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

Study Summary

Wildfire Smoke Exposure May Be Linked to Higher Risk of Preterm Birth, ECHO Study Finds

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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?

Wildfire smoke exposure is a growing threat to public health in the United States. The fine particulate matter ($PM_{2.5}$) in wildfire smoke may be more harmful than other kinds of ambient air pollution because of the chemicals it's made of and how these chemicals interact with the body. Pregnant women and the developing fetus may be particularly sensitive to the effects of wildfire $PM_{2.5}$. Previous studies have associated wildfire smoke with preterm birth. This study builds on previous work by including a large number of participants from across the country, accounting for other risk factors, and looking closely at how the timing, intensity, or duration of smoke exposures affects birth outcomes.

What were the study results?

Nearly all pregnant participants (99.2%) experienced at least one day of wildfire smoke, with an average of 22 smoke days during pregnancy. The study found that higher average wildfire smoke exposure during pregnancy was linked to a slight increase in risk for preterm birth. The connection was clearer in the Western U.S., especially with more intense or longer-lasting smoke events. Preterm birth was also associated with exposure to smoke days in mid-to-late pregnancy at the national level.

What was the study's impact?

The study highlighted that exposure to wildfire-specific $PM_{2.5}$, particularly at higher intensities and durations, is a risk factor for preterm birth. This is especially relevant in the Western U.S., where associations were more pronounced.

Who was involved?

The study included 20,034 pregnant participants who gave birth between 2006 and 2020, recruited from 30 ECHO Cohort Study Sites with residences during pregnancy in all 48 contiguous US states and the District of Columbia across the U.S.

What happened during the study?

The study tracked how much wildfire smoke pregnant participants were exposed to based on where they lived. Researchers looked at both the amount and duration of smoke, including stretches of smoky days in a row. They then used statistical methods to see if greater smoke exposure was linked to a higher risk of preterm birth, while also accounting for other health and social factors.

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 happens next?

Future research could help identify regional differences in the effects of wildfire exposure, how wildfire smoke interacts with other risks like extreme heat, which parts of the smoke are most harmful, and how well different prevention strategies work to reduce exposure and related health outcomes.

Where can I learn more?

Access the full journal article, titled “Wildfire-specific fine particulate matter and preterm birth: a US ECHO Cohort analysis,” in *Lancet Planetary Health*.

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