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

Study Summary

ECHO Study Finds Exposure to Phenols During Pregnancy Associated with Changes in Non-Nutritive Suck Patterns in Infants

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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?

During this study, researchers evaluated the relationship between exposure to phenols—chemicals used in a variety of consumer products and industrial processes that can disrupt hormones—during pregnancy and non-nutritive sucking patterns in infants. Non-nutritive sucking is a common behavior during infancy where a baby may suck on an object that cannot provide nutrients, such as a pacifier. Non-nutritive sucking is characterized by bursts of sucking separated by pauses to breathe. Researchers can measure the frequency, speed, and strength of non-nutritive sucking. Because sucking is a behavior present from birth that is controlled by neurons in the brainstem, it is an ideal indicator of early brain development. Previous studies have indicated that non-nutritive sucking patterns can be affected by environmental exposures during pregnancy. Understanding this relationship could provide insights into how prenatal chemical exposures impact early neurodevelopment.

What were the study results?

The study found that phenol exposure during pregnancy was linked to changes in non-nutritive suck patterns in infants. Specifically, exposure to Bisphenol F, a common alternative to Bisephenol A or BPA found in some food packaging, was related to a lower non-nutritive suck frequency. Alternatively, exposure to Triclosan, an antimicrobial chemical found in some soaps, was associated with a higher non-nutritive suck frequency. Exposure to other phenols used as preservatives and industrial processes (propylparaben, 2,4-dichlorophenol, and 2,5-dichlorophenol) was associated with weaker non-nutritive suck. Exposure to some phenols used in sunscreens and industrial processes (benzophenone-3, 2,4-dichlorophenol, and 2,5-dichlorophenol) were related to more non-nutritive suck bursts per minute. Propylparaben, a chemical used in some preservatives, was associated with more non-nutritive sucking per burst.

What was the study's impact?

This study provides additional evidence that exposure to phenols may affect early brain development. Continued research into the effects of pregnancy exposures on infant health and development can help inform strategies for reducing potentially harmful exposures.

Who was involved?

The study included 215 mother-infant pairs from two ECHO Cohort study sites: the Illinois Kids Development Study (IKIDS) and ECHO in Puerto Rico (ECHO-PROTECT).

What happened during the study?

During the study, researchers measured phenol exposure by analyzing phenol levels in maternal urine samples collected during pregnancy. Non-nutritive sucking was evaluated in 1- to 8-week-old infants using a custom pacifier for approximately 5 minutes. Statistical methods were used to investigate how exposure to 11 different phenols and triclocarban—another chemical used as an antibacterial agent in some soaps—affected non-nutritive suck, adjusting for factors like study site, child sex and assessment age, and maternal age and education.

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 studies could help clarify why non-nutritive suck patterns change in response to certain pregnancy exposures and how these changes might affect the baby's brain development as they grow.

Where can I learn more?

Access the full journal article, titled “Examining the association between prenatal Phenol exposure and infant non-nutritive suck in two ECHO Cohorts,” in *Environmental Epidemiology*.