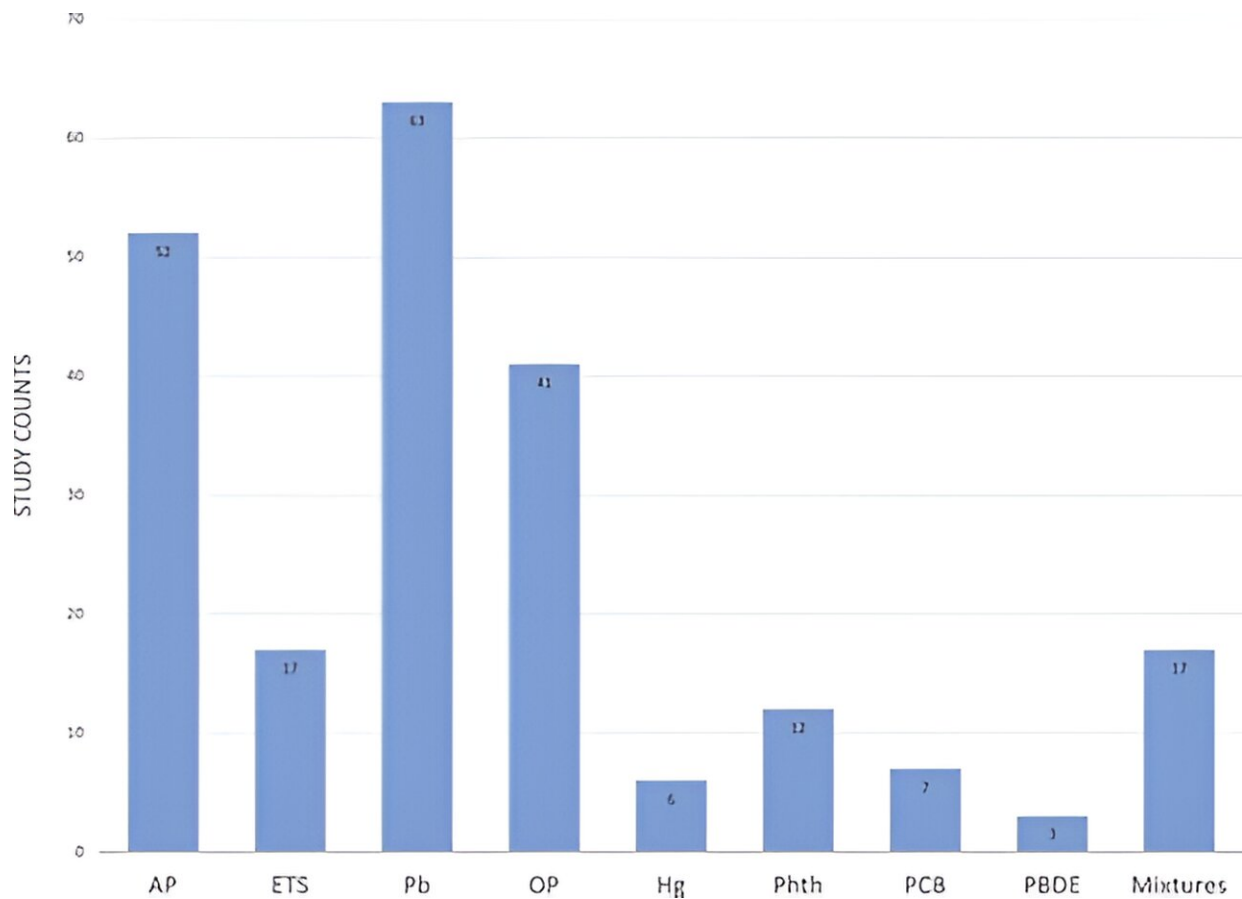


# Review finds deep disparities in childhood exposure to neurotoxins

September 27 2023, by Allison Eatough



Frequencies of TENDR exemplar contaminants examined by the studies. Some studies are counted more than once if they examined multiple exemplar neurotoxicants separately. Note: AP, air pollution; ETS, environmental tobacco smoke; Hg, mercury; mixtures, chemical mixtures; OP, organophosphate pesticides; Pb, lead; PBDE, polybrominated diphenyl ethers; PCB, polychlorinated biphenyls; Phth, phthalates; TENDR, Targeting Environmental Neuro-Development Risks. Credit: *Environmental Health Perspectives* (2023).

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Children of color and those from families with low incomes are disproportionately exposed to neurotoxic chemicals, resulting in greater harm to brain development and more developmental delays, according to a new review of five decades of studies co-led by a University of Maryland researcher.

The expansive review covers more than 200 studies examining children up to age 18 in the United States, showing how a history of discriminatory practices and policies extending up to the present has exposed families to chemicals hazards "where they live, work, play, pray and learn," said environmental health Associate Professor Devon Payne-Sturges, one of the lead authors of today's publication in [\*Environmental Health Perspectives\*](#).

"Their neighborhoods are more likely to be located near factories, chemical plants, Superfund sites, highways and more vehicle traffic or by agricultural fields where pesticides are applied."

The review also found that when these exposures are reduced, health disparities fall.

"If you go ahead and clean up these hazardous waste sites, you actually can see improvements," Payne-Sturges said. "One of the studies we reviewed provided evidence that Superfund site cleanup substantially benefits children's cognitive development."

Among other findings from the environmental health studies spanning 1974 to 2022:

- Low-income and Black children had higher exposures to lead than children from higher-income families and white children.
- Children in communities of color and low-income communities were disproportionately exposed to air pollution.
- Black and Hispanic children were exposed to higher levels of organophosphate pesticides widely used in agriculture.
- Black and Hispanic mothers had higher levels of phthalates, endocrine-disrupting "forever chemicals" used in food packaging, [personal care products](#) and elsewhere that suffuse our environment.
- Babies living in economically disinvested neighborhoods and exposed to air pollution in their first year of life were more likely to be diagnosed with autism than those in higher-income neighborhoods.

The review co-authors are all affiliates of Project TENDR (Targeting Environmental Neuro-Development Risks), an alliance of more than 50 scientists, health professionals and advocates working to protect children from toxic chemicals and pollutants that harm [brain development](#).

"We need more stringent environmental standards to address pollution that is disproportionately impacting [low-income communities](#) and communities of color," said Tanya Khemet Taiwo, the other lead author and assistant professor at Bastyr University in Seattle. "But it's just as important that we find a way to improve the unjust systems and [social policies](#) that create harmful conditions in the first place."

Despite decades of evidence showing families with low incomes and families of color are more highly exposed to neurotoxic chemicals, review authors found most previous research failed to examine how race, ethnicity and economic hardship interact with those exposures to produce differing outcomes. But when scientists did investigate those interactions, they discovered toxic chemical exposures are more strongly

associated with learning, attention and behavior problems for children in families that are also exposed to social and economic adversities, the researchers said.

The research review also showed a lack of studies examining exposures and neurodevelopmental outcomes among American Indian, Alaska Native and Asian American communities.

The authors called for governmental policies to cut the use of [toxic chemicals](#), including pesticides, and halt locating and permitting new chemical and plastics manufacturing plants in or near [communities of color](#) and [low-income](#) communities; and enact stronger workplace protections.

"FDA and EPA can act now—not later—to protect families from neurotoxic chemicals in consumer products and in the environment," said Payne-Sturges, a former policy specialist at the Environmental Protection Agency.

**More information:** Devon C. Payne-Sturges et al, Disparities in Toxic Chemical Exposures and Associated Neurodevelopmental Outcomes: A Scoping Review and Systematic Evidence Map of the Epidemiological Literature, *Environmental Health Perspectives* (2023). [DOI: 10.1289/EHP11750](#)

Provided by University of Maryland

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