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

Study Summary

ECHO Study Analyzes Relationship Between Molecules During Pregnancy and Childhood BMI

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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?

A child's body mass index (BMI) can be associated with their future health. Some researchers seek to understand how factors during pregnancy may influence childhood BMI. Increasingly, researchers use molecular data to analyze the relationship between pregnancy and childhood health outcomes. Researchers sometimes combine molecular data from multiple study sites to increase the statistical power of these analyses. This study aimed to evaluate molecular data during pregnancy across multiple study sites while also using these data to test a framework for analyzing molecular data across multiple studies.

What were the study results?

ECHO researchers combined the results from multiple ECHO Cohort Study Sites including mothers and their children to determine whether a relationship existed between small molecules present in the mother's blood during pregnancy and later childhood BMI. Altogether, 20 molecules showed up in all study sites, and 127 molecules showed up in at least two. The study found that the levels of only six small molecules, primarily related to maternal diet, were associated with BMI across all sites. However, statistical analysis across these study sites did not identify significant associations between these molecules and child BMI.

What was the study's impact?

This study demonstrates some of the challenges that arise when harmonizing molecular data across diverse study sites and highlights important considerations for researchers trying to conduct similar analyses. Ensuring that all of the studies used in an analysis have the same standardized procedures for collecting samples, measuring molecules present in those samples, and collecting related data (e.g., BMI, diet) can improve the reliability and reproducibility of results.

Who was involved?

This study involved mothers and their children from multiple study sites: the Atlanta ECHO Cohort, the New Hampshire Birth Cohort, and the Vitamin D Antenatal Asthma Reduction Trial. The researchers

included mothers in the second and third trimesters of pregnancy and measured their children's BMI at the age of two years.

What happened during the study?

For this study, the authors combined existing results from multiple study sites. Pregnant people provided blood samples, and researchers used those samples to measure a range of small molecules. These molecules provide information on each participant's health, environment, and biological/genetic factors that could affect their pregnancy. The researchers continued to follow these participants and their children across pregnancy and early life to assess their ongoing health, height, and weight. Ultimately, in this analysis, the authors used data from these studies to evaluate the relationship between molecules measured during pregnancy and BMI at age two years, aiming to identify relationships that were consistent across all three studies.

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?

Differences in how molecular data were collected and measured between the sites in this study made it difficult to draw strong conclusions on the relationship between small molecules during pregnancy and childhood BMI. Future analyses could involve larger, more standardized studies that all use the same methods for sample collection and measurement. Many ECHO Cohort Study Sites are now measuring small molecules in both mothers and children with a standardized approach under the ECHO Cohort Data Collection Protocol. ECHO researchers have an opportunity to use these data to power analyses that can explore the relationship between pregnancy health and child health outcomes.

Where can I learn more?

Access the full journal article, titled "Metabolomic Data Presents Challenges for Epidemiological Meta-Analysis: A Case Study of Childhood Body Mass Index from the ECHO Consortium," in *Metabolomics*.