



ECHO

Environmental influences
on Child Health Outcomes

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Study Summary

Prenatal Exposure to Organophosphate Esters Associated with Increased Autism-Related Outcomes, 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?

Organophosphate esters (OPE) replaced harmful polybrominated diphenyl ethers (PBDEs) as flame retardants and plastic softeners in the mid-2000s. They are now present in various household and industrial products, including polyurethane foam, furniture, electronics, construction materials, infant products, textiles, and fabrics. Health officials and researchers currently know little about how OPEs affect child development. Earlier studies have suggested a link between prenatal exposure to these chemicals and birth outcomes and cognitive and behavioral problems in children. This study investigated the potential effects of prenatal exposure to nine OPEs on child autism-related outcomes.

What were the study results?

The study found generally small associations between three OPEs and child autism-related outcomes. Specifically, high exposure to bis(butoxyethyl) phosphate (BBOEP) was associated with higher scores for autism-related traits and greater odds of autism diagnosis. Another OPE, bis(1-chloro-2-propyl) phosphate (BCPP) showed associations with higher autism-related trait scores. High exposure to bis(2-chloroethyl) phosphate (BCETP) was associated with lower odds of autism diagnosis. The study also found that the association between BBOEP and higher autism-related traits scores was stronger in boys than in girls.

What was the study's impact?

This study underscores the need to better understand and address the potential developmental toxicity of these widely used chemicals.

Who was involved?

The study included 4,159 mother-child pairs with children born from 2006 to 2020 from 15 study sites in the ECHO Cohort.

What happened during the study?

Researchers analyzed urine samples from pregnant mothers for nine OPE biomarkers. The researchers then assessed child autism-related traits via the Social Responsiveness Scale (SRS) and collected

information on whether they received a clinical autism diagnosis to examine associations between prenatal OPE exposure and child neurodevelopment.

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 replicate these findings in different populations and use multiple measures of OPEs throughout pregnancy to better understand the critical exposure windows and long-term effects of OPEs on child neurodevelopment. Additionally, further studies could help researchers explore the potential sex-specific effects of prenatal OPE exposure.

Where can I learn more?

Access the full journal article, titled “Exposure to organophosphate ester flame retardants and plasticizers during pregnancy and autism-related outcomes in the ECHO Cohort,” in [Environmental Health Perspectives](#).

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