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

Study Summary

ECHO Study Observes Health Disparities in Air Pollution-associated Risk of Childhood Asthma

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Who sponsored this study?

The Environmental influences on Child Health Outcomes (ECHO) Program, Office of the Director, National Institutes of Health supported this research.

Why was this study needed?

Asthma is one of the most common chronic childhood diseases in the United States, affecting over 4.5 million children. Although air pollution levels have decreased over the past decades, individuals living in certain areas have seen lower reductions in air pollution and may also be more vulnerable to its effects. For this study, researchers examined sociodemographic disparities in the association between air pollution and incident childhood asthma until age 10.

What were the study results?

The study found that higher exposures to fine particulate matter, nitrogen dioxide, and ground ozone were associated with a higher incidence of asthma in the first 10 years of a child's life. For fine particulate matter and nitrogen dioxide, children from areas with a higher proportion of Black residents or higher population density were identified being at a higher risk for air pollution-associated asthma.

Footnote: Results reported here are for a single study. Other or future studies may provide new information or different results. You should not make changes to your health without first consulting your healthcare professional.

What was the study's impact?

This study showed that sociodemographic disparities in air pollution-associated asthma persist despite reductions in the overall air pollution levels. The study highlighted the potential to mitigate childhood asthma risk by reducing air pollution and addressing the root causes of these disparities.

Who was involved?

The study involved over 23,000 children, born between 1981-2021, from 34 sites in the Environmental influences on Child Health Outcomes (ECHO) Program with data on asthma diagnosis until age 10 in the contiguous US.

What happened during the study?

During the study, the study team collected data on each participant's asthma status, month of diagnosis, and length of their follow-up. They also collected sociodemographic data that included sex, race/ethnicity, maternal education, and more. Lastly, they used area-level data from the 1980-2019 Census Bureau and the American Community Survey on the percent of low-income residents, Black residents, residents with less than a high school education, unemployed residents, and female residents, and overall population density. The study team then analyzed this data, first examining the association between air pollution exposures (fine particulate matter, nitrogen dioxide, and ground ozone) and childhood asthma, then determining whether the sociodemographic and economic variables modified the air pollution-asthma association.

What happens next?

Future studies could help researchers better understand the root causes of susceptibility to air pollution. Additional studies with longer follow-up could also help researchers understand how asthma risk may change throughout childhood as the climate and environmental conditions change. Lastly, additional studies may help researchers understand how personal exposures affect asthma in children, including indoor sources of air pollution.

Where can I learn more?

Access the full journal article, titled "Disparities in the Association of Ambient Air Pollution with Childhood Asthma Incidence in the ECHO Consortium: a US-wide Multi-cohort Study," in *Environmental Epidemiology*.