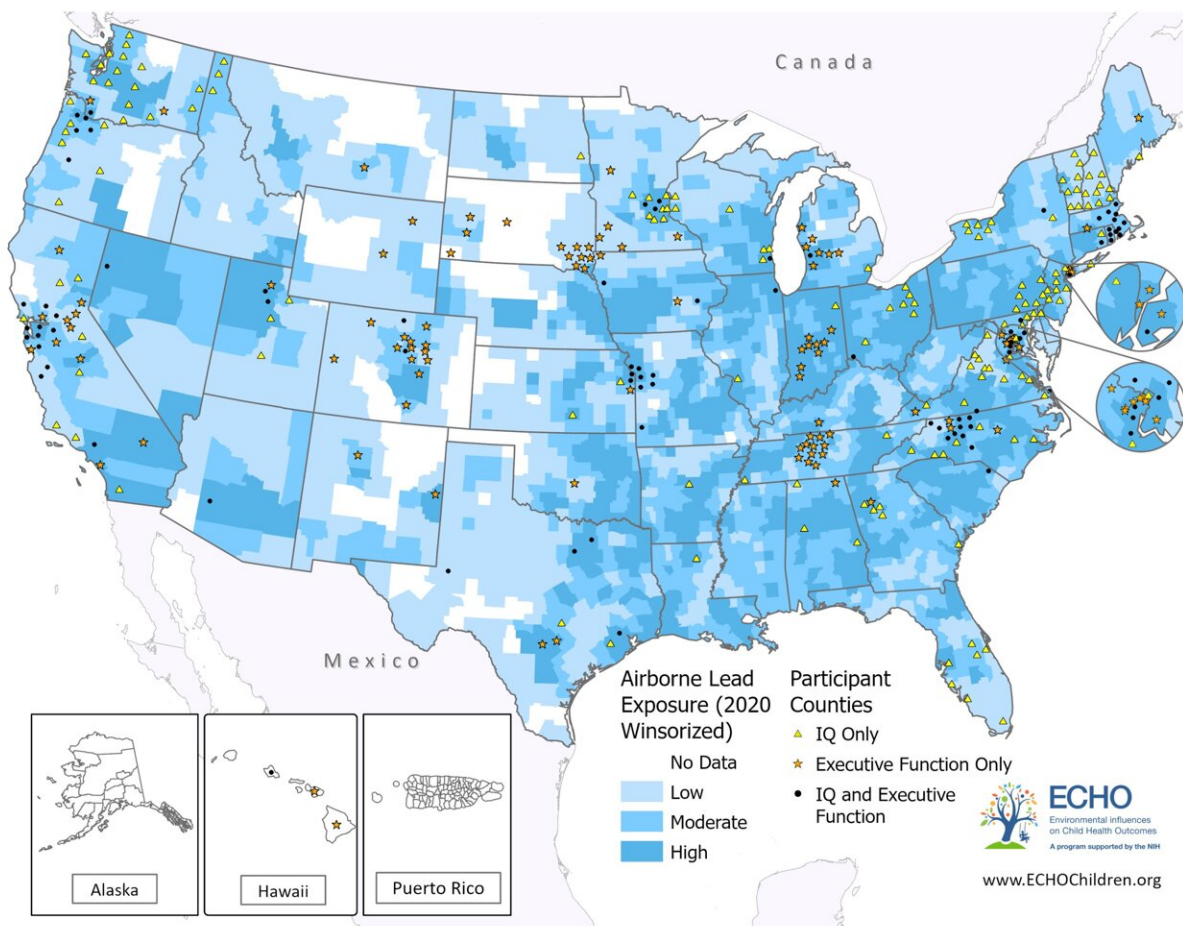


Early-life airborne lead exposure associated with lower IQ and self-control: Study

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Study participants and county-level risk-screening environmental indicators (RSEI) lead toxicity scores: United States, 2020. Credit: NIH/Environmental influences on Child Health Outcomes Program

Children who lived in areas with higher levels of airborne lead in their first five years of life appeared to have slightly lower IQs and less self-control, with boys showing more sensitivity to lead exposure, according to a new study from the NIH Environmental influences on Child Health Outcomes (ECHO) Program.

Lead exposure, [even at low levels](#), can affect cognitive and physical development in children. While children's blood lead levels have decreased in recent decades, inequities persist in areas with older, poorly maintained housing or inadequate water system management. There is limited research on how airborne lead from industrial emissions affects children.

ECHO Cohort researchers wanted to learn if airborne [lead exposure](#) is associated with children's IQ and executive functioning. Their analysis, published in the [American Journal of Public Health](#), suggests there may be an association between lead released into the air and children's brain development.

"To ensure that children have a fair chance at [healthy development](#), reducing the [environmental pollution](#) in general and focusing on factors such as nutrition could lessen the impact of lead exposure on children's development," said study author Lisa Gatzke-Kopp, Ph.D. of Penn State.

In the study, lower average IQ scores were associated with high levels of airborne lead exposure in children between the ages of 4 and 8. A similar association was observed with executive function between the ages of 3 and 8, but only for impulse control and not the ability to follow changes in instructions. The association with impulse control was more pronounced in boys.

To gain these insights, investigators used residential address data of more than 3,000 [children](#) from 14 ECHO Cohorts combined with an

Environmental Protection Agency (EPA) database of historical and geographically specific estimates of airborne lead levels.

After calculating the average lead exposures for each child over the course of their first five years, researchers analyzed their IQ and cognitive test scores from ages 3 to 8, while accounting for a number of additional factors, such as socioeconomic status.

These findings are consistent with a previous study, reinforcing the importance of examining air pollution and child development. However, researchers pointed out that other chemicals could also play a role, and factors like nutrition might help mitigate the effects of lead exposure.

Future studies can examine whether other factors in a child's environment modify lead pollution and why boys appear to be more susceptible.

More information: Lisa M. Gatzke-Kopp et al, Airborne Lead Exposure and Childhood Cognition: The Environmental Influences on Child Health Outcomes (ECHO) Cohort (2003–2022), *American Journal of Public Health* (2024). [DOI: 10.2105/AJPH.2023.307519](https://doi.org/10.2105/AJPH.2023.307519)

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