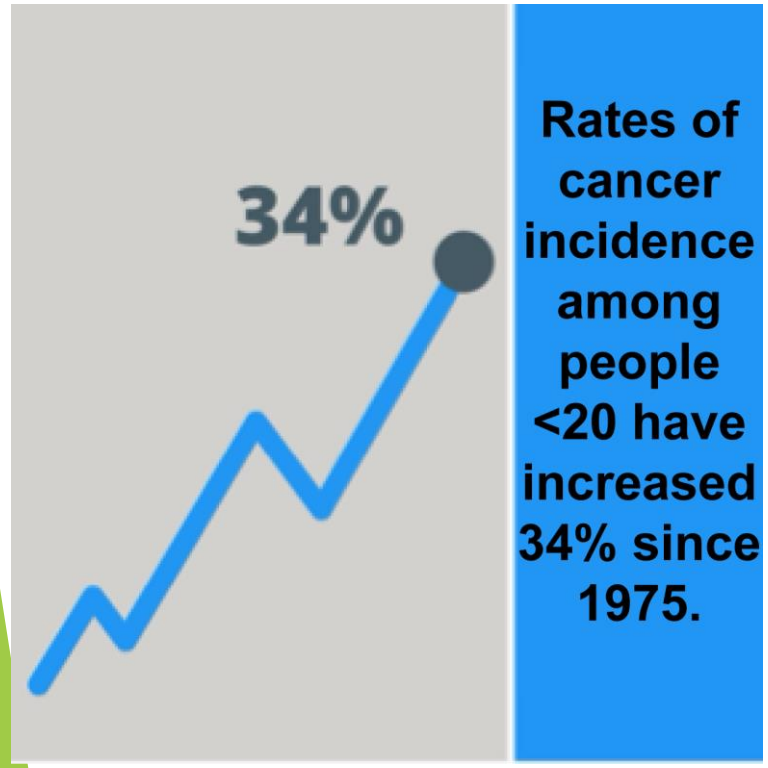
17% of children <5 live near superfund sites

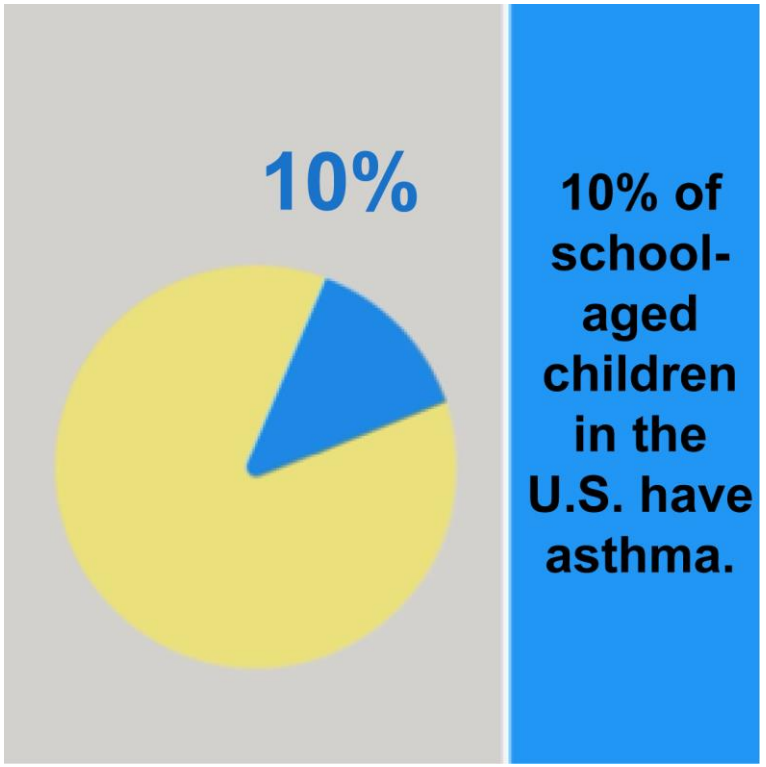
24 million homes have lead-based paint hazards

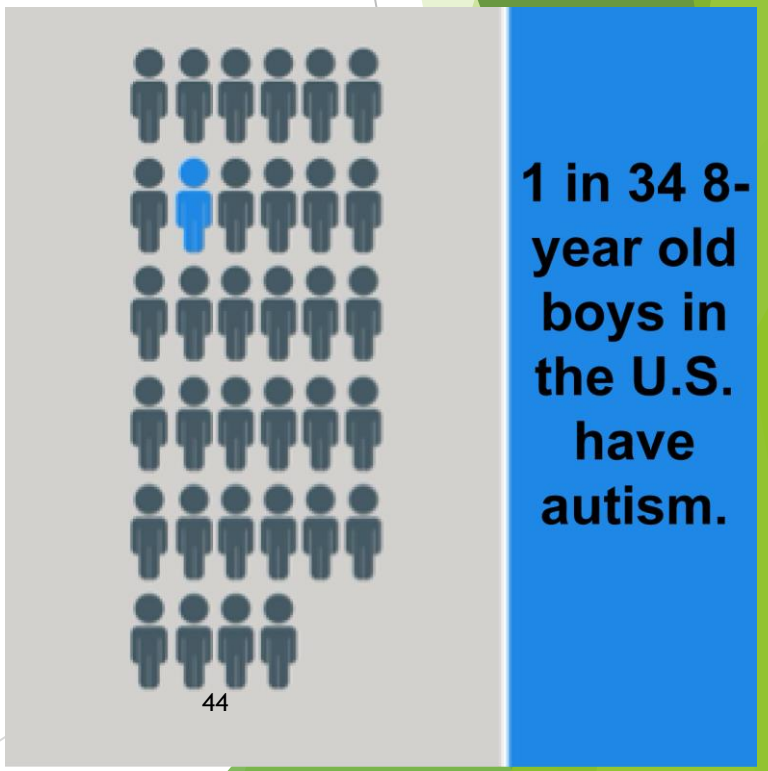
95% of baby foods toxic heavy metals

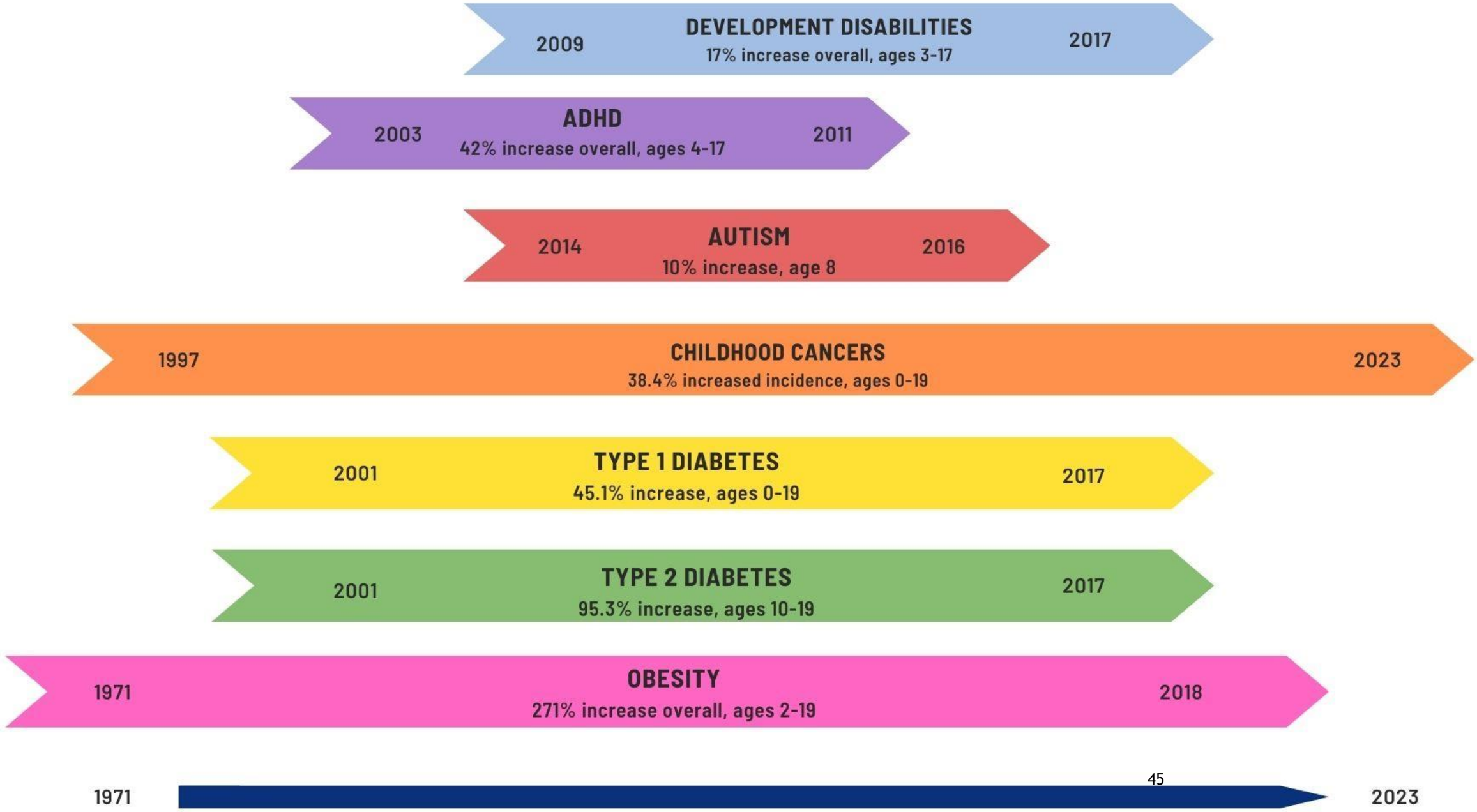
84,000+ chemicals registered for use

> 40% of School-Aged Children & Adolescents have at Least One Chronic Health Condition





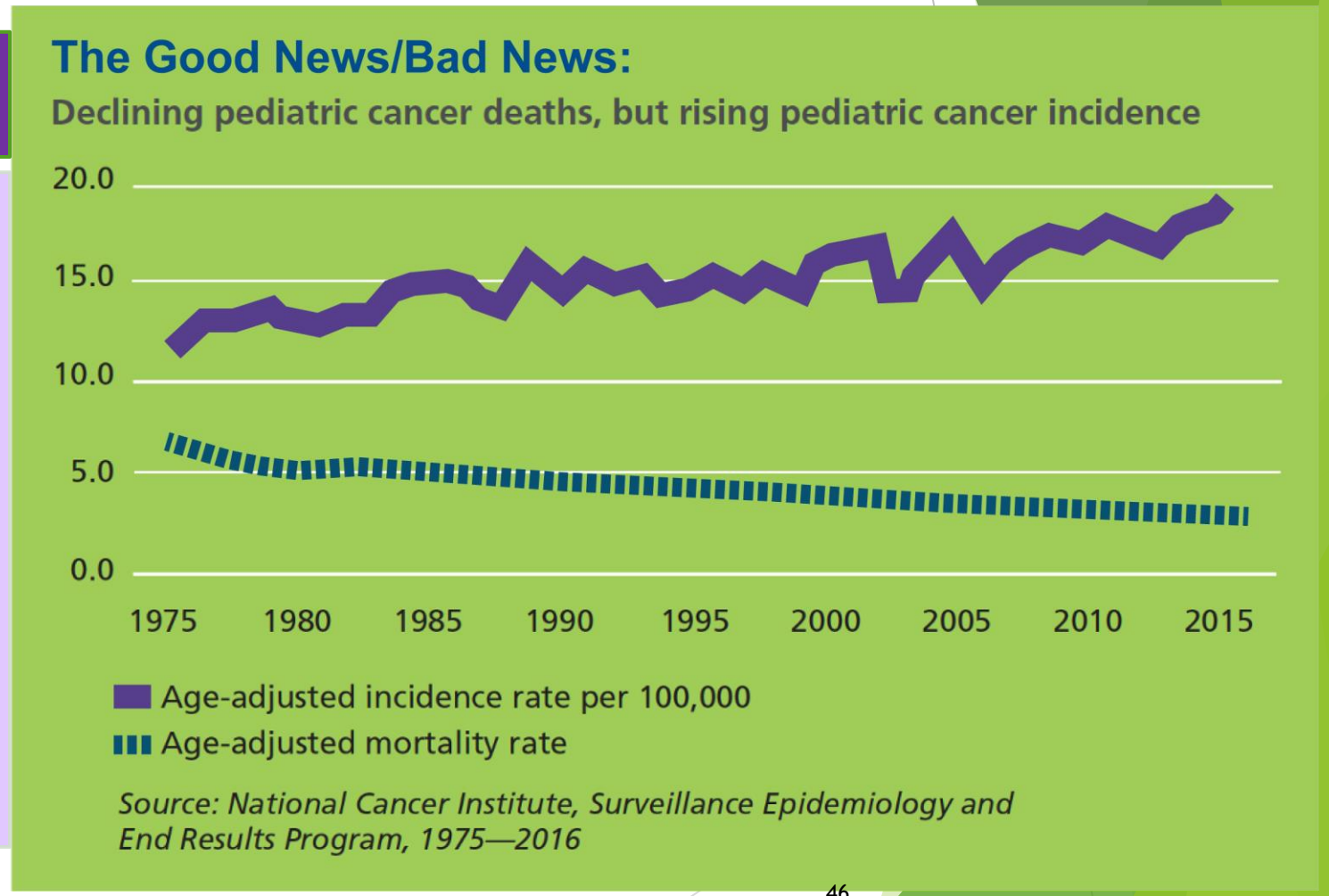



2009
DEVELOPMENT DISABILITIES
17% increase overall, ages 3-17
2017
2003
ADHD
42% increase overall, ages 4-17
2011
2014
AUTISM
10% increase, age 8
2016
1997
CHILDHOOD CANCERS
38.4% increased incidence, ages 0-19
2023
2001
TYPE 1 DIABETES
45.1% increase, ages 0-19
2017
2001
TYPE 2 DIABETES
95.3% increase, ages 10-19
2017
1971
OBESITY
271% increase overall, ages 2-19
2018
1971
2023

Childhood Cancer

The sobering stats

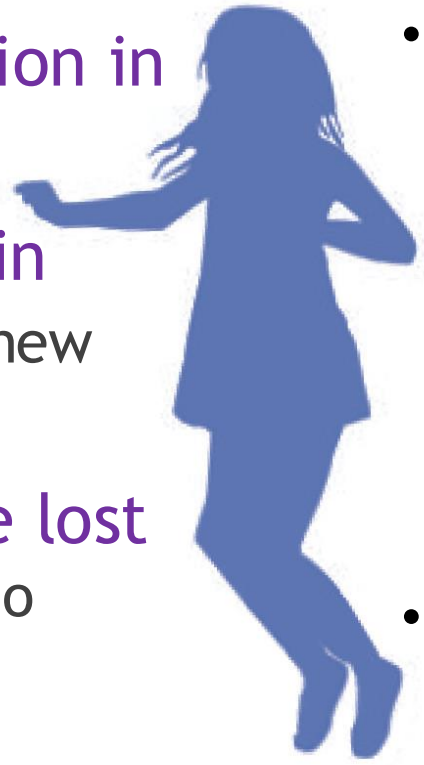
- 16,050 children in 2019 diagnosed with cancer
- Cancer is the leading cause of death past infancy
- Steady rise in incidence since 1975
- Most common: leukemia, brain/CNS and lymphomas;
- Rates of leukemia highest among Latinx children



The Economic and Social Burden



- Hospitalizations: $1 billion in 2009 and still rising
- 1 in 5 families living in poverty who receive a new diagnosis
- 40% of annual income lost work disruption related to cancer treatments

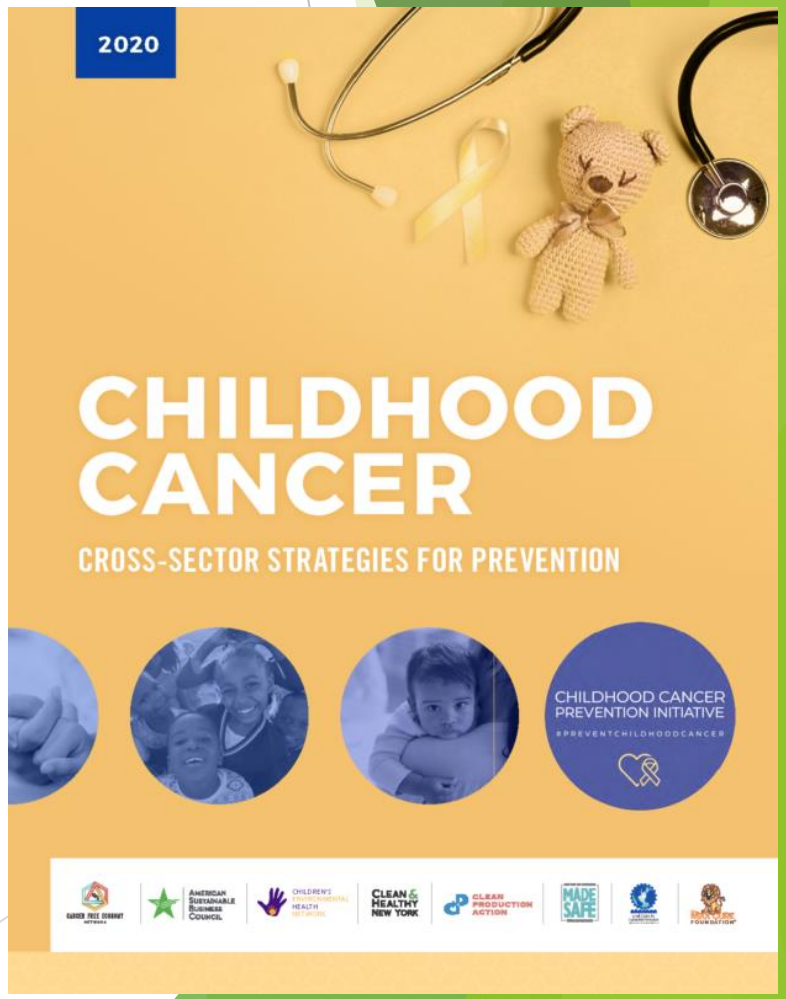


- Childhood cancer survivors, increased risk of:
  - cardiac, respiratory and renal diseases
  - stroke
  - sleep disturbances
  - learning difficulty
  - infertility
  - second cancers
- Childhood cancer survivors:
  - greater work limitations
  - miss more days of work
  - greater loss in household productivity

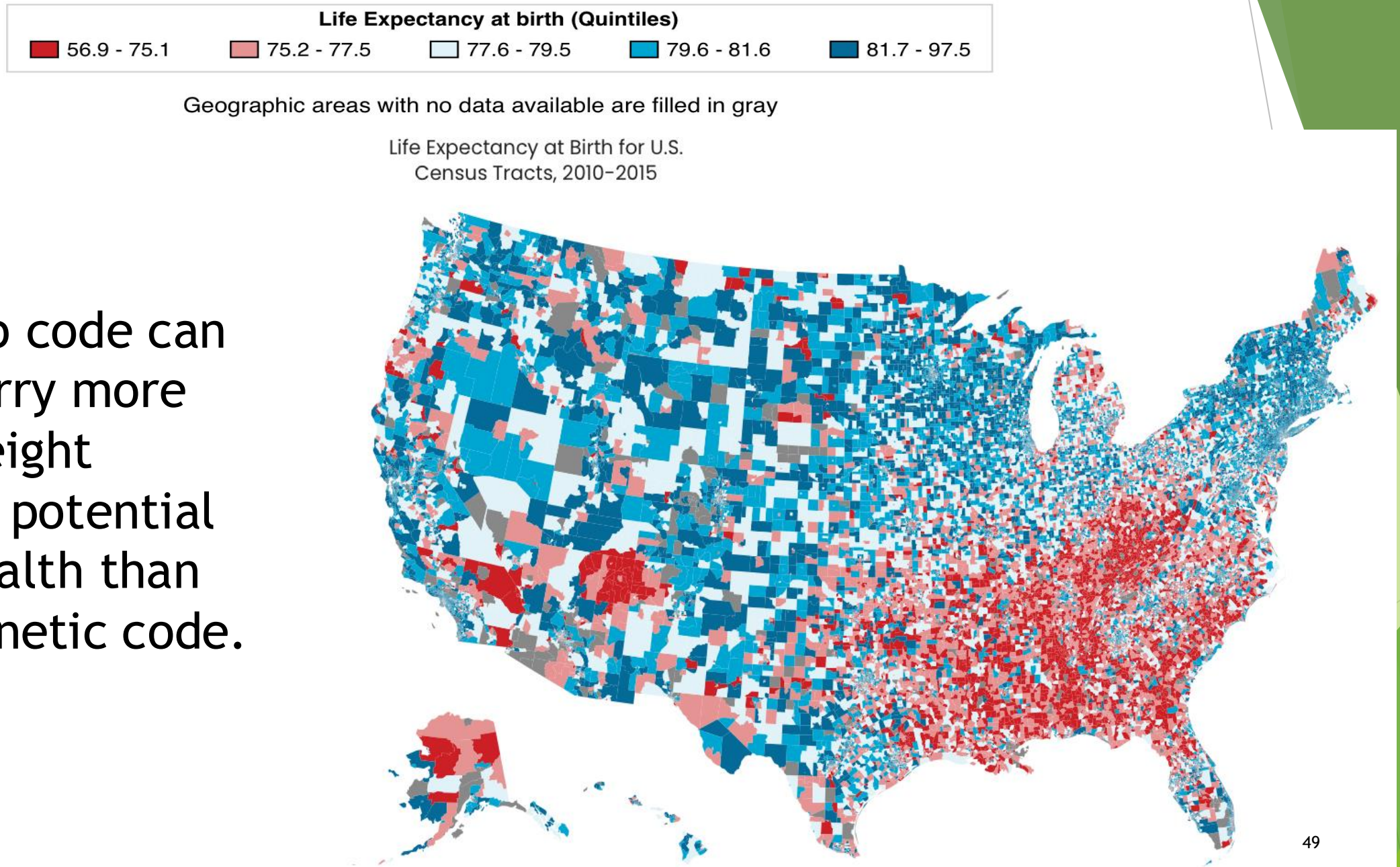
A simple truth: It is almost always more effective (and humane) to prevent harm than to restore wellbeing.

Cancer Free Economy Network

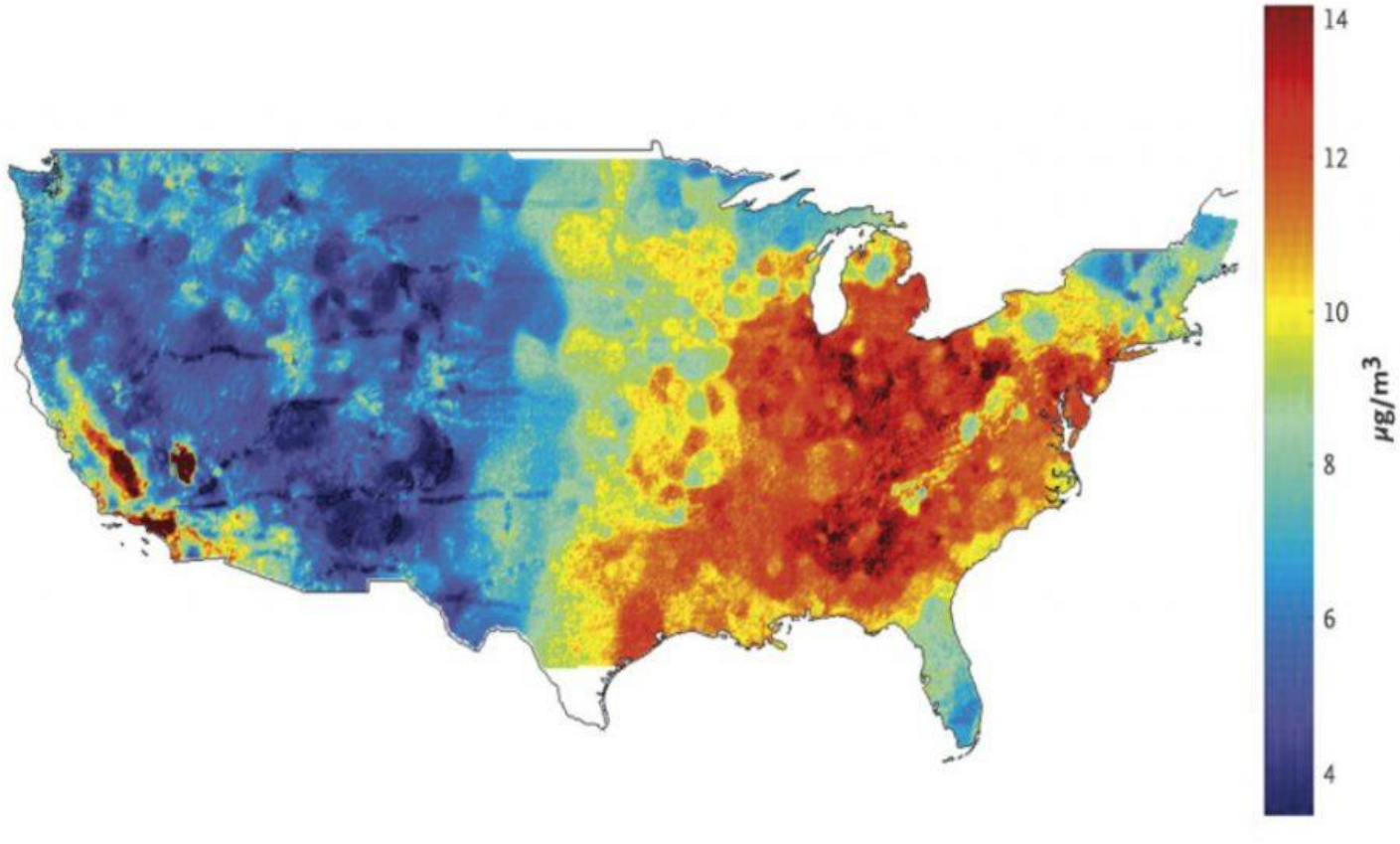
- Systems approach to changing cancer lens paradigm
- Work to prevent cancer from known environmental hazards
- Health/Science
- Building Power
- Market Shift
- Policy/Legal
- Communications



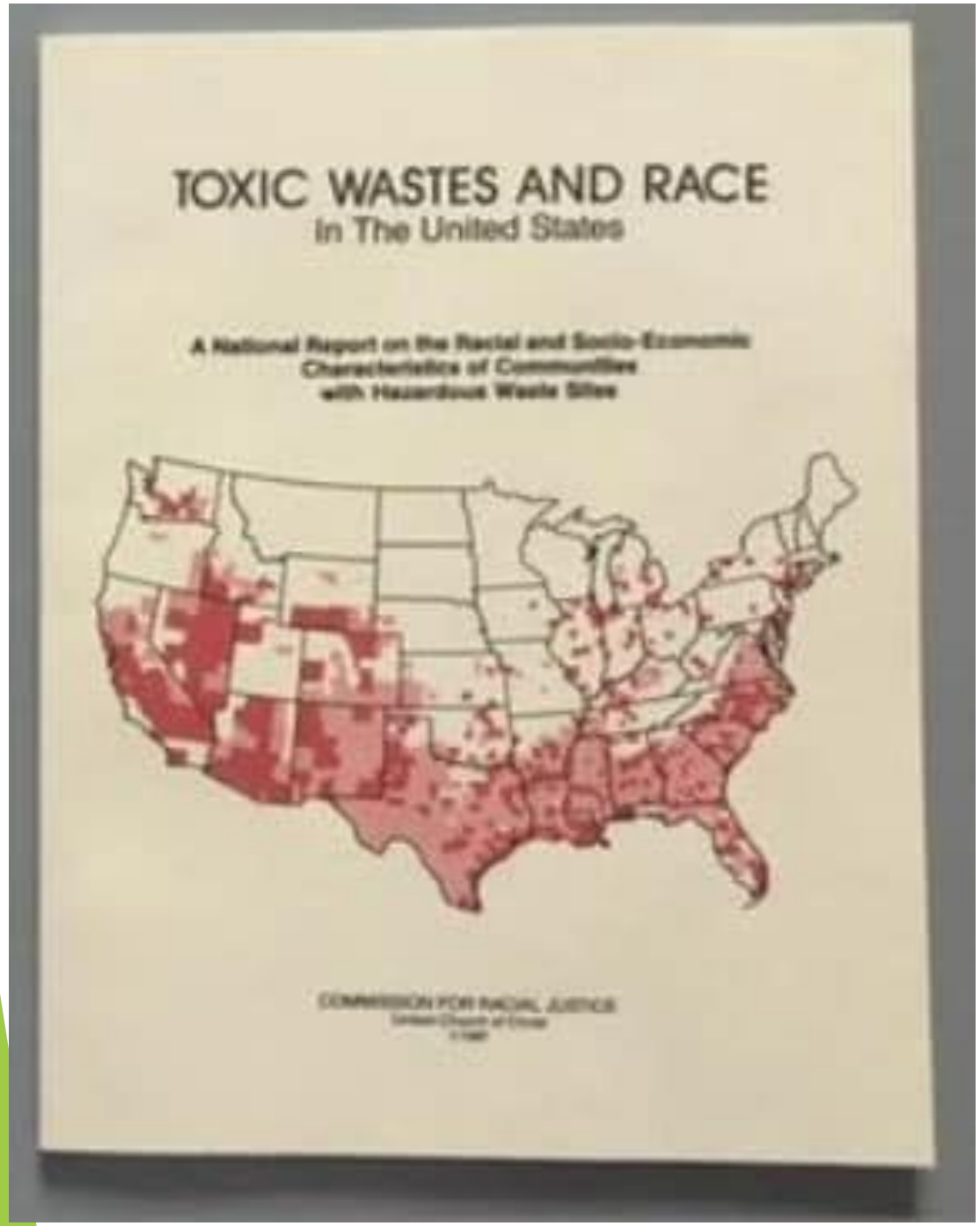
Zip code can carry more weight on potential health than genetic code.



Map of Particulate Matter



3 Years Ago



Toxic Wastes and Race at Twenty: 1987-2007

Grassroots Struggles to Dismantle Environmental Racism in the United States



A Report Prepared for the United Church of Christ Justice and Witness Ministries

Principal Authors

Robert D. Bullard, Ph.D.
Paul Mohai, Ph.D.
Robin Saha, Ph.D.
Beverly Wright, Ph.D.

March 2007

Polluted Air - Disparities

- **Nearly half of U.S. children — about 33.5 million — live in areas with unhealthy air pollution**, and **44% of all Americans (152 million people)**
- Higher Incidence of premature death among Black/Brown children



American Lung Association
State of the Air Report - 2026

Polluted Air - Disparities

- People of color are twice likely to live in a community with a failing grade for at least one measure (ozone, year round particle pollution, short-term particle pollution)
- American Lung Association – State of the Air Report - 2026

.



Polluted Air - Health Outcomes

Respiratory Health

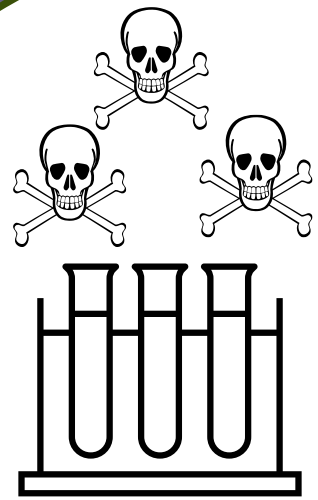
Neurological Effects

Cardiovascular Impacts

Immune System vulnerability



Toxic Chemicals in Plastics Harm Children's Brains



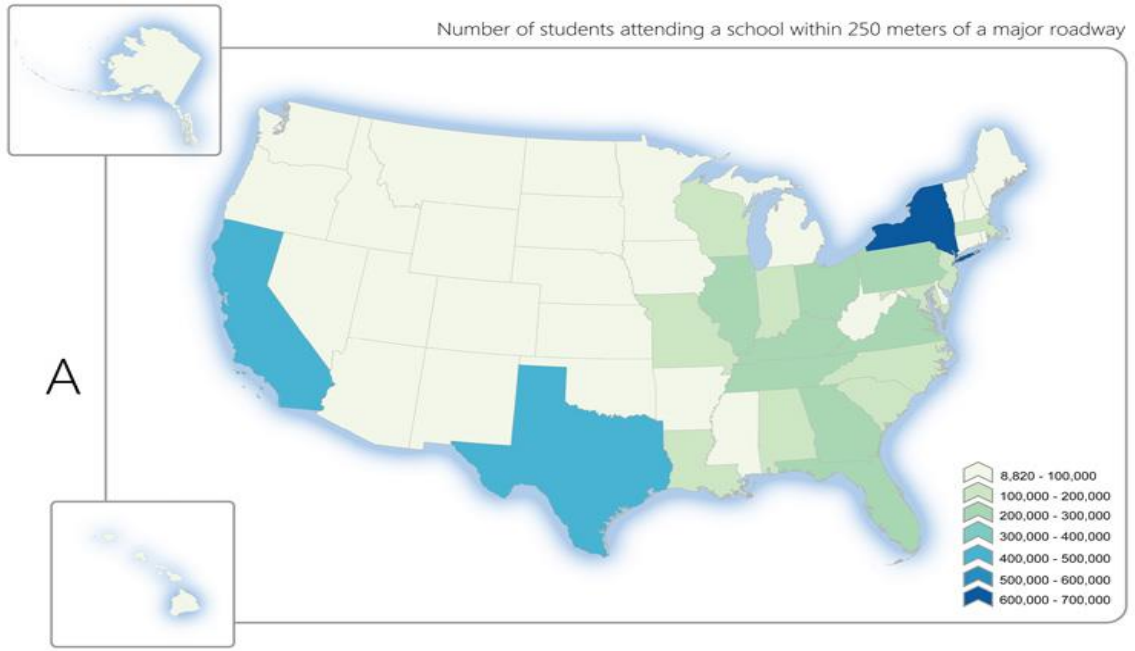
Phthalates
Bisphenols
Flame Retardants

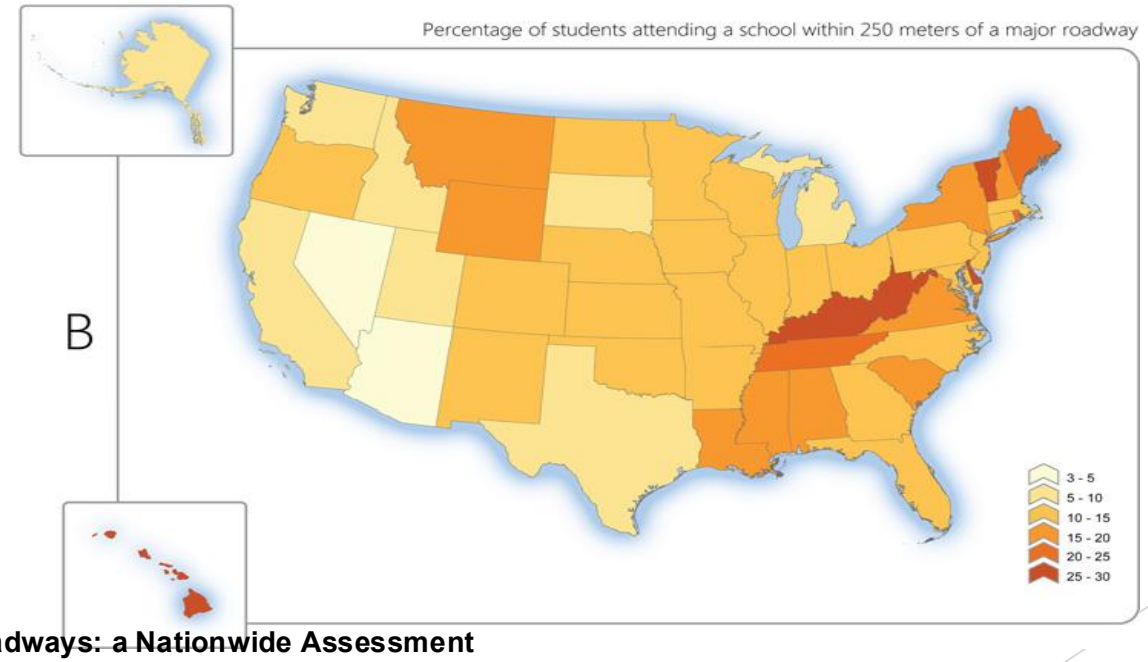


Problems with Learning, Attention, Behavior

Decades of Mounting Evidence

Proximity of Schools to Major Roadways





6.4 Million Children

Proximity of US Schools to Major Roadways: a Nationwide Assessment

Samantha L Kingsley [1], Melissa Eliot [1], Lynn Carlson [2], Jennifer Finn [3], David L MacIntosh [3], Helen H Suh [4], Gregory A Wellenius [1]

Likelihood of Going to School Near Polluting Site



Native American – 124%
Black – 86%
Latino/a – 43%

10,000 Pk-12 schools are located within .25 miles from toxic site

Brown University

Impact of the Climate Crisis

- There may be no greater, combined and growing threat facing the world's children – and their children – than climate change.



Impact of Climate Crisis on the Most Vulnerable



Paradise, California – Camp Fire (2018)

Impact of Climate Crisis on the Most Vulnerable



Los Angeles, CA Wildfires (2025)

Rising Heat Index



- **Climate change makes heat waves hotter and longer**
  - Limits time outdoors
  - Children/seniors can experience heat stress
  - Greater exposure to disease carrying insects (ticks and mosquitos)
  - Decreased air quality increases asthma/allergies
  - Increased food & water insecurity
  - Further establishes inequity among solutions

EXTREME HEAT AND CHILDREN

Children are at risk from more frequent & intense heat



CLIMATE CENTRAL

Children are Particularly Vulnerable



- Direct Impacts
  - Casualties
  - Injuries
  - Trauma
  - Mental Health Concerns
  - Morbidity/Mortality from heart/respiratory/kidney diseases (heat)
  - Food/Water shortages
  - Closed child care/schools
  - Parents - Labor hours lost – Economic Stress

Defining and Interlinked Crises of our Time—Climate and Inequity

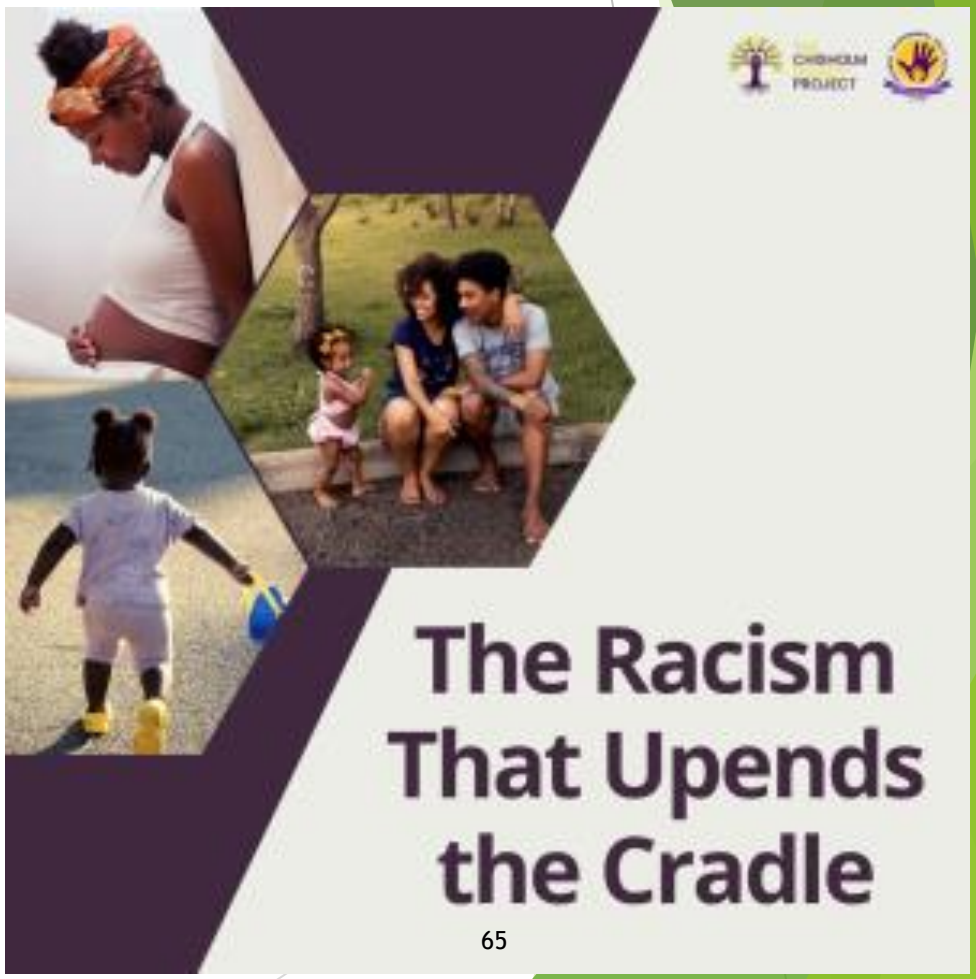
- Communities marginalized by racism, class oppression, and other systems of inequity experience climate stress/anxiety
  - Food insecurity
  - Housing insecurity
  - Employment insecurity
  - Health care insecurity
  - Economic insecurity
  - Child care/K-12 school insecurity



Disproportionate Burdens

The Racism that Upends the Cradle: How Black Children Are Differentially Vulnerable to Impacts of the Syndemic — The Economic Crisis, Covid 19 Pandemic, and Climate Change

https://cehn.org/the-racism-that-upends-the-cradle-black-children-caught-in-the-syndemic-crosshairs/



Breaking the Cycles of Harm and Exposures

Child Care



~13,000,000 children in child care nationally

Spend Up to 10 hr/day, 5 days/week

© Children's Environmental Health Network 2026

Child Care & COVID-19

- **Fragmented**. Each state has its own set of child care policies
  - Funding for comes from different sources with different requirements.

- **Inequitable**. Children of color and children from low-wealth families are less likely to attend high-quality child care programs.

- **Inaccessible**. For many families, high-quality child care is not an option. There are not enough child care providers to meet the demand, and providers are leaving the field in record numbers. This particularly affects families of color, families living in rural areas and children with special needs.

- **Underfunded**. The U.S. spends less than 0.5% of our GDP on child care – far less than most industrialized countries.



© Children's Environmental Health Network 2021/ Child Care Aware of America

HAZARDOUS CHEMICALS FOUND IN CHILD CARE FACILITIES

- 2014 Study evaluated the dust and air of 40 child care centers in California
- All of the dust samples had flame-retardant chemicals
- Phthalates detected in 100% of the air and dust samples
- Pyrethroid pesticides were found in all facilities

Dr. Asa Bradman/UC Berkeley



ECO-HEALTHY CHILD CARE® PROGRAM

- Protects children and their caregivers from harmful environmental toxicants
- Offers free to low-cost solutions
  - Resources
  - Technical assistance
  - Training (online and in person)



Eco-Healthy Child Care®

Identify

Identified information gap re: environmental health

Assess

Assess which environmental health hazards are the most common within and around child care facilities --Center-based, Family Child Care, Head Start and Early Head Start

Create

Determine free/low cost, realistic and effective best practices

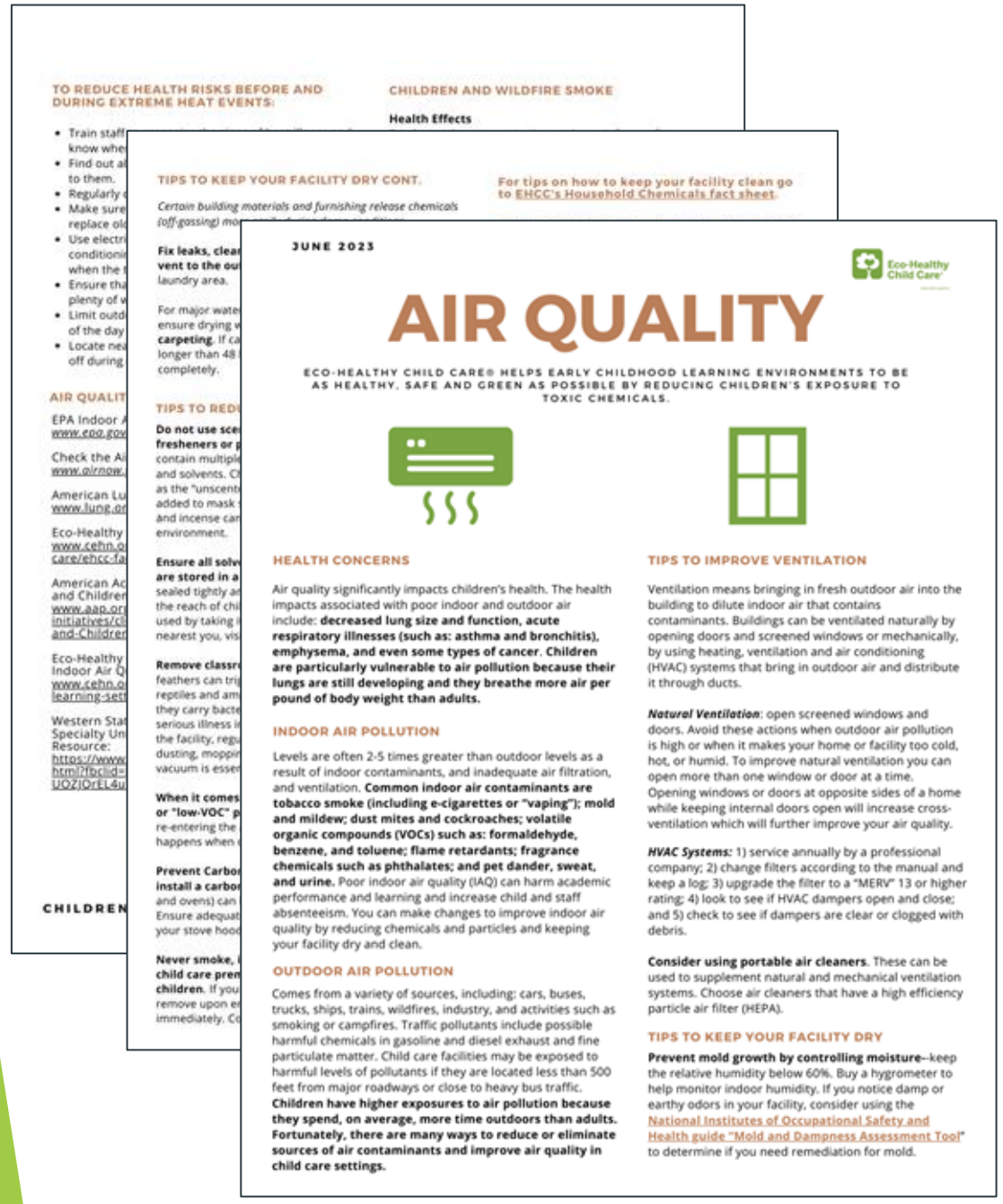
Educate/ Empower

Aimed to empower and educate child care professionals and parents served

Core Endorsement & Training Topics

- Pest Management
- Air Quality
- Household Chemicals
- Lead
- Mercury
- Furniture and Carpets
- Art Supplies
- Plastics and Plastic Toys
- Playground Equipment
- Radon
- Reduce, Reuse, and Garbage Storage





JUNE 2023

AIR QUALITY

ECO-HEALTHY CHILD CARE® HELPS EARLY CHILDHOOD LEARNING ENVIRONMENTS TO BE AS HEALTHY, SAFE AND GREEN AS POSSIBLE BY REDUCING CHILDREN'S EXPOSURE TO TOXIC CHEMICALS.

HEALTH CONCERNS

Air quality significantly impacts children's health. The health impacts associated with poor indoor and outdoor air include: **decreased lung size and function, acute respiratory illnesses (such as: asthma and bronchitis), emphysema, and even some types of cancer. Children are particularly vulnerable to air pollution because their lungs are still developing and they breathe more air per pound of body weight than adults.**

INDOOR AIR POLLUTION

Levels are often 2-5 times greater than outdoor levels as a result of indoor contaminants, and inadequate air filtration, and ventilation. **Common indoor air contaminants are tobacco smoke (including e-cigarettes or "vaping"); mold and mildew; dust mites and cockroaches; volatile organic compounds (VOCs) such as: formaldehyde, benzene, and toluene; flame retardants; fragrance chemicals such as phthalates; and pet dander, sweat, and urine.** Poor indoor air quality (IAQ) can harm academic performance and learning and increase child and staff absenteeism. You can make changes to improve indoor air quality by reducing chemicals and particles and keeping your facility dry and clean.

OUTDOOR AIR POLLUTION

Comes from a variety of sources, including: cars, buses, trucks, ships, trains, wildfires, industry, and activities such as smoking or campfires. Traffic pollutants include possible harmful chemicals in gasoline and diesel exhaust and fine particulate matter. Child care facilities may be exposed to harmful levels of pollutants if they are located less than 500 feet from major roadways or close to heavy bus traffic. **Children have higher exposures to air pollution because they spend, on average, more time outdoors than adults. Fortunately, there are many ways to reduce or eliminate sources of air contaminants and improve air quality in child care settings.**

TIPS TO IMPROVE VENTILATION

Ventilation means bringing in fresh outdoor air into the building to dilute indoor air that contains contaminants. Buildings can be ventilated naturally by opening doors and screened windows or mechanically, by using heating, ventilation and air conditioning (HVAC) systems that bring in outdoor air and distribute it through ducts.

Natural Ventilation: open screened windows and doors. Avoid these actions when outdoor air pollution is high or when it makes your home or facility too cold, hot, or humid. To improve natural ventilation you can open more than one window or door at a time. Opening windows or doors at opposite sides of a home while keeping internal doors open will increase cross-ventilation which will further improve your air quality.

HVAC Systems: 1) service annually by a professional company; 2) change filters according to the manual and keep a log; 3) upgrade the filter to a "MERV" 13 or higher rating; 4) look to see if HVAC dampers open and close; and 5) check to see if dampers are clear or clogged with debris.

Consider using portable air cleaners. These can be used to supplement natural and mechanical ventilation systems. Choose air cleaners that have a high efficiency particle air filter (HEPA).

TIPS TO KEEP YOUR FACILITY DRY

Prevent mold growth by controlling moisture--keep the relative humidity below 60%. Buy a hygrometer to help monitor indoor humidity. If you notice damp or earthy odors in your facility, consider using the National Institutes of Occupational Safety and Health guide "Mold and Dampness Assessment Tool" to determine if you need remediation for mold.

EHCC topics

For each EHCC topic:

- **Health effects** of concern
- Where **toxicant** is found
- **Free/low-cost** steps to protect children
- Resources

EHCC Endorsement

- Complete checklist & payment
  - Online or mail-in
  - Meet 30 out of 35 standards
  - 5 are mandatory
- Agree to “quality control” virtual TA
- E-learning course
- Receive 2-year EHCC endorsement
- CEHN promotes EHCC endorsed centers on our website and social media accounts



Locations and Partners



- San Francisco, CA: Low Income Investment Fund (CDFI)
- San Jose, CA: Latinas Contra Cancer
- Flagstaff/Northern, AZ: Institute for Tribal Environmental Professionals
- Houston, TX: Air Alliance Houston
- Atlanta, GA: Partnership for Southern Equity
- Detroit, MI: Green Door Initiative
- Florence, SC: New Alpha Community Development Corporation

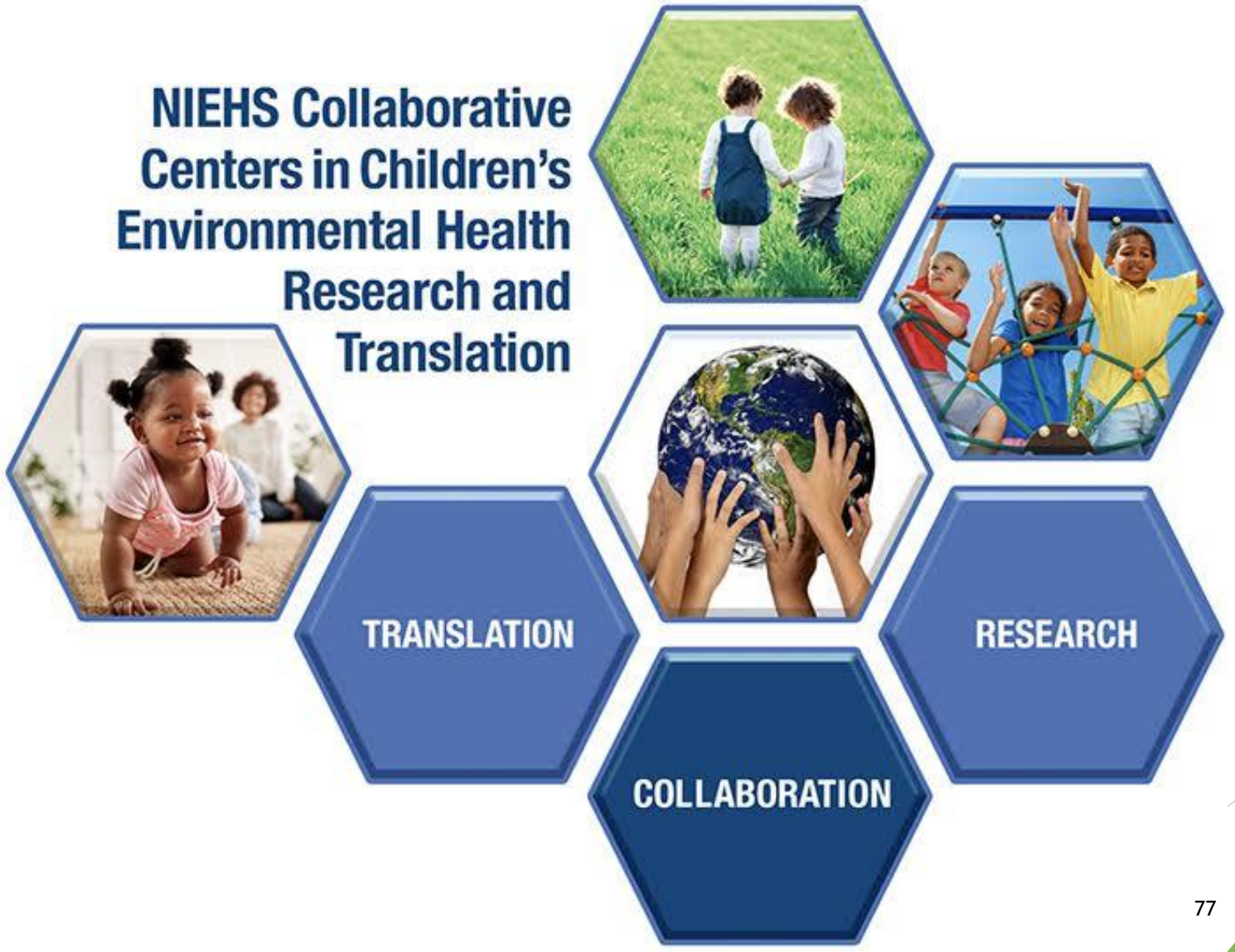
Purple Air Flex - Air Quality Monitor



MedifyAir MA-50-V3.0 Air Purifier



NIEHS Collaborative Centers in Children's Environmental Health Research and Translation



Translating Science into Action

CHARTER

Philadelphia Regional Center for Children's Environmental Health

Kids BREATHE CENTER

BRIDGING RESEARCH, LUNG HEALTH & THE ENVIRONMENT

NYU Langone Health

Collaborative Center in Children's Environmental Health Research and Translation

USC Center for Children's Environmental Health

Oregon State University ASP³IRE Center

Childhood Cancer Prevention Consortium

- Science and Policy/Advocacy Committees
- Symposiums
  - Washington, DC (2023)
  - Houston, TX (2025)
  - Atlanta, GA (April 2027)







- Working to ensure that all have access to safe, healthy, and affordable drinking water and recreational water.
  - Basic human right
  - Opposing threats against protections
  - Supporting community efforts


AMERICA THE BEAUTIFUL FOR ALL COALITION
We must unite under a shared agenda and build shared power to achieve America the Beautiful goals by 2030.
Microsoft Stock Image

BREAK THE CYCLE 21

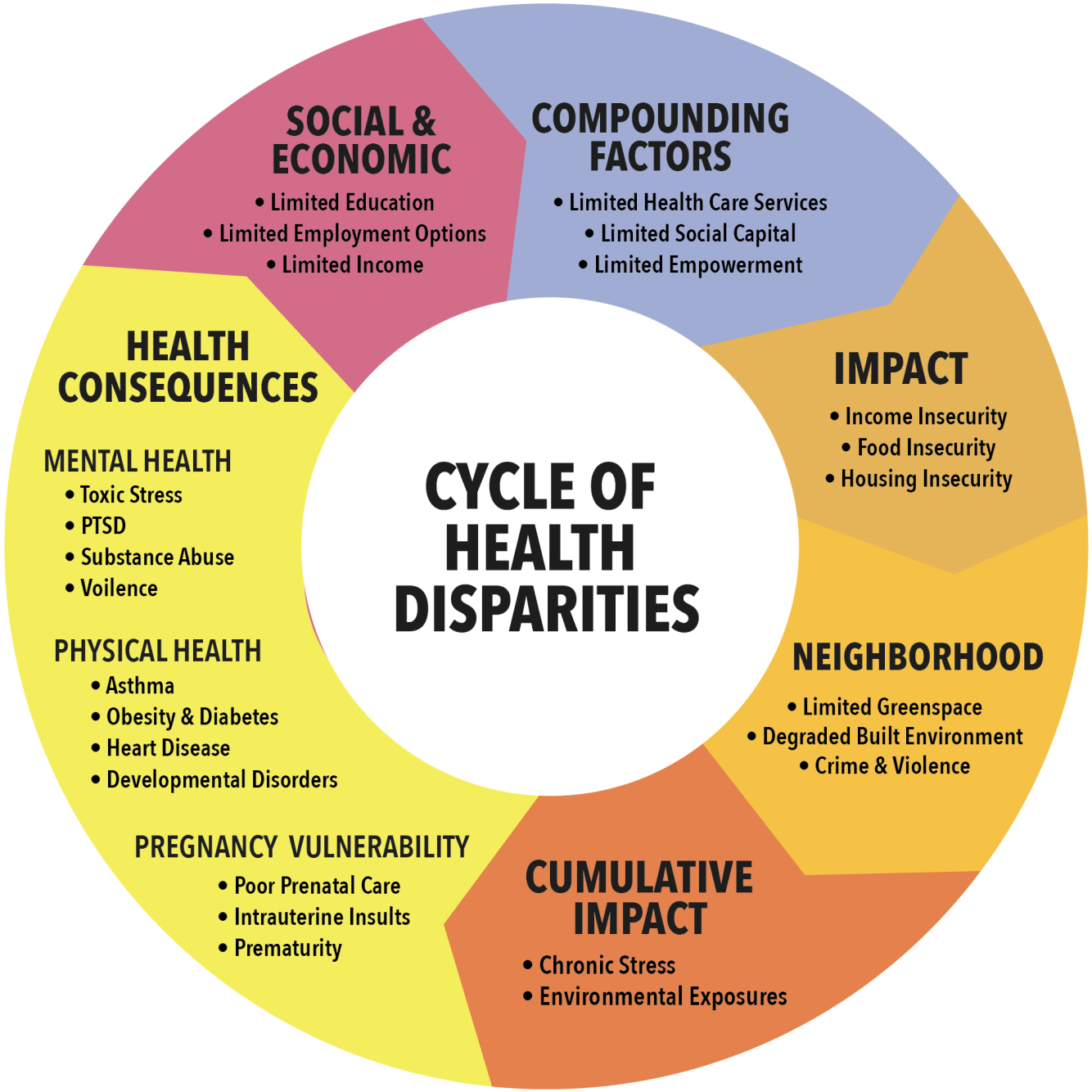
OF CHILDREN'S ENVIRONMENTAL HEALTH DISPARITIES

Promoting Health Equity for ALL Children

Leslie Rubin MD
Morehouse School of Medicine
Southeast PEHSU at Emory University
Break the Cycle of Health Disparities, Inc.

BREAK THE CYCLE OF HEALTH DISPARITIES

EXPLORING
SOCIAL, ECONOMIC AND ENVIRONMENTAL
DETERMINANTS OF HEALTH


SOCIAL & ECONOMIC
• Limited Education
• Limited Employment Options
• Limited Income
COMPOUNDING FACTORS
• Limited Health Care Services
• Limited Social Capital
• Limited Empowerment
IMPACT
• Income Insecurity
• Food Insecurity
• Housing Insecurity
NEIGHBORHOOD
• Limited Greenspace
• Degraded Built Environment
• Crime & Violence
CUMULATIVE IMPACT
• Chronic Stress
• Environmental Exposures
HEALTH CONSEQUENCES
MENTAL HEALTH
• Toxic Stress
• PTSD
• Substance Abuse
• Voilence
PHYSICAL HEALTH
• Asthma
• Obesity & Diabetes
• Heart Disease
• Developmental Disorders
PREGNANCY VULNERABILITY
• Poor Prenatal Care
• Intrauterine Insults
• Prematurity
CYCLE OF HEALTH DISPARITIES

Social Drivers of Health and Childhood Asthma Disparities

Mothers' positive early life experiences buffers adverse childhood experiences among American Indian Alaska Native children

Oral Health Services for Medicaid-Covered Children in Nebraska

Indigenous Language Education on Identity and Health among Basque Ikastolak

Mycoplasma Pneumoniae Infection and Severity and Children's Neighborhoods,

Climate Change and Vector-Borne Diseases in Low-Income Children

Parental Perceptions on Children's Exposure to Plastic-Related Chemicals: The Role of Social Media

Immigrant Children and Climate Change in U.S Detention Facilities

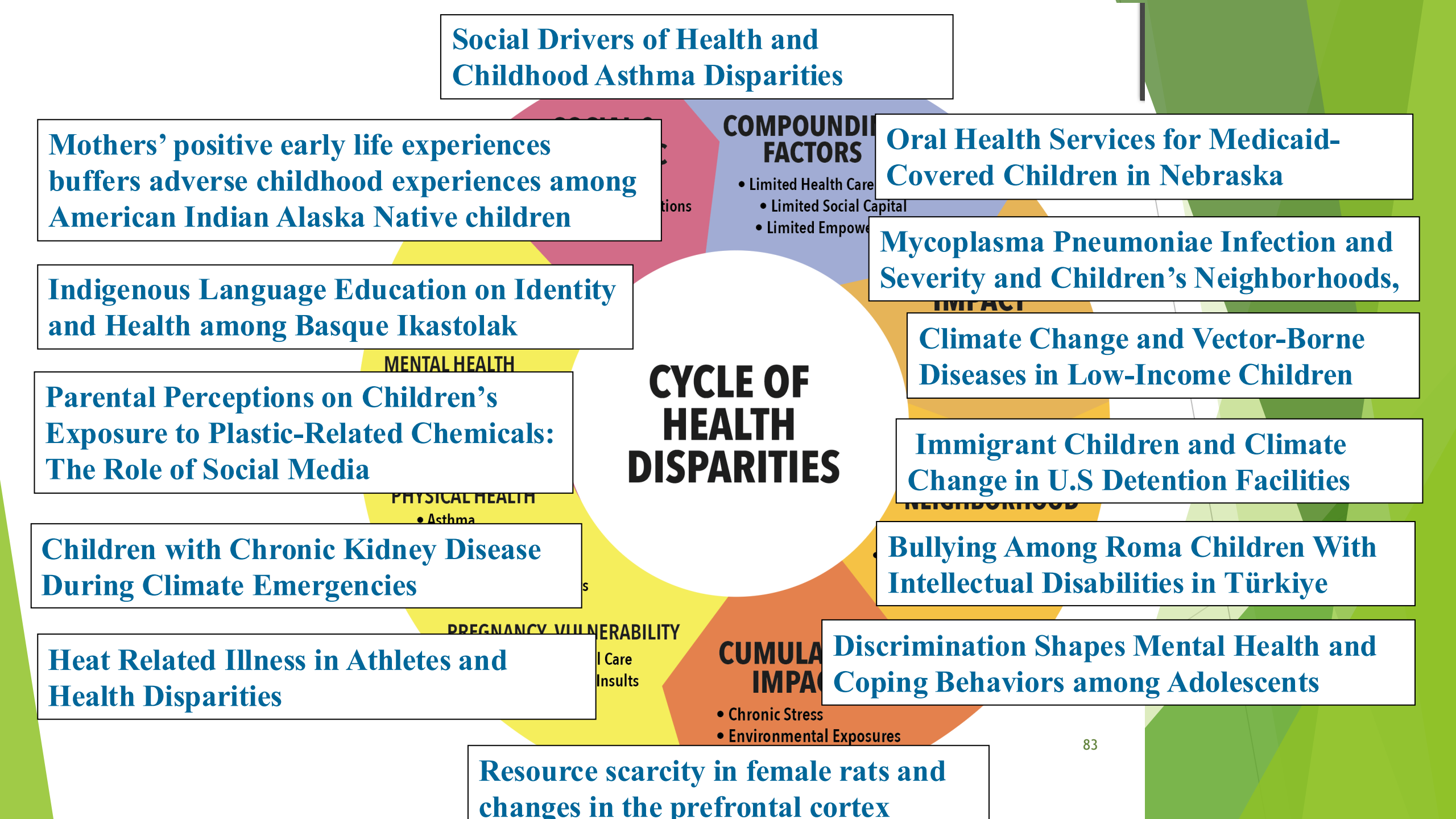
Children with Chronic Kidney Disease During Climate Emergencies

Bullying Among Roma Children With Intellectual Disabilities in Türkiye

Heat Related Illness in Athletes and Health Disparities

Discrimination Shapes Mental Health and Coping Behaviors among Adolescents

Resource scarcity in female rats and changes in the prefrontal cortex



Protecting Children Worldwide from Toxic Chemicals

Join ISCHE



Make an Impact by joining a global community advancing children's environmental health.

Become Eligible for an amazing mentorship program – Research to Action (R2A) – aimed at enhancing the skills of early-stage investigators.

Reduced Registration rate for our Annual Retreat

Have a Voice in the Community: Participate in meetings with researchers, public health professionals, clinicians, and policymakers who are working to protect children from environmental hazards.

Networking Opportunities at the annual retreat and throughout the year.

Invitations to exclusive webinars, conferences, and events to discuss problems unique to the study and control of childhood diseases and disabilities linked to the environment with other leaders from diverse fields.

Professional Development Opportunities to serve on committees which support the mission, vision, and goals of ISCHE and which plan our annual retreat.

Support interdisciplinary collaboration & equitable policies that create real change to protect all children.

@littlethingsmtr

Opportunities



- **Overwhelming public support for EPA across all demographics**
- 76% of Trump voters and 86% of all voters oppose attempts to weaken EPA.
- 81% of Trump voters and 88% of all voters want Congress to increase EPA funding or keep funding steady.
- 72% of Trump voters and 80% of all voters support increasing federal funding to communities disproportionately harmed by air and water pollution.

CEH Movement!



CALL TO ACTION

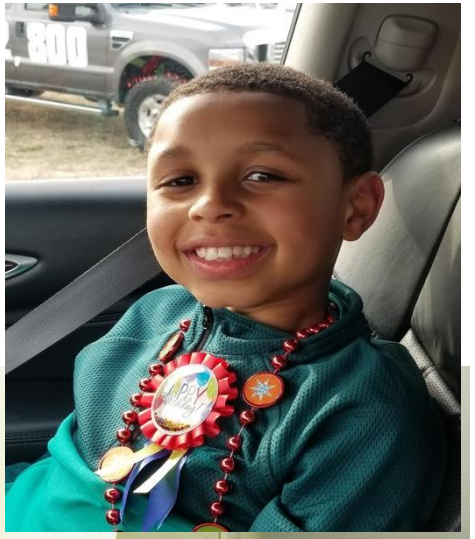
- Self Care
- Vote!!! Elections Matter (Voter Guide)
- Expand your network
- Consider mentoring
- Align with NGO partners
- Tell your story - Lift your critical voice
- Encourage community partners to tell their stories
- Call, email, meet with policy leaders
- Become a CEH Day Partner!



Why We Do This Work

















Thank You!

Nsedu Obot Witherspoon
Executive Director, CEHN
nobot@cehn.org

@CEHN

SCAN ME!

Find us on ehcc1

CEHNet

@ecohealthychildcare
@cehnetwork

Keynote Address



Nsedu Witherspoon
Executive Director, Children's Environmental Health Network (CEHN)

Scan QR code to submit a question or comment

#ECHOSymposium2026

National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science
to Action



Session 1: Plastics

Session 1 Presenters



Dr. Philip Landrigan
Boston College



Dr. Sheela Sathyanarayana
Seattle Children's Research Institute



Dr. Veena Singla
University of California San Francisco

PLASTICS, PETROCHEMICALS AND CHILDREN'S HEALTH

Philip J. Landrigan, MD, MSc, FAAP

BOSTON COLLEGE
Global Observatory on Planetary Health



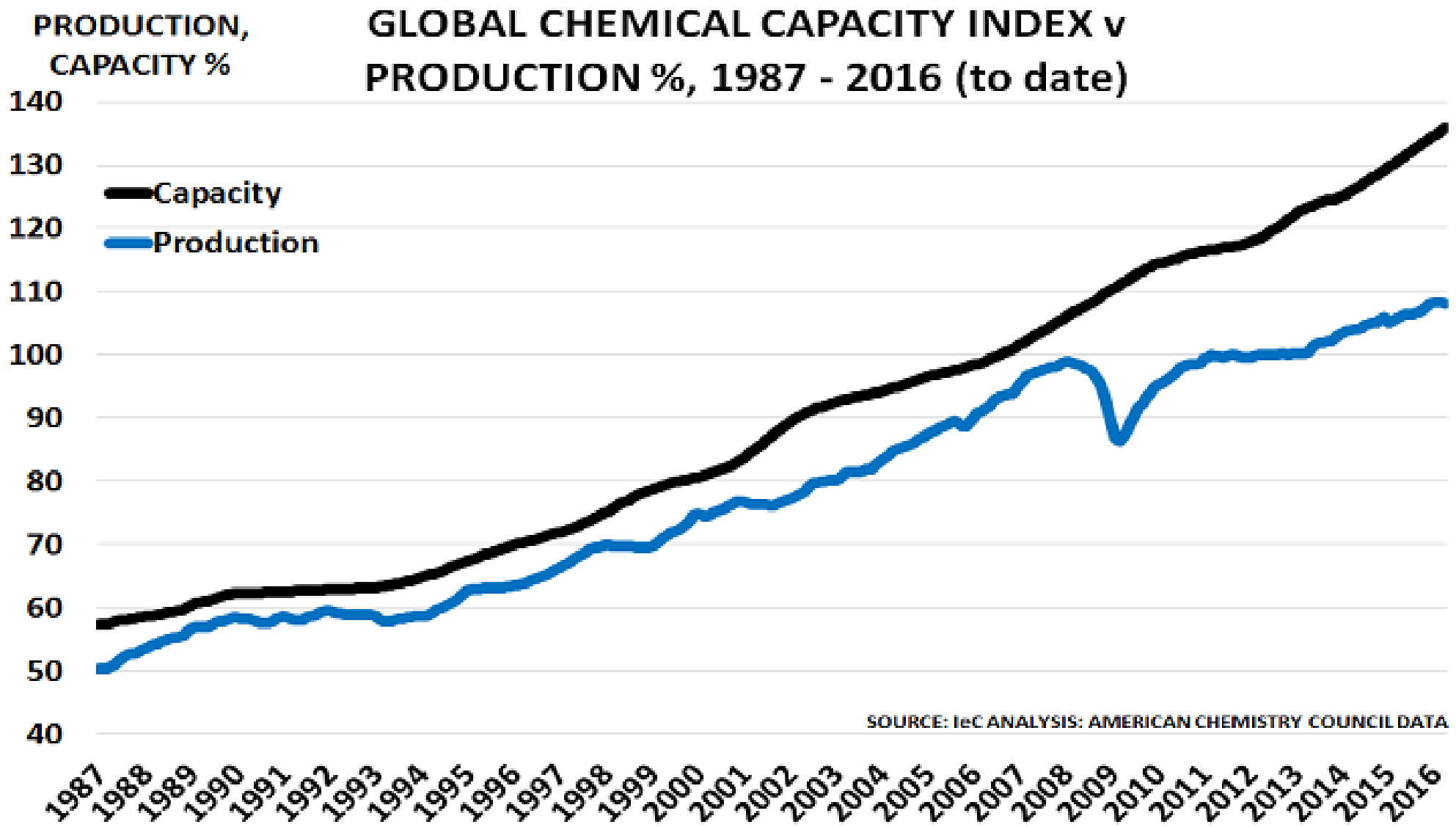


THE CHEMICAL AND PLASTIC REVOLUTION

SINCE THE 1950'S,
THOUSANDS OF NEW
CHEMICALS AND PLASTICS
HAVE BEEN MANUFACTURED AND
RELEASED TO THE ENVIRONMENT

MANY OF THESE MATERIALS
ARE LINKED TO
DISEASES IN CHILDREN

GLOBAL CHEMICAL PRODUCTION, 1987- 2016



SYNTHETIC CHEMICALS TODAY

- An estimated 325,000 manufactured chemicals, chemical mixtures, and plastics exist on earth today
- 99% are made from coal, oil and gas
- Widely disseminated in the environment – from the high Arctic, to the Himalayan glaciers, to the ocean depths
- CDC surveys find nearly universal human exposure – including pregnant women and newborn infants
- Disproportionately heavy exposure of the poor and minorities – environmental injustice
- Global chemical production is increasing by 3.5% annually. Doubling time of 25-30 yrs.
- **The great majority of chemicals in commerce have never been tested for safety or toxicity**

PRENATAL CHEMICAL EXPOSURES ARE ESPECIALLY DANGEROUS



- There are unique windows of vulnerability in fetal life when organs are forming and rapidly developing when those tissues are at high risk for damage
- During these windows, toxic chemicals can cause damage to infants at even the lowest levels detectable – levels far below those that harm adults
- Potential consequences include brain damage, birth defects and cancer.
- The brain damage caused by chemicals can result in autism, ADHD and decreased intelligence (IQ loss)
- There are no safe exposure “thresholds” in prenatal life
- These effects can last lifelong
- **Prevention of exposure is the only truly effective treatment**

THE THALIDOMIDE TRAGEDY

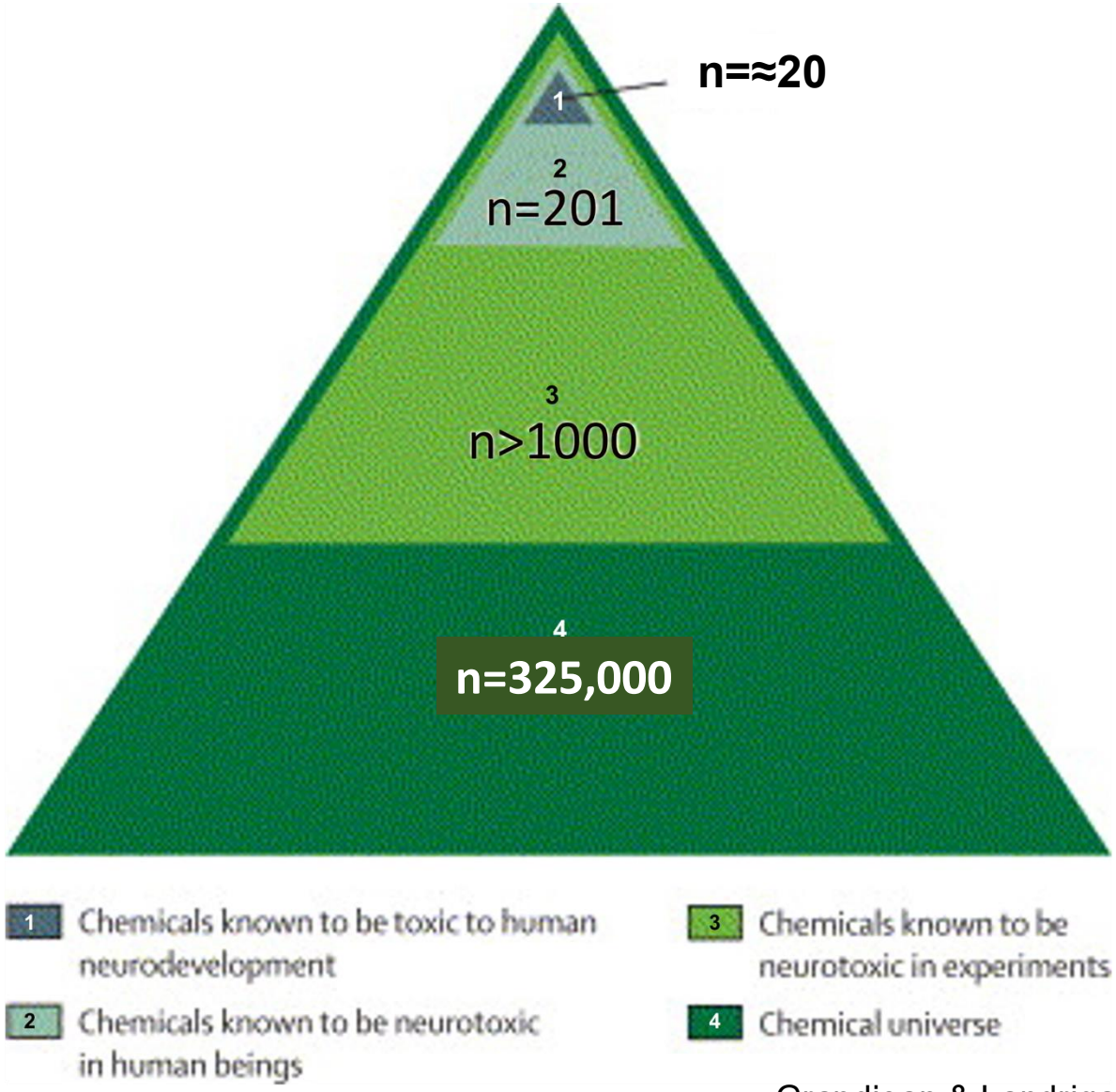
INITIAL RECOGNITION OF INFANTS' UNIQUE VULNERABILTY TO MANUFACTURED CHEMICALS



The thalidomide tragedy led to strict regulation of chemicals intended for use as pharmaceuticals

Photo courtesy of the Thalidomide Victims Association of Canada

ARE THERE STILL OTHER CHEMICALS WHOSE TOXICITY HAS NOT YET BEEN DISCOVERED?



Grandjean & Landrigan, *The Lancet,* 2006

David Rall on Developmental Neurotoxicity



Suppose that thalidomide, instead of causing the birth of childrenwith missing limbs, had instead reduced their intellectual potential by 10%.
Would we be aware, even today, of its toxic potency?

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PLASTICS

- Complex, manufactured chemical materials
- 99% produced from fossil carbon – coal, oil, gas
- All plastics have two main components:
  - A carbon-based backbone – a polymer, e.g., polyvinyl chloride and polystyrene
  - Thousands of chemical additives - dyes, plasticizers, stabilizers, fillers, flame retardants, water repellants, and ultraviolet blockers

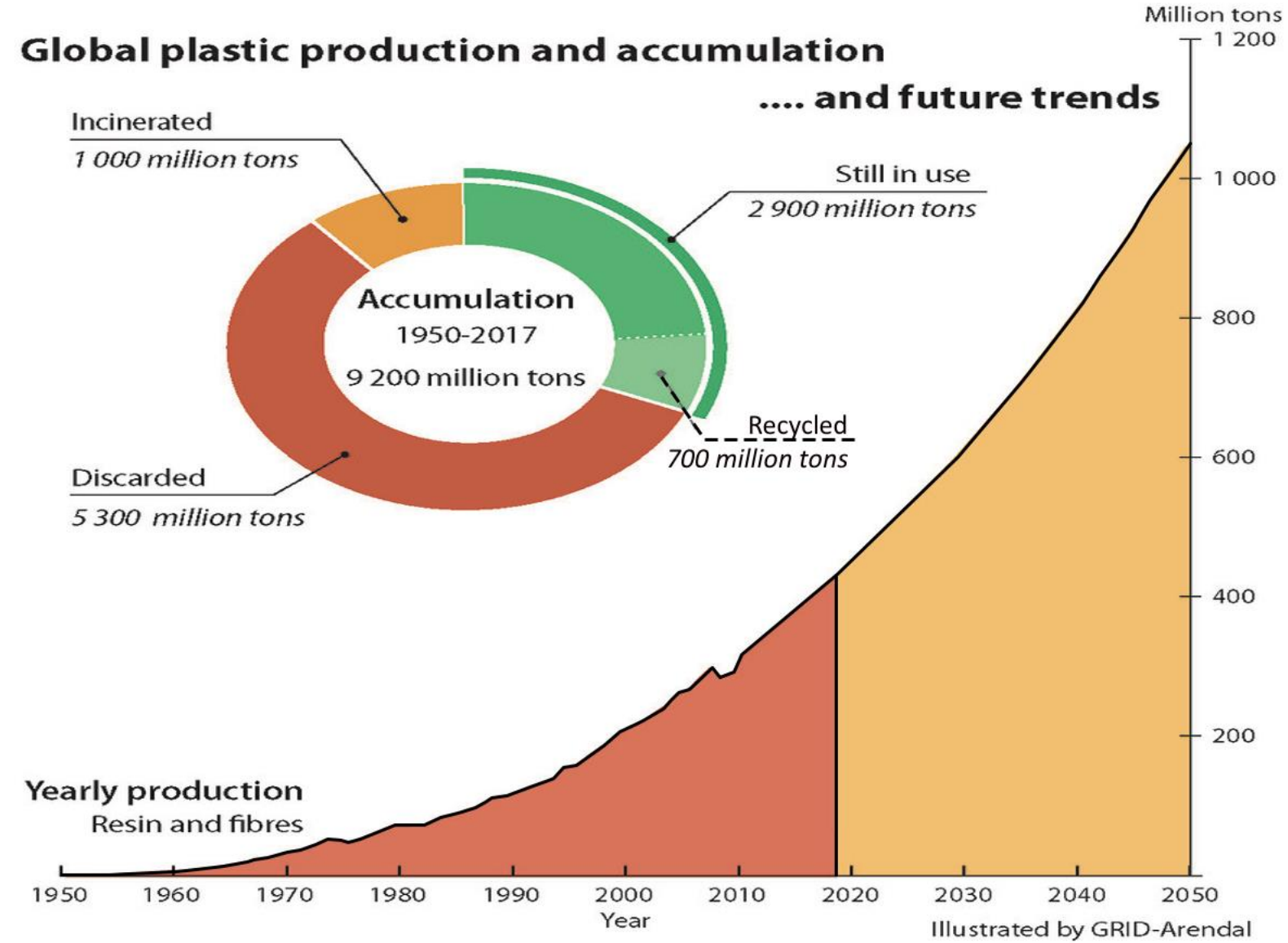


PLASTIC MEGATRENDS

- Commercial plastics manufacture began in the 1950s- civilian repurposing of war production facilities
- Since then, global plastic output has increased greatly
- Plastic recovery and recycling rates are very low – about 8% globally
- Plastics break down in the environment into microplastic and nanoplastic particles (MNPs) , which are persistent– years to decades
- Because of increasing production, low recycling, and long persistence, plastic pollution is increasing . An estimated 8 billion metric tons of plastic waste now pollute the planet.
- Great damage to ecosystems
- Human exposure is increasing year-to-year



PROJECTED TRENDS IN PLASTIC PRODUCTION, 2018-2050



UNEP (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. Nairobi.

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PLASTIC RECYCLING DOES NOT WORK

- Only 8% of all US plastic is recycled
- This contrasts to 68% of paper and cardboard and 90% of glass
- Plastic cannot be recycled because it is chemically diverse and contains multiple toxic additives
- Much of what is counted as “recycled” is in fact burned, creating air pollution and greenhouse gases, or exported overseas
- Consequence: 8 billion tons of plastic waste pollute the planet



WHY ARE CHEMICAL AND PLASTIC POLLUTION INCREASING SO RAPIDLY?

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WHY IS PLASTIC PRODUCTION INCREASING SO RAPIDLY?

The fossil carbon industry is pivoting away from producing fuels and redirecting their investment into plastics and petrochemicals.

Why?

- The global transition to green energy = decreasing consumption of gasoline, diesel fuel and home heating with oil and gas

- Enormous expansion in oil and gas production due to fracking

This pivot is the major driver of almost exponential recent increases in petrochemical and plastic production

Single-use plastics are at the center of this strategy



PLASTICS HARM HUMAN HEALTH AT EVERY STAGE OF THE PLASTIC LIFE CYCLE

- **Oil and gas extraction** – plastic feedstocks
- **Plastic Production** - energy-intensive processes that generate large amounts of air and water pollution
- **Plastic use** - microplastics, microfibers, and additive chemicals are released to the environment
- **Plastic waste disposal**
  - **Incineration** is the most harmful plastic disposal method and generates CO_2 emissions as well as dioxins
  - **Landfilling** – products can persist for hundreds of years, potentially leaching toxic chemicals and microplastics to soil and water and taking up important land surface

All of these harms are worsening as plastic production increases.

https://doi. org/10.5334/aogh.4056

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HEALTH IMPACTS OF PLASTIC FEEDSTOCK EXTRACTION- FRACKING

HEALTH IMPACTS OF PLASTIC FEEDSTOCK EXTRACTION – TAR SANDS MINING, ALBERTA, CANADA





HEALTH IMPACTS OF PLASTIC TRANSPORT
EAST PALESTINE, OHIO



ETHANE CRACKER PLANT

WHERE OIL AND NATURAL GAS ARE CONVERTED TO PLASTIC

FENCELINE COMMUNITY PETROCHEMICAL PLANT



ETHANE CRACKERS AND ENVIRONMENTAL INJUSTICE



HEALTH IMPACTS OF PLASTIC WASTE





HEALTH IMPACTS OF PLASTIC USE

Mostly due to the chemicals in plastics

THE 16,000 + CHEMICALS IN PLASTICS ARE REPONSIBLE FOR MULTIPLE HARMS TO HUMAN HEALTH

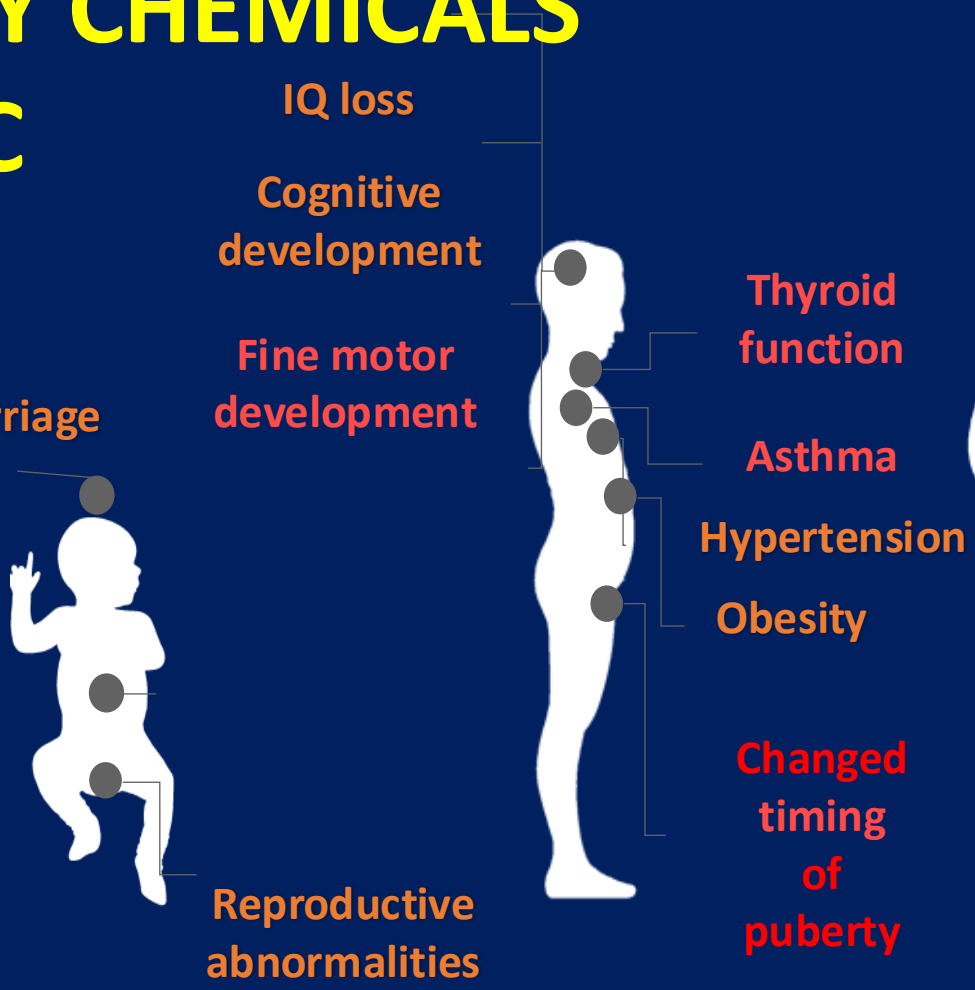


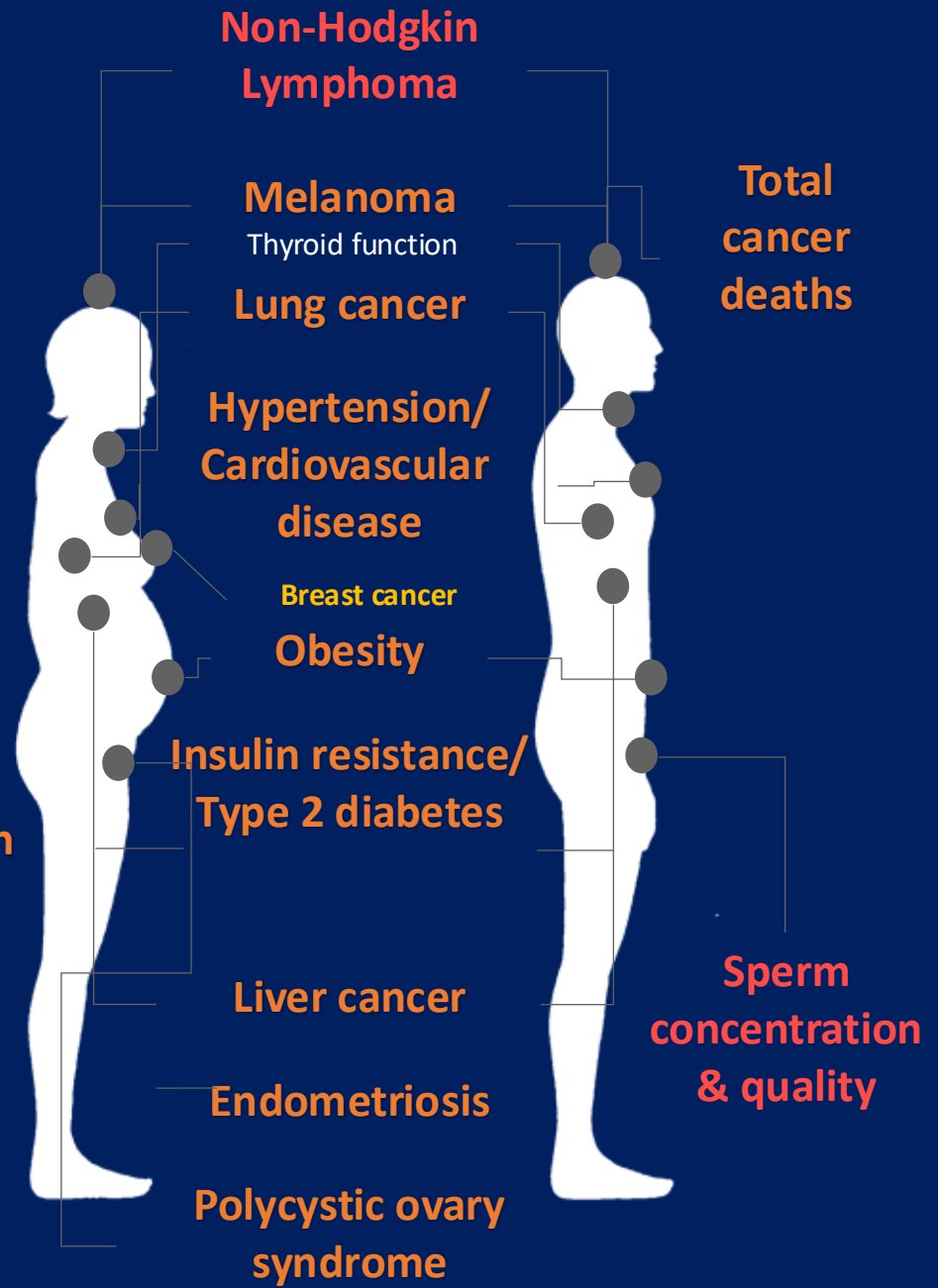
They include:

- Carcinogens - vinyl chloride, 1,3-butadiene, PFAS
- Developmental neurotoxicants –brominated flame retardants, organophosphate flame retardants, lead
- Endocrine-disruptors – phthalates, BPA

The great majority of chemicals in plastics have never been tested for toxicity – their potential health hazards are not known

HEALTH IMPACTS OF PLASTIC USE – CAUSED BY CHEMICALS IN PLASTIC



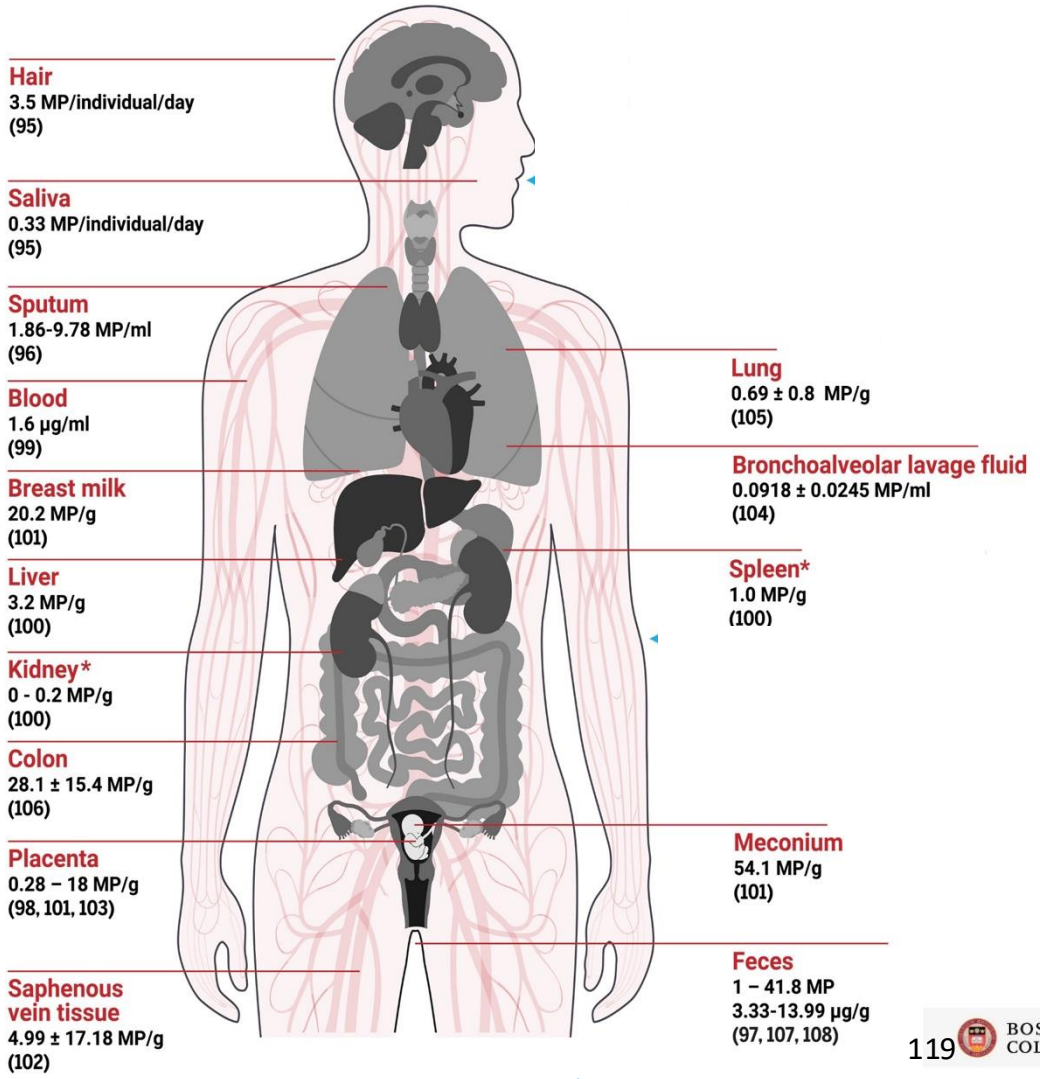


MICRO AND NANOPLASTICS



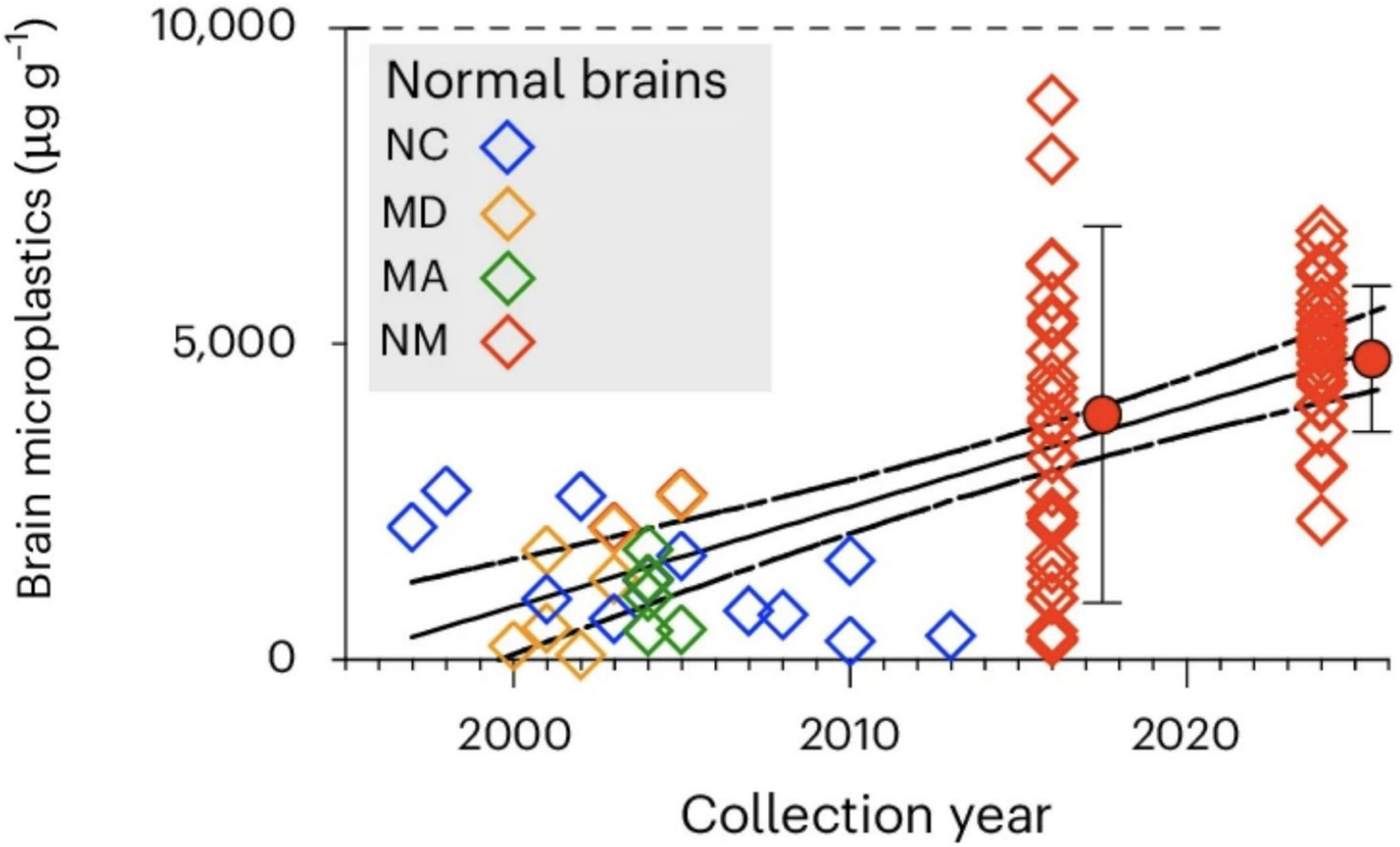
HUMAN EXPOSURE TO MICROPLASTICS

- Microplastic and nanoplastic particles are found today in virtually every organ of the human body
- These particles have two main components:
  - ➢Polymers
  - ➢Additives and other chemicals – PFAS, phthalates, bisphenols, flame retardants, and more
- Both components have potential to harm health and cause disease – chemicals can leach from microplastic particles
- Human body burden of microplastics appears to be increasing as plastic pollution increases



Adapted from doi:10.1126/science.adl2746

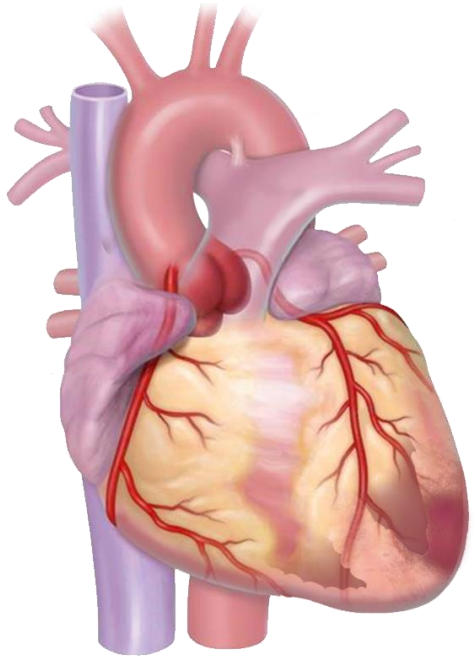
INCREASING BURDEN OF MICROPLASTICS IN HUMAN BRAIN



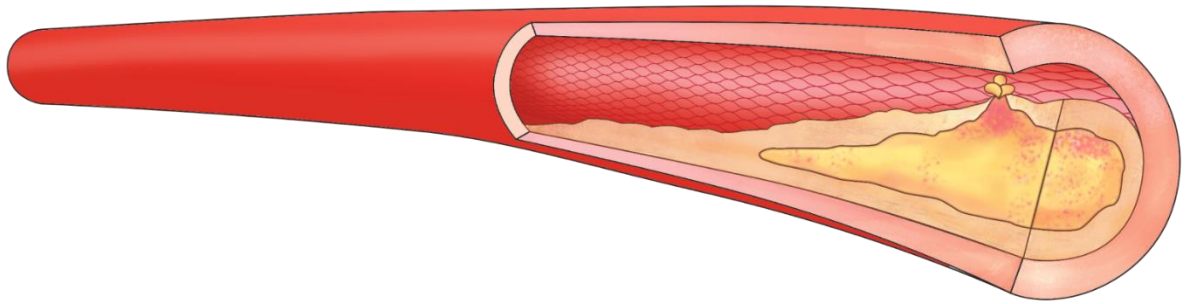
Campen et al.
https://doi.org/10.1038/s41591-024-03453-1

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CARDIOVASCULAR HAZARDS OF MICROPLASTICS



- *New England Journal of Medicine* – March 7, 2024
- 312 patients who underwent carotid endarterectomy



- Microplastics and nanoplastics (MNPs) were detectable in the excised plaque of 58% of the patients
- Patients with MNPs had a 4.5-fold (450%) increase in risk for nonfatal myocardial infarction, nonfatal stroke, or death over the next 3 years.
- Only one study. Does not prove causation. But a striking finding and very worrisome

OTHER REPORTED HEALTH EFFECTS OF MICROPLASTICS

- Increased accumulation of micro and nanoplastic particles in decedent brains with dementia, Campen et al. doi.org/10.1038/s41591-024-03453-1
- Nanoplastics promote aggregation of α-synuclein, of a Parkinson Disease protein, Liu et al DOI: 10.1126/sciadv.adi8716
- Microplastics are associated with gut inflammation, Wang et al. doi.org/10.3389/fcimb.2024.1492759
- Placental microplastics linked to preterm birth, Garcia et al DOI: 10.1093/toxsci/kfae021
- Microplastics found in testis, Hu et al doi.org/10.1093/toxsci/kfae060

These are early data. Mostly small sample sizes. Methods not yet standardized. But the findings cannot be ignored

MICROPLASTIC CHALLENGES

- Critics have argued that reports identifying MNPs in human tissues and linking MNPs to disease are flawed. These criticisms center on the challenges of analyzing MNPs in blood and tissues, especially interference by biological lipids
- Plastics industry representatives have seized upon these criticisms to exaggerate uncertainty, manufacture doubt, and delay preventive action
- This debate reflects the inherently iterative and provisional nature of new scientific discovery. It underscores that the technologies for MNP analysis are still evolving and that recently reported findings on MNPs need to be confirmed.
- In no way, however, do these methodologic disagreements signal that the presence of MNPs in human tissues can be ignored. Nor do they suggest that recently reported associations between MNPs and disease can be dismissed.
- Instead, they point up the need to develop robust, selective, sensitive analytical methods that can reliably and accurately generate data on the types and quantities of MNPs in biological matrices
- That work is well underway

THE HIGH BUT HIDDEN COSTS OF PLASTIC

- Plastic is responsible for healthcare costs as well as for productivity losses:
  - Globally, the health-related costs of plastic production amount to almost $600 billion (USD) globally - more than the GDP of New Zealand or Finland.
  - Additionally, the annual costs of diseases caused by three plastic chemicals - PBDE, BPA and DEHP - exceed $1.5 trillion annually
- These estimates are undercounts of the full economic losses associated with plastics
- These costs are externalized by the fossil fuel and plastic production industries
- They borne by taxpayers and governments

PLASTIC PRODUCTION AND CLIMATE CHANGE

- Plastic production is energy-intensive and is an important contributor to climate change.
- In 2019, plastic production generated 2.24 gigatonnes of carbon dioxide equivalent, 5.3% of all global greenhouse gas (GHG) emissions - more than GHG emissions from Brazil
- Assuming a 4% annual growth rate in global production and no interventions, plastic-associated GHG emissions could approximately triple by 2050 to reach 6.78 Gt per year.

THE TIME HAS COME WHEN WE MUST ACT

- There is much about plastic and its hazards that we still do not know, and more research is needed
- But we now know very clearly that plastics' harms to human health and the global environment are extremely serious.
- And we know that in the absence of urgent intervention these harms will get much worse.
- We cannot use lack of complete knowledge about plastics' harms as an excuse for inaction.
- Strategies that have proven successful in control of other hazards show the way forward – air pollution, lead in gasoline, CFCs
- The impediments to controlling the plastics' crisis are not technical. They are legal, economic, and political

EXAMPLES OF ACTION ON MANY LEVELS

- **State and local**
  - Bans on single-use plastic products: e.g., bags, straws, tableware
  - Bans on plastic packaging – proposed NY State law
  - Extended Producer Responsibility with take-back requirements – California law
- **National**
  - Bans on single-use plastic products: e.g., national bans on plastic bags in Kenya and Rwanda
  - Legal requirements for premarket toxicity testing of all plastic chemicals
  - Bans on toxic plastic chemicals
- **International**
  - Global Plastics Treaty



On March 2, 2022, the nations of the world – acting through the UN Environment Assembly - adopted a historic resolution to develop a Global Plastics Treaty.

UN environment programme

TREATY PROVISIONS ESSENTIAL FOR HEALTH PROTECTION

Human health protection, especially of vulnerable populations, including workers, must be an over-arching goal of the Global Plastic Treaty. **Plastic is not just an environmental problem**.

- A global cap on plastic production
- Control of the thousands of chemicals in plastics
- Adequate financing

THANK YOU!



We are the stewards of this Earth. We hold it in trust for our children.

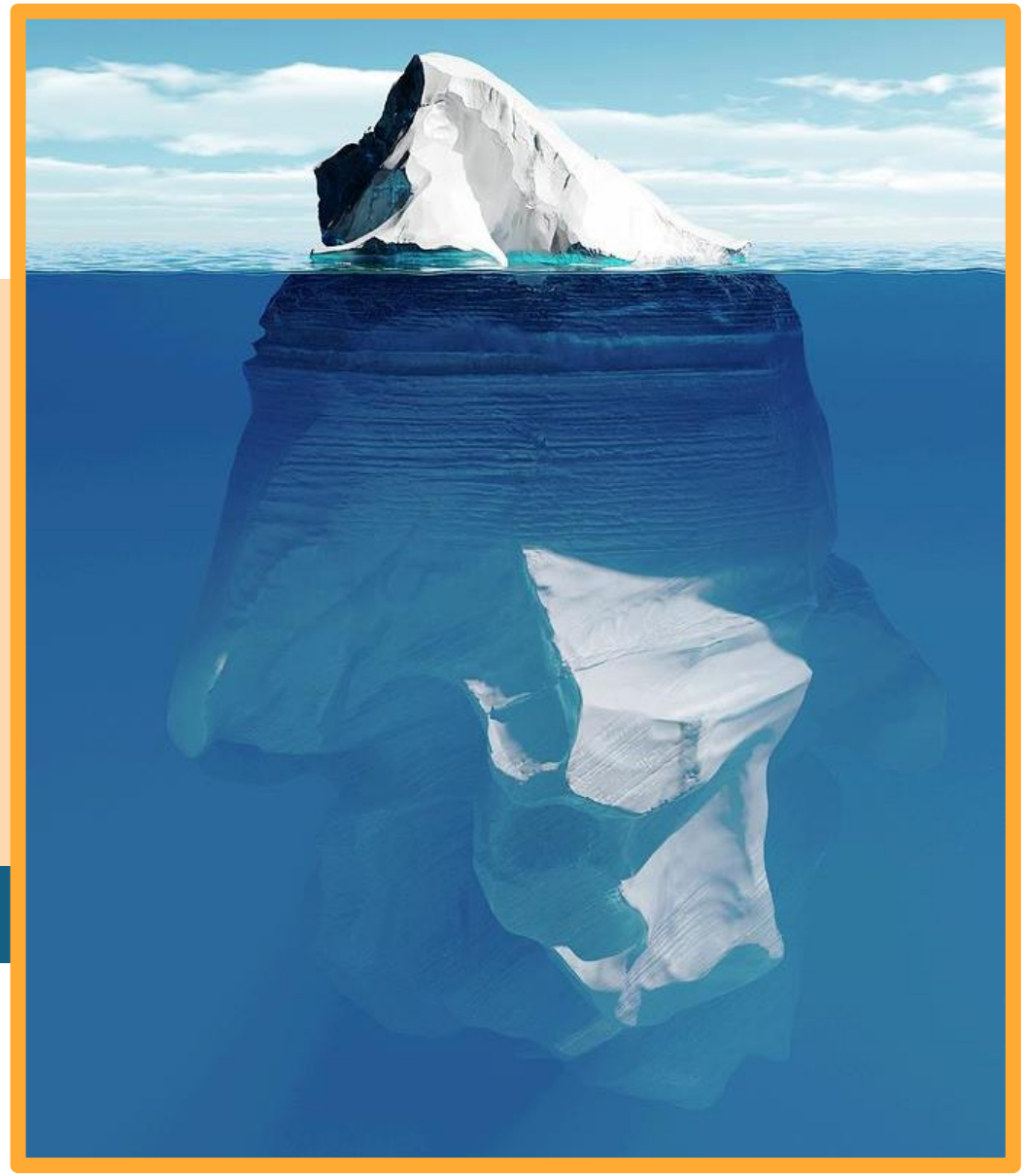
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Chemicals in Plastics and Children's Development

What We Know and Don't Know



Sheela Sathyanarayana MD MPH



UW Medicine
UNIVERSITY of WASHINGTON

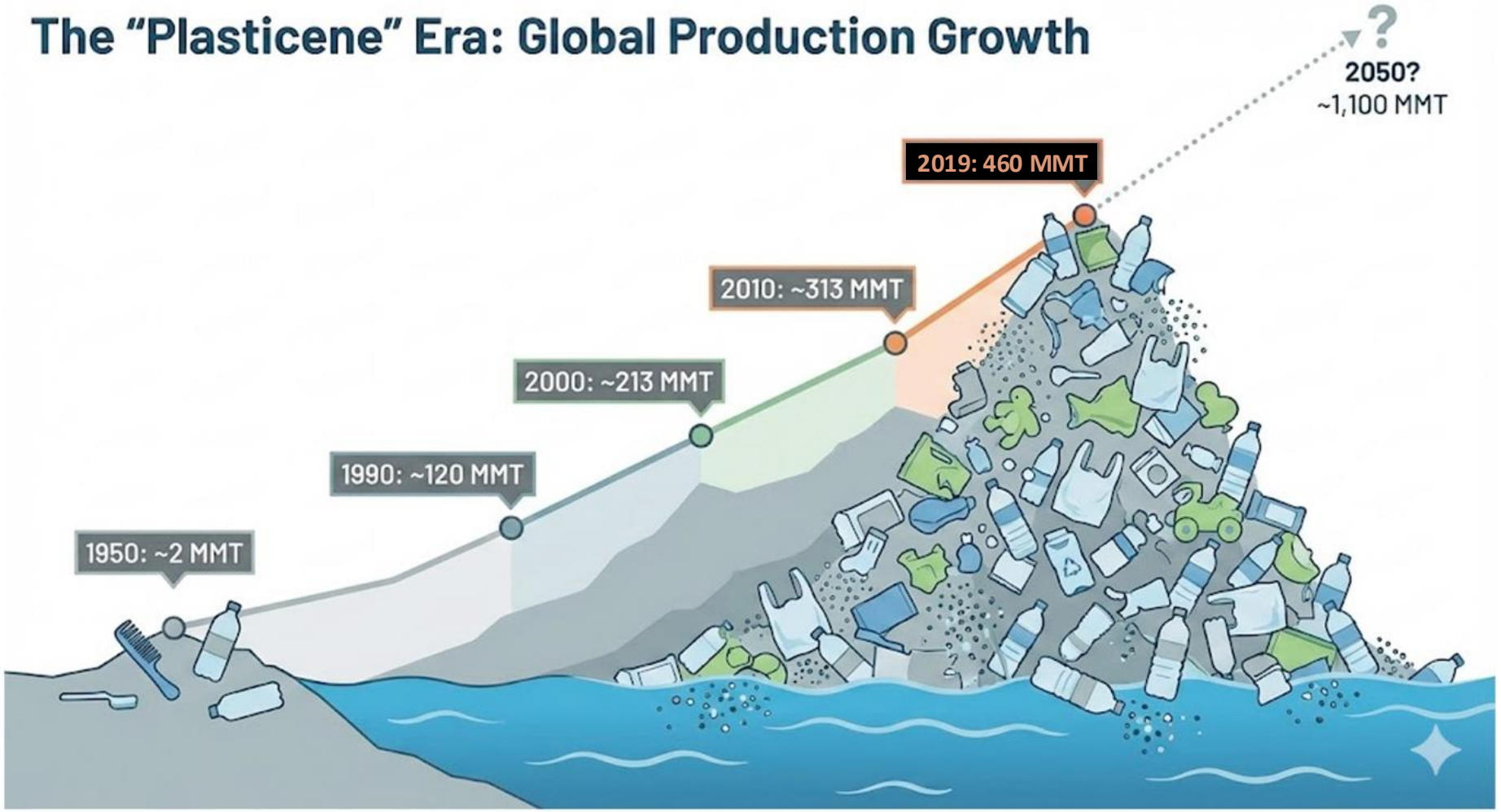
Seattle Children's
HOSPITAL · RESEARCH · FOUNDATION

Sheela Sathyanarayana, MD MPH

- Professor, Pediatrics and Environmental and Occupational Health Sciences, University of Washington
- Associate Center Director, Center for Health, Behavior, and Development, Seattle Children's Research Institute
- ECHO Cohort PI
- No conflicts to disclose

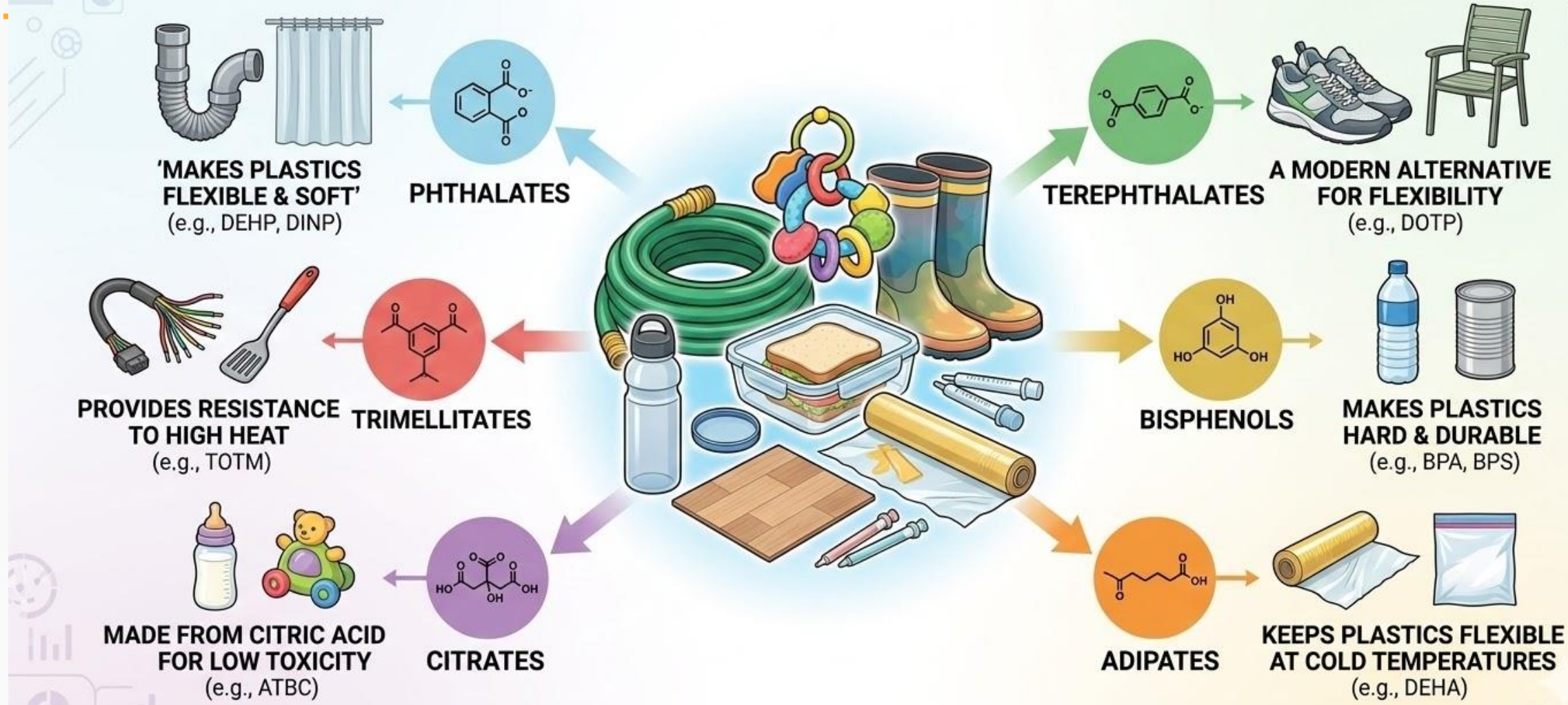


The "Plasticene" Era: Global Production Growth



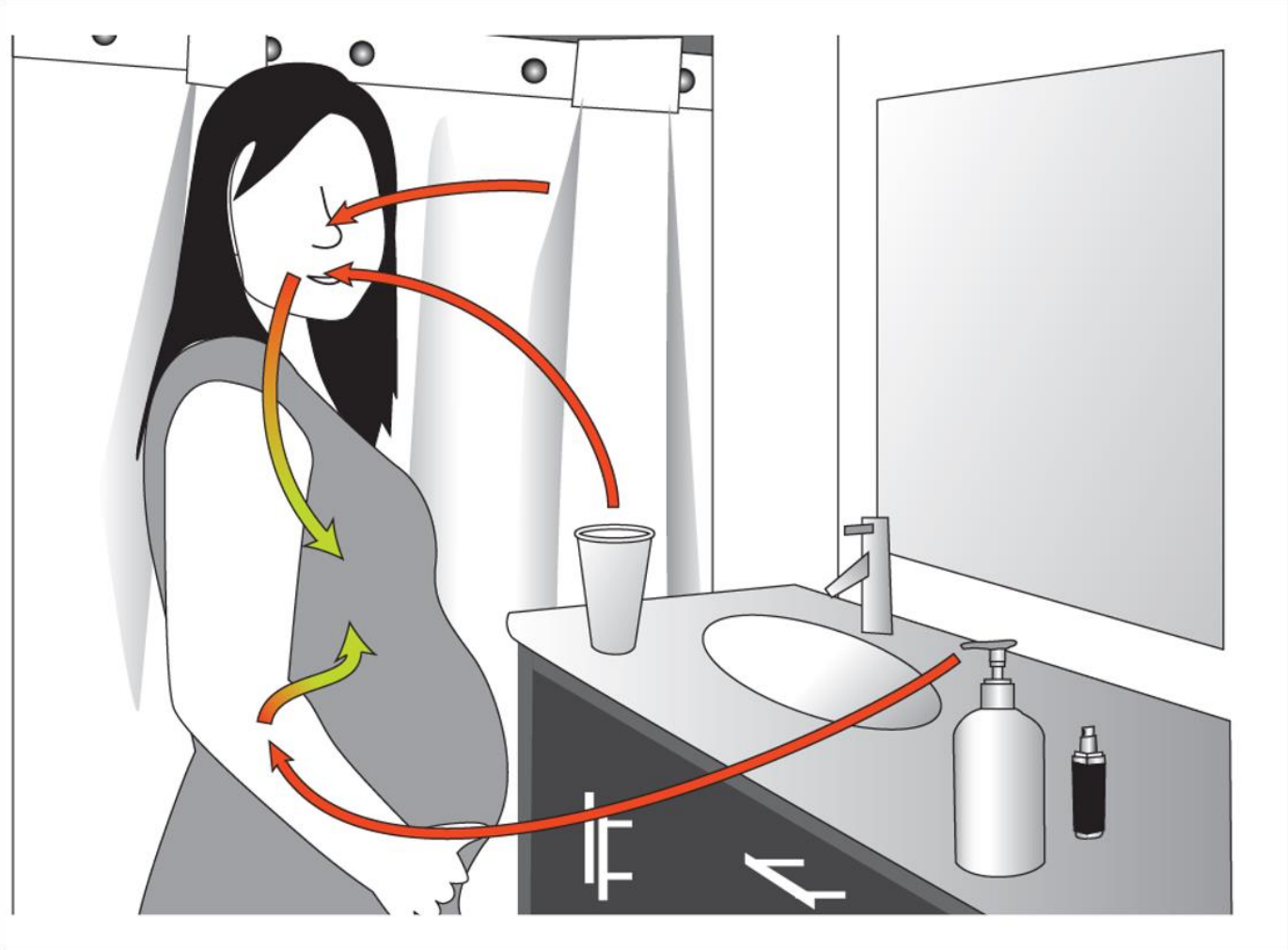
- 1950–2015 Data: Geyer, R., Jambeck, J. R., & Law, K. L. (2017). *Production, use, and fate of all plastics ever made.* Science Advances.
- 2019–2021 Data: OECD (2022). *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options.*
- 2050–2060 Projections: * OECD (2022): Predicts plastic use will triple by 2060 to roughly 1,231 MMT.
- World Economic Forum (2016): *The New Plastics Economy.* Predicts production will double by 2050.

HOW COMMON CHEMICALS MIGRATE FROM PLASTICS



Note: Chemical migration varies by product type, heat exposure, and food contact. For illustrative purposes.

How People are Exposed

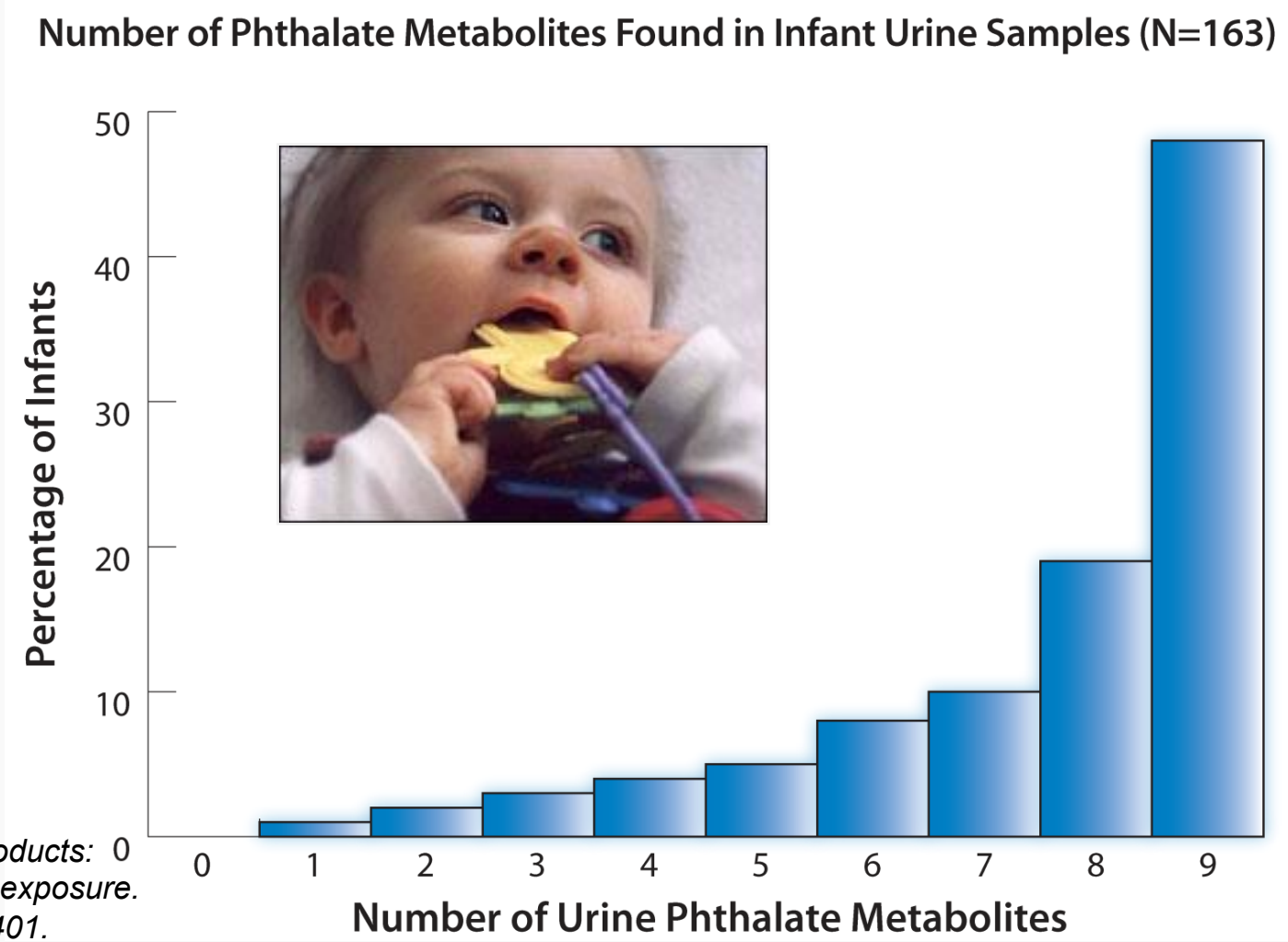


Infant Exposure

Phthalate – plasticizer chemical measured in infants 3-10 months of age

No infants with 0 exposure → all kids exposed

Most children have exposures to multiple phthalates



Sathyanarayana et al. Baby care products: possible sources of infant phthalate exposure. Pediatrics. 2008 Feb. PMID: 18245401.

Food: A Primary Source of Exposure



Direct: intentionally added to food
ex: colorings, flavorings

Indirect: not intentionally added to foods but reasonably expected to be part of food
ex: materials in food packaging & processing equipment

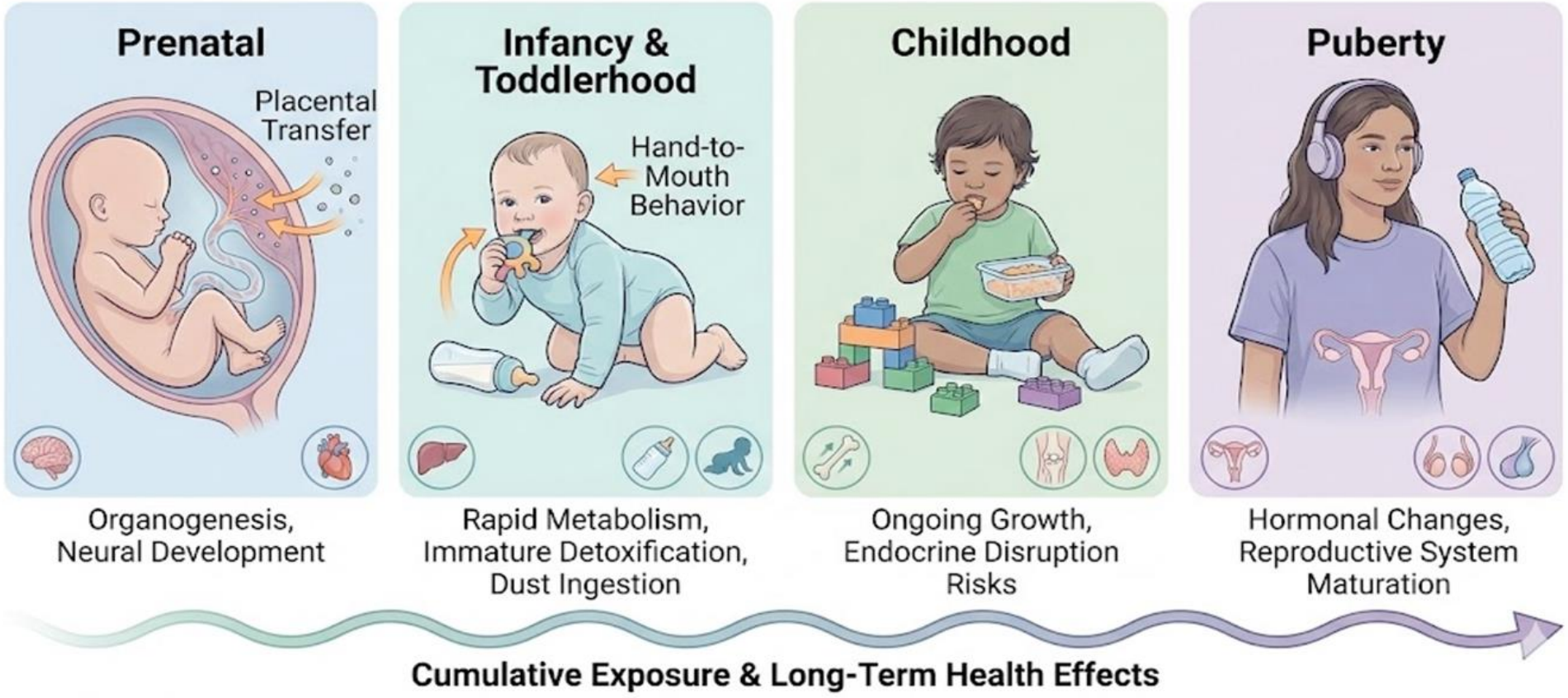
TECHNICAL REPORT

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

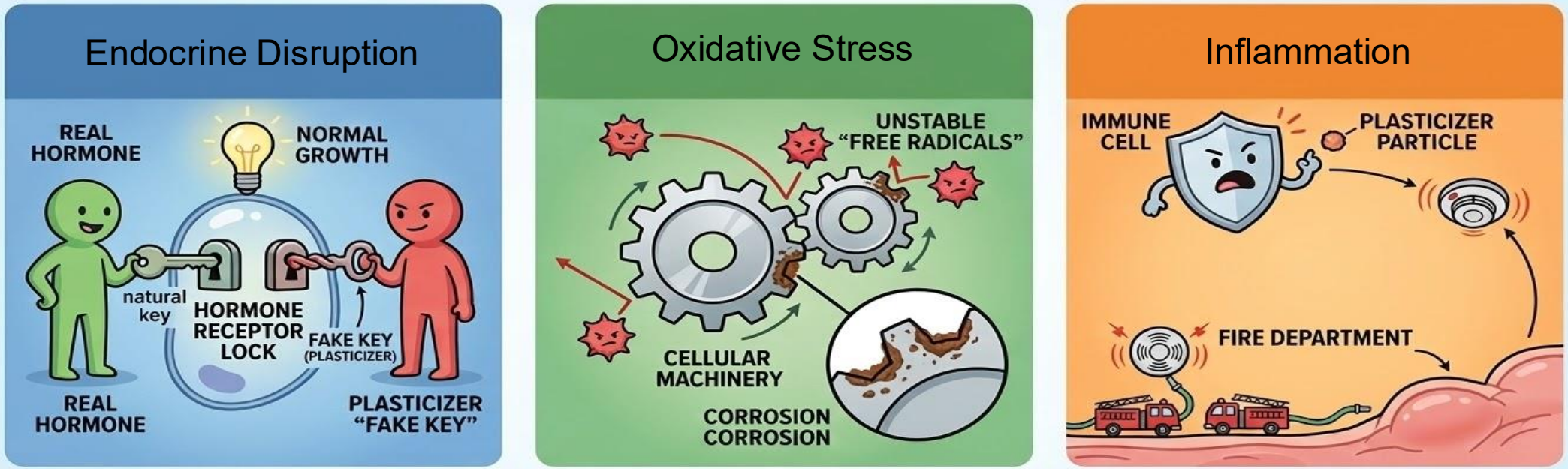
Food Additives and Child Health

Leonardo Trasande, MD, MPP, FAAP,[a] Rachel M. Shaffer, MPH,[b] Sheela Sathyanarayana, MD, MPH,[b,c]
COUNCIL ON ENVIRONMENTAL HEALTH

Windows of Susceptibility: Pediatric Vulnerability to Plastics



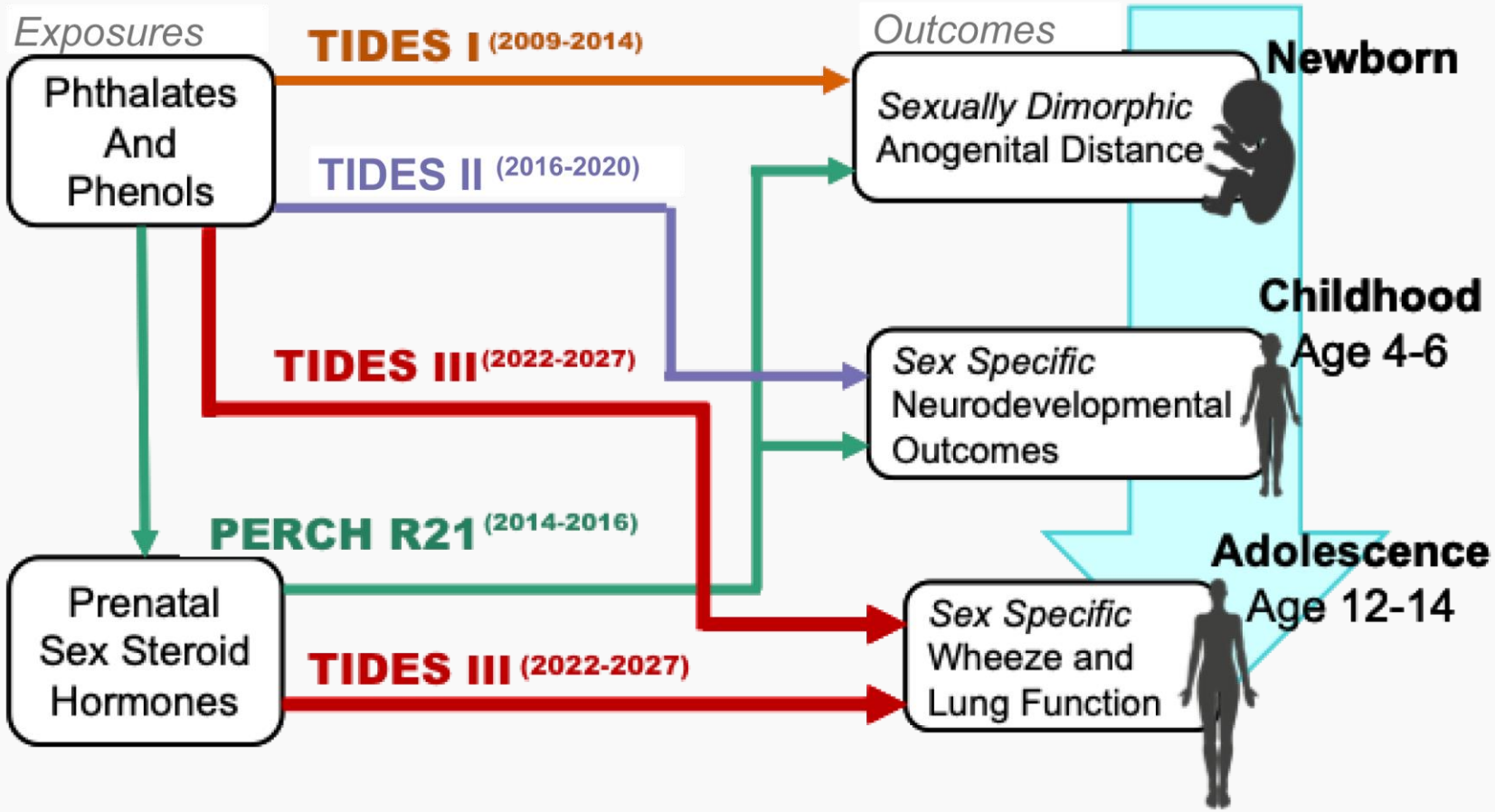
How Plasticizers Impact Human Health



ECHO and TIDES

TIDES
THE INFANT DEVELOPMENT AND ENVIRONMENT STUDY

- Examine environmental phthalate (chemicals found in plastics) in pregnancy
- Look at impacts of pregnancy exposures on infant and child health outcomes

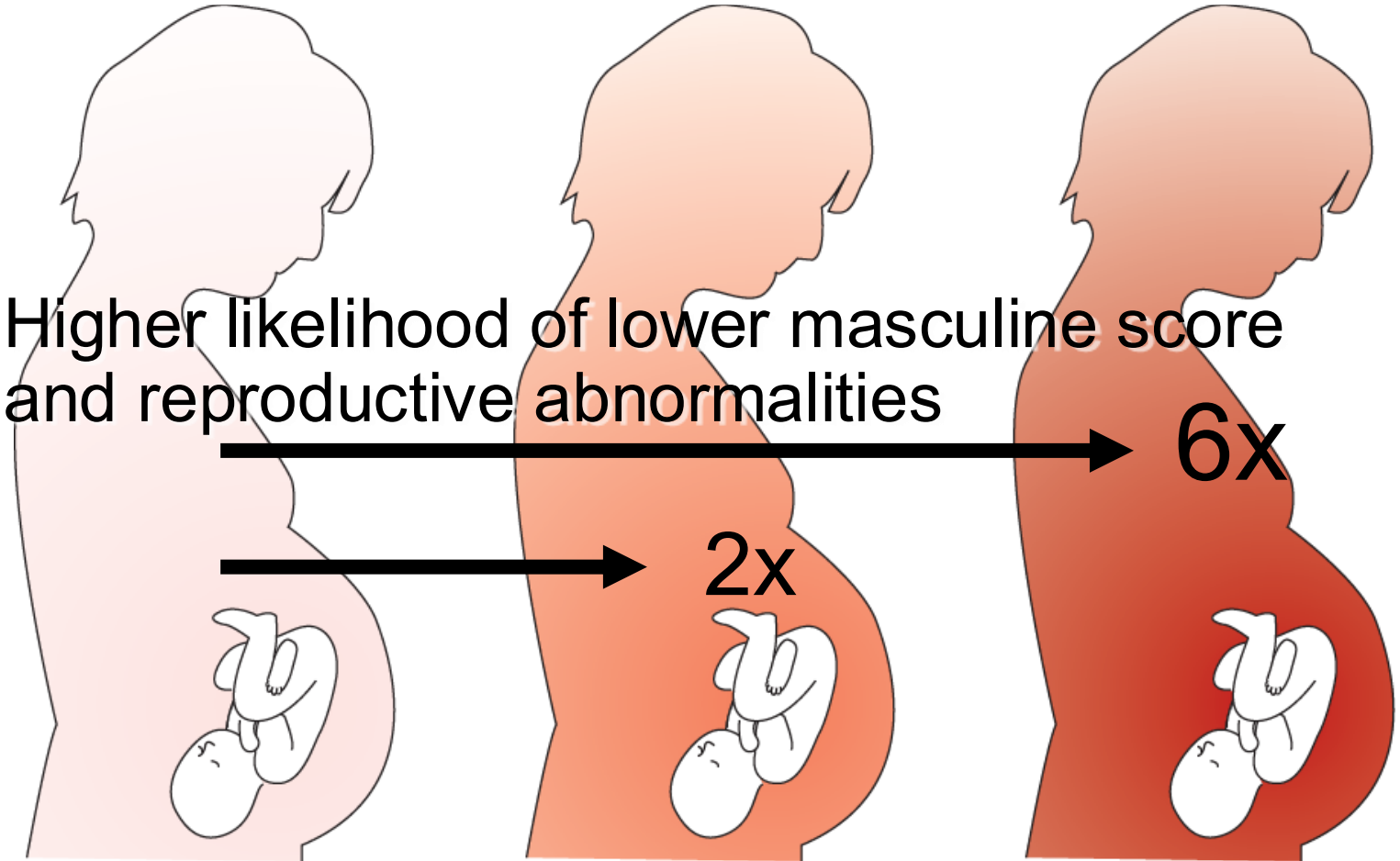


NIH UH3OD023271

Phthalates in Pregnancy → Reproductive Abnormalities at Birth

	Percentile (ng/mL)		
Monoester Metabolite	**25th**	**50th**	**75th**
MEHHP	6.0	11.4	20.1

6-12% lower testosterone concentrations in pregnant women for every log unit increase in high molecular weight phthalate exposure



Swan et al. 2015
Sathyanarayana et al. 2016

Prenatal Phthalate Mixtures & Child Behavior

(Day et al., 2021)

Early Pregnancy (Mean 33 Weeks)





Increased Autistic Traits
(Social Impairment - SRS-2 T-score)

boys, 1.2 (95% CI: 0.4, 1.9) , girls, 1.0 (95% CI: 0.1, 2.0



Poorer Adaptive Skills
(BASC-2 T-score)

β = -1.5, 95% CI: -2.8, -0.2, p = 0.02

Effect observed in **BOTH Boys & Girls**

Late Pregnancy (Mean 33 Weeks)





Externalizing Behaviors
(Aggression, Hyperactivity - BASC-2 T-score)

β = 1.8, 95% CI: 0.1, 3.5, p = 0.04

Effect specific to **BOYS**

Key Takeaway: Cumulative exposure to phthalate *mixtures* acts on the developing brain, with critical windows for different behavioral outcomes. Early exposure affects social/adaptive skills in both sexes; late exposure affects externalizing behaviors in boys.

PLASTICIZERS & CHILDREN'S HEALTH: SUMMARY OF EVIDENCE

1. PHTHALATES

Common in flexible vinyl, food packaging, and scented products.



HORMONE DISRUPTION

Linked to: Changes in male reproductive development.



- Increased risk of asthma & allergies.
- ADHD-like behaviors.



2. BISPHENOLS (BPA/BPS/BPF)

Found in hard plastics, can liners, and thermal receipts.



BRAIN & BEHAVIOR

Linked to:

- Hyperactivity, anxiety, and aggression.
- Metabolic changes (obesity risk).
- Early puberty in girls.





3. TEREPHTHALATES

Often used as "phthalate-free" alternatives (e.g., in flooring, toys).



EMERGING RISKS

Linked to:

- Potential hormonal changes, although research is newer.
- May affect metabolism in similar ways to other plasticizers.



KEY TAKEAWAY: Early-life exposure can have long-term impacts. *BASED ON CURRENT SCIENTIFIC STUDIES

How Do We Address the Problem?

Prescriptions for Prevention: Reducing Plastic Exposure

The "Three No's" (Avoid)



NO HEAT
Never microwave plastic. Avoid dishwashing plastic food items.



NO #3, #6, #7
Check codes: #3 (PVC), #6 (Styrene), #7 (Bisphenols)



NO "FRAGRANCE"
Choose fragrance-free products (avoids phthalates).

The "Three Yes's" (Choose)



YES TO GLASS/STAINLESS STEEL
Use for food and drink storage, especially for kids.



YES TO FRESH/FROZEN
Prioritize fresh or frozen foods over canned goods.



YES TO DUSTING
Regular wet dusting/mopping removes plastic-laden dust.

Use Reliable Resources

Environmental Working Group Example

Vaseline Intensive Care Dry Skin Repair Lotion

6

Data Availability: LIMITED

Learn more About EWG's Scores



EWG scientists reviewed the Vaseline Intensive Care Dry Skin Repair Lotion product label collected on August 10, 2021 for safety according to the methodology outlined in our Skin Deep Cosmetics Database. We assess the ingredients listed on the labels of personal care products based on data in toxicity and regulatory databases, government and health agency assessments and the open scientific literature. EWG's rating for Vaseline Intensive Care Dry Skin Repair Lotion is 6.

Ingredient Concerns

Cancer ⓘ



Developmental & Reproductive Toxicity ⓘ



Allergies & Immunotoxicity ⓘ



Use Restrictions ⓘ



Other Ingredient Concerns

HIGH
- Endocrine disruption
- Contamination concerns
- Irritation (skin, eyes, or lungs)
- Miscellaneous
- Organ system toxicity (non-reproductive)
- Occupational hazards
- Use restrictions

LOW
- Enhanced skin absorption
- Ecotoxicology

Learn more About Ingredient Concerns

Score	Data Availability	Ingredient	Concern
9	Fair	PROPYLPARABEN	• Developmental/reproductive toxicity (moderate) • Allergies/immunotoxicity (moderate) • Use restrictions (moderate) • Endocrine disruption (high) • Ecotoxicology (low)
8	Fair	FRAGRANCE Appeared as: PARFUM	• Allergies/immunotoxicity (high) • Endocrine disruption (moderate) • Non-reproductive organ system toxicity (moderate) • Ecotoxicology (low) • Irritation (skin, eyes, or lungs) (moderate)
4	Fair	PETROLATUM	• Use restrictions (moderate) • Non-reproductive organ system toxicity (moderate) • Contamination concerns (PAHS)
4	Limited	PHENOXYETHANOL	• Allergies/immunotoxicity (low) • Use restrictions (moderate) • Non-reproductive organ system toxicity (moderate) • Irritation (skin, eyes, or lungs) (high) • Occupational hazards (high)
4	Fair	METHYLPARABEN	• Allergies/immunotoxicity (moderate) • Use restrictions (low) • Endocrine disruption (moderate) • Biochemical or cellular level changes (moderate)

What's Missing

Interventions to Reduce Exposures

- Few interventions that are evidence-based (meaning published peer reviewed studies)
- Interventions to reduce exposures (supplying foods to families, applying deep cleaning methods) work in controlled settings
- Need for more intervention studies that are feasible in the general population

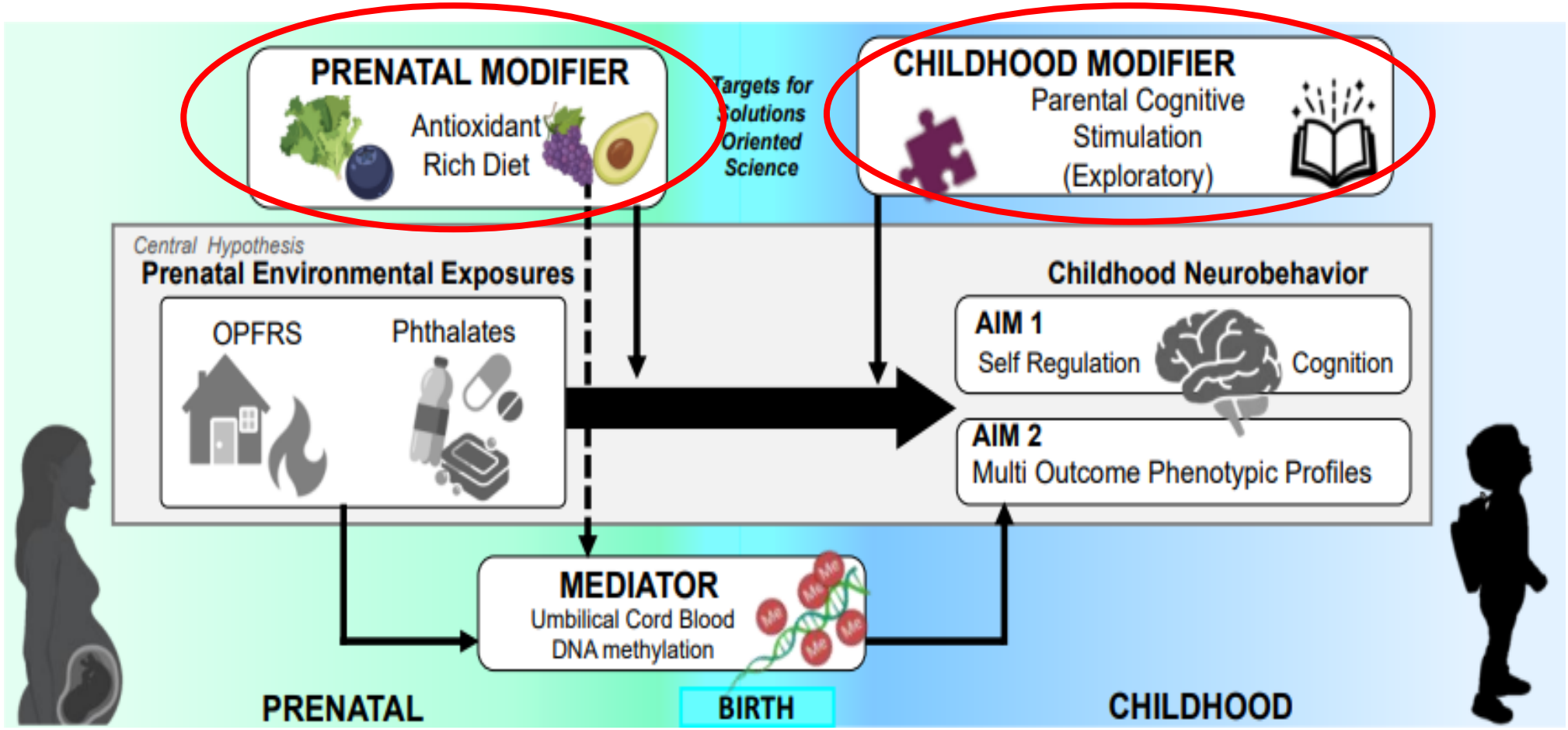
Toxicity Data and Regulation

- While evidence exists for about 3-4 thousand chemicals, thousands more without toxicity data
- More advanced science on novel chemical toxicity
- Current regulatory action focused on one chemical at a time → class regulation

Integration into Medical Education

- Few providers have environmental health education
- Need for integration of environmental health concepts into provider curricula
- Need for more structured ways to train medical professionals outside of standard curricula

ECHO - Mediators and Modifiers of Children's Environmental Exposures and Neurodevelopment (MEND)



NIH UH3OD035508

Past to Future

1980-2000s

- Learned that chemicals leach from plastics
- Learned widespread exposure in the population

2000s-now

- Learned about toxicity to human bodies and pregnant women/young children most susceptible

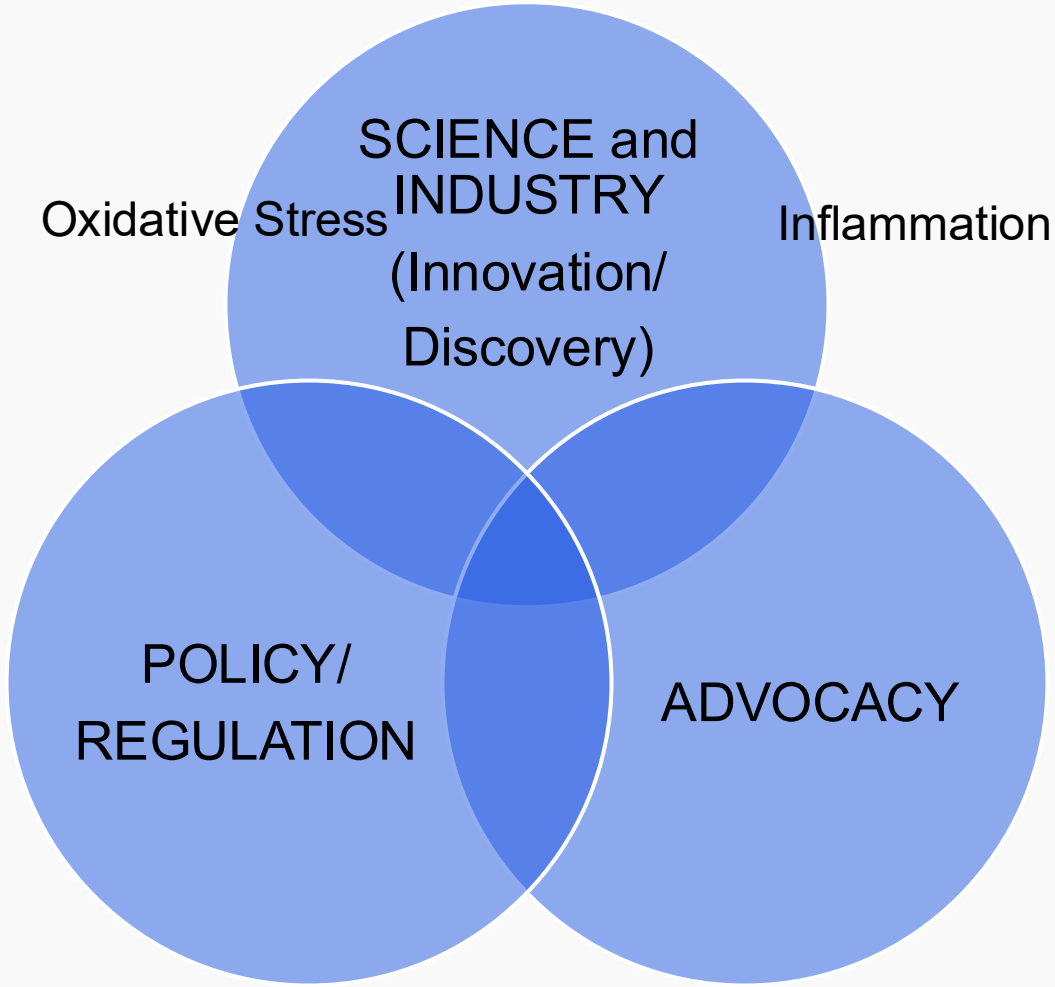
Future

- Interventions to reduce exposure
- Regulation
- Safer chemicals
- Safer products

WILL TAKE ALL OF US

Endocrine Disruption

Synergy Across Sectors and Disciplines



Thank You – Takes a Village

- TIDES Study Team – Shanna Swan, Ruby Nguyen, Emily Barrett, Nicole Bush
- MEND Study Team – Brent Collett (MPI), Melissa Melough, Alison Paquette, Adam Szpiro, Marnie Hazlehurst
- Drew Day PhD
- Brennan Baker PhD
- ECHO PATHWAYS Team
- NIH UH3OD035508
- NIH UH3OD023271
- NIEHS R01ES025169





Children’s health concerns over the plastics life cycle and opportunities for action



Veena Singla, PhD

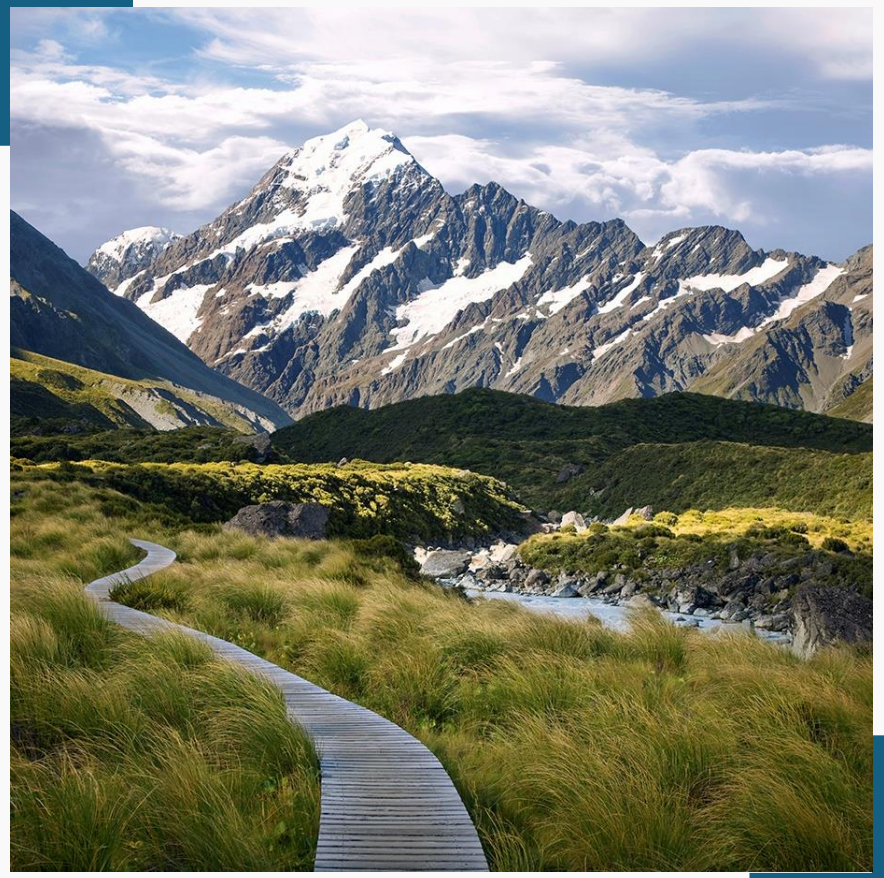


Veena Singla, PhD

- Affiliate, University of California San Francisco and Senior Fellow, Halt the Harm Network
- Supported by funding from the Schmidt Family Foundation
- I have no conflicts to disclose



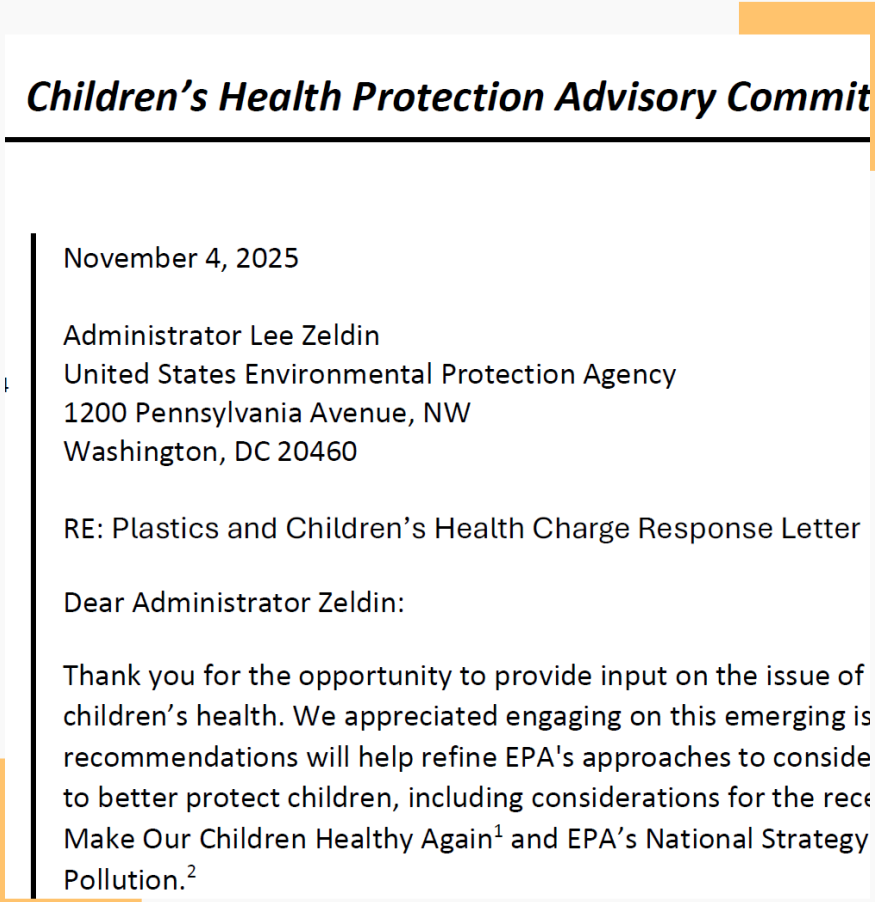
Trail map



- EPA Children's Health Protection Advisory Committee (CHPAC) letter on plastics and children's health
- Plastics life cycle and children's health
- Research informing policy
- Gap- built environment
- Opportunities

Children's Health Protection Advisory Committee (CHPAC)

- Federal Advisory Committee to U.S. Environmental Protection Agency (EPA)
- Nov 2025 letter to EPA summarizing science on plastics and children's health
- Recommendations for policy makers, families, communities
- bit.ly/chpac-plastics



Children's Health Protection Advisory Commit

November 4, 2025

Administrator Lee Zeldin
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Plastics and Children's Health Charge Response Letter

Dear Administrator Zeldin:

Thank you for the opportunity to provide input on the issue of children's health. We appreciated engaging on this emerging is recommendations will help refine EPA's approaches to conside to better protect children, including considerations for the rece Make Our Children Healthy Again[1] and EPA's National Strategy Pollution.[2]

Plastic pollution is:

"the negative effects and emissions resulting from the production and consumption of plastic materials and products across their entire life cycle." (United Nations Environment Programme 2023)

Extraction → Manufacture → Use → End of life management



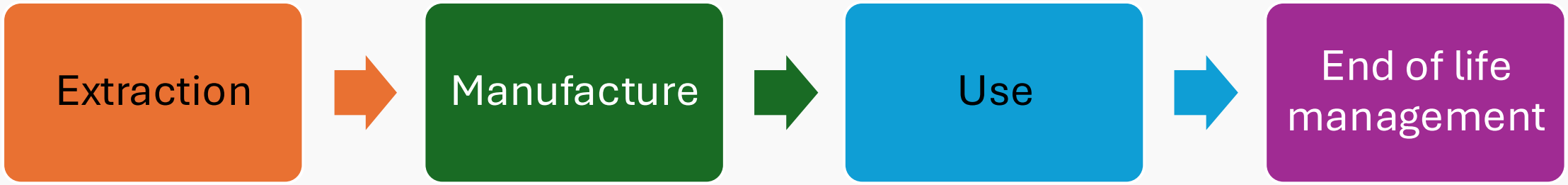


Photo: Louisiana Bucket Brigade





Health threats over the plastics life cycle



Fenceline communities
Workers
Communities affected by environmental movement of pollutants

Examples
Particulate matter (PM)
Volatile Organic Compounds (VOCs)

Fenceline communities
Workers
Communities affected by environmental movement of pollutants

Examples
Bisphenols
Flame retardants
Phthalates
Per and polyfluoroalkyl substances (PFAS)
Particulate matter (PM)
VOCs

Product users

Examples
Bisphenols
Flame retardants
Phthalates
Per and polyfluoroalkyl substances (PFAS)

Fenceline communities
Workers
Communities affected by environmental movement of pollutants

Examples
Flame retardants
Phthalates
PFAS
Particulate matter (PM)
VOCs

CHPAC Nov 2025 plastics letter and Landrigan, 2023

Children's health concerns

- Children have higher exposures to bisphenol-A and flame retardants compared to adults
- Higher exposures of lower socio-economic status people to bisphenol-A, flame retardants, phthalates, PFAS
- Exposures during pregnancy are of concern
- Some health hazards of concern
  - PFAS- immune toxicity
  - Phthalates, flame retardants and bisphenols - reproductive system and brain development
  - Particulate matter and VOCs- development and aggravation of asthma



CHPAC Nov 2025 plastics letter

Flame retardants raise risks for children's health

- Flame retardants added to furniture and baby product foam, electronics, textiles

EHP Environmental Health Perspectives

Review

Developmental PBDE Exposure and IQ/ADHD in Childhood: A Systematic Review and Meta-analysis

Juleen Lam, Bruce P. Lanphear, David Bellinger, Daniel A. Axelrad, Jennifer McPartland, Patrice Sutton, Lisette Davidson, Natalyn Daniels, Saunak Sen, and Tracey J. Woodruff

Every 10-fold increase in polybrominated diphenyl ether (PBDE) levels



associated with



Loss of 3.7 IQ points in children

Lam, 2017

Providing data and evidence to inform the public and policy

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Exposure to brominated and organophosphate ester flame retardants in U.S. childcare environments: Effect of removal of flame-retarded nap mats on indoor levels☆

W.A. Stubbings [a], E.D. Schreder [b], M.B. Thomas [b], K. Romanak [a], M. Venier [a], A. Salamova [a, *]

[a] School of Public and Environmental Affairs, Indiana University, Bloomington, IN, 47405, United States
[b] Toxic-free Future, 4649 Sunnyside Ave N., Suite 540, Seattle, WA, 98103, United States





Human Exposure to Flame Retardant Chemicals and Health Concerns

Testimony before the
U.S. Senate Committee on Environment and Public Works
Tuesday, July 24th, 2012
Dirksen Senate Office Building, Room 406

Heather M. Stapleton, Ph.D., Associate Professor
Nicholas School of the Environment, Duke University

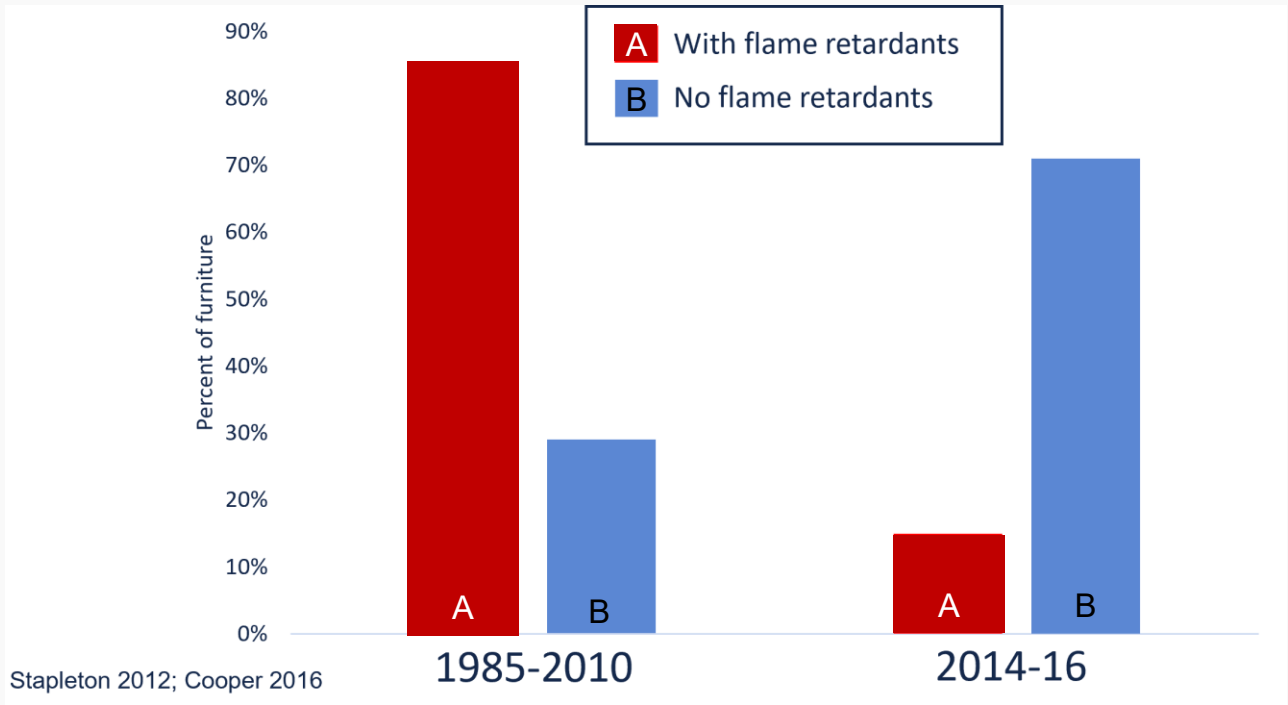
- Significant decrease in indoor flame retardant levels after flame-retarded nap mats replaced with flame-retardant free nap mats


San Francisco Chronicle

Kids' low IQ linked to antifire chemicals

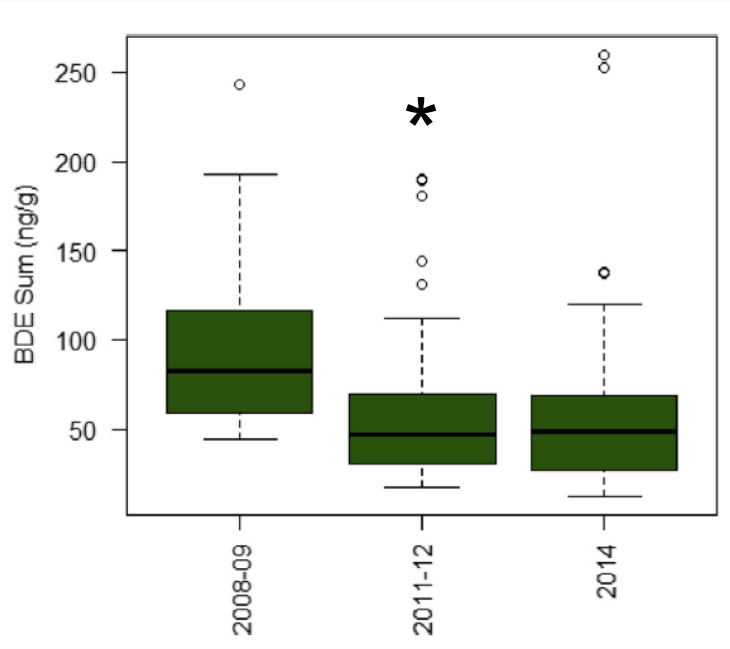
Flammability standard update + flame retardant phase outs/ bans

- Flame retardants in products and people drop



Stapleton 2012; Cooper 2016

Furniture



Polybrominated diphenyl ethers (PBDEs) in pregnant women,
Northern CA

Parry, 2018

PFAS raise risks for children's health

- Used in plastic production, as parts of plastic, and as treatments for plastic fibers and textiles
- Developmental and reproductive toxicity
- Cancers
- Immune toxicity
- Interference with the body's natural hormones (endocrine disruption)

US EPA, 2025

Effective interventions to reduce PFAS exposures



Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

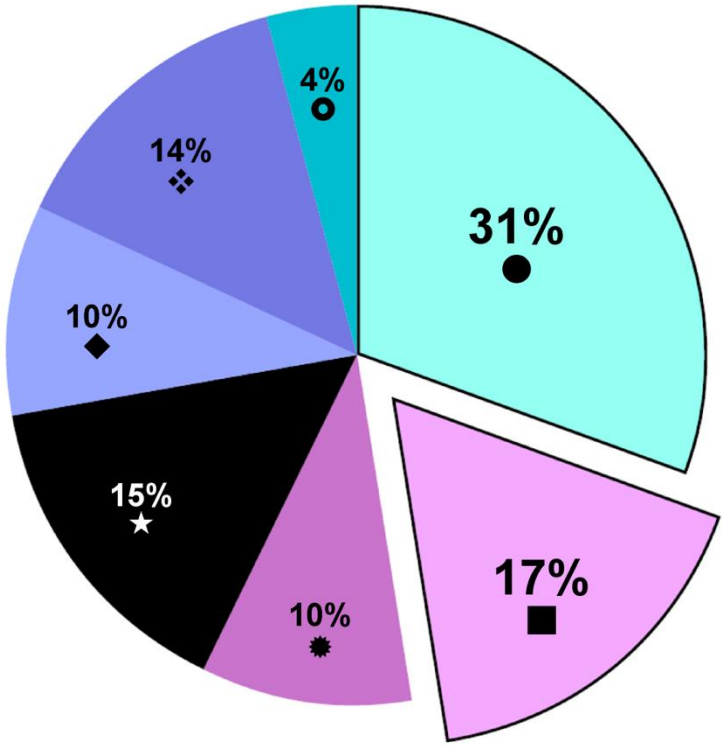
Impact of "healthier" materials interventions on dust concentrations of per- and polyfluoroalkyl substances, polybrominated diphenyl ethers, and organophosphate esters

Anna S. Young [a,b,*], Russ Hauser [a], Tamarra M. James-Todd [a], Brent A. Coull [a,c], Hongkai Zhu [d], Kurunthachalam Kannan [d], Aaron J. Specht [a], Maya S. Bliss [a], Joseph G. Allen [a]

- Room with healthier PFAS-free materials had **78% lower PFAS** levels than typical room

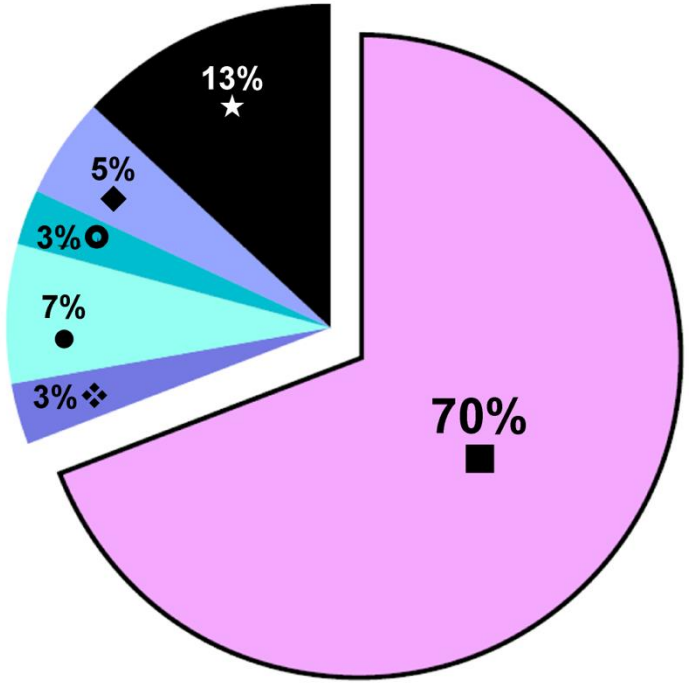
Building materials second largest user of plastics, and largest user of PVC

PLASTIC



PACKAGING
BUILDING & CONSTRUCTION
TEXTILES
CONSUMER & INSTITUTIONAL PRODUCTS
TRANSPORTATION
ELECTRICAL/ELECTRONIC
OTHER

PVC (polyvinyl chloride)



Habitable 2024

Gap: Plastic building materials impact on children's health

- Spend ≈90% of time indoors
- Plastic building materials (such as flooring) and building materials containing plastic (such as engineered wood) significant indoor sources of:
  - Flame retardants
  - Formaldehyde
  - Phthalates
  - PFAS



Habitable 2024

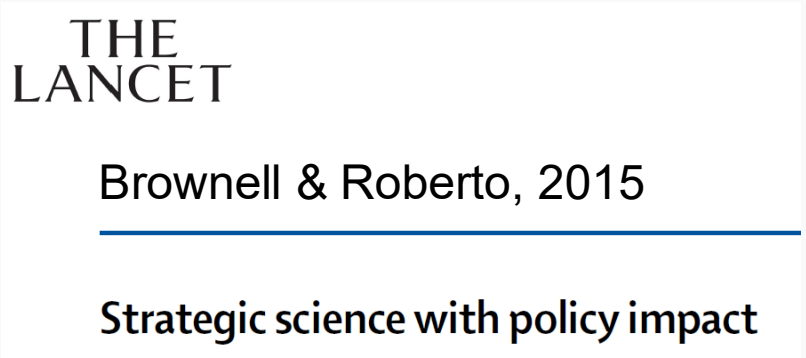
Research informing policy

- Data on hazards and risks to children's health related to specific chemicals, exposures, products
- Effective interventions to decrease risks
- Provide evidence in policy processes
- Document success and decreased health risks from policy changes



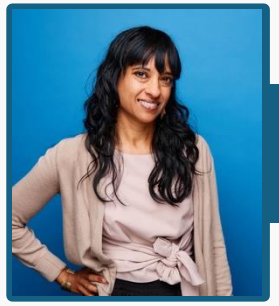
Opportunities

- Solutions-oriented research
- Policy-relevant research
- Systems-level approaches consider full life cycle and upstream interventions
- Providing the most current data and scientific principles to inform better decisions to protect children's health









Veena Singla, PhD

Contact Information

Veena.singla@ucsf.edu

Thank you!

Session 1 Presenters







Dr. Philip Landrigan
Boston College

Dr. Sheela Sathyanarayana
Seattle Children's Research Institute

Dr. Veena Singla
University of California San Francisco

Scan QR code to submit a question or comment

#ECHOSymposium2026



Session 1: Fireside Chat

Fireside Chat Participants

Moderator



Dr. Susanne Brander
Pew Charitable Trusts

Discussants



Julia Cohen
Plastic Pollution Coalition



Dr. Emily Hilz
University of Texas at Austin

Scan QR code to submit a question or comment

#ECHOSymposium2026

National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science
to Action



What's Coming Up

Session 2:
Air Quality

Lunch Break

Scan QR code to submit a question or comment

#ECHOSymposium2026

National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science
to Action



Session 2: Air Quality

Session 2 Presenters



Dr. Catherine Karr
University of Washington



Dr. Erin Semmens
University of Montana



Laura Kate Bender
American Lung Association

Wildfire Smoke: A burning issue for child health scientists, practitioners, programs and policy



Catherine Karr, MD PHD MS FAAP

ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

UW Medicine
UW SCHOOL OF MEDICINE

Northwest PEHSU
Pediatric Environmental Health Specialty Units

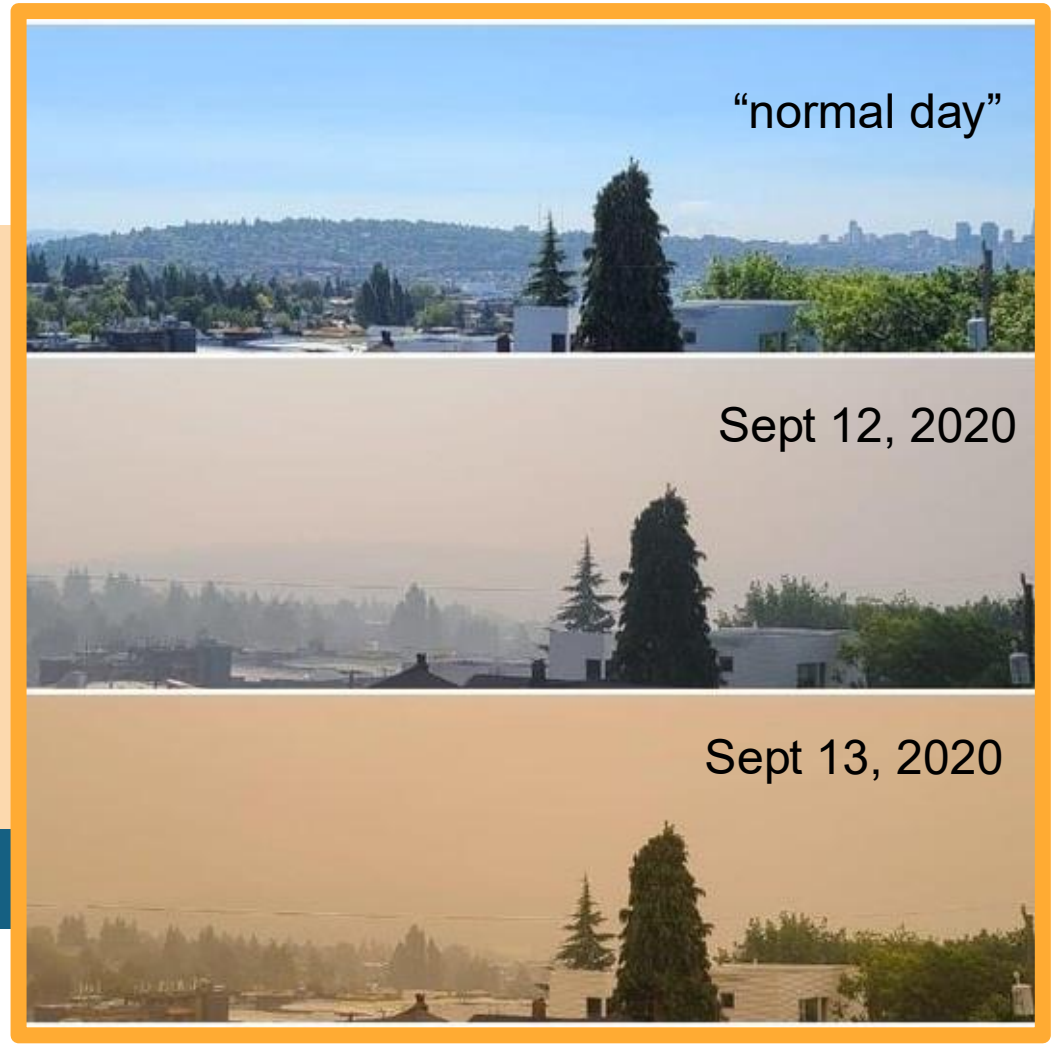
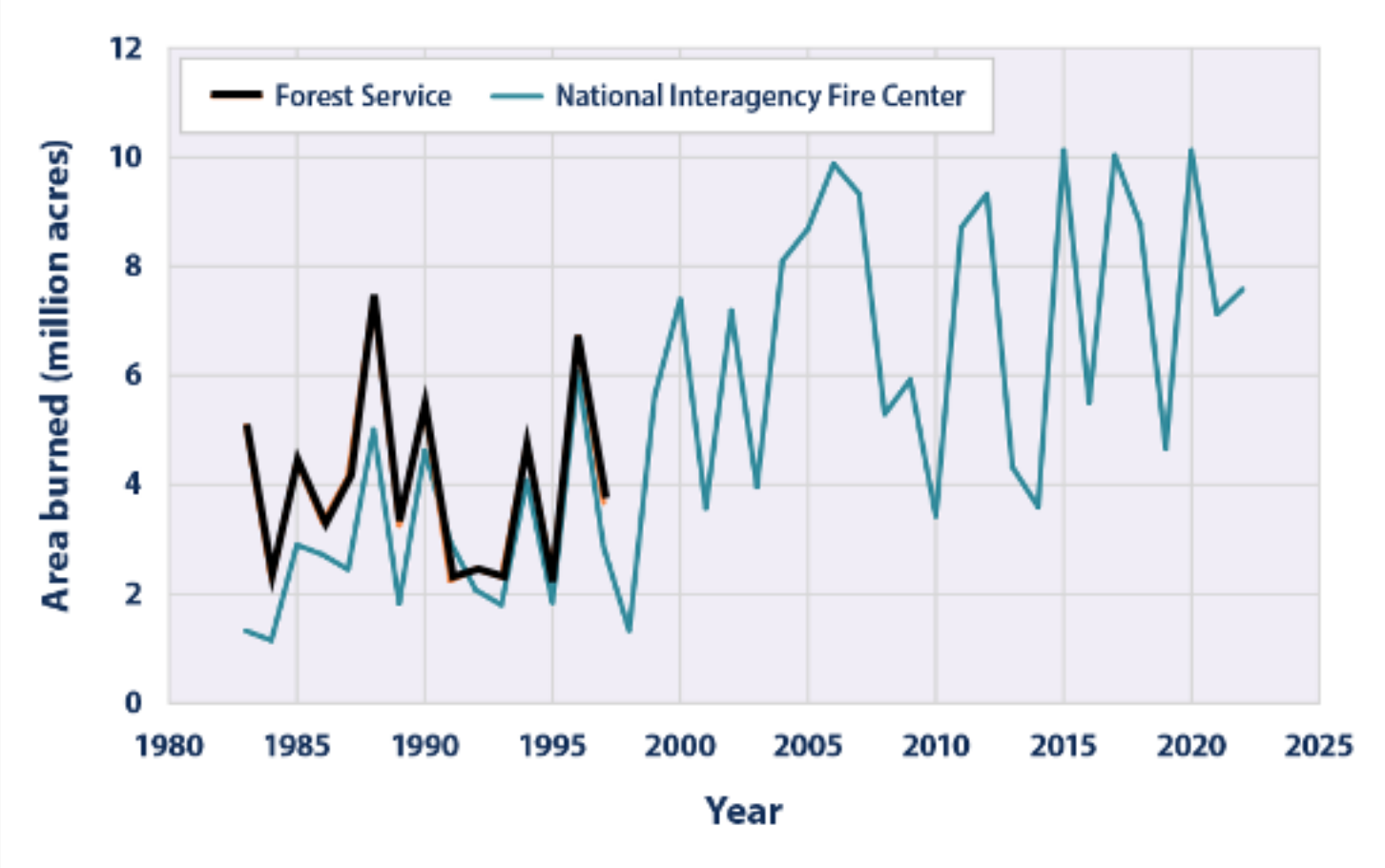


Photo credit: Kurt Ricketts

Wildfires are increasing

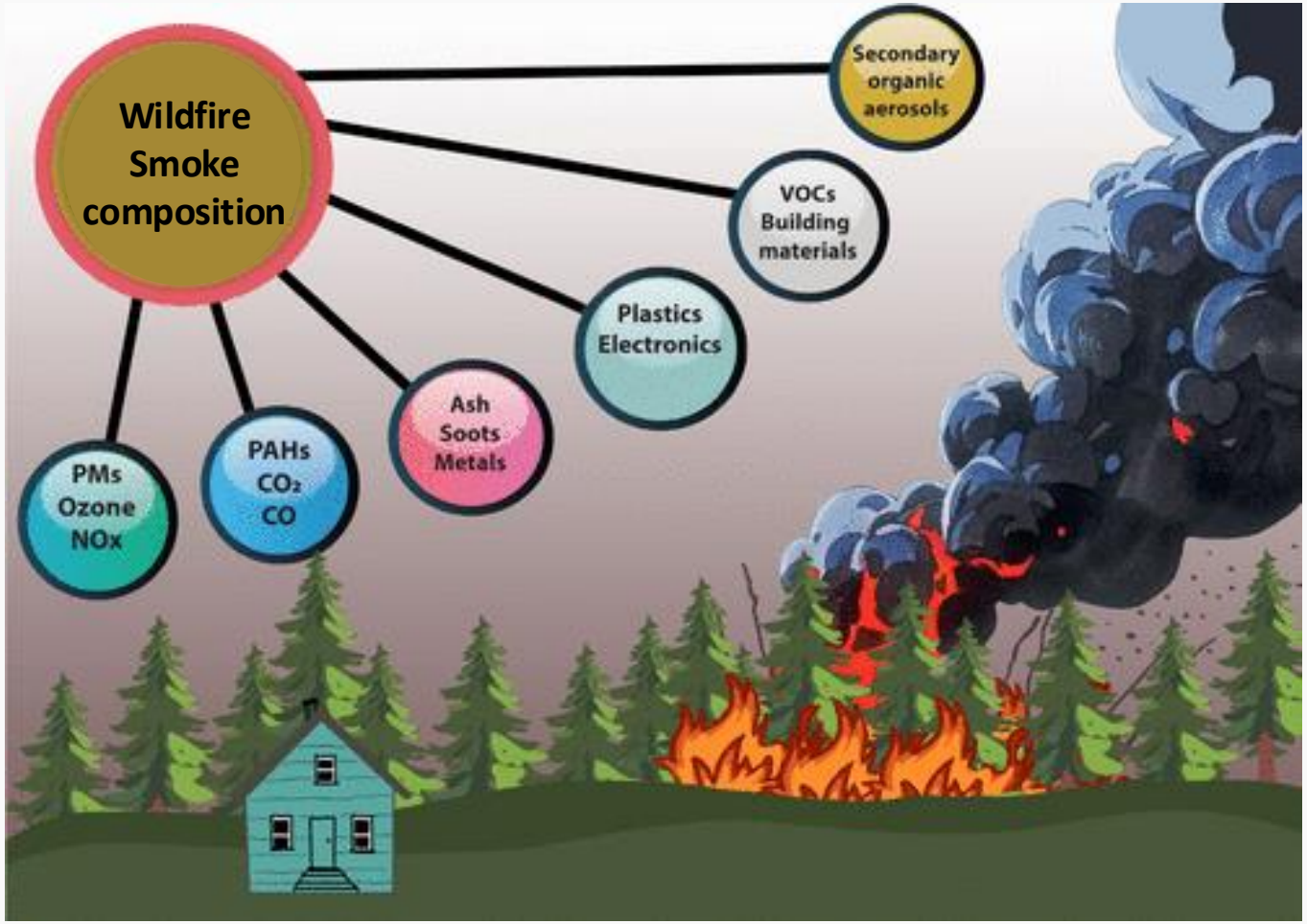


Expected to intensify as the climate changes.

Every year, ≈ 7.4 million children across the United States are affected by wildfire smoke.

PMID: 37943716
PMID: 28493694

Wildfire Smoke: A Toxic Mix



PMID: 39516728

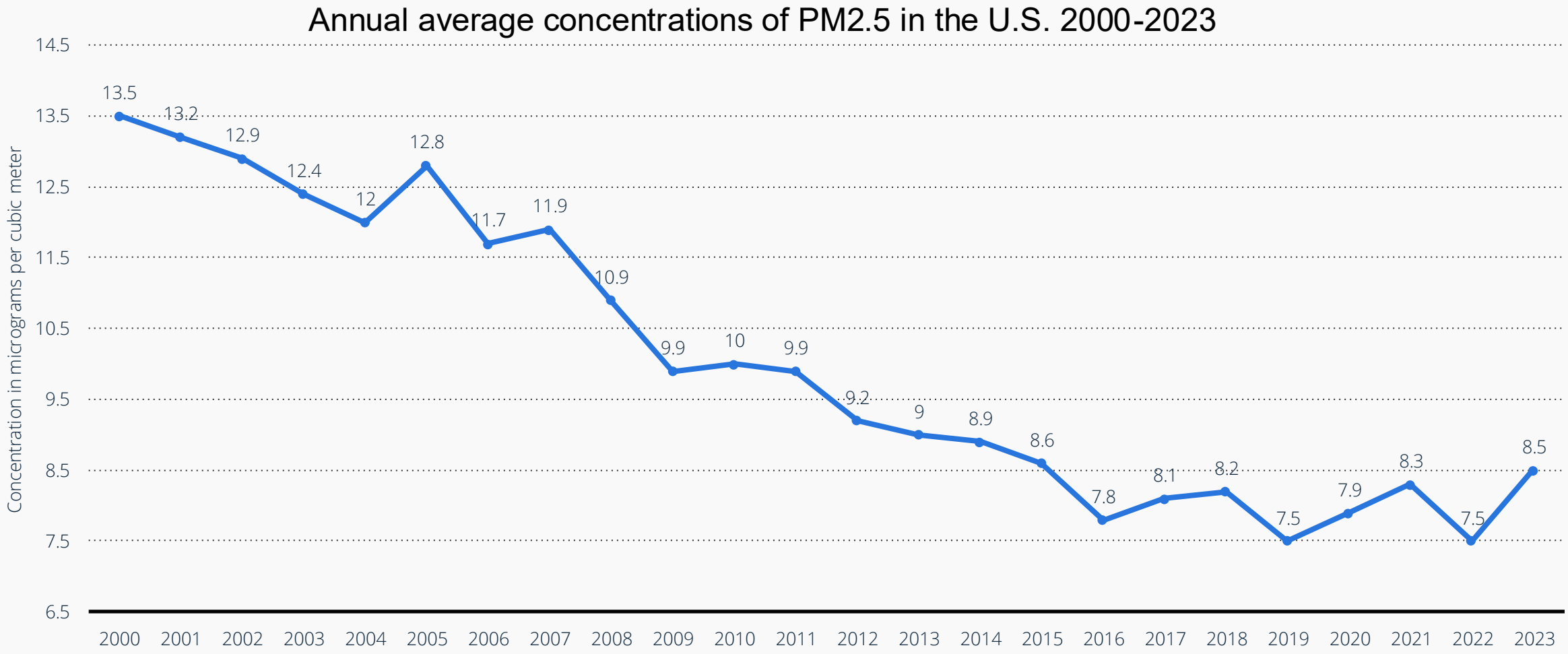
Small particles "PM"

Gases

Polycyclic aromatic hydrocarbons

Metals

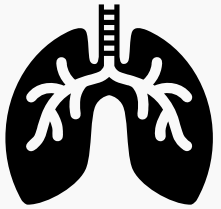
PM2.5 improvements leveling off



Statista: data from USEPA

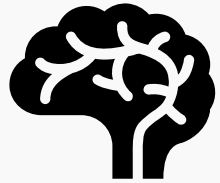
Wildfire Smoke PM more harmful (10xs!)

Many studies demonstrate harmfulness of non WFS PM



WFS PM

- higher proportion of the smallest particles than can penetrate organ systems
- More surface area for introducing toxic components
- More oxidative stress punch- “cellular rust”
- Episodic doses





PMID: 38338192

Vulnerability to exposure in early life

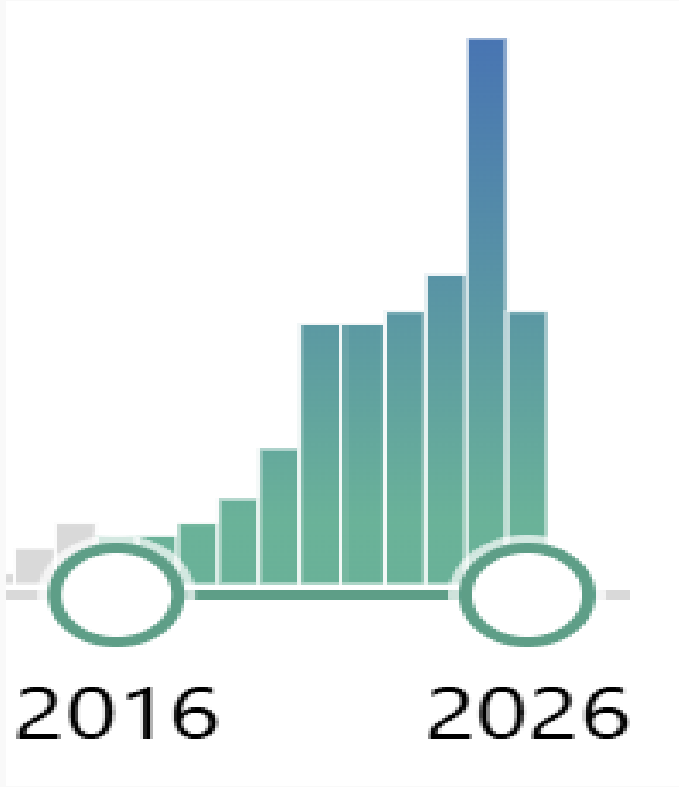




Understanding the evidence: WFS & Child Health

Science is growing

Many gaps to fill



146 publications (child + wildfire smoke)
½ of these in last 2 years

Most Evidence: Short-term Child Health Effects

Respiratory symptoms and health service use (clinic/ED/hospital) for these symptoms

Cough, nasal congestion, sore throat, eye irritation, and dermatitis PMIDs: 39887446, 34444546



Vulnerability of children with asthma

PMID: 41664433

Emerging Questions

- Prenatal exposure?

- Chronic health impacts?

Prenatal Exposure & Birthweight?

- Several studies provide suggestive evidence for lower birthweight with increased WFS exposure in pregnancy PMID: 37931734

- Fewer studies find effects for large-for-gestational age PMIDs: 26574560, 37324234

ECHO study work in progress (Allison Sherris et al)



Evidence: Prenatal Exposure & Preterm Birth

Research Highlight

Key Findings:

Supports prior studies

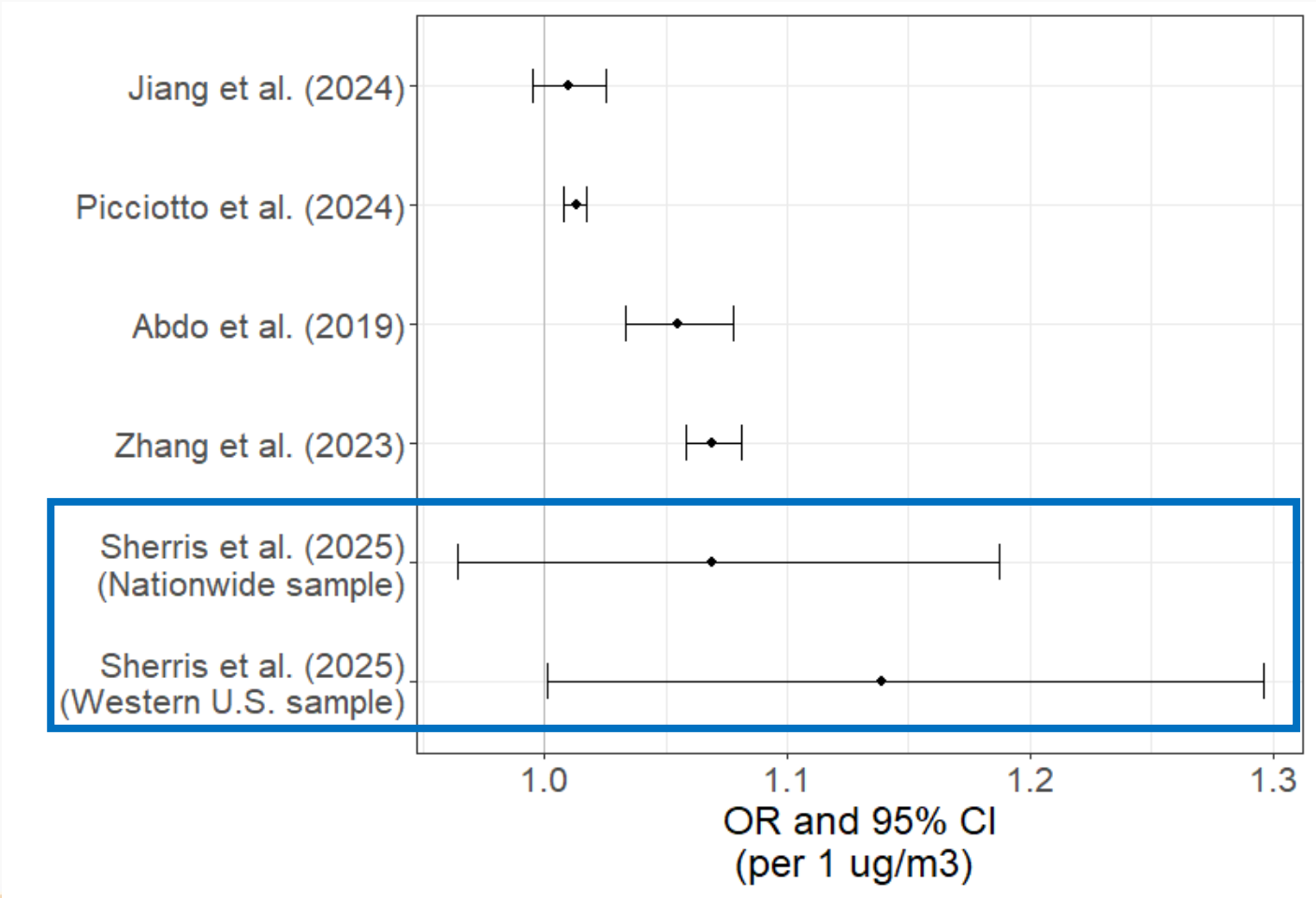
Higher risk for longer smoke waves

Higher risk for smoke days with higher concentrations

Higher risk for Western States participants

PMID: 41197644

Association between average prenatal wildfire PM2.5 preterm birth in selected studies



Emerging evidence: Child Chronic Disease and Long term Health Outcomes

Neurodevelopment

Attention traits & autism study in progress, Rebecca Schmidt/Amanda Goodrich

Autism PMID: 41557972, 41687340,





Airway health & allergic disorders

Respiratory Infections (& ear infections)

Asthma Development

studies in progress Logan Dearborn, Allison Sherris

WFS and Atopic Dermatitis

Research Highlight

Logan Dearborn et al

1st study of early life WFS and *development* of atopic dermatitis

Key Findings:

Prenatal exposure- suggestive evidence of increased risk

Postnatal exposure (infancy) less consistent

Effects greater for boys than girls

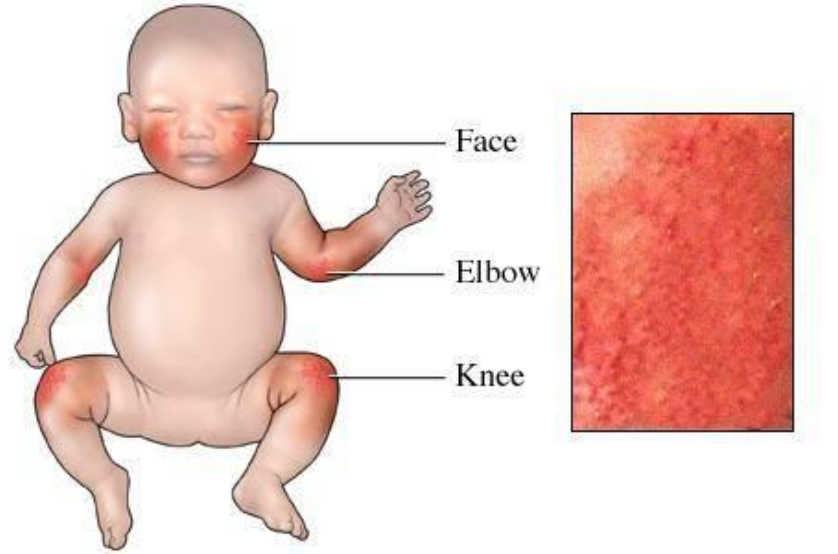


Image: Kaiser Permanente

Evidence Gaps: Postnatal Exposure & Child Health Outcomes (Long term)

Given evidence for non WFS PM influencing asthma risk, lung function, cognition -- *do increases in childhood exposures to WFS*:

- Increase development of asthma? allergies?
- Reduce lung function growth?
- Increase neurobehavioral conditions such as ADHD, autism or reduce cognitive potential?
- Long term metabolic or cardiovascular health?



Honing understanding of the risks:

- Influence of timing and duration of exposure?
- Modifying factors ?
- Co-exposure to heat?



Responding to WFS Episodes



While the evidence is continually expanded and enhanced, how can we protect children's health now?

Addressing the Knowledge and Protection Gap

Studies show health care providers view WFS as important to their patient care but lack training or confidence to address it PMIDs: 38153213, 41664433

Limited study on community experience of wildfire smoke episodes, their child's health, and barriers to protection – despite increasing public health messaging PMID: 41041563

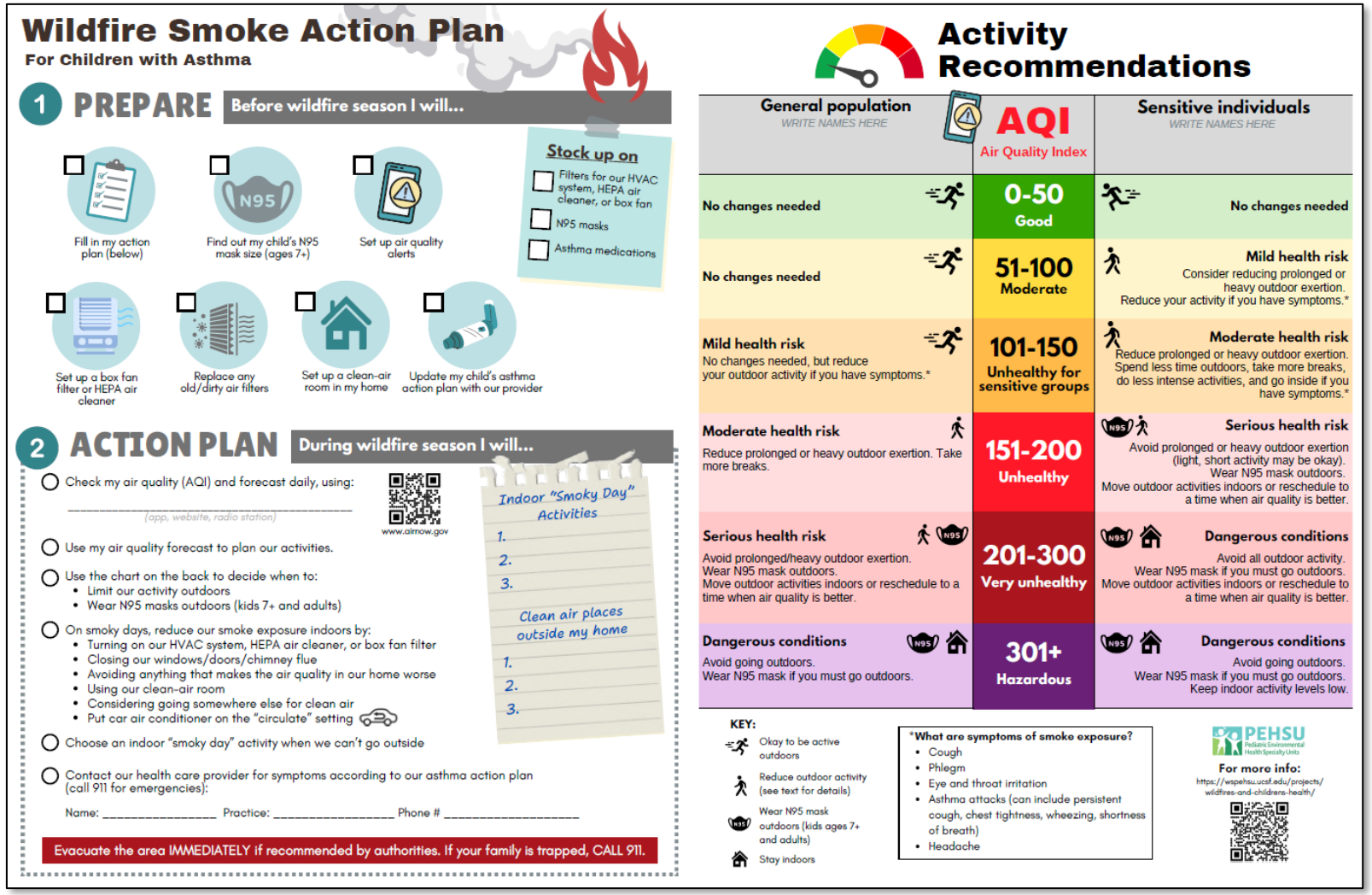


Mary Crocker MD MPH



Christine Loftus PHD MPH

Developing and Testing a Wildfire Smoke Action Plan



Wildfire Smoke Action Plan

For Children with Asthma

1 PREPARE — Before wildfire season I will...

- Fill in my action plan (below)
- Find out my child's N95 mask size (ages 7+)
- Set up air quality alerts
- Set up a box fan filter or HEPA air cleaner
- Replace any old/dirty air filters
- Set up a clean-air room in my home
- Update my child's asthma action plan with our provider

Stock up on

- Filters for our HVAC system, HEPA air cleaner, or box fan
- N95 masks
- Asthma medications

2 ACTION PLAN — During wildfire season I will...

- Check my air quality (AQI) and forecast daily, using: _____ (app, website, radio station) — www.airnow.gov
- Use my air quality forecast to plan our activities.
- Use the chart on the back to decide when to:
  - Limit our activity outdoors
  - Wear N95 masks outdoors (kids 7+ and adults)
- On smoky days, reduce our smoke exposure indoors by:
  - Turning on our HVAC system, HEPA air cleaner, or box fan filter
  - Closing our windows/doors/chimney flue
  - Avoiding anything that makes the air quality in our home worse
  - Using our clean-air room
  - Considering going somewhere else for clean air
  - Put car air conditioner on the "circulate" setting
- Choose an indoor "smoky day" activity when we can't go outside
- Contact our health care provider for symptoms according to our asthma action plan (call 911 for emergencies):

Name: _____ Practice: _____ Phone # _____

Evacuate the area IMMEDIATELY if recommended by authorities. If your family is trapped, CALL 911.

Indoor "Smoky Day" Activities

1. 2. 3.

Clean air places outside my home

1. 2. 3.

Activity Recommendations

General population (WRITE NAMES HERE)	AQI Air Quality Index	Sensitive individuals (WRITE NAMES HERE)
No changes needed	0-50 Good	No changes needed
No changes needed	51-100 Moderate	Mild health risk: Consider reducing prolonged or heavy outdoor exertion. Reduce your activity if you have symptoms.*
Mild health risk: No changes needed, but reduce your outdoor activity if you have symptoms.*	101-150 Unhealthy for sensitive groups	Moderate health risk: Reduce prolonged or heavy outdoor exertion. Spend less time outdoors, take more breaks, do less intense activities, and go inside if you have symptoms.*
Moderate health risk: Reduce prolonged or heavy outdoor exertion. Take more breaks.	151-200 Unhealthy	Serious health risk: Avoid prolonged or heavy outdoor exertion (light, short activity may be okay). Wear N95 mask outdoors. Move outdoor activities indoors or reschedule to a time when air quality is better.
Serious health risk: Avoid prolonged/heavy outdoor exertion. Wear N95 mask outdoors. Move outdoor activities indoors or reschedule to a time when air quality is better.	201-300 Very unhealthy	Dangerous conditions: Avoid all outdoor activity. Wear N95 mask if you must go outdoors. Move outdoor activities indoors or reschedule to a time when air quality is better.
Dangerous conditions: Avoid going outdoors. Wear N95 mask if you must go outdoors.	301+ Hazardous	Dangerous conditions: Avoid going outdoors. Wear N95 mask if you must go outdoors. Keep indoor activity levels low.

KEY:

- Okay to be active outdoors
- Reduce outdoor activity (see text for details)
- Wear N95 mask outdoors (kids ages 7+ and adults)
- Stay indoors

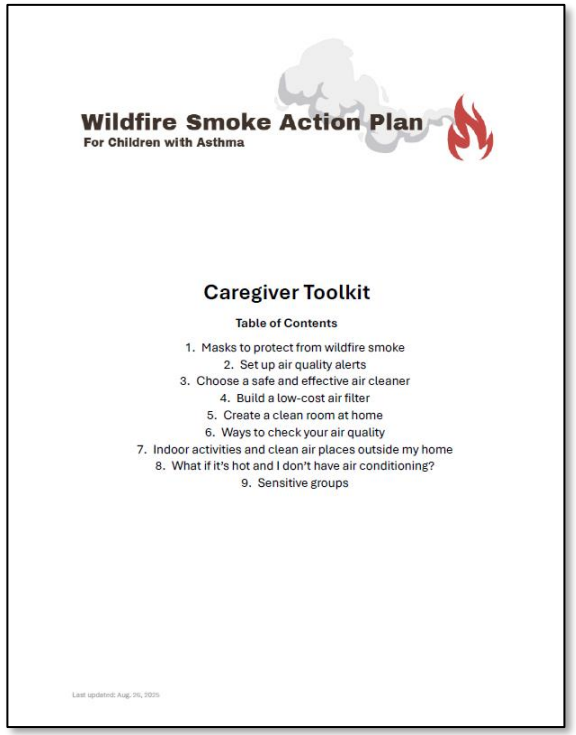
***What are symptoms of smoke exposure?**

- Cough
- Phlegm
- Eye and throat irritation
- Asthma attacks (can include persistent cough, chest tightness, wheezing, shortness of breath)
- Headache

PEHSU Pediatric Environmental Health Specialty Units

For more info:

https://wspehsu.ucsf.edu/projects/wildfires-and-childrens-health/



Wildfire Smoke Action Plan

For Children with Asthma

Caregiver Toolkit

Table of Contents

1. Masks to protect from wildfire smoke
2. Set up air quality alerts
3. Choose a safe and effective air cleaner
4. Build a low-cost air filter
5. Create a clean room at home
6. Ways to check your air quality
7. Indoor activities and clean air places outside my home
8. What if it's hot and I don't have air conditioning?
9. Sensitive groups

Last updated: Aug. 26, 2025

Also available in Spanish!

Mary Crocker MD MPH
Seattle Children's Hospital
University of Washington

Available on the Pediatric Environmental Health Specialty Unit (PEHSU) website

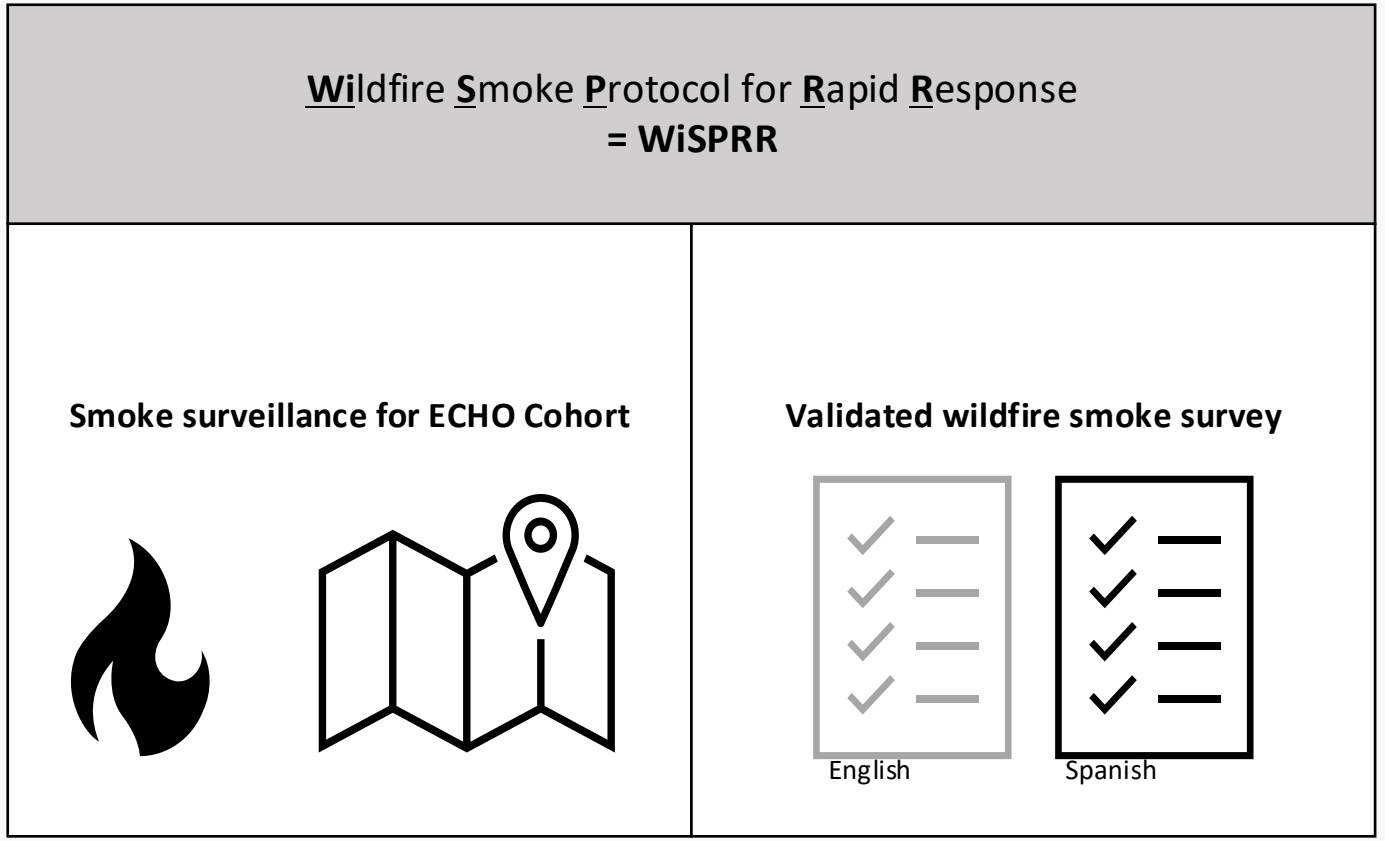
Capturing ECHO participant experience during WFS & informing interventions

OIF in progress

Christine Loftus, PHD, MPH

Automated system to identify “smoke days” across US

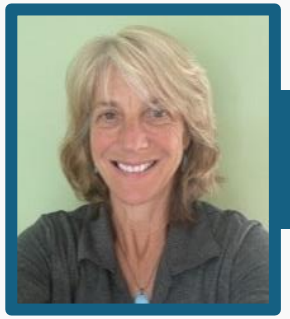
Rapid deployment of surveys to impacted ECHO communities (pilot) – health, protective behaviors, community resources



Key Points

- Wildfire smoke exposure is increasing – compromising prior gains in public health protection from “everyday” air pollution
- Wildfire smoke is uniquely toxic & early life is a period of vulnerability to adverse health consequences
- Evidence for child health effects is growing
  - Strongest evidence for short term health effects (particularly respiratory)
  - Important research needs– limited long-term studies, particularly for children and pregnant women – development of chronic conditions
  - Limited “science to action” designs – interventions, program implementation
- Need involvement of scientists, practitioners, & policy makers to inform research (observational & interventional) and translate findings to action.

Thank you!



Catherine Karr MD PHD MS FAAP

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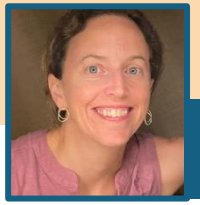
https://deohs.washington.edu/faculty/catherine-karr

ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

UW Medicine
UW SCHOOL OF MEDICINE

Northwest PEHSU
Pediatric Environmental Health Specialty Units

Indoor Air Quality, $PM_{2.5}$, and Respiratory Health in Children



Erin O. Semmens, PhD, MPH

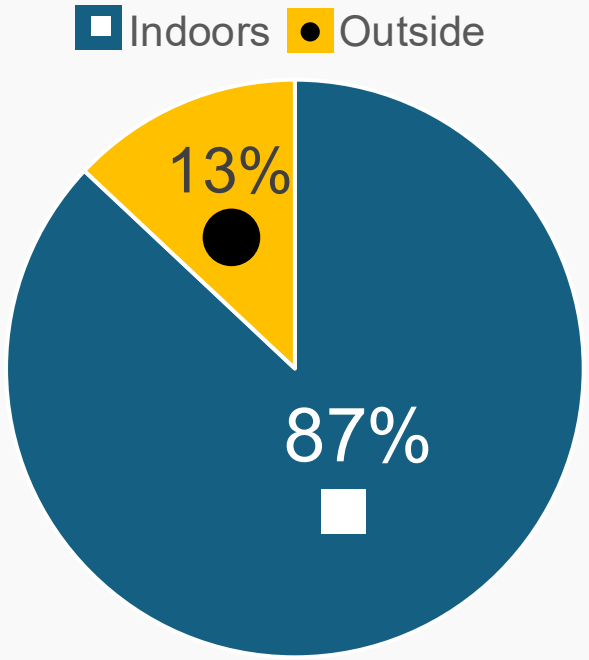
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UNIVERSITY OF MONTANA
CENTER FOR POPULATION HEALTH RESEARCH





Why focus on indoor air quality (IAQ)?



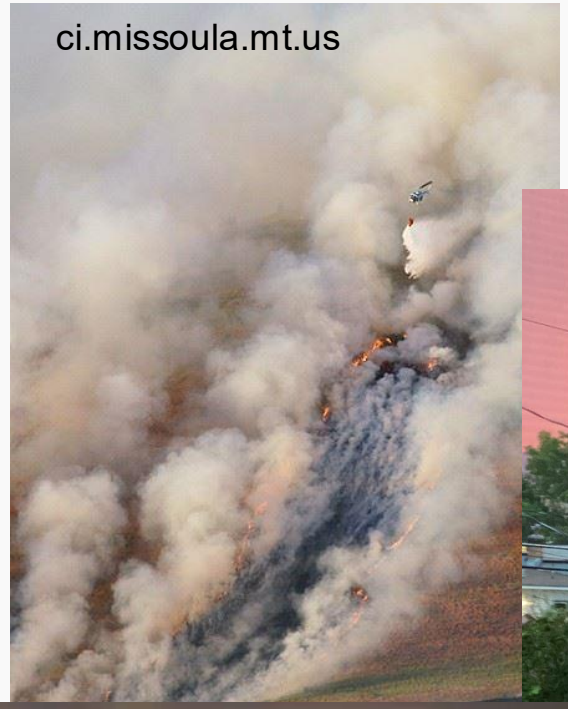
We spend most of our time indoors.

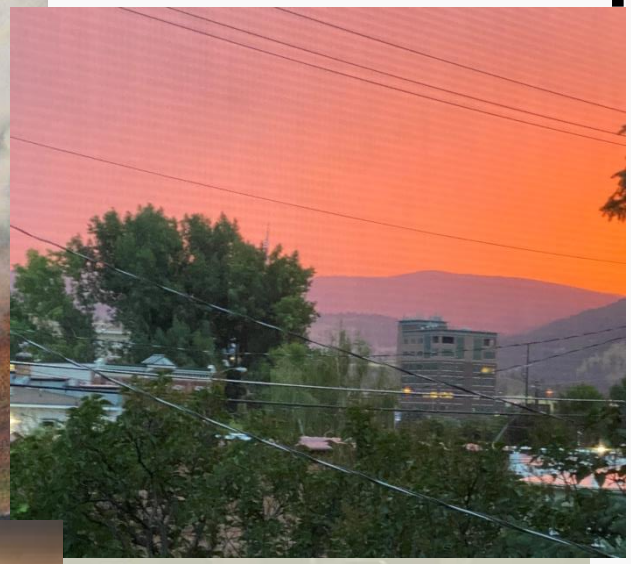
Klepeis et al. The National Human Activity Pattern Survey. *J Expo Sci Environ Epidemiol* (2001).

indoor AQ ≠ outdoor AQ



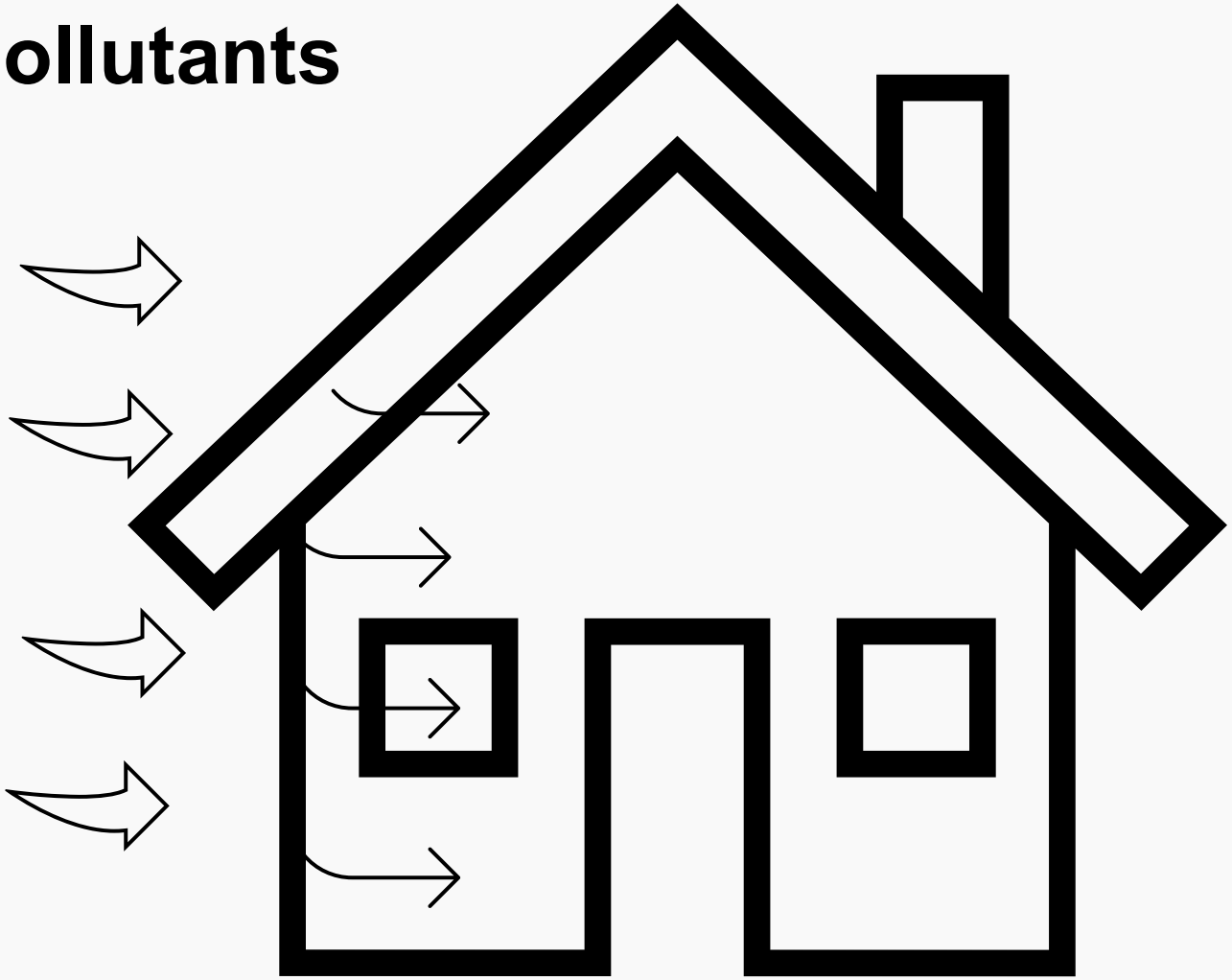
Outdoor sources of indoor air pollutants



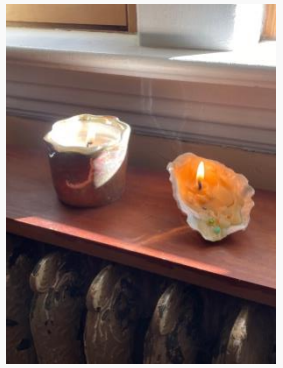




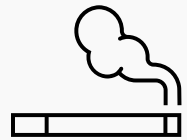




Indoor sources of air pollutants











Background – The BREATHE Study

- Infants with severe bronchiolitis are at increased risk of recurrent respiratory symptoms, wheeze, and asthma
- Particulate matter <2.5 micrometers in diameter ($PM_{2.5}$) is an air pollutant strongly linked to respiratory health effects
- High efficiency particulate air (HEPA) filters effective in lowering $PM_{2.5}$



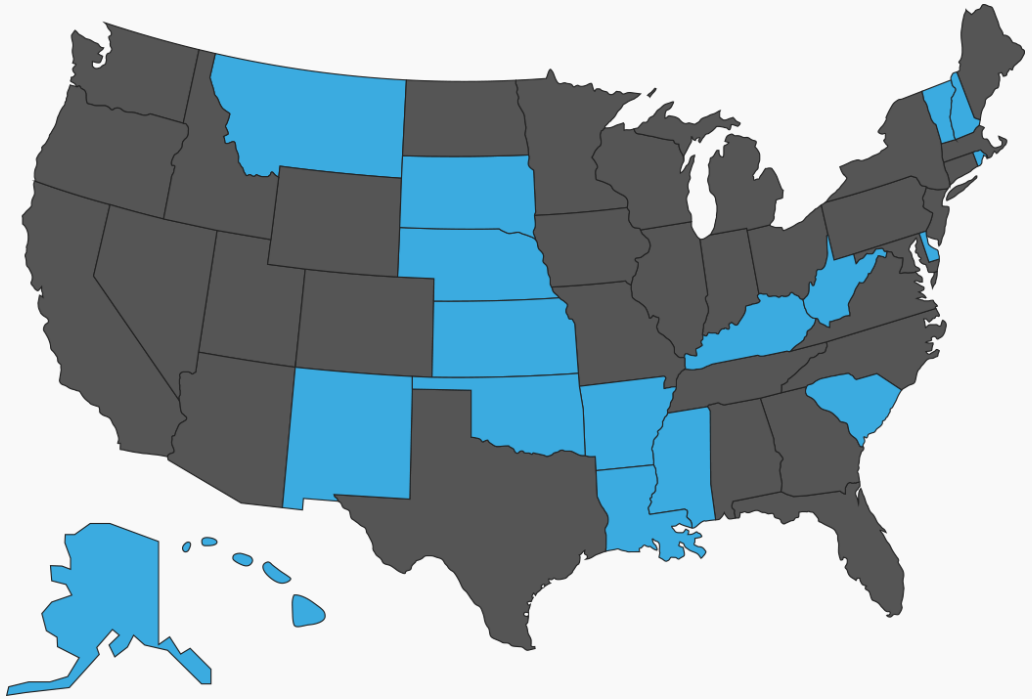
Primary Aim

Determine if in-home use of HEPA filtration units for 24 weeks reduces respiratory symptom burden after bronchiolitis hospitalization compared to placebo.

Setting for BREATHE

ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN)

The ECHO Program's mission is to enhance the health of children for generations to come.



- Established in 2016
- ECHO ISPCTN Goals:
  - Provide medically underserved and rural populations access to state-of-the-art clinical trials
  - Build capacity to conduct pediatric clinical trials in states with historically low levels of NIH funding

Why the ECHO ISPCTN for testing an IAQ intervention?

Rural and underserved children may have:

- Decreased access to medical care for symptoms and illness episodes
- Unique air pollutant exposure profiles







BREATHE Study Set-up



2 week Baseline Air quality monitored

HEPA filtration units
- Sleep space
- Common room



Placebo units (no filters)
- Sleep space
- Common room



24 weeks

- **Caregiver reports**
  - **Symptom-free days (primary outcome)**
  - Healthcare visits for respiratory symptoms
  - Quality of Life (PedsQL™)
- **$PM_{2.5}$ levels monitored** (Walker et al. 2026)

24 weeks

Community & Stakeholder Influence on Study Design and Implementation

At Enrollment | **During** | **After Participation**

Make it as easy as possible for families to participate

- "Plug in-ready" for families
- Ship HEPA units directly to homes



Compensate families for their time and say "thank you"

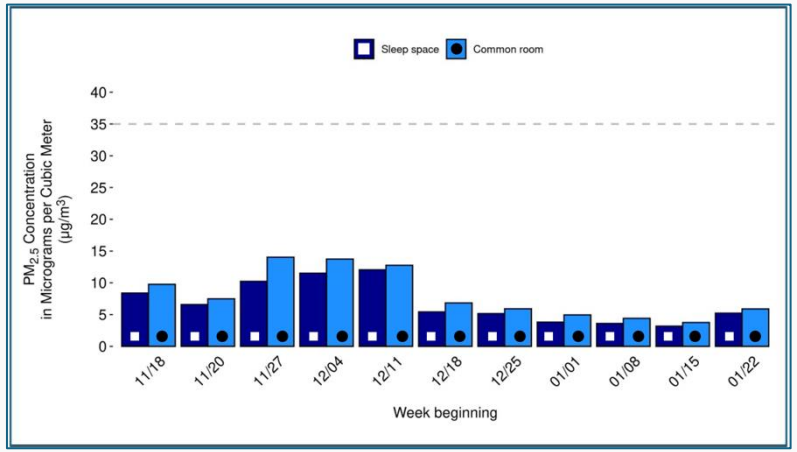
- Mail "Healthy Homes" kits to families
  - Children's books
  - Bath thermometer
  - Outlet covers
  - etc.



- Timely payment for study tasks

Provide new HEPA supplies and tell families how the study went

Example $PM_{2.5}$ report for home



How the BREATHE Study Worked

- When the the infant was discharged, study equipment was provided to the family for use in their home for ≈6 months.
- Caregivers completed weekly electronic surveys on their child's respiratory symptoms.



Air quality monitor



HEPA air filtration unit

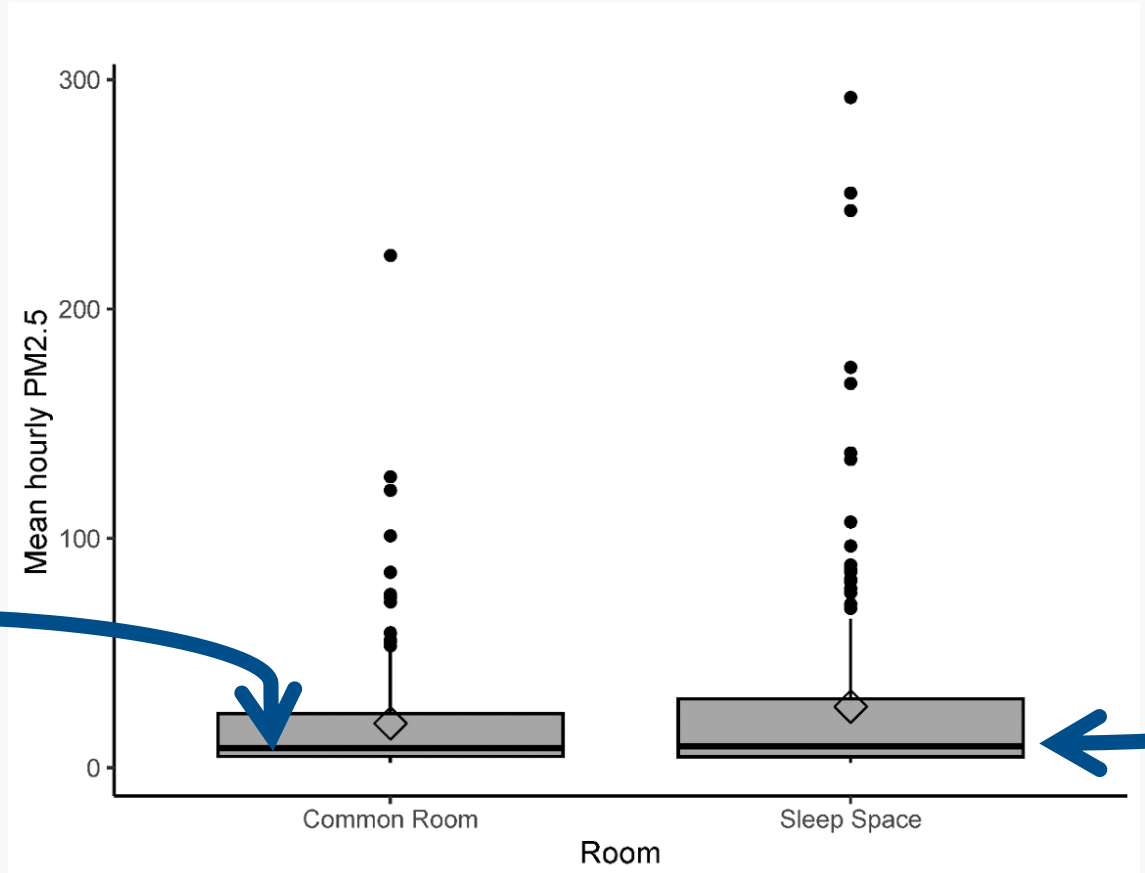


What did we find?

$PM_{2.5}$ levels in BREATHE homes BEFORE the HEPA intervention (≈2 weeks)

Common Room Median Level

8.7 (18.9) μg/m³



Sleep Space Median Level

9.4 (25.2) μg/m³

INTERPRETATION

Wide variability in $PM_{2.5}$ across homes with some families experiencing extremely high levels indoors.

Average $PM_{2.5}$ levels in BREATHE homes DURING the HEPA intervention (≈ 6 months)

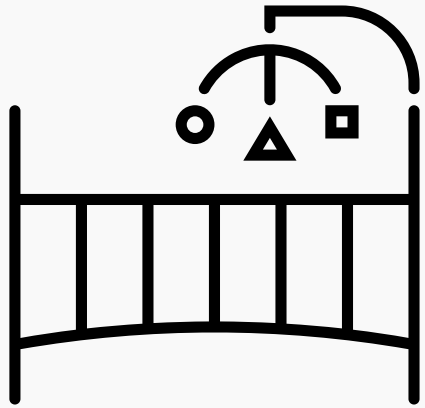
Common Room



	Mean (Standard Deviation)
HEPA	10.7 (15.9)
No HEPA	15.3 (16.9)

≈ 4 µg/m³ lower $PM_{2.5}$ in the HEPA group

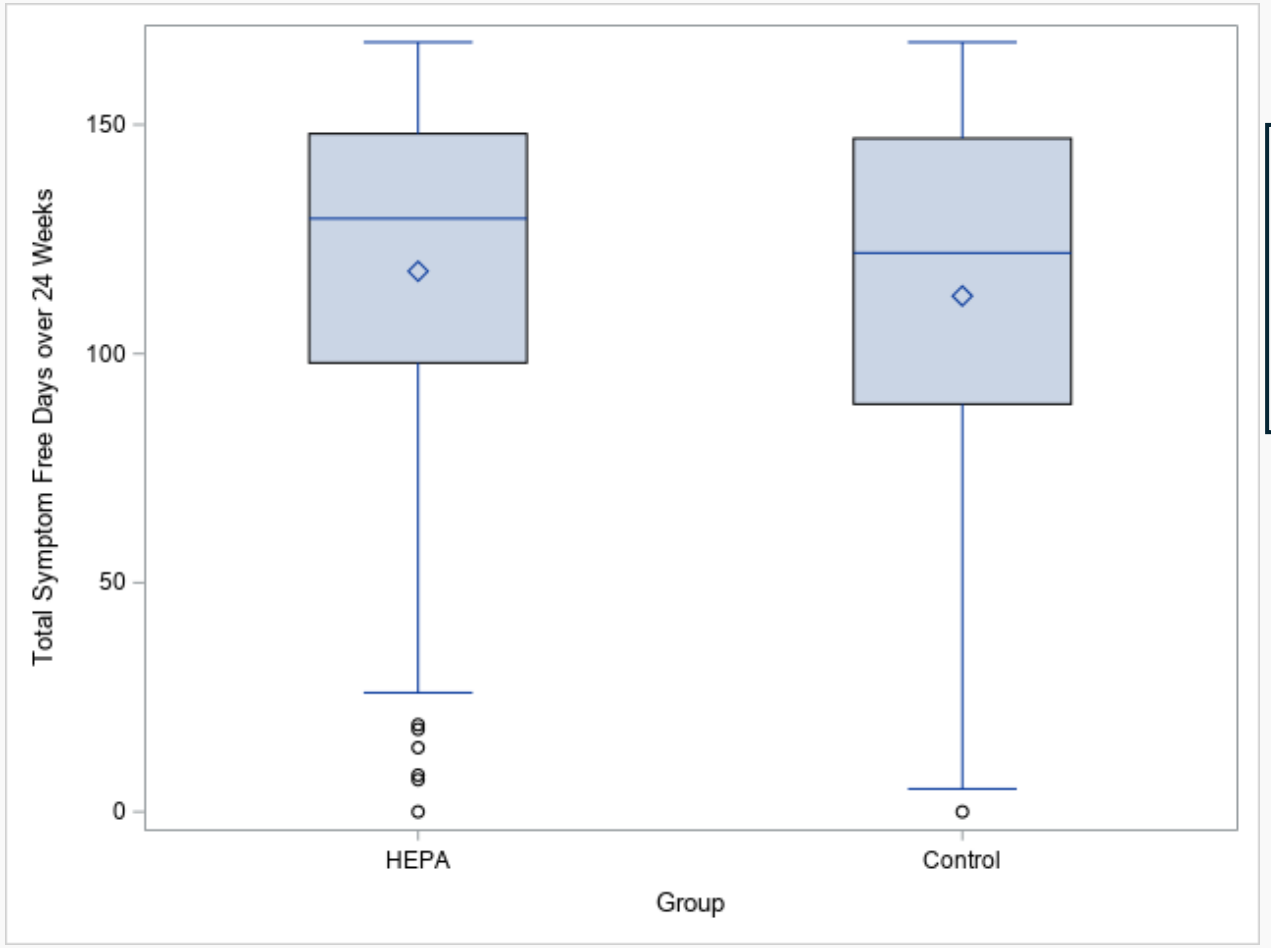
Sleep Space



	Mean (Standard Deviation)
HEPA	11.1 (18.8)
No HEPA	21.5 (33.1)

≈ 11 µg/m³ lower $PM_{2.5}$ in the HEPA group

Main findings: Did the intervention increase respiratory symptom free days (SFDs)?



On average, ≈ 5 more SFDs in the HEPA group, BUT results could be due to chance*

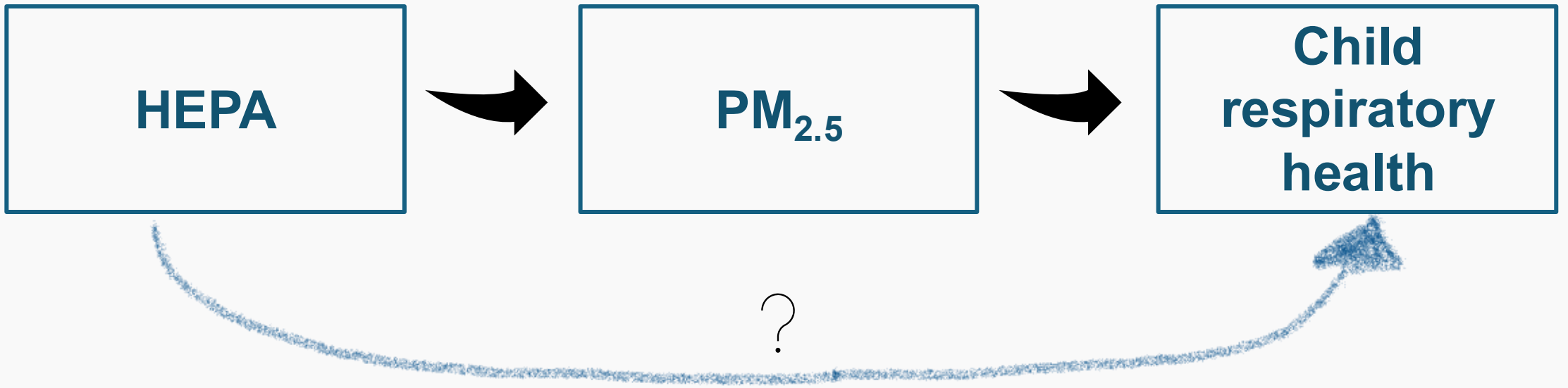
*Between group difference: 5.4 SFDs (95% confidence interval: -11.8, 22.6)

Secondary findings: Did the intervention affect other health measures?

- Generally, no.
- Infants who had HEPA filter units running most of the time during the study had ≈ 25% lower chance of unscheduled doctor's office visits for breathing problems.


CDC.gov

What's Missing?



- Is HEPA not capturing all key pollutants? *OR* not reducing indoor or overall $PM_{2.5}$ exposures enough?
- Is a more comprehensive approach to lowering exposures needed?
- Are there particular settings in which HEPA is most beneficial, such as high pollution environments?

How This Informs Action

- **Build on partnerships to inform best practices to improve IAQ and health**
  - Healthcare providers, public health practitioners, researchers, and community members
  - Development of strategies that are feasible, accessible, widely applicable, and sustainable
- **Consider more comprehensive interventions**
  - HEPA / other air purification strategies
  - Education for exposure reduction (not just indoors)
- **The evidence base implicating air pollution impacts on health is strong and supports action.**

Acknowledgments

- Kelly Cowan, MD, BREATHE Protocol Chair, Vermont ISPCTN site
- BREATHE participants and families
- BREATHE clinical site teams
- ECHO ISPCTN University of Arkansas for Medical Sciences team
- NIH Project Scientist, Dr. Linda Fu
- Montana BREATHE team: Paul Smith, DO; Ethan Wallker, PhD, MPH; Sara Cox, BSN, MPH, CCRP; Jen Faiella, BSN, MPH, CCRP; Taylor Stewart, MPH, CCRC; Dave Jones, MS; Cindy Leary, MA





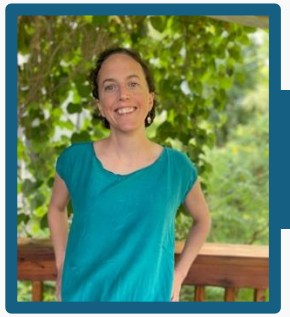




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- Office of the Director of the National Institutes of Health: U24OD024957; UG1OD024942; UG1OD024943; UG1OD024944; UG1OD024945; UG1OD024946; UG1OD024947; UG1OD024948; UG1OD030016; UG1OD024950; UG1OD024951; UG1OD024952; UG1OD024953; UG1OD024954; UG1OD024955; UG1OD024956; UG1OD024958; UG1OD024959; UG1OD030019.
- NIGMS Center for Population Health Research (P20GM130418)

Thank you!



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https://www.umt.edu/public-community-health-sciences/faculty/primary-faculty.php#ID=4340

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Translating Air Quality Research into Advocacy

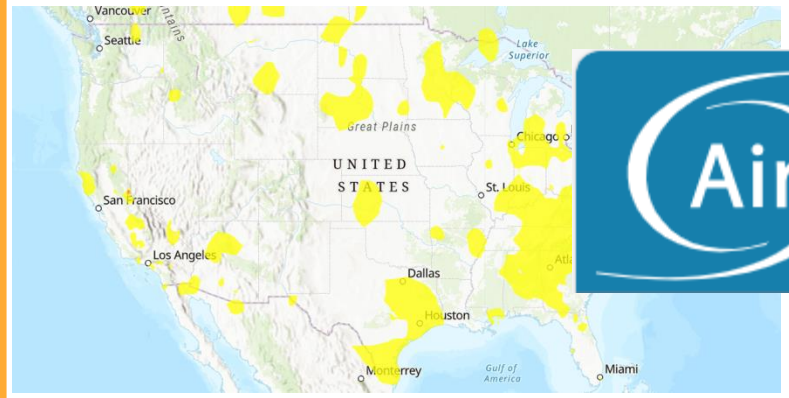


Laura Kate Bender

American Lung Association



American Lung Association.
State of the Air



Advocacy Landscape

- Concern about toxic exposures, chronic disease, kids' health
- Polling shows people see health as a compelling reason to care about air quality
- Health professionals report impacts on patients from poor air quality
- People have increasing experience with extreme weather

Lung Association's Work

- Air quality from a health perspective
- Education, advocacy and research
  - We fund research ourselves and draw on studies by others
  - We educate health professionals and patients on how to protect their lungs
  - We draw on research and personal stories to push policymakers for change



Current Landscape: Research



Gabrielle Yi-hui Liu, MD

What are the Long-Term Effects of Wildfire Exposure on Lung Health?



Elliott Tyler Gall, PhD

Impact of Portable Induction Cooktops on Indoor Air Quality



Victoria Barber, PhD

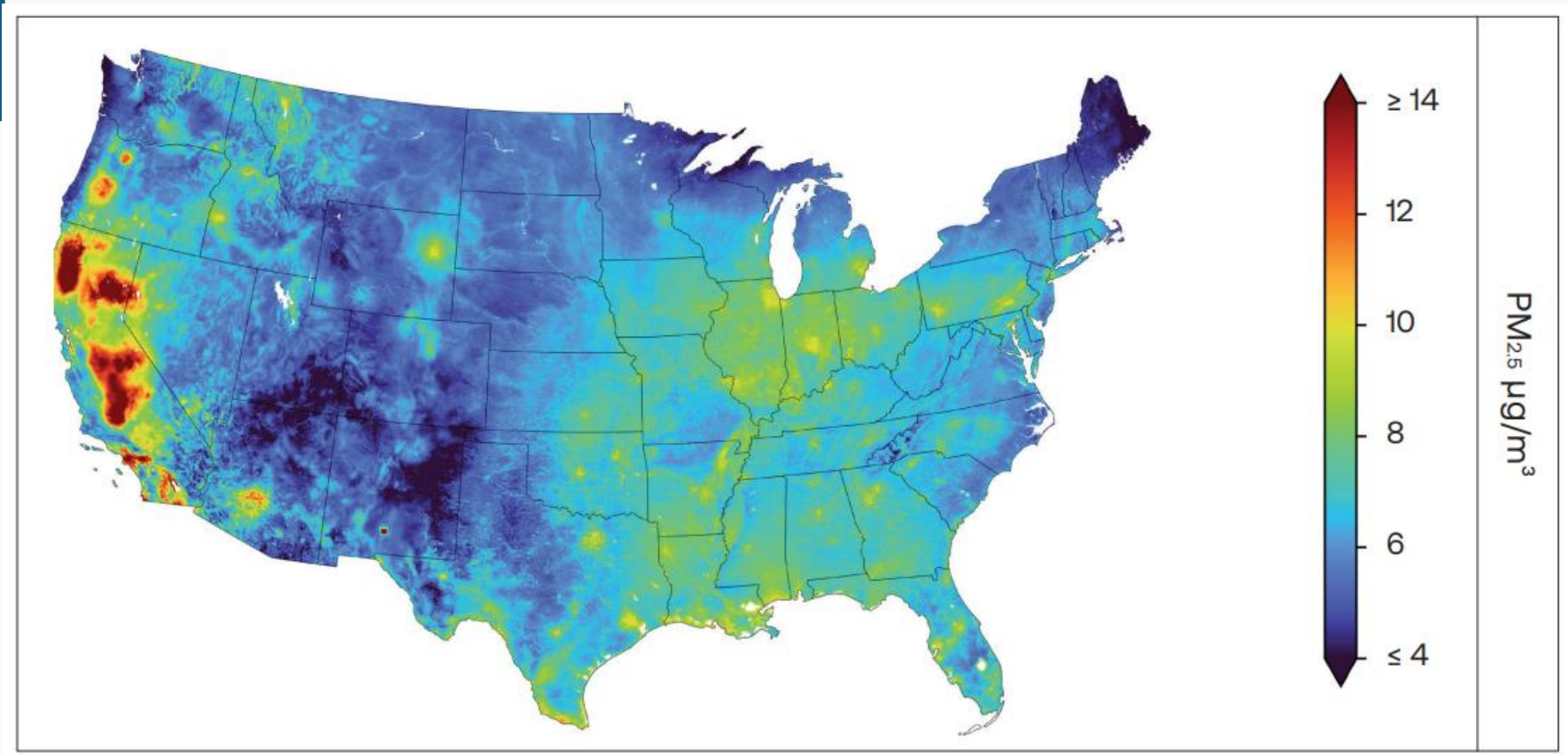
Evaluating Health Effects of Re-emitted Smoke Volatile Organic Compounds



Sheena E. Martenies, PhD, MPH

Improving Portable Air Cleaner Use in Homes with Children

Current Landscape: Data



- EPA monitored data
- NASA satellite data
- Community sensor programs

Satellite-derived concentrations of PM2.5 concentrations, 2020-2022 (Lung Association)

Current Landscape: Stories

"I never had asthma or any respiratory issues until June 7th, 2023, when I was outside for roughly 40 minutes during the Canadian wildfire smoke over NYC…completely impacted my life."
Marin C.

"My patients didn't know how to protect themselves from the smoke…Some patients reported having difficulty breathing."
Alexander Azan, MD, primary care physician

"[EPA staff] appreciate that the role of a civil servant is to serve… Those that work for state, local and tribal air agencies, those in the regulated community, as well as all of the people that live and breathe air in this country."
Chet Wayland, EPA (ret.)

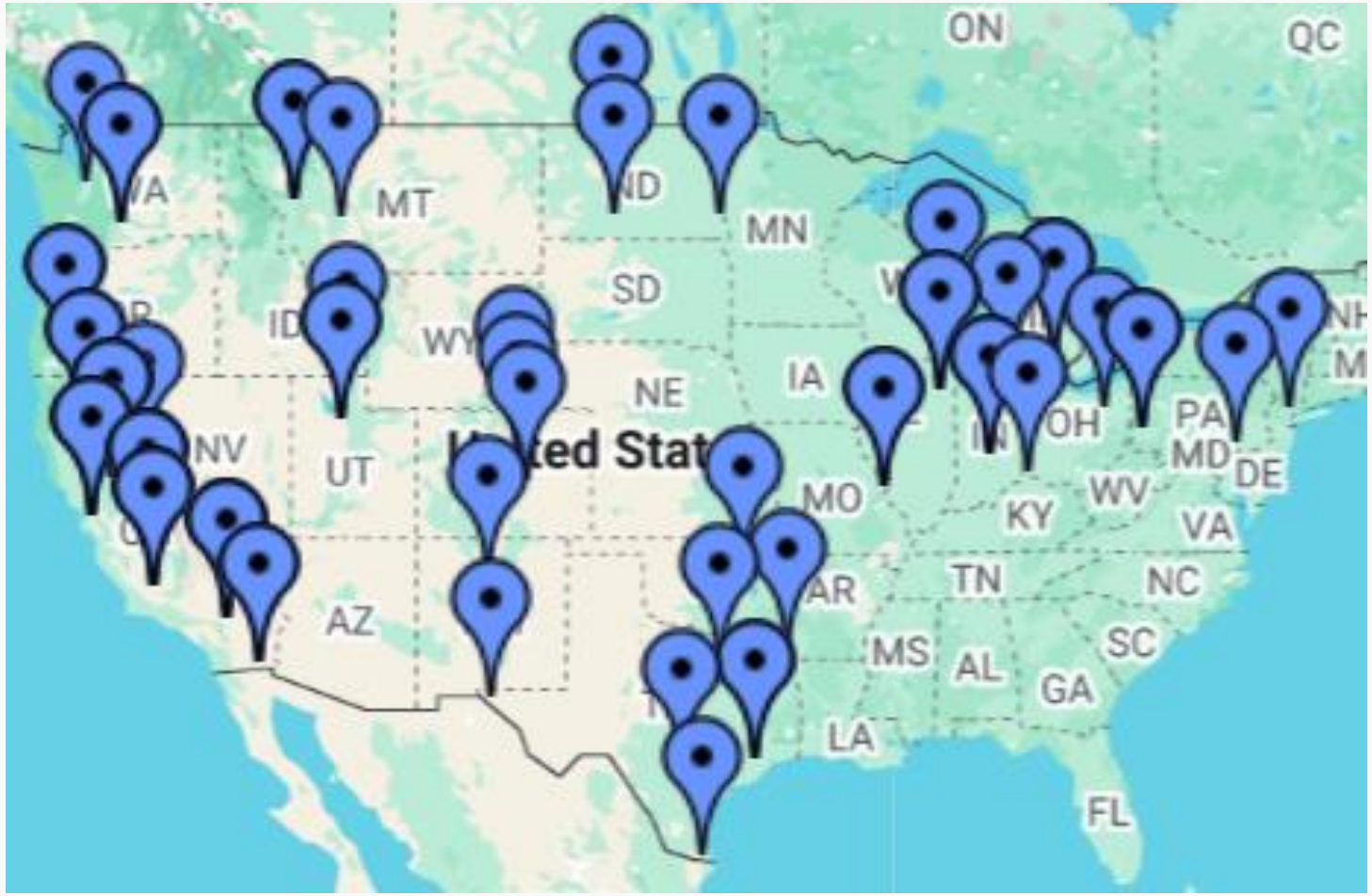


Research Needs

- More research needed on repeated impacts of smoke exposure
- Improving air monitoring in homes, schools and communities
- Continued practical interventions to reduce exposure
- Continued research into cumulative impacts

And of course, there's a continued need for more personal stories!

“State of the Air” Report



- Puts air pollution into everyday language
- Gives the public local information
- Focuses attention on particle pollution and ozone
- Gives grades to 885 counties with monitors (out of 3,221 counties)
- Ranks 25 metro areas with worst and best pollution levels (worst pictured)

Informing Advocacy



- “State of the Air” report results are useful at every level
- Research that informs report’s information on health impacts also informs our policy asks on air pollution standards
- Report includes policy recommendations and take-action opportunities
- Media coverage of report informs public and policymakers

How People Can Plug In

- Visit Lung.org/sota
  - Other advocacy reports:
    - Lung.org/SomethingInTheAir
    - Lung.org/EV
    - Lung.org/Clean-Heat
- Use local report results to educate policymakers
  - U.S. Congress, state legislature, local officials
  - USA.gov/elected-officials
- Take online action at Lung.org/Action
- Share stories at Lung.org/HealthyAir



Thank you!



Laura Kate Bender

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Session 2 Presenters







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University of Washington

Dr. Erin Semmens
University of Montana

Laura Kate Bender
American Lung Association

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Did you gain at least one new insight you can apply towards translation?

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As a result of today's discussion, what action are you MOST likely to take?
(Choose one)

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National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

ECHO Symposium:
Translating Science to Action



What's Coming Up

Session 3:
Cross-Cutting Panel

Break

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National Institutes of Health
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Translating Science
to Action



Session 3: Cross-Cutting Panel

Translating Science to Action

Crosscutting Panel

Chair

Dr. Kimberly Gray



National Institute of Environmental Health Sciences, NIH

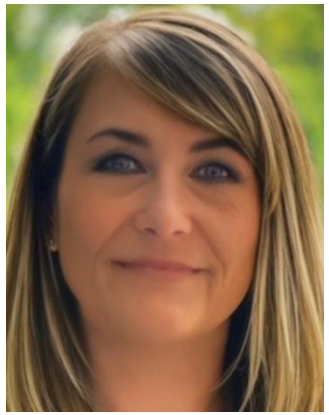
Panelists

Mindy Bierwag



Community Medical Center

Jean Bérubé



NIH Office of Legislative Policy and Analysis

Lori Riddle



Environmental Justice Advocate

Dr. Sindhu Srinivas



Society for Maternal Fetal Medicine

Dr. Shirlee Tan



Seattle & King County Public Health Department

Kimberly Gray, PhD



- Program Director, National Institute of Environmental Health Sciences (NIEHS)
- Crosscutting Session, Moderator
  - *Epidemiologist, University of Pittsburgh, Graduate School of Public Health*
  - *Program Director NIEHS Collaborative Centers in Children's Environmental Health Research and Translation*
  - *Co-Chair Chemical Exposures Subcommittee* President's Task Force on Environmental Health Risks and Safety Risks to Children
  - *Federal Liaison to American Academy Pediatrics council on Environment and Climate*

Mindy Bierwag, BSN, RN, CAPA, AMB-BC



- Registered Nurse at Community Medical Center, Missoula MT
- BREATHE Study Participant
- Bella Bierwag's Mother (most importantly)
- Crosscutting Session, Panelist

Bella at 7 Months Old, November 2022

- Became very ill with RSV- hospitalized in PICU at Community Medical Center.
- Tasked with making medical decisions based on what the doctors and my husband and I felt was right.





BREATHE Study Participant

- After she recovered from RSV, we were invited to enroll in the BREATHE study
- We chose to enroll in the study for a few reasons:
  - Helping future children who were in Bella's place
  - Commitment seemed easy for my family
  - Generosity of the study
    - Air purifier for home
    - Bag of "goodies"-books, toys, bath temperature monitor
    - Gift card distribution for participation

BREATHE Study Participant

- Enrollment was easy and supportive
  - worked with one Study Coordinator (Jen) mostly
- I was checked in on often to ensure I was "doing it right" and genuinely felt like she cared about Bella's well being
- I was given information along the way about the device that was in my home (hepa vs no hepa filter), about my home environment air quality, and about the results of the study afterwards in both technical and non technical terms.

Gaps and Opportunities for Informing Participants

Communication Tips for Study Leaders to Study Participants

- Be like Jen!
  - Check in frequently so you don’t lose the interest of the participant
  - Explain the importance of adherence to the program you are participating it, and why
  - Explain what risk/benefit there might be to the child/family
  - Compensate the participant to the level of work required-find what drives people to participate best

What Participants Want to Know from Study Leaders

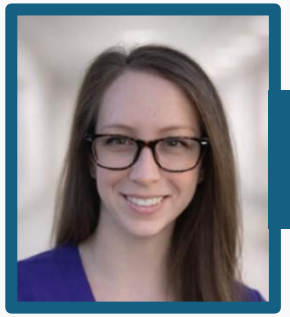
- Validation that the participant's data is working for your needs
- Results of the study, and what it means for my child and/or family
- How MY participation helped further science and help others







Thank you!



Mindy Bierwag, BSN, RN, CAPA, AMB-BC

Contact Information

Mbierwag@communitymed.org

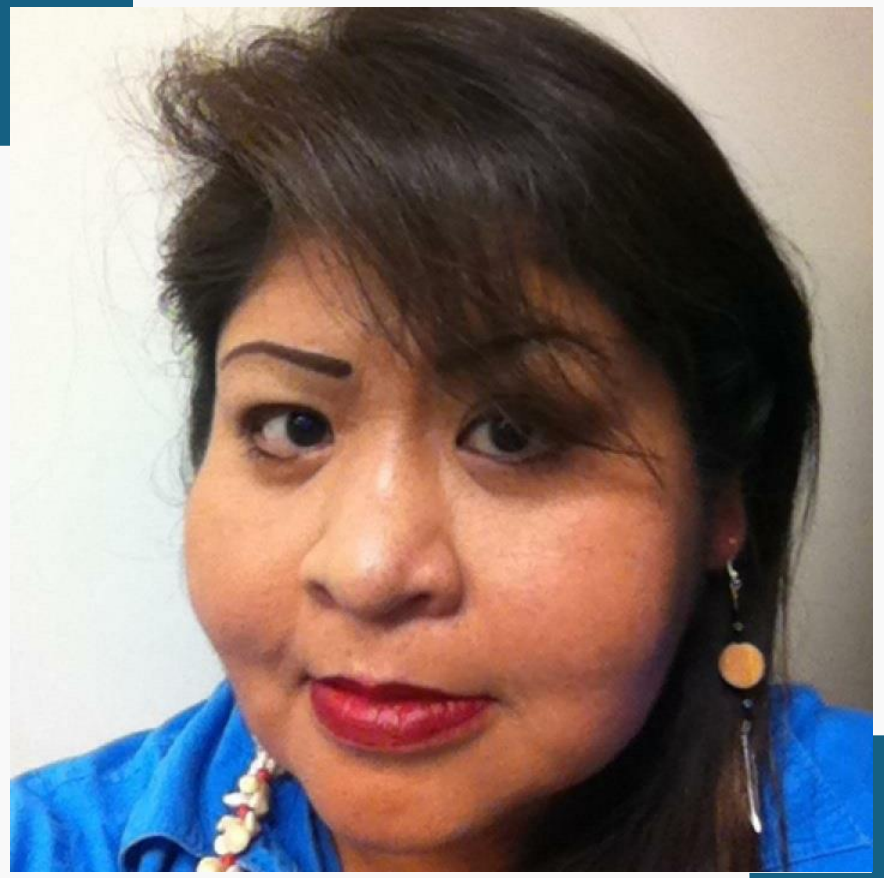
406-550-0308

https://www.facebook.com/mindy.olear/

https://www.communitymed.org/



Lori Riddle



- Environmental Justice Advocate & Tribal Health Specialist
- Chair and Vice-chair, Environmental Health Services program
- Crosscutting Session, Panelist
  - *Environmental Activist, Public Health Professional*

Who am I?

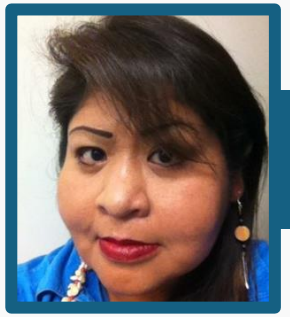
- Dedicated environmental activist and public health professional whose
  - Intersection of policy, law, and community safety, with a lifelong commitment to Environmental Justice.
- Shaping local legislation and securing funding
  - prioritizes health, safety, and human rights
- Leader in tribal occupational health
  - Built a safety infrastructure modeled after OSHA standards
- Environmental Health Services program - manages a broad range of initiatives supporting rural infrastructure and community wellness

Gap for Communicating with Indigenous People

- Trust and historical context
- Top-down communication
- Cultural mismatch in messaging
- Limited accessibility
  - Language differences, low bandwidth internet access in some areas, and materials that aren't adapted for different literacy levels or communication preferences
- Underrepresentation in research design
- Fragmented systems
  - Resource constraints, making it harder to consistently translate research into community-friendly communication

Opportunities for Communicating with Indigenous People

- Co-creation and shared ownership
  - communities help shape the research and how it's communicated.
- Leveraging trusted community channels
  - shared through tribal leaders, Elders, community health workers, and Indigenous-led organizations
- Culturally grounded storytelling
- Strength-based framing
  - Instead of focusing only on disparities, communication can highlight resilience, protective cultural practices, and community strengths in child health
- Youth and family-centered engagement
  - Involving parents, caregivers, and youth helps translate research into everyday decisions and builds long-term awareness
- Capacity building within communities
  - Train Indigenous researchers, communicators, and health workers to create sustainable



Lori Riddle

Thank you!

Sindhu Srinivas, MD, MSCE



- Professor of OBGYN, University of Pennsylvania Perelman SOM
- Immediate Past President, Society for Maternal Fetal Medicine
- Crosscutting Session, Panelist
  - *Physician, Researcher, Advocate*

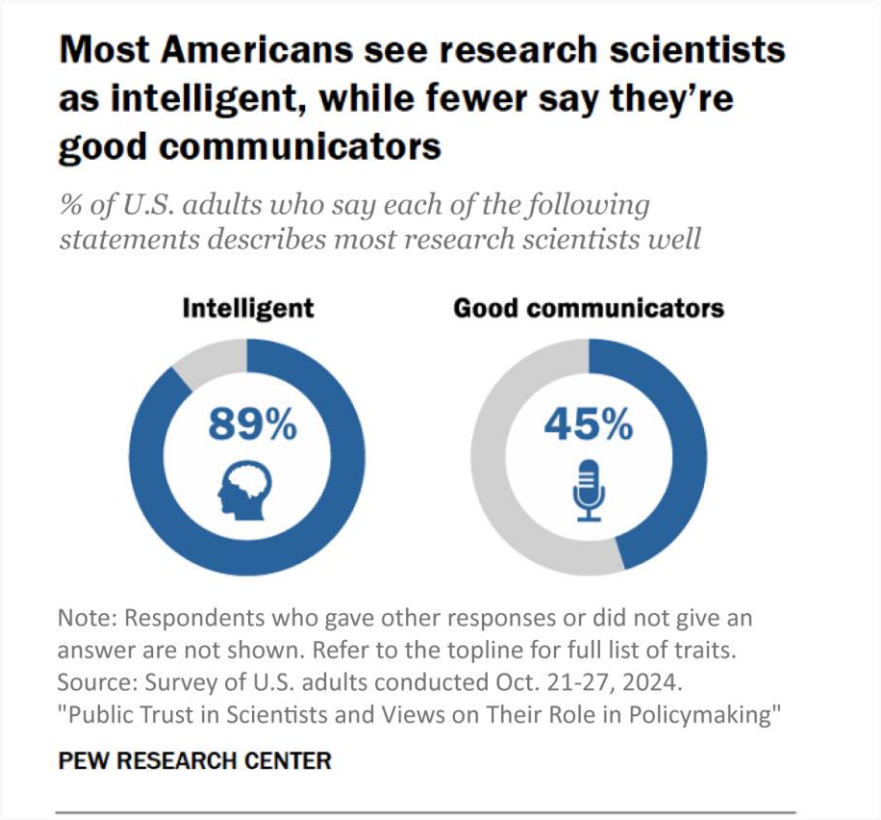
Common Scenario

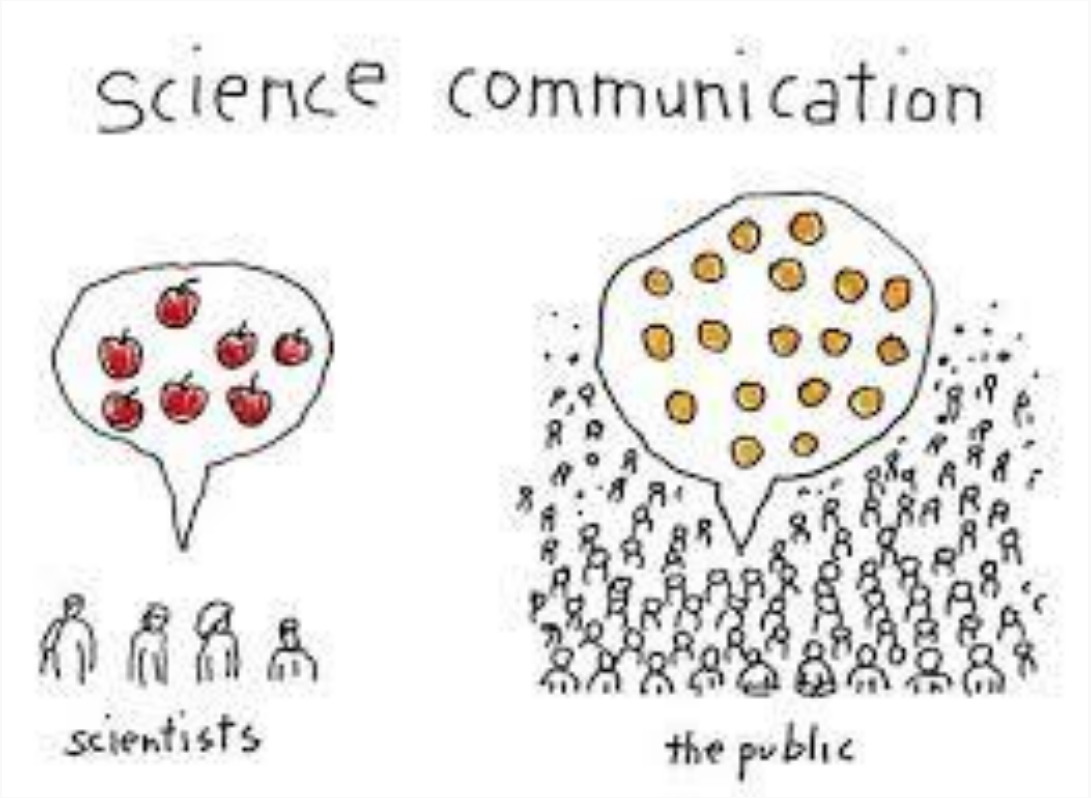


- 29 year old with history of high blood pressure and depression on medications for both
- 12 weeks pregnant –comes to prenatal appointment having discontinued all medications due to concern for safety of medications

Opportunities
Communication with Patients

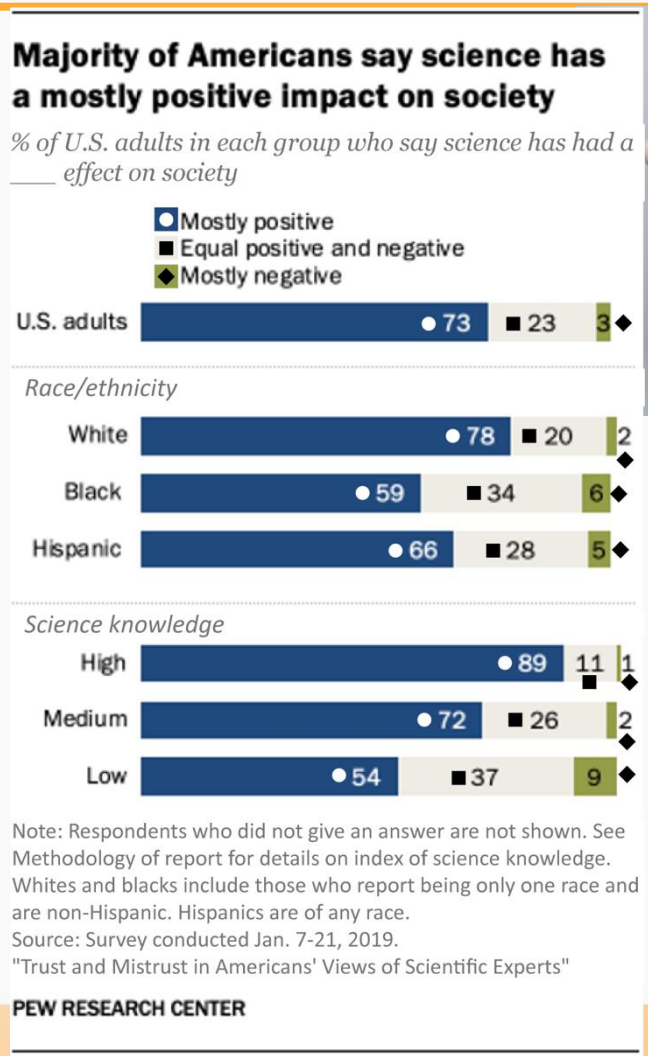
- The facts-may not be enough-WHY





Opportunities
Communication with Patients

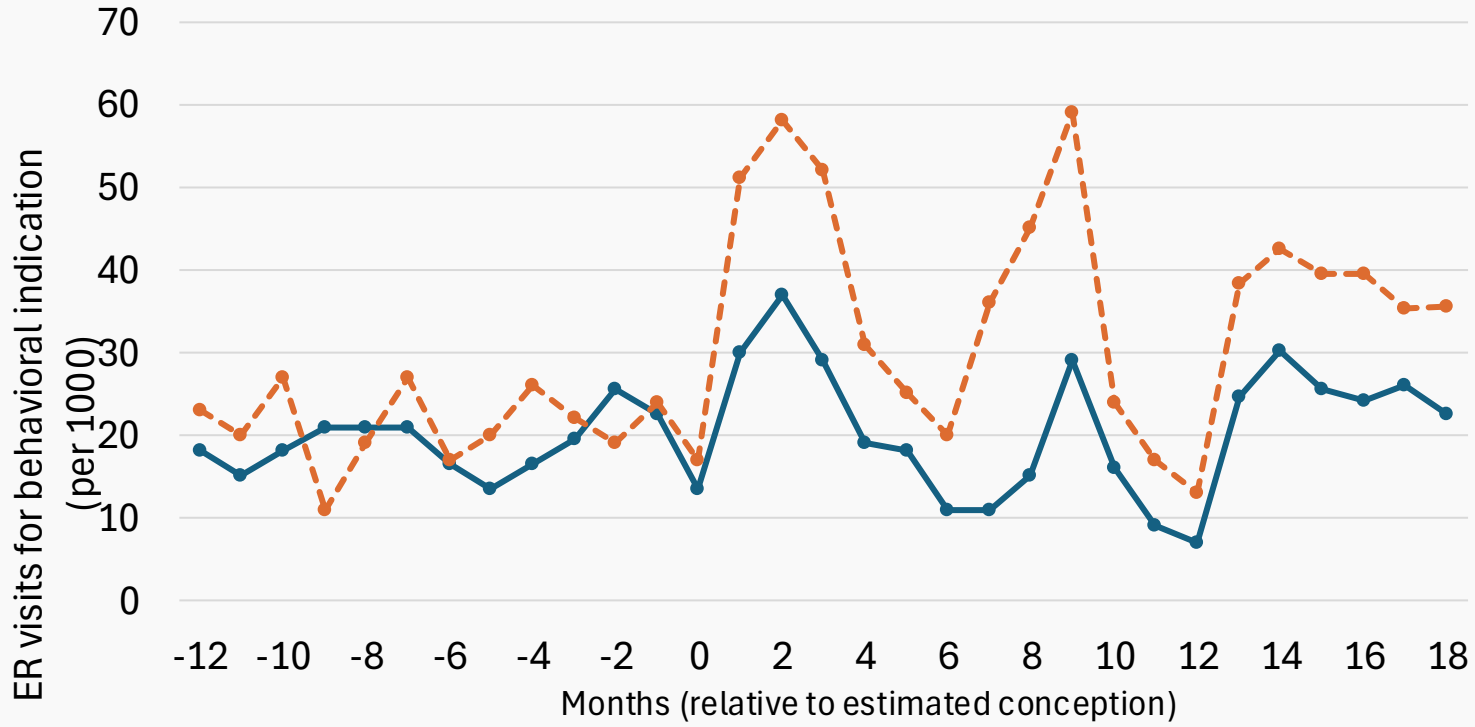
- Understand the context
  - Fear
  - Guilt
  - Public messaging
- Acknowledge the feelings/assumptions





Opportunities
Communication with Patients and Clinicians

- Share what we know
- Talk about harms of both sides-theoretic risks of taking versus not taking
- Share common goal



Develop messaging for Patients and Clinicians

- Bridges scientific information while acknowledging context and myths
- Incorporates feedback from multiple groups
- Directly addresses in accurate information among influential groups (i.e. other medical providers)



Thank you!



Sindhu Srinivas, MD, MSCE

Contact Information

ssrinivas@pennmedicine.upenn.edu

215-888-8153

Shirlee Tan, PhD





- Senior Toxicologist, Public Health – Seattle & King County
- Crosscutting Session, Panelist
  - *I lead our department's toxics team – we focus on reducing exposures to harmful chemicals through:*
    - *Collaboration and advisory opportunities*
    - *Community interventions*
    - *Applied research*
    - *Policy development*



Opportunities for Policy Recommendations

Local Health Department *- opportunities to engage policymakers and public officials at local, state and federal levels*

- *Federal advisory committees (e.g., EPA's Children's Health Protection Advisory Committee, Chaired (March 2020- March 2026); others)*
- *State advisory committees (Chemical Action Plan Advisory committees)*
- *Local – briefings, assessments and inquiries for King County Board of Health, County Council, Council members or County Executive*

What's My Approach

- Who is the audience?
- Understand where they are coming from
- Existing policies that can be leveraged?
- Are there strategic areas of focus?
- Prioritize recommendations
- Provide information that can empower others

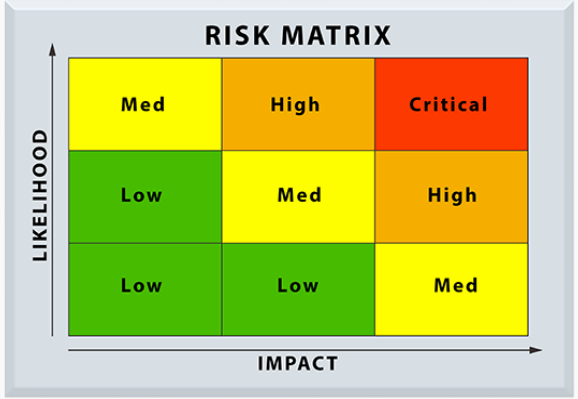


Gaps and Opportunities for Informing Audiences

Gap 1

Data Limitations

Is definitive proof needed before action can be taken?



https://assessments tools.com/wp-content/uploads/2025/05/climate-change-risk-assessment-matrix.png

Gap 2

Capacity Constraints

Communications support in crafting visuals and/or messaging is not always available



https://lifescicommunications.com/wp-content/uploads/2020/05/3-ScienceCommunication-FINAL-RGB.jpg

Gap 3

Lack of Resources

Not enough funding to fully address a question or issue.



https://dailyorange.com/resize/810/wp-content/uploads/2026/01/15001250/img_2534_720.png

Gaps and Opportunities for Informing Audiences

Opportunity 1

Collaboration

Leveraging partner's strengths and resources to develop a greater ability to address gaps (King County proviso request to our legislator for academic partner)

Opportunity 2

Build on Existing Resources

Provide recommendations that can utilize existing knowledge, interests, or policies when able (e.g., CHPAC recommendations)

Opportunity 3

Strategic Communication

1) Empower policy makers to utilize information or recommendations you're providing (e.g., clear responses specific to needs when requests come from elected officials)
2) Make messaging useful to a wider audience when possible (e.g., comment letters/public-facing recommendations)

Opportunity 4

Data Use

Use data in a way that targets the needs of the audience you are working with (e.g., PHSKC lead data analysis – cohort data vs total testing)

Thank you!



Shirlee Tan, PhD

Contact Information

Shirlee.tan@kingcounty.gov

Public Health - Seattle & King County | Facebook

Public Health-Seattle & KingCo (@kcpubhealth) • Instagram photos and videos

Public Health - Seattle & King County (@KCPubHealth) / X

https://kingcounty.gov/en/dept/dph

Public Health
Seattle & King County

Crosscutting Panel

Chair

Dr. Kimberly Gray



National Institute of Environmental Health Sciences, NIH

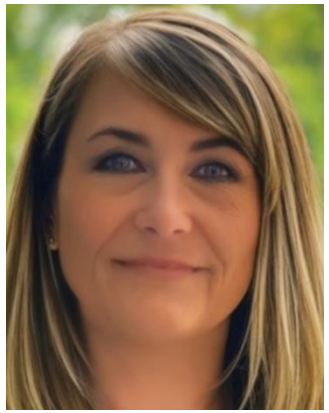
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NIH Office of Legislative Policy and Analysis

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Society for Maternal Fetal Medicine

Dr. Shirlee Tan



Seattle & King County Public Health Department

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Which translation challenge did this panel address most effectively? (Select all that apply)

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After this session, how ready are you to take a next step in your field?

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Now, how confident do you feel translating science into action?

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Did you make a new connection today?

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How valuable do you expect this connection to be?

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On a scale of 1–5, how committed are you to taking action within 30 days?

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ECHO Symposium:
Translating Science to Action



Networking Break

What's Coming Up

Closing Remarks by:

Dr. Andrew Racine
President, American Academy of Pediatrics

Dr. Matthew Gillman
Director, ECHO

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National Institutes of Health
Environmental influences on Child Health Outcomes (ECHO)

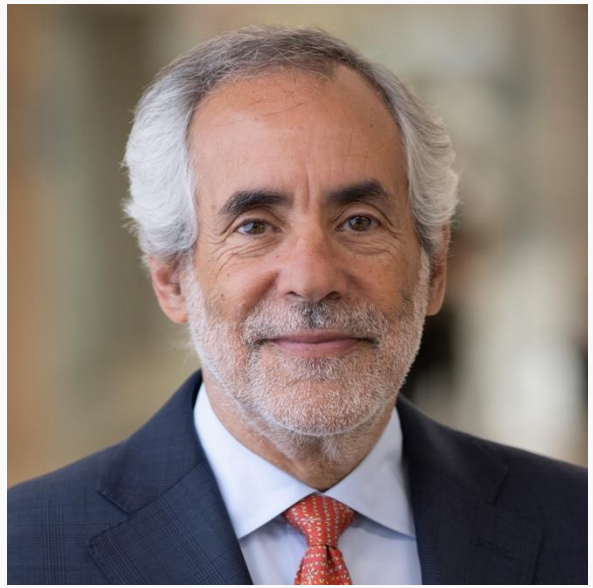
ECHO Symposium:
Translating Science
to Action



Closing Remarks

Concluding Remarks Presenters

Closing Address



Andrew Racine, MD, PhD, FAA
President, American Academy of Pediatrics

Reflections



Matthew W. Gillman, MD, SM
Director, NIH Environmental influences on Child Health Outcomes (ECHO)



Environmental Influences on Child Health:

From ECHO Science to Pediatric Care

Andrew D. Racine, MD, PhD, FAAP
AAP President

American Academy of Pediatrics
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Caring for America's Children

Key Trends and Vulnerabilities

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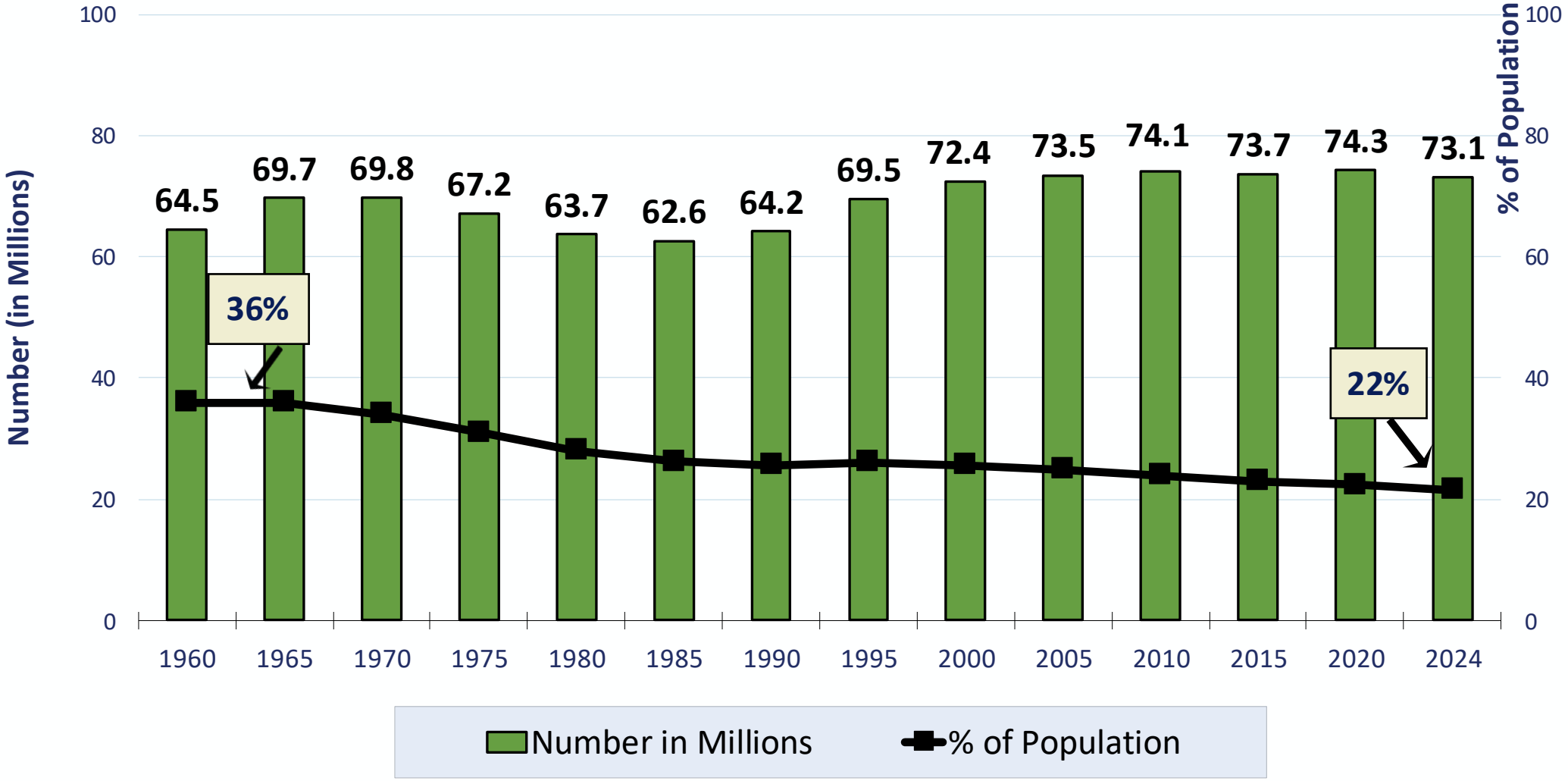
Historic Child Generational Changes Affecting US Pediatrics Today

- Children are a declining portion of the population
- Substantial increase in immigration
- High migration within the US
- Increasing diversity by race/ethnicity
- Growing household income inequality
- Across these trends high interconnections between income, race and ethnicity, immigration status, geography
- Diverse needs require diverse strategies



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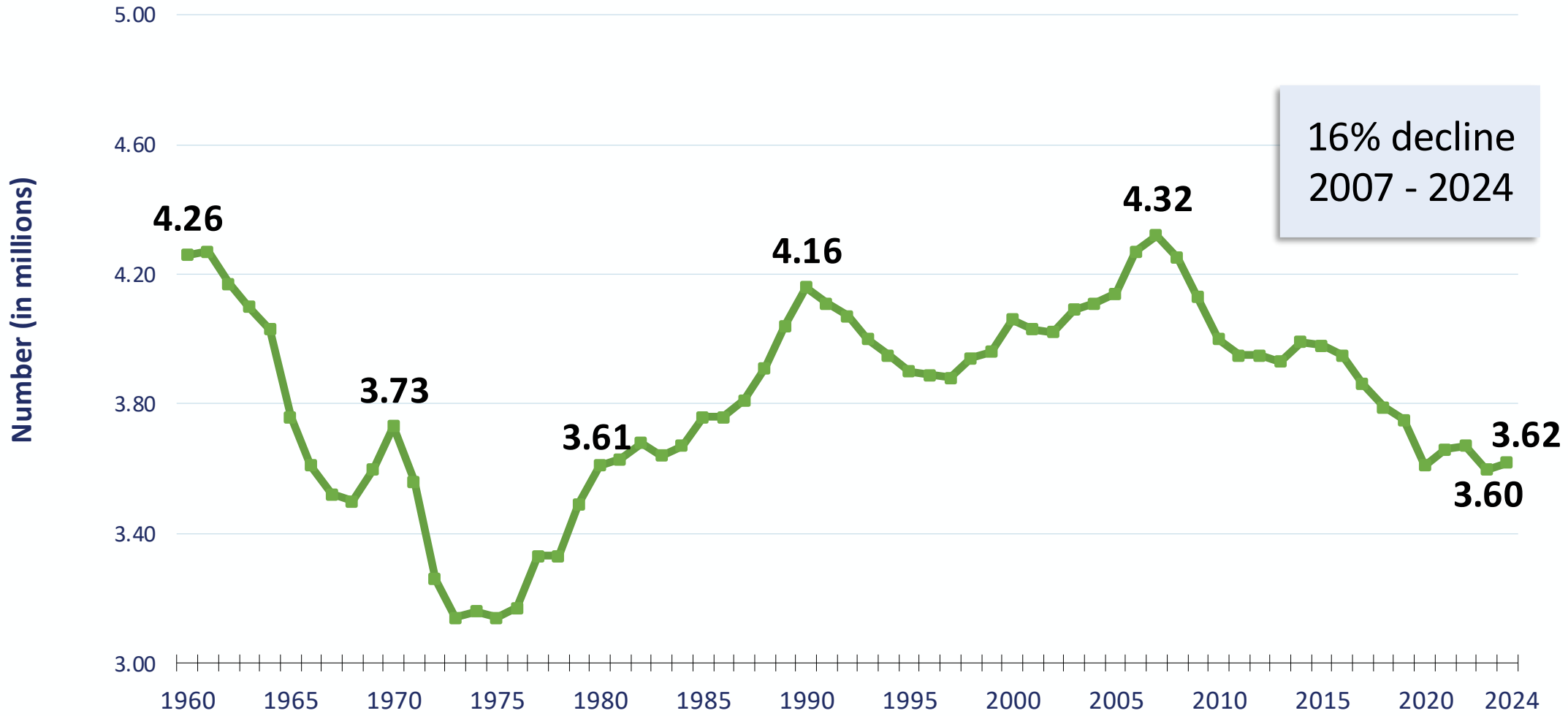
US Child (under 18) Population: Number and % of Overall Population, 1960-2024



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Source: US Census Bureau, Current Population Reports (data for 1960-2020: http://www.childstats.gov/americaschildren/tables/pop1.asp and http://www.childstats.gov/americaschildren/tables/pop2.asp; and 2024: https://www.census.gov/data/tables/time-series/demo/popest/2020s-national-detail.html)

Number of US Births (in Millions of Children Born), 1960-2024*



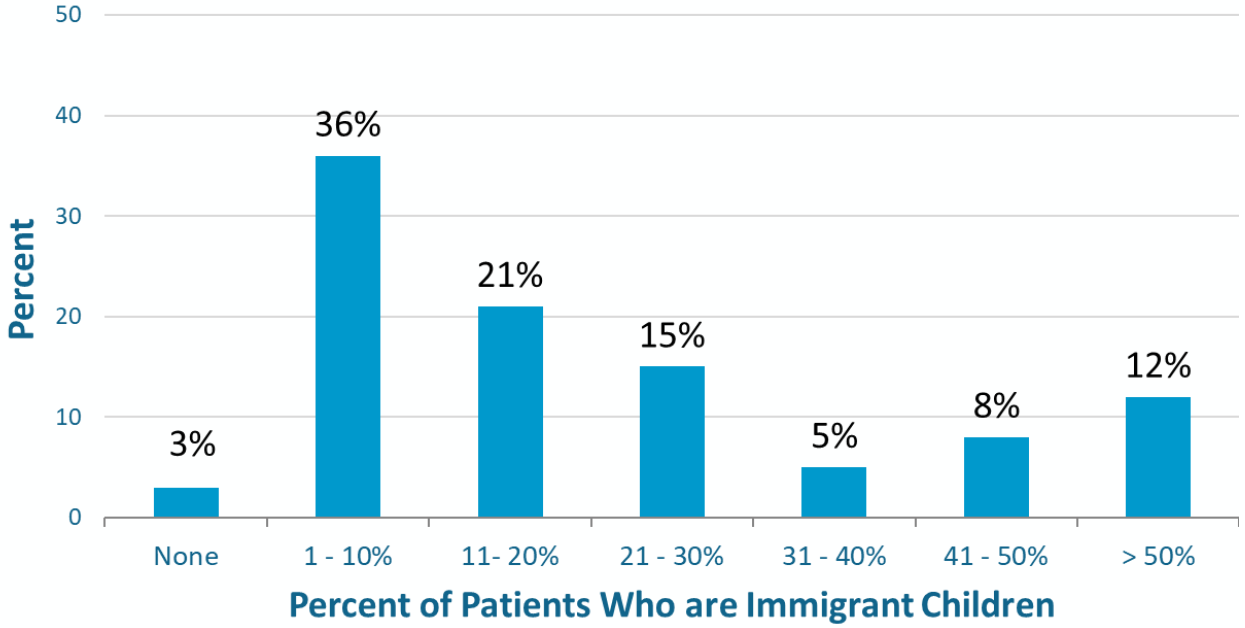
*Provisional data for 2024

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Source: CDC/NCHS, National Vital Statistics Reports (data for 1960-2015: https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66_01.pdf; 2016-2023: https://www.cdc.gov/nchs/data/nvsr/nvsr74/nvsr74-1.pdf; and 2024: https://www.cdc.gov/nchs/data/vsrr/vsrr038.pdf)

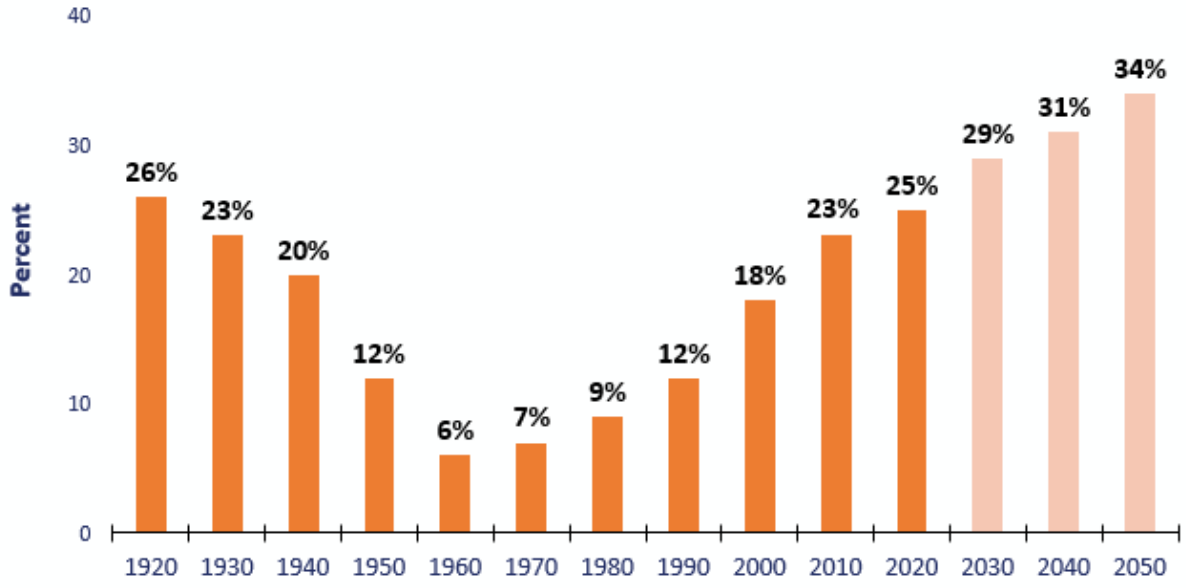
1 in 4 US Children Are in an Immigrant Family*

Immigrant Children: a Core Part of Pediatric Care



Source: AAP Periodic Survey #106, 2023 (n=622; includes residents)

Immigrant Children as Share of All US Children: Current and Projected

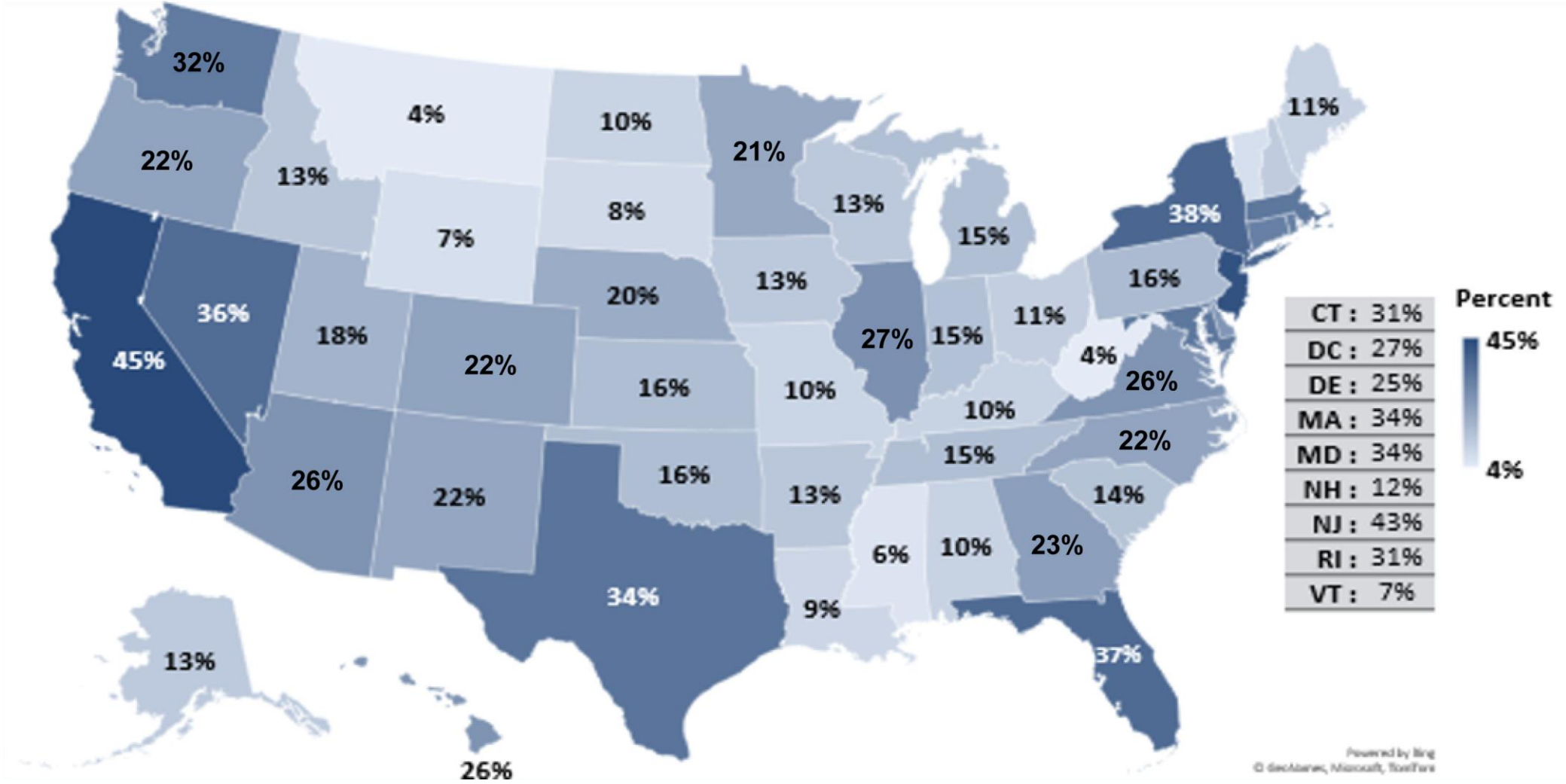


Source: 1920-2000 and 2030-2050 population projections: Passel, Jeffrey. "Demography of Immigrant Youth: Past, Present, and Future." The Future of Children, 2011; 2010-2020: US Census Bureau, Current Population Survey, Annual Social and Economic Supplement (https://www.childstats.gov/americaschildren/tables/fam4.asp)
Note: "Immigrant children" defined as children under age eighteen who are either foreign-born or U.S.-born to immigrant parents; Light shaded region (2030-2050) refers to population projections

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*Parent or child born in another country

Percent of US Children (under 18) in Immigrant* Families Varies Substantially by State, 2024

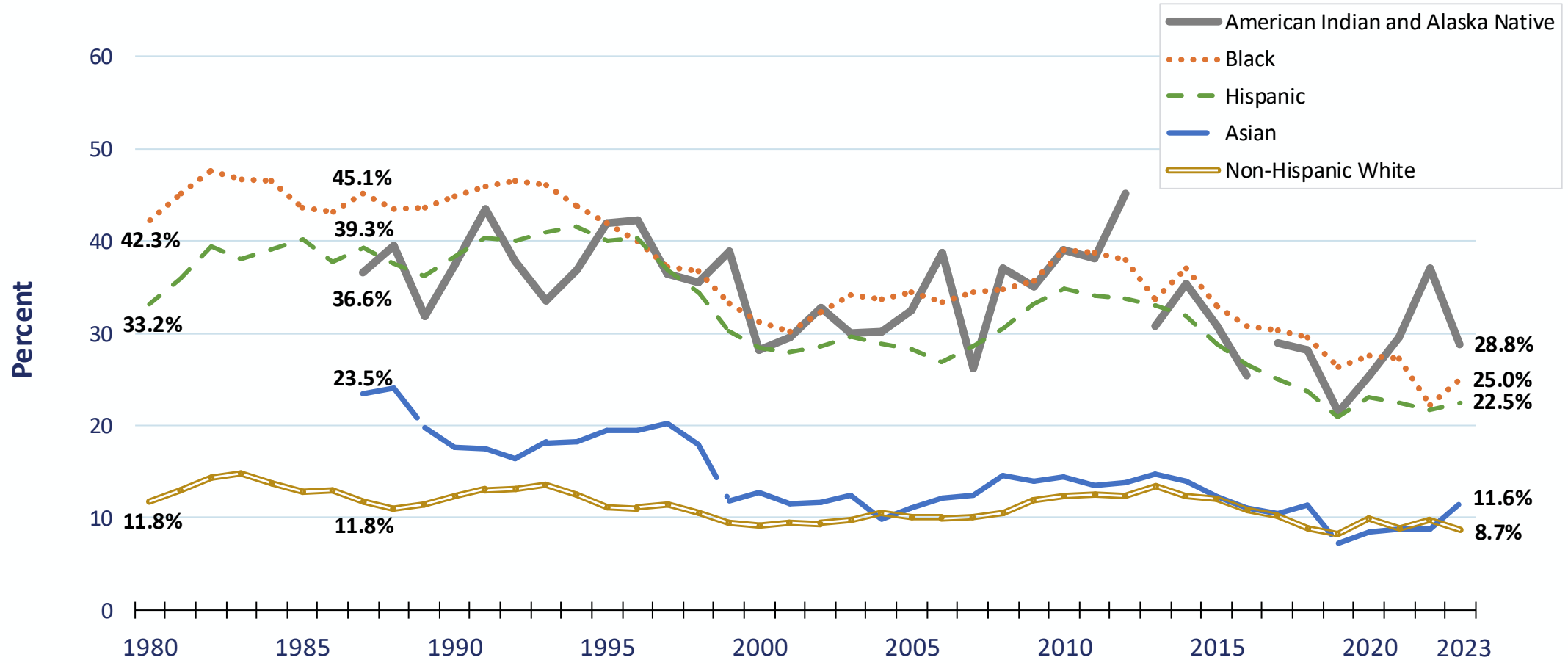


Percent of US Children (under 18) in Immigrant Families -- US Population: 27%
**Children who are foreign-born or reside with at least one foreign-born parent*

Source: US Census Bureau, American Community Survey
(https://data.census.gov/table/ACSDT1Y2024.B05009?q=immigrant+children&g=010XX00US,$0400000)

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Percent of US Children (under 18) Living Below the Official Poverty Level by Race and Ethnicity, 1980-2023*



**Estimates for 2013 and beyond are not directly comparable to previous years due to a re-design of the income questions. Estimates for 2017 and beyond are not directly comparable to previous years due to the implementation of an updated CPS ASEC processing system.*

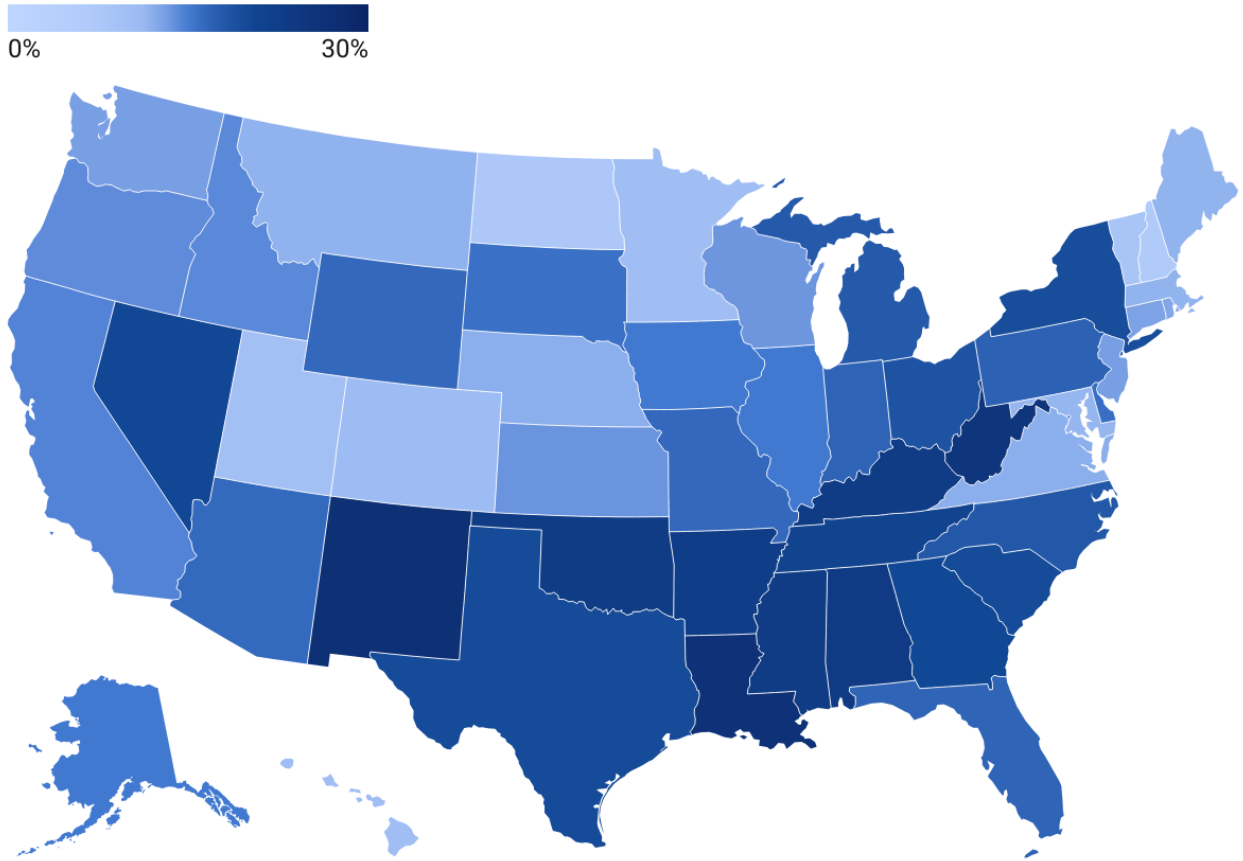
Poverty Level in 2023: $30,900 (family of 4 with 2 children)

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Source: US Census Bureau, Current Population Survey, Annual Social and Economic Supplement (https://www2.census.gov/library/publications/2024/demo/p60-283.pdf)

Children under age 6 have high rates of poverty

Percentage of children under age 6 in each state living in poverty, as measured by the official poverty measure, 2023



Hover or click to see values.

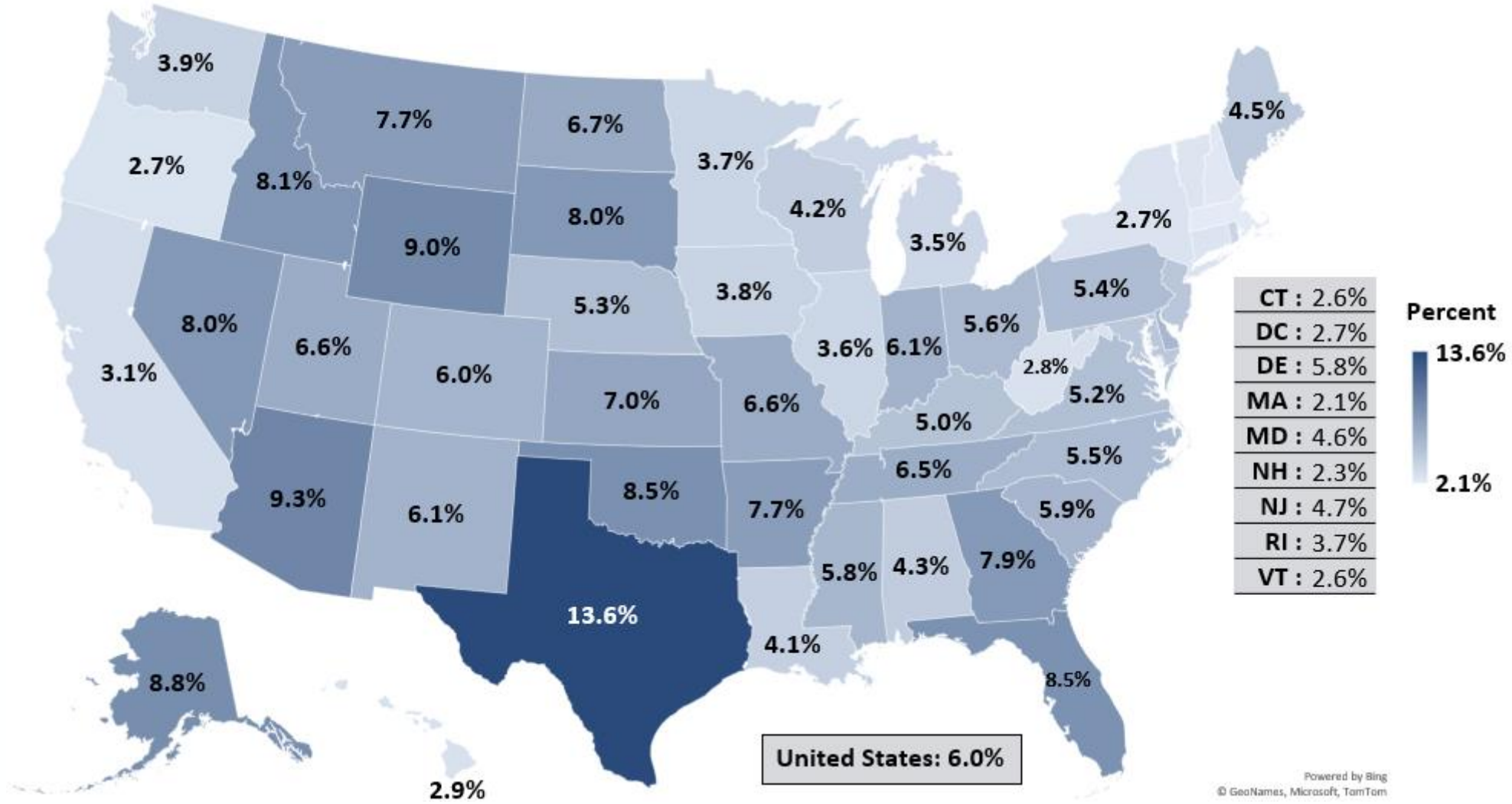
Note: The author calculated the percentage of children under age 6 in poverty by dividing the estimated number of children under age 6 who were below the poverty threshold by the sum of the estimated number of children under age 6 who were below the poverty threshold and the estimated number of children under age 6 who were at or above the poverty threshold.

Source: Author's calculation based on U.S. Census Bureau, "Table B17006: Poverty Status in the Past 12 Months of Related Children Under 18 Years by Family Type by Age of Related Children Under 18 Years" (last accessed November 2024).

Map: Center for American Progress

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Percent of US Children (under 19) without Health Insurance by State, 2024



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Source: US Census Bureau, American Community Survey, Table B27010 (https://data.census.gov/table?q=b27010)

The Current Child Health Landscape

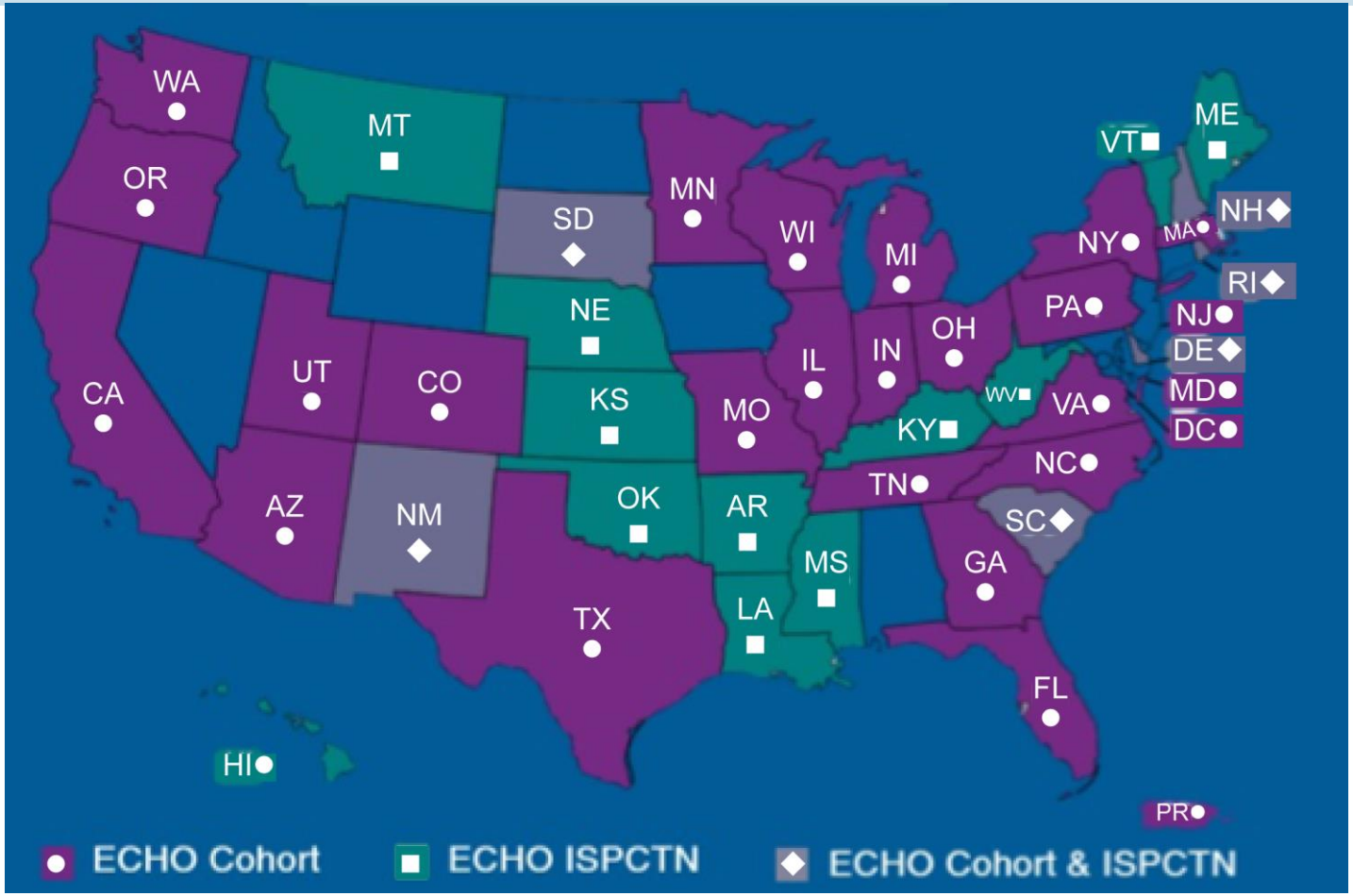


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Source: Launching Lifelong Health by Improving Health Care for Children, Youth, and Families National Academies of Sciences, Engineering, and Medicine. 2024.

ECHO Cohort and ISPCTN Locations

170,000 Participants: 5 Outcome Areas



ECHO projects oversample rural and underserved children

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Investing in Children

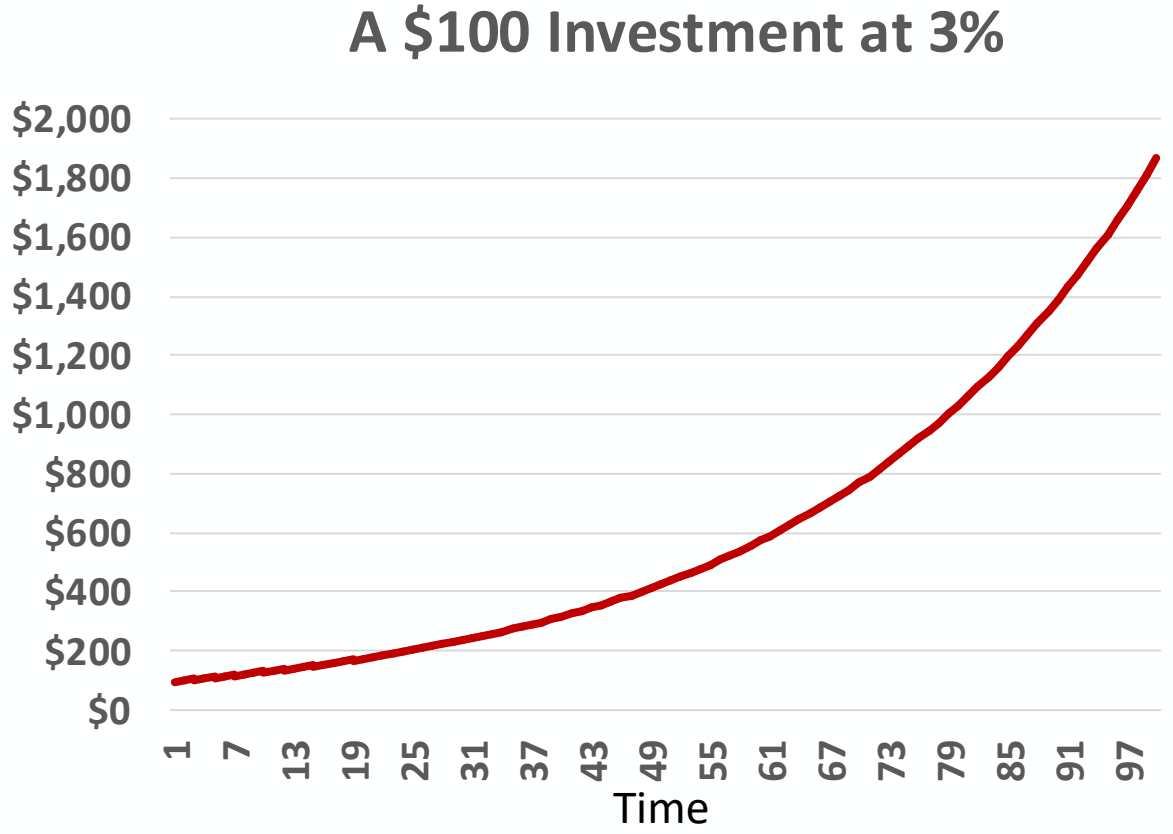
Early Environmental Protection; Lifelong Returns

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An Investment Compounds Over Time

- Imagine you have $100 to invest at time period T_0.
- In each subsequent time period, the investment increases by 3%.
- Because that 3% is applied to an ever-increasing base, the $100 grows not linearly but exponentially.



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Human Capital Investment in Children

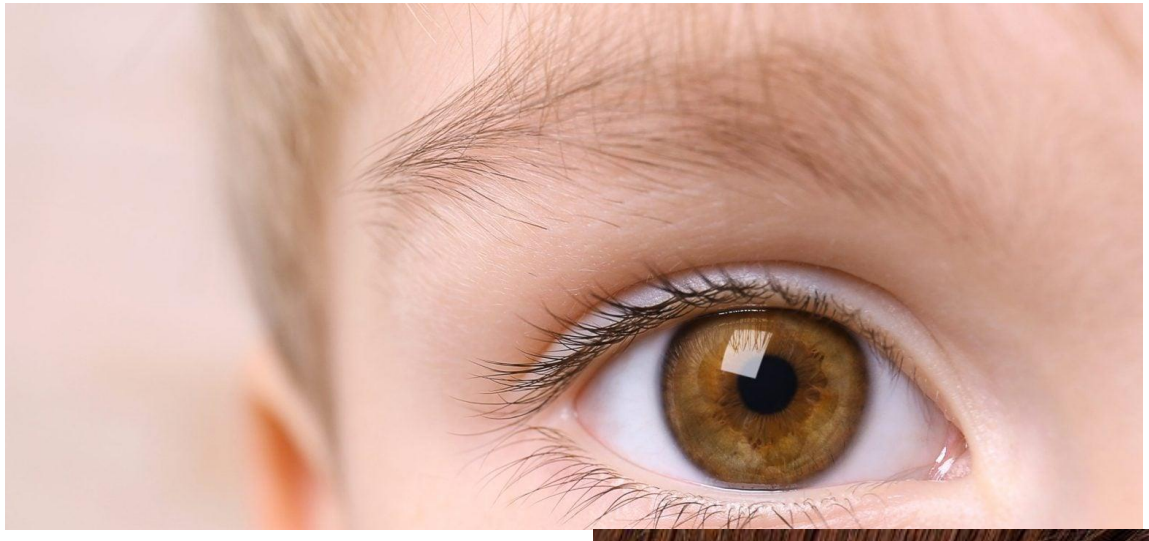
- For children, parents decide what inputs to supply (nutrition, education, safe environments, protection from toxic exposures, vaccinations, physical activity, social opportunities, etc.) that, in combination, will help their children thrive.
- Because children develop over time, it is important to model notions of child well-being outcomes that take this time element into account.



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Human Capital Investment in Children: Sensitive Periods

Investments in some developmental stages or time periods have a greater impact than in other developmental stages or time periods.[1]





[1] Cunha and Heckman (2007)

The model of skill development in summary…

$$\theta_{t+1} = f_t(h, \theta_t, I_t) \quad \text{and}$$

$$\partial f_t(h, \theta_t, I_t)/\partial \theta_t > 0 \quad \text{and finally}$$

$$\partial^2 f_t(h, \theta_t, I_t)/\partial \theta_t \partial I_t' > 0$$

…what does this mean?

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What it means

Translating the equations into English

- Skills beget skills and
- Equivalent levels of investment result in greater returns when applied to higher baseline skill levels

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Investment in Child Health

Extending the model

Just like a child's *skill set* in one time-period depends upon her skill set in the previous time-period, augmented by investment, so too with her *health status*.[1]

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[1] Case (2001)

Investment in Child Health

Extending the model

And just like there are sensitive time periods in development when skill acquisition is critical, so too with environmental exposures some time periods during development are more sensitive than others.[1]

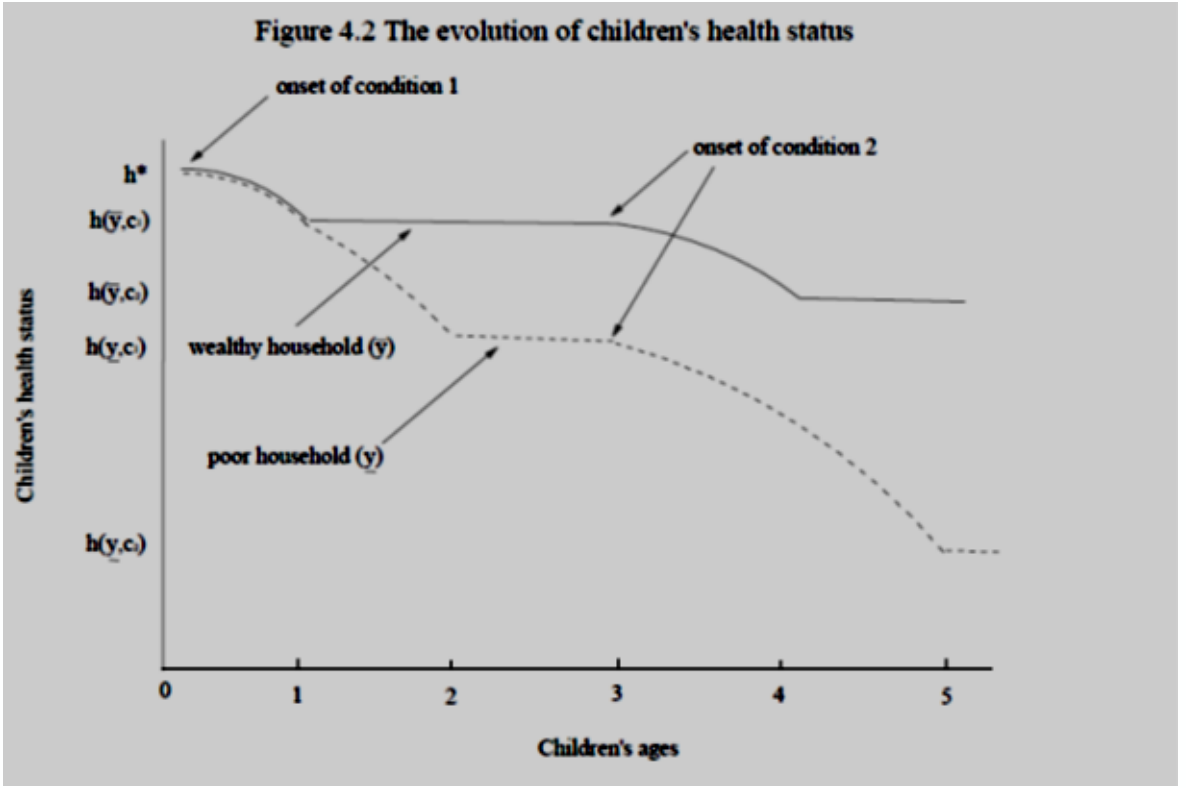
[1] Heyer and Meredith (2017)

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Investments and the Origin of Health Disparities

As children move through life and experience shocks to their health status (health depreciation):

- Those from families with greater means will benefit from investments to counteract those health shocks more than those from families with lesser means, and
- Over time, the health disparities between richer and poorer families will grow.



Case (2001)

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Investments and the Origin of Health Disparities

Families are not the only source of potential investments in child health.

Investing in Children

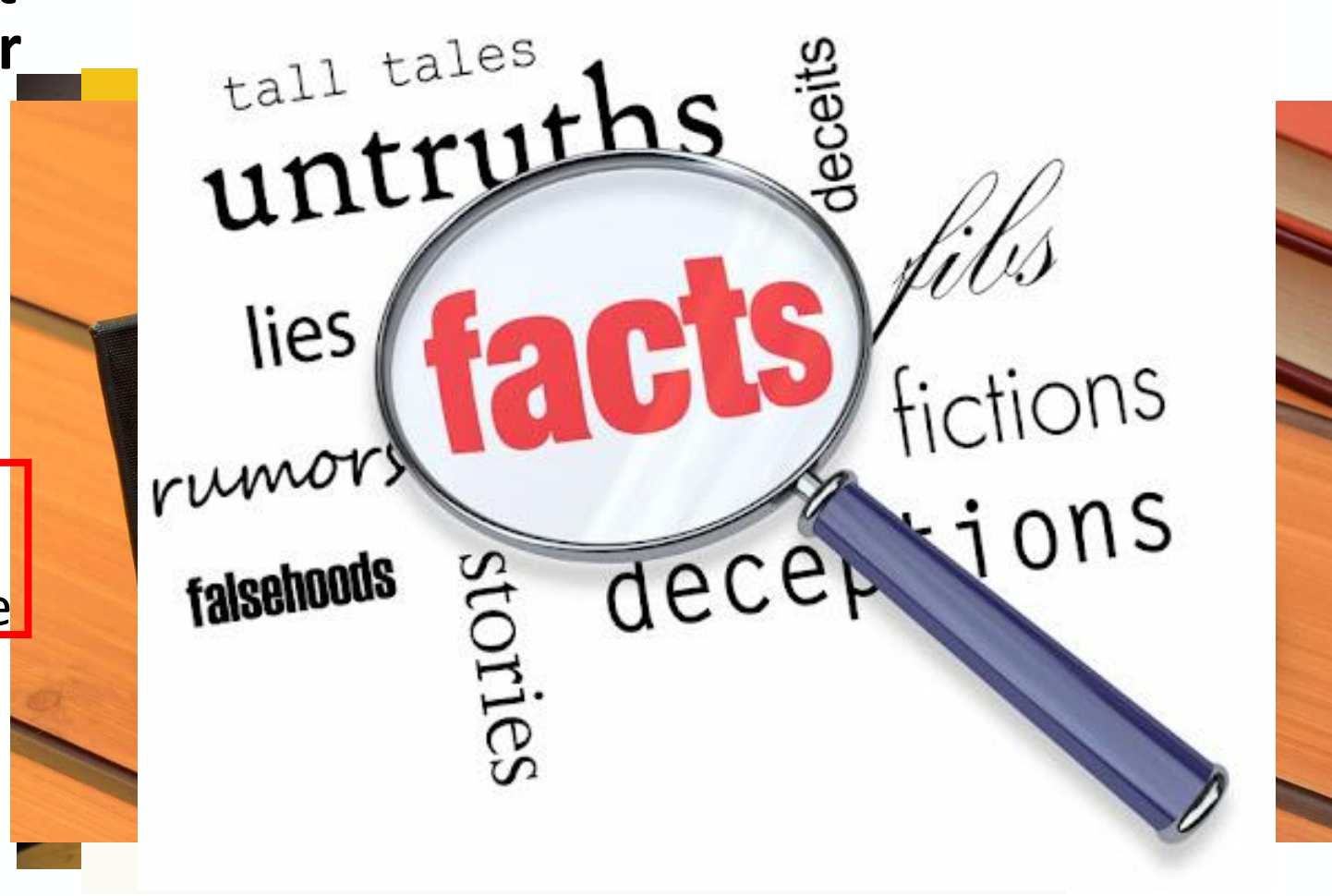
The Role of Government and Policy Implications

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Policy Implications for Investing in Children

Communities and governments fashion environments that condition parental decisions about human capital investments in their children.

- Health care services
- Stable housing
- Public education
- Food assistance
- Minimize toxic environmental exposure
- Legal protections
- Access to reliable information



Pew

TOPICS: ADVANCE HEALTH & WELL-BEING | STRENGTHEN STATE GOVERNMENT

PROJECTS: PUBLIC HEALTH DATA IMPROVEMENT | STATE HEALTH SOLUTIONS

Public Health Initiatives Deliver Big Returns on Investment

Data analysis shows that every dollar spent on such efforts saves about $14 in medical and societal costs

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Advancing the Policy Agenda

The Role of the AAP

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Children's Environmental Health

A Central Element of the AAP's Agenda

- Synthesizing the science through policy statements
- Creating tools for pediatricians
- Helping to educate families
- Collaborating with others
- Strengthening the communications to policy makers

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AAP Council on Environmental Health and Climate Change

Purpose & Leadership

- Pediatric expertise on environmental exposures/climate impacts

Translating Science to Practice

- Converts science into guidance, policy statements, and clinical tools

Advocacy and Policy Engagement

- Provides clinical expertise to inform AAP advocacy at the federal, state, local levels
- Elevates pediatric evidence in regulatory, legislative, judicial settings

Equity-Centered Approach

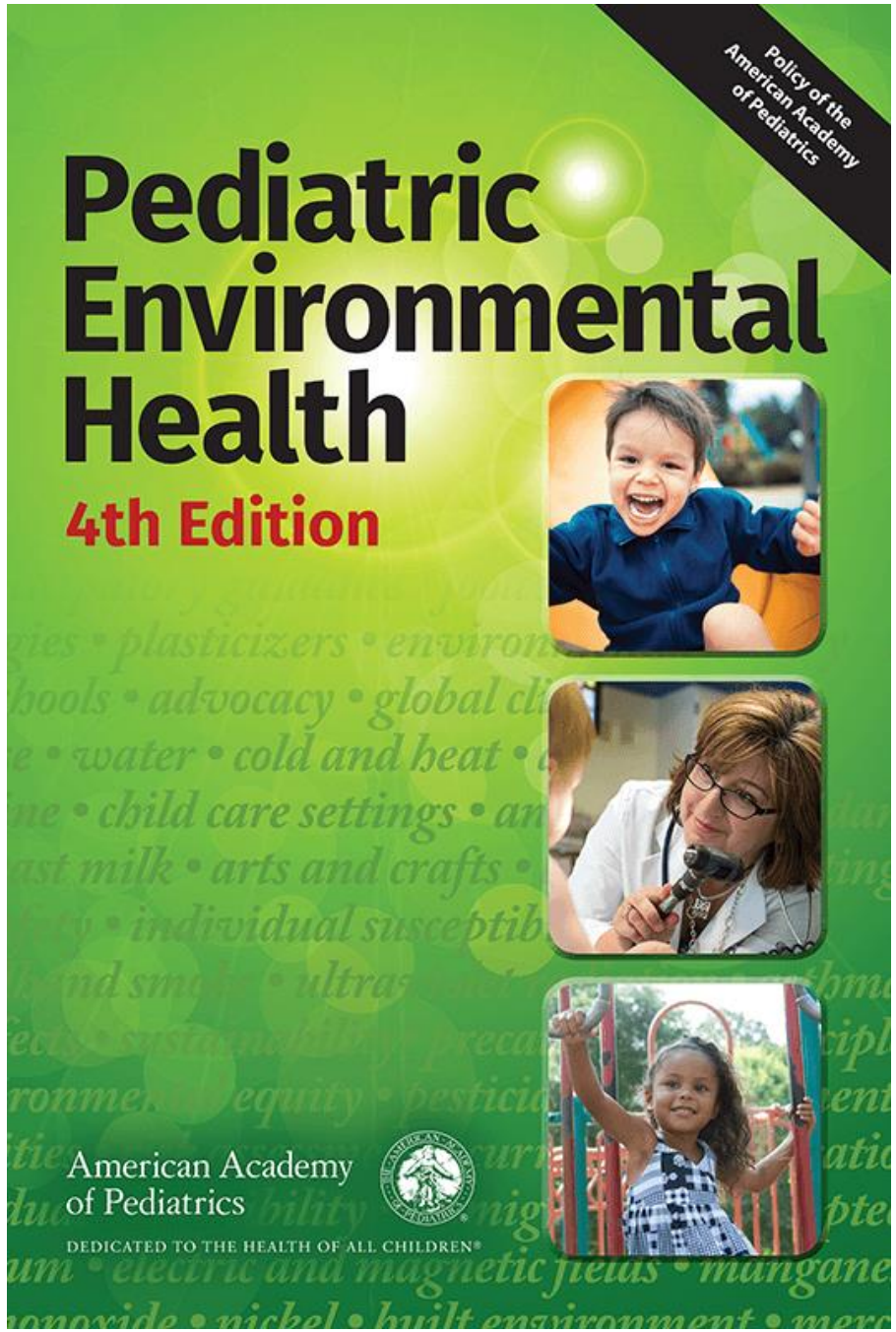
- Highlights disproportionate environmental burdens on low-income and minoritized children
- Advances environmental justice as a core child health priority



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The Green Book

AAP Guidance on Pediatric Environmental Health



AAP Portfolio of Policy, Clinical and Technical Reports

- Environmental Issues in Global Child Health
- Global Climate Change
- Built Environment
- Use of GMO-Containing Food Products
- Preventing Excessive Noise Exposure
- Drinking Water From Private Wells and Risks to Children
- Ambient Air Pollution: Health Hazards to Children
- Chemical-Biological Terrorism and Its Impact on Children
- Fish, Shellfish, and Children's Health
- Pediatric Considerations in Radiological or Nuclear Emergencies
- Food Additives and Child Health
- Indoor Environmental Control Practices and Asthma Management
- Prevention of Childhood Lead Toxicity
- Nontherapeutic Use of Antimicrobial Agents in Animal Agriculture



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Environmental Issues in Global Pediatric Health: *Recommendations for Pediatricians*

- **Clinical practice integration:** Incorporate environmental hazards into differential diagnosis; add standardized environmental screening questions, particularly for children from LMICs and for conditions plausibly linked to exposures (e.g., asthma, neurodevelopmental concerns, anemia).
- **Capacity building:** Expand environmental health and climate content in continuing education, maintenance of certification, and training curricula.
- **Cross-sector coordination:** Strengthen referral pathways to public health/environmental health agencies and community resources for exposure investigation and mitigation.
- **Population-level prevention:** Call for greater governmental and international investment in pollution prevention, environmental health workforce development, and public health infrastructure.



POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

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Environmental Issues in Global Pediatric Health: Policy Statement

Lauren Zajac, MD, MPH, FAAP,[1] Philip J. Landrigan, MD, MSc, FAAP,[2] and the Council on Environmental Health and Climate Change

abstract

Pediatricians and pediatric trainees in North America are increasingly involved in caring for children and adolescents in or from low- and middle-income countries (LMICs). In many LMICs, hazardous environmental exposures—notably outdoor and household air pollution, water pollution, lead, pesticides, and other manufactured chemicals—are highly prevalent and account for twice the proportion of disease and deaths among young children as in North America. Climate change will likely worsen these exposures.

It is important that pediatricians and other pediatric health professionals from high-income countries who work in LMICs be aware of the disproportionately severe impacts of toxic environmental hazards, become knowledgeable about the major local/regional environmental threats, and consider environmental factors in their differential diagnoses. Likewise, pediatricians in high-income countries who care for patients who have emigrated from LMICs need to be aware that these children may be at elevated risk of toxic environmental diseases from past exposures to toxic environmental hazards in their countries of origin as well as ongoing exposures in products imported from their home countries, including traditional foods, medications, and cosmetics.

Because diseases of toxic environmental origin seldom have unique physical signatures, pediatricians can utilize the environmental screening history, supplemented by laboratory testing, as a diagnostic tool. To prepare pediatricians to care for children in and from LMICs, pediatric organizations could increase the amount of environmental health and climate change content offered in continuing medical education (CME) credits, maintenance of certification (MOC) credits, and certification and recertification examinations. Broadly, it is important that governments and international agencies increase resources directed to pollution prevention, strengthen the environmental health workforce, and expand public health infrastructure in all countries.

[1]Department of Environmental Medicine and Public Health and Department of Pediatrics, Icahn School of Medicine at Mount Sinai, New York, New York; and [2]Program for Global Public Health and the Common Good, Boston College, Chestnut Hill, Massachusetts; Centre Scientifique de Monaco, Monaco, MC

Dr Zajac was the lead author and Drs Zajac and Landrigan were both responsible for conceptualizing, writing, and revising the manuscript and considering input from all reviewers and the board of directors, and all authors approved the final manuscript as submitted.

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The guidance in this statement does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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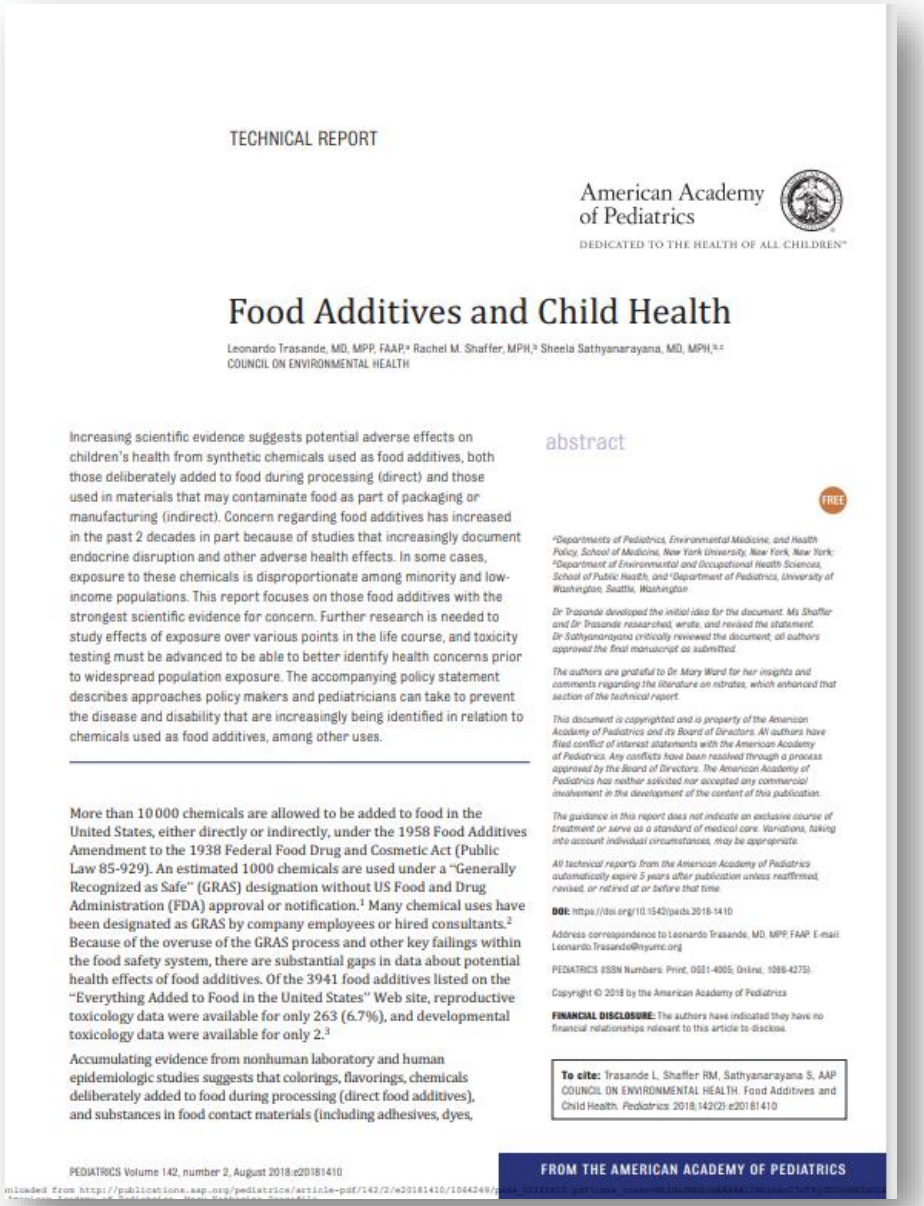
To cite: Zajac L and Landrigan PJ; American Academy of Pediatrics, Council on Environmental Health and Climate Change. Environmental Issues in Global Pediatric Health: Policy Statement. *Pediatrics* 2025;155(2):e2024070075

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an Academy of Pediatrics, Mary Katherine Scarafile

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Food Additives and Child Health: *Recommendations for Pediatricians*

- **Dietary pattern emphasis:** encourage diets richer in fresh/minimally processed foods.
- **Pragmatic exposure reduction:** reduce use of plastics in food heating/storage where feasible; be mindful of highly processed/packaged foods; consider limiting processed meats.
- **Clinical counseling:** recognize feasibility constraints and avoid stigmatizing families with limited food access.
- **Regulatory reform agenda:** strengthen or replace GRAS processes; update toxicity testing approaches; require more transparent, independent review; and reassess previously approved chemicals with modern methods.



TECHNICAL REPORT

American Academy of Pediatrics
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Food Additives and Child Health

Leonardo Trasande, MD, MPP, FAAP,[a] Rachel M. Shaffer, MPH,[b] Sheela Sathyanarayana, MD, MPH,[b,c]
COUNCIL ON ENVIRONMENTAL HEALTH

abstract

Increasing scientific evidence suggests potential adverse effects on children's health from synthetic chemicals used as food additives, both those deliberately added to food during processing (direct) and those used in materials that may contaminate food as part of packaging or manufacturing (indirect). Concern regarding food additives has increased in the past 2 decades in part because of studies that increasingly document endocrine disruption and other adverse health effects. In some cases, exposure to these chemicals is disproportionate among minority and low-income populations. This report focuses on those food additives with the strongest scientific evidence for concern. Further research is needed to study effects of exposure over various points in the life course, and toxicity testing must be advanced to be able to better identify health concerns prior to widespread population exposure. The accompanying policy statement describes approaches policy makers and pediatricians can take to prevent the disease and disability that are increasingly being identified in relation to chemicals used as food additives, among other uses.

More than 10 000 chemicals are allowed to be added to food in the United States, either directly or indirectly, under the 1958 Food Additives Amendment to the 1938 Federal Food Drug and Cosmetic Act (Public Law 85-929). An estimated 1000 chemicals are used under a "Generally Recognized as Safe" (GRAS) designation without US Food and Drug Administration (FDA) approval or notification.[1] Many chemical uses have been designated as GRAS by company employees or hired consultants.[2] Because of the overuse of the GRAS process and other key failings within the food safety system, there are substantial gaps in data about potential health effects of food additives. Of the 3941 food additives listed on the "Everything Added to Food in the United States" Web site, reproductive toxicology data were available for only 263 (6.7%), and developmental toxicology data were available for only 2.[3]

Accumulating evidence from nonhuman laboratory and human epidemiologic studies suggests that colorings, flavorings, chemicals deliberately added to food during processing (direct food additives), and substances in food contact materials (including adhesives, dyes,

[a]Departments of Pediatrics, Environmental Medicine, and Health Policy, School of Medicine, New York University, New York, New York; [b]Department of Environmental and Occupational Health Sciences, School of Public Health, and [c]Department of Pediatrics, University of Washington, Seattle, Washington

Dr Trasande developed the initial idea for the document, Ms Shaffer and Dr Trasande researched, wrote, and revised the statement. Dr Sathyanarayana critically reviewed the document; all authors approved the final manuscript as submitted.

The authors are grateful to Dr Mary Ward for her insights and comments regarding the literature on nitrates, which enhanced that section of the technical report.

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Help Pediatricians Promote Environmental Justice

1.Incorporate climate change into clinical practice. AAP policy *Climate Change and Children's Health: Building a Healthy Future for Every Child* suggests "assessing climate risks and recommending solutions when screening for/addressing SDH such as energy, food and housing security."

2.Engage with and empower communities to learn about their concerns and take action together.

3.Promote environmental sustainability at home and in clinical practice. Global greenhouse gas emissions from health care entities are equal to the annual emissions from 514 coal-fired power plants, according to a 2019 Health Care Without Harm report.

4.Educate families, communities and trainees on environmental justice

5.Ensure families have access to safe green spaces, which have positive effects on weight, mental and cardiovascular health.



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Educating Families and the Public about Children's Environmental Health

HealthyChildren.org is the AAP's primary public-facing website for parents and caregivers. It translates pediatric research and AAP policy into **plain-language, practical guidance** about children's health, including environmental risks such as pollution, climate change, lead exposure, air quality, and toxic substances. The site functions as a bridge between **scientific evidence and everyday parenting decisions**, emphasizing prevention and steps families can take.



Indoor Air Pollution & Children's Health: Tips for Healthier Breathing at Home

By: Lauren Zajac, MD, MPH, FAAP

Outdoor air pollution from factories, vehicles and wildfires is harmful for kids. But the air inside homes, schools and other indoor spaces matters, too, especially because kids spend so much of their time indoors.

Indoor air can carry particles and gases that irritate growing lungs and airways, making breathing problems and infections more likely. Some indoor air pollutants can even cause lasting harm to children's lungs, brains and other organs.

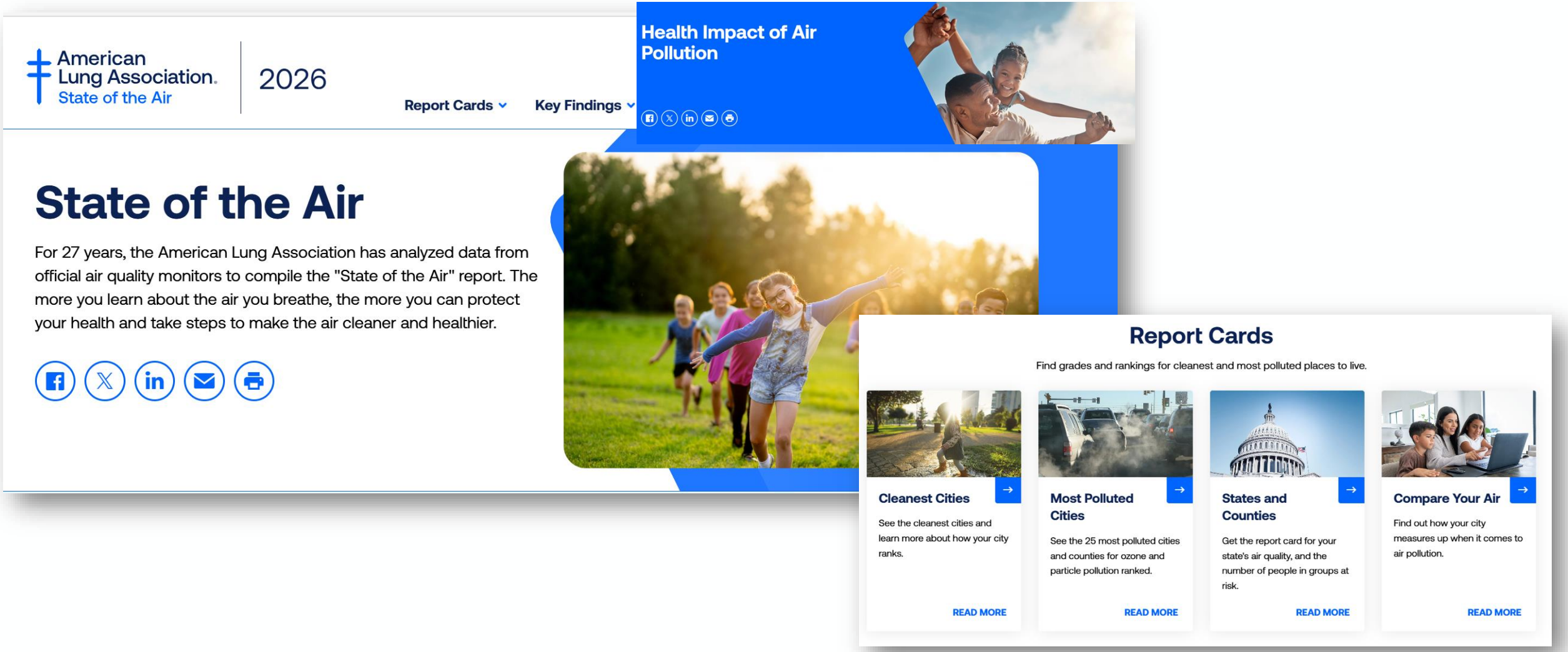


SHARE

EPA: Climate change has wide-ranging impacts on children's health

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ALA *State of the Air* Report Shows Half of America's Children Live in Places with Unhealthy Levels of Air Pollution



AAP Western Region Symposium on Wildfires Serve as Model to Educate Communities



- Start with community needs and local expertise. Ground agenda in real experiences of families facing climate-related events.
- Eliminate barriers to access. A free virtual format (Webex) and registration link shared on social media and professional networks significantly broadens participation.
- Include clinicians, professional societies and community partners in school health, child care, public health, disaster response, climate equity and advocacy.
- Build templates and repeatable processes for ease of implementation.



Alliance of Nurses for Healthy Environments
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American Lung Association.
AMA AMERICAN MEDICAL ASSOCIATION
APHA AMERICAN PUBLIC HEALTH ASSOCIATION For science. For action. For health.
Children's Environmental Health Network
The Medical Society Consortium on CLIMATE & HEALTH
neha National Environmental Health Association
PSR PHYSICIANS FOR SOCIAL RESPONSIBILITY

November 7, 2025

Lee Zeldin, Administrator
U.S. Environmental Protection Agency
William J. Clinton Building
1200 Pennsylvania Ave, NW
Washington DC 20460

Docket: EPA-HQ-OPPT-2025-0260; 90 Fed. Reg. 45690 (September 23, 2025)

RE: Comments on Procedures for Chemical Risk Evaluation Under the Toxic Substances Control Act (TSCA)

On behalf of the signed national health and medical organizations, we oppose the proposed changes to procedures for chemical risk evaluations. We urge the Environmental Protection Agency (EPA) to withdraw this proposal, which we are concerned would weaken protections from deadly chemicals.

Exposure to harmful industrial and commercial chemicals poses significant risks to human health. These substances — such as volatile organic compounds (VOCs), flame retardants and plasticizers — can affect nearly every organ system. They are linked to respiratory diseases like asthma and chronic obstructive pulmonary disorder (COPD), cardiovascular problems, developmental disorders in children and increased cancer risk. Both acute and chronic exposure can impair immune and endocrine function, exacerbate existing health conditions and contribute to premature death.

Defending the Toxic Substances Control Act (TSCA)

- Since 2016, under a bipartisan update to AAP-supported TSCA, the EPA has used TSCA to regulate and ban toxic substances and chemicals.
- At the end of last year and early this year, the AAP has joined many letters to EPA and Congress opposing efforts to weaken TSCA.
- In February AAP joined with ACOG and Project TENDR to put on a congressional briefing to educate lawmakers' staff on the importance of TSCA.

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AAP Environmental Advocacy: Expand *Centers for Disease Control and Prevention National Center for Environmental Health* Programs

- Expand **National Environmental Public Health Tracking Network** to improve surveillance/analyze disease and environmental data to identify health risks and implement interventions.
- Expand **Childhood Lead Poisoning Prevention Program** activities to determine extent of childhood lead poisoning, educate the public and health providers about lead poisoning and ensure lead-exposed children receive follow-up services.
- Expand **National Biomonitoring Network** so more states can undertake population-based surveillance of chemicals and toxics.



- Strengthen **National Asthma Control Program** that tracks asthma prevalence, promotes asthma prevention.
- Expand **Climate and Health Program** that helps states, localities, tribes diagnose/prepare for adverse health impacts from extreme heat, floods, droughts, wildfires, worsening allergy seasons, spread of vector-borne diseases.
- Support and expand **laboratory studies** into health impacts of exposure to toxic substances to increase understanding of which exposures may cause/contribute to development of different cancers.

Strengthening the Evidence for a Healthier Generation

What We Know and What's Next

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Seven Top Children's Environmental Health Research Opportunities

1. **Early-life environmental exposures**: Limited clarity on how prenatal and early childhood exposures, such as chemicals, pollution, food environments, shape long-term child health outcomes, including obesity
   - Lee Zeldin announced EPA will focus on levels of microplastics and PFAS in drinking water--- good examples of early life exposures we need to know more about.
2. **Epigenetic pathways**: Insufficient understanding of how environmental factors influence gene expression across development, how these patterns differ by geography, and which interventions might reverse harmful changes
3. **Social and Structural Determinants**: Gaps in evidence on how early food insecurity, chronic stress, neighborhood conditions, and related inequities interact with environmental exposures to influence child health.



Seven Top Children's Environmental Health Research Opportunities *(cont.)*

4. **Emerging Plastics and Replacement Plasticizers**: Rising exposure to newer plasticizers (e.g., DINCH/DEHTP) with limited data on developmental, metabolic, and neurobehavioral impacts
   - ECHO already measures developmental, metabolic and neurobehavioral outcomes; need to develop valid exposure measures for microplastics.
   - Newer ''replacement'' plasticizers are first brought into commerce, THEN scientists develop methods for quantifying exposure to them.
5. **Environmental Effects on Treatment Outcomes:** Limited research on how physical and social environments contribute to variability in child health intervention outcomes (e.g., obesity treatment, chronic disease management)



Seven Top Children's Environmental Health Research Opportunities *(cont.)*

6. **Air Quality and Environmental Exposures:** Additional research needed on what constitutes safe levels of exposures for growing children, at a single point in time and in the aggregate
   - What unique toxic compounds are present in smoke from Maui and LA fires where so much of what burned was from housing-related materials?
   - What are children's exposures and health effects?

7. **Efficacy of Interventions:** More research needed to include characterizations of environmental exposures and efficacy of interventions to evaluate, crease or prevent exposure



Bridging Discovery and Care

In Summary

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Summary

- Investments in children pay off
- Public health approaches are particularly effective
- Sensitive periods of development must be protected
- The AAP is a critical partner for ECHO in translating science into pediatric practice, family awareness, policy interventions and lasting impact

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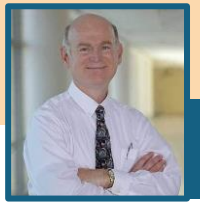
Thank You!





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Where we go from here



Matthew W. Gillman, MD, SM

Director, NIH Environmental influences on Child Health Outcomes (ECHO) Program



ECHO
Environmental influences on Child Health Outcomes
A program supported by the NIH

Key Takeaways

- **ECHO brings people together** — researchers, clinicians, policymakers, parents, participants, and communities — to turn science into action.
- We collaborate across sectors to **prevent common chronic disease and promote child health**.
- **Participant's voices and lived experiences** guide meaningful, solution-oriented research.
- Science has the most impact when we **translate findings to inform programs, practices, and policies**.
- The ECHO Program will continue to **expand our nation's capacity to enhance the health of children for generations to come**.

Next Steps



Access the Symposium recordings

Listen to the conversations and share them with your networks



Read the forthcoming white paper

Learn about key findings and actionable solutions summarized in 1 place



Collaborate with new connections from today

Explore partnerships or project opportunities



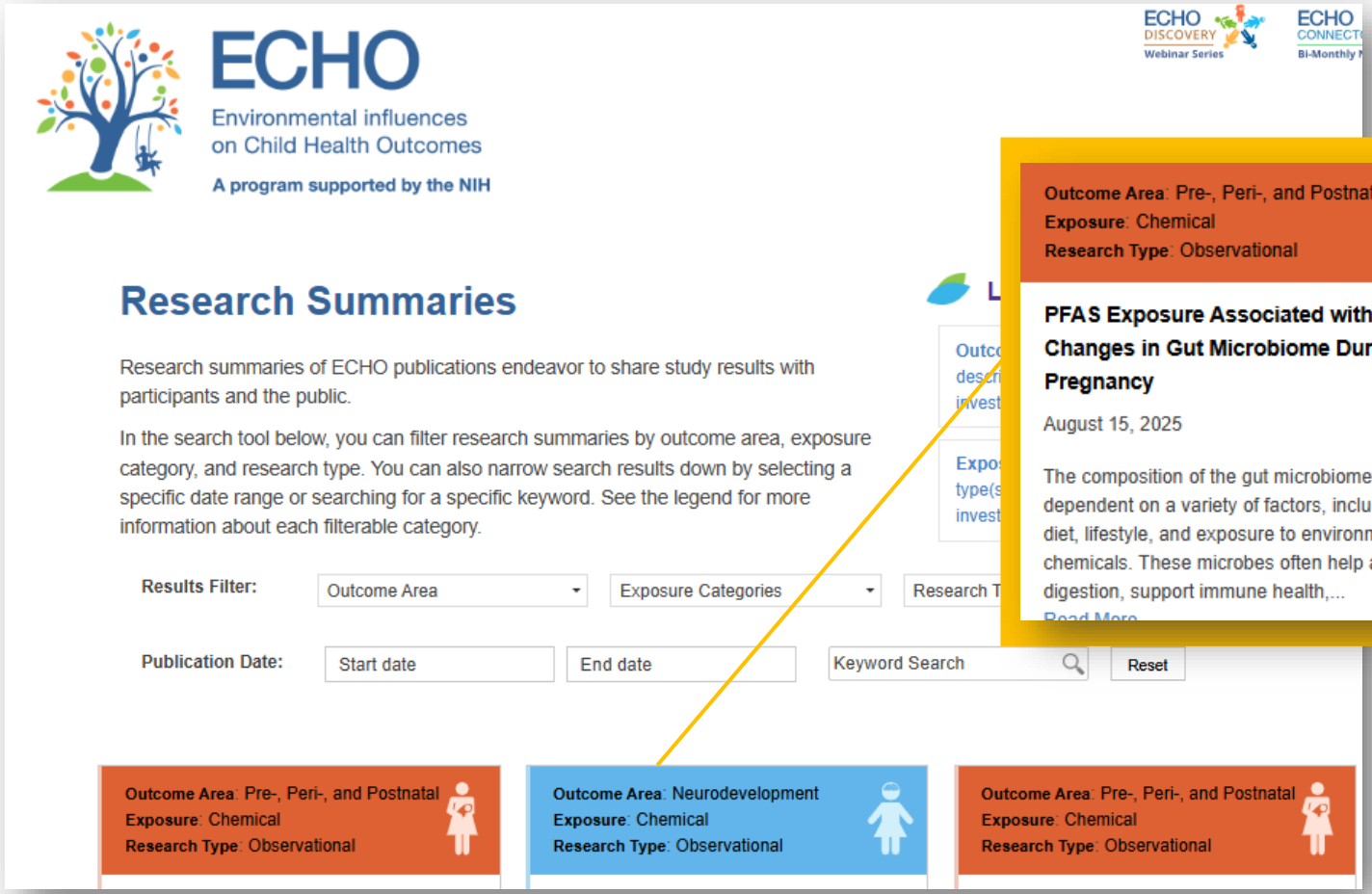
Participate in future ECHO Symposia

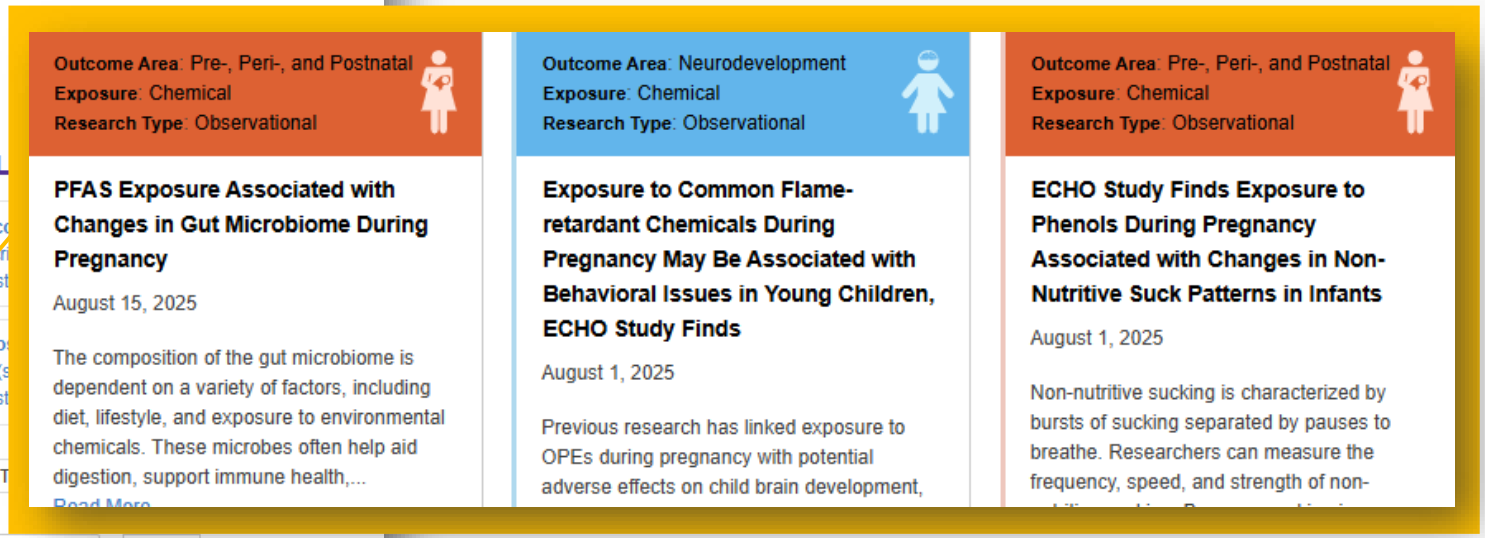
Help shape what's next; take part in annual ECHO Symposia

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Submit questions or comments here:
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ECHO Research Topics of National Interest

echochildren.org

ECHO Topics of Interest

AIR QUALITY

How indoor and outdoor air exposures may shape breathing, brain development, and birth outcomes

NEIGHBORHOODS

How neighborhood and social conditions such as safety, resources, and air quality can be tied to outcomes like obesity, asthma, and mental health

NUTRITION

How diet and access to healthy food can influence growth and development from pregnancy through childhood

CHEMICAL EXPOSURES

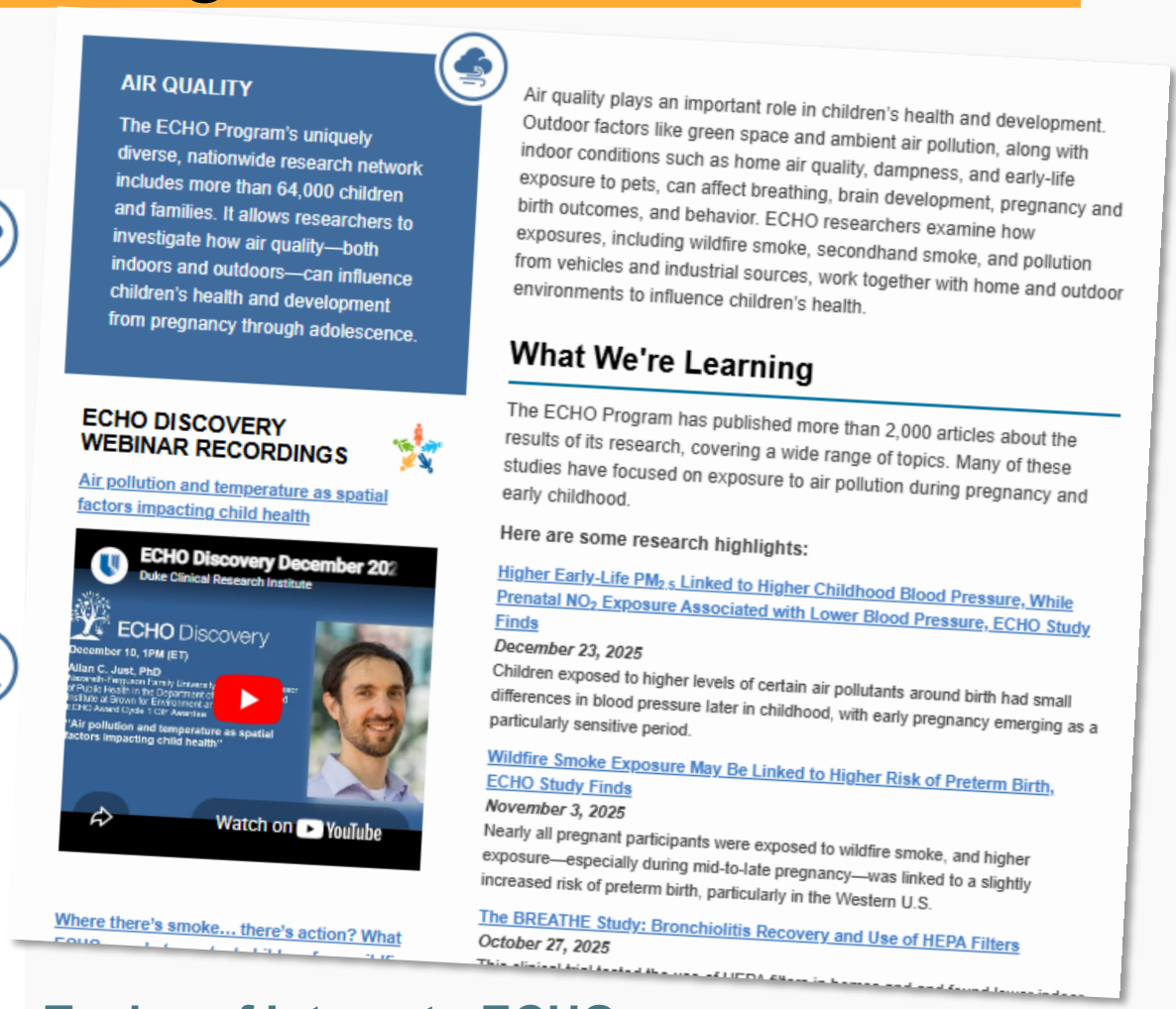
How everyday chemicals like PFAS, lead, phthalates, phenols, parabens, and others can affect children's growth and health

AUTISM

What prenatal diet, chemical exposures, and early-life conditions may reveal about autism risk

MEDIA USE

The ways digital media use and screen time may shape children's health and well-being



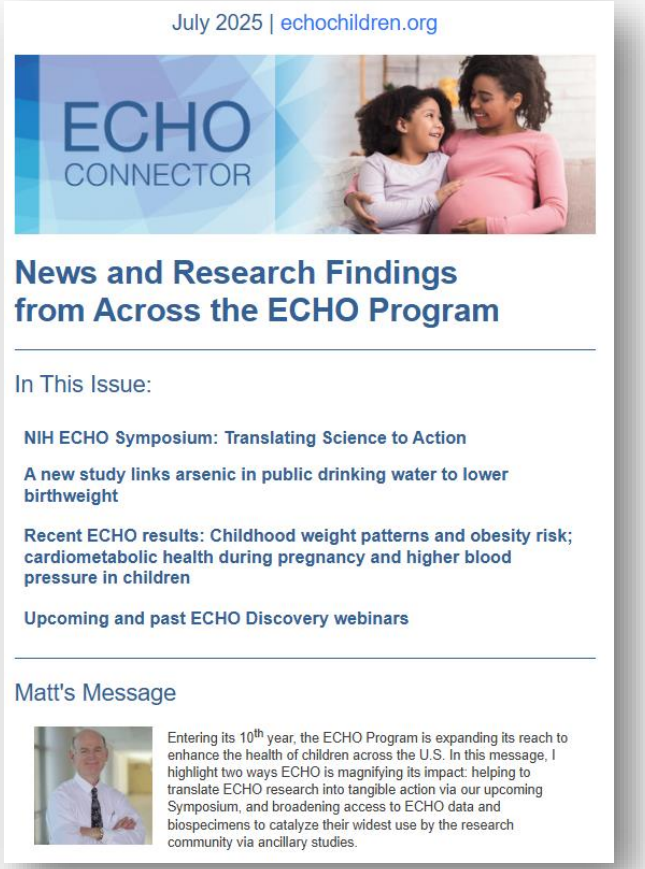
[Topics of Interest - ECHO]

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  - –Brings together ECHO scientific community
  - –Invited speakers



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Thank you to all who presented, listened, discussed, and asked questions!



A feedback survey for today's symposium will be emailed shortly—we look forward to your insights!