



ECHO

Environmental influences
on Child Health Outcomes

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Study Summary

“Accelerated” Biological Age at Birth Not Linked to Behavioral and Emotional Health Outcomes in Early Childhood

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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?

Previous studies have shown that early identification and intervention in the development of emotional and behavioral health challenges in children seems connected to better long-term health outcomes. Recently, researchers have begun looking at how epigenetic factors affect children’s [biological age](#) and health outcomes.

A molecular process known as DNA methylation, or DNAm, adds a tag to DNA to control gene expression. Researchers measure DNAm to estimate a person’s biological age and compare it with their chronological age to better understand the factors that may influence their long-term health outcomes. In this study, ECHO researchers looked at the link between biological age at birth, the time between conception and birth (chronological gestational age), and emotional and behavioral health outcomes in children.

What were the study results?

Differences between biological age at birth and chronological gestational age did not appear linked to emotional and behavioral problems in childhood. This study did not find any difference between boys and girls in terms of the effect of “accelerated” biological age on behavioral and emotional outcomes.

Footnote: Results reported here are for a single study. Other or future studies may provide new information or different results. You should always consult with a qualified healthcare provider for diagnosis and for answers to your personal questions.

What was the study’s impact?

These results highlight that because biological age at birth does not seem to predict emotional or behavioral health challenges in early childhood, research should investigate how other biological factors at birth may influence neurodevelopmental health outcomes in early childhood.

Who was involved?

The study included four ECHO research sites in the United States and a total of 592 children.

What happened during the study?

Researchers calculated each child's "biological age" by analyzing DNA samples collected at birth, and they compared this age to the child's chronological gestational age. They then tested whether newborns who showed increased biological age relative to their chronological age ("accelerated aging") were more likely to have emotional and behavioral problems in early childhood.

What happens next?

Future research in a larger sample might confirm these findings. The relatively small sample size of this study may have made it difficult to observe differences in behavioral or emotional outcomes based on child sex. Future research with larger samples could help investigate potential differences in the results between boys and girls.

Where can I learn more?

Access the full journal article, titled "Accelerated epigenetic age at birth and child emotional and behavioral development in early childhood: a meta-analysis of four prospective cohort studies in ECHO," in [Epigenetics](#).

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