CHE Collaborative for Health & Environment

Webinar Highlights

Mapping Environmental Injustice: Disparities in chemical exposures and neurodevelopmental outcomes

Families with low incomes and families of color have long faced disproportionate exposures to toxic chemicals and pollutants known to hinder brain development. These inequities stem from histories of discriminatory policies.

A recently published literature review by members of Project TENDR (Targeting Environmental Neuro-Development Risks), sheds light on the disparities in toxic chemical exposures and neurodevelopmental outcomes in children in low-income families and communities of color in the United States. The scoping review, which analyzes more than 200 studies conducted between 1974 and 2022, maps existing literature on seven types of neurotoxicants, including combustion-related air pollution, lead, mercury, pesticides, phthalates, PBDE flame retardants, and PCBs.

As part of the review process, Project TENDR Health Disparities Workgroup members met with community and environmental justice leaders to identify possible areas of collaboration and opportunities for the research to support the work of the environmental justice organizations.

In this webinar, **Dr. Devon Payne-Sturges** and **Dr. Tanya Khemet Taiwo**, the lead authors of the report, presented their findings and recommendations. **Dr. Kristie Ellickson** demonstrated a searchable database of studies on disparities in exposures and impacts. **Vi Waghiyi** discussed neurodevelopmental disparities and health inequities specifically in Alaska Native children.

Featured Speakers: Devon Payne-Sturges, MEngr, DrPH, Associate Professor with the Department of Global, Environmental, and Occupational Health at the University of Maryland, School of Public Health, Tanya Khemet Taiwo, LM, CPM, MPH, PhD, Assistant Professor in the Department of Midwifery at Bastyr University Chapel Hill, Kristie Ellickson, PhD, Kendall Fellow at the Center for Science and Democracy at the Union of Concerned Scientists, and Vi Pangunnaaq Waghiyi, Environmental Health and Justice Program Director at Alaska Community Action on Toxics speaking July 02, 2024.

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provided by the webinar presenters, see the webinar page, where you'll also find associated slides and resources.

The Problem

Many studies have clearly shown that communities of color and low-income communities experience disparities in pollutant and chemical exposures. Research has also shown that those communities are disproportionately impacted by those environmental hazards.

"As a result of discriminatory practices and policies, families with low incomes and families of color are currently and historically disproportionately exposed to chemicals without their knowledge or consent where they live, work, play, pray, and learn," says co-lead author Dr. Devon Payne-Sturges.

However, as their literature review notes, "no systematic or scoping reviews have been conducted specifically on children living in the United States to examine both exposure disparities and the joint effects of combined exposures of environmental neurotoxicants and social disadvantage as they relate to disparities in neurodevelopmental outcomes."

In order to address this gap, the review focused on examining four main questions:

1. What proportion of studies provide a conceptualization (i.e., definition) of race/ethnicity and other indicators of sociodemographic and socioeconomic disadvantage?
2. How are race/ethnicity, sociodemographic, and socioeconomic disadvantage data operationalized (i.e., measured and coded)?
3. Do the studies present data on exposure and outcome disparities by race/ethnicity and other indicators of sociodemographic and socioeconomic disadvantage, and what are the patterns of those disparities?
4. Did the studies investigate how measured effects were modified by race/ethnicity and other indicators of sociodemographic and socioeconomic disadvantage?

The speakers stressed that it is important to understand how social differences are conceptualized and measured in these epidemiological studies in order to accurately interpret the results and to find opportunities for positive interventions.

Key findings on chemical exposures:

- Children of color and children in families with low incomes are more exposed to neurotoxic chemicals and experience greater harm to brain development, learning, attention, and behavior.

- Exposures to all neurotoxic chemicals examined, including lead, air pollution, pesticides, and phthalates, are higher for children of color and those in low income communities.

Key findings on reviewed studies:

- Many researchers documented higher exposures, but rarely examined how race and economic hardship interact with children's exposures to neurotoxicants.
- Scientists are failing to examine what we need to understand to protect children and communities, and instead use "race" as a proxy for adversity, stress, or discrimination.
- Few studies include American Indian and Alaska Native populations.
- A majority of studies found children in low-income households and children of color at greater risk of neurodevelopmental problems from neurotoxic exposures, but this finding was not consistent across all studies and comparators.
- Approximately 80% of studies that reported differences in outcomes by socioeconomic status (SES) strata found the strongest associations in lower SES groups.
- Of studies that found differences in outcomes by race or ethnicity, 63% found stronger associations by race and 60% by ethnicity.

Vi Waghiyi highlighted the importance of community involvement in these studies. Waghiyi helped start a community-based participatory research project in her community, Sivuqaq, in response to water and soil contamination left behind by the U.S. military. Community-based research approaches include the impacted community in the design, conduct, and interpretation and discussion of results. Waghiyi shared her community's experience. In addition to contamination from former military sites, the Arctic is a hemispheric sink for pollutants from around the world. The traditional, subsistence foods that they eat in Sivuqaq have become contaminated with these pollutants. Children there have been found to have high exposures to chemicals, such as PCBs. Part of Waghiyi's work has been developing a toolkit for parents and teachers to protect children from the impacts of this pollution.

Recommendations

The review and presentation underscores the need for action at all levels of government to limit, lower, and eliminate existing pollutants and toxic chemicals in our environments in order to achieve environmental justice and health equity.

For decision makers:

- We need stronger workplace protections and an end to siting chemical and plastics manufacturing facilities in/near communities of color and low-income communities.
- FDA should immediately ban phthalates from food packaging and processing.

- EPA and FDA should eliminate sources of lead exposure to children, including banning leaded aviation gas, reducing to zero allowable levels of lead and other metals in children's food, and replacing all lead water pipes.
- EPA should ban all organophosphate pesticides and assess other classes of pesticides for further regulation.
- EPA should ensure the swift and health protective cleanup of Superfund sites.

For scientists:

- Use existing evidence to advocate for change and prevention.
- Avoid continued studies just to document harm when the weight of the evidence is already clear.
- Measure the impact of racism and avoid conflating race with being a detriment.
- Study how social adversity and neurotoxic exposures may interact to affect risks to children's brain development and function.
- Intentionally measure what you are really interested in, rather than using "race" as a catch-all or proxy term. If the assumption is that race stands as a proxy for exposure to discrimination, then measure discrimination; if the assumption is that race is a proxy for stress, then measure stress.
- Carefully and consistently identify the definitions of terms like "race," "ethnicity," and "adversity".
- Collaborate with American Indian and Alaska Native populations to support existing community-based participatory research and co-create research programs and protocols to address issues raised by these communities, seeking actionable data.

To provide easier access to the studies that were included in the review, the speakers shared a data analytics tool that they made featuring the studies that they examined.

To Find Out More

- Watch the July 02, 2024 webinar: Mapping Environmental Injustice: Disparities in chemical exposures and neurodevelopmental outcomes
- Read the presentation slides: Slides – Payne-Sturges, Taiwo, Ellickson
- Read the report: Disparities in Toxic Chemical Exposures and Associated Neurodevelopmental Outcomes: A Scoping Review and Systematic Evidence Map of the Epidemiological Literature
- Visit the Tableau page: Health Disparities Scoping Review

About the Speakers

Devon Payne-Sturges, MEngr, DrPH is an Associate Professor with the Department of Global, Environmental, and Occupational Health at the University of Maryland, School of Public Health. Dr. Payne-Sturges earned her Master of Public Health and Doctor of Public Health degrees in environmental health sciences from Johns Hopkins Bloomberg School of Public Health. Previously, she served as Assistant Commissioner for Environmental Health with the Baltimore City Health Department, then later as the Assistant Center Director for Human Health with U.S. EPA's National Center for Environmental Research.

Tanya Khemet Taiwo, LM, CPM, MPH, PhD is an Assistant Professor in the Department of Midwifery at Bastyr University in both the Master of Science in Midwifery and the Master of Arts in Maternal-Child Health Systems programs. Dr. Khemet Taiwo is an epidemiologist whose research examines the role of maternal prenatal stress on child neurodevelopment and how these stressors interact with environmental exposures. She is a Senior Program Officer for the Birth Justice portfolio at Skyline Foundation, and counts herself blessed as the mother of three beautiful girls who were all born at home.

Kristie Ellickson, PhD is a Kendall Fellow at the Center for Science and Democracy at the Union of Concerned Scientists. Prior to joining UCS, at the Minnesota Pollution Control Agency she co-developed a statewide cumulative air pollution risk model, MNRISKS, combining these results with socioeconomic data to investigate disproportionate impacts. Dr. Ellickson earned a PhD in exposure science from Rutgers University's Environmental and Occupational Health Science Institute, and a BA in chemistry from Hamline University in St. Paul, MN.

Vi Pangunnaaq Waghiyi is a Sivuqaq Yupik, Native Village of Savoonga Tribal Citizen, mother, and grandmother. Since 2002, she has worked with ACAT and serves as Environmental Health and Justice Director. She was appointed by President Biden to the White House Environmental Justice Advisory Council (WHEJAC) in April 2021. She is a nationally recognized environmental justice leader. Vi serves as a leader of the Global Indigenous Peoples Caucus that advises the United Nations international delegates for treaties concerning persistent organic pollutants. She served as a member of the Environmental Health Sciences Council that advises the NIEHS.