



# ECHO

Environmental influences  
on Child Health Outcomes

A program supported by the NIH

## Study Summary

### ***ECHO Study Finds Link Between Phthalate Exposure and Preterm Birth, Estimates Potential Costs***

*Authors: Leonardo Trasande, et al.*

#### 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?

Phthalates are widely used chemicals found in some consumer products, and previous research has linked phthalate exposure to preterm birth. In response, the use of di-2-ethylhexyl phthalate (DEHP), a common type of phthalate, has decreased in recent years. However, there is limited research on the effects of the replacement phthalates, and the costs associated with phthalate exposure remain unquantified. ECHO Cohort researchers wanted to learn about the potential connections between phthalates, their metabolites in the urine of pregnant individuals, and birth outcomes—including birth weight and length of pregnancy. The study also sought to estimate the potential costs associated with adverse birth outcomes.

#### What were the study results?

When the researchers grouped mothers based on the amount of DEHP metabolites (substances produced when the body breaks down DEHP) found in their urine, they found that the 10 percent with the highest levels had a 50 percent higher chance of giving birth before the 37th week of pregnancy compared to the 10 percent with the lowest levels.

Some common alternatives to DEHP were associated with even higher risk of preterm birth. Women exposed to the highest amounts of these alternative chemicals—phthalic acid, di-isodecyl phthalate (DIDP), di-n-octyl phthalate (DnOP), and diisononyl phthalate (DiNP)—had twice the risk of preterm birth compared to those with little to no exposure to these alternatives.

Researchers estimated that the number of premature births in the U.S. that could be linked to phthalate exposure in 2018 was between 24,000 and 120,000, potentially costing between \$1.6 billion and \$8.1 billion in medical expenses over the lifetime of the children.

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 was the study's impact?

This ECHO Cohort research examines the effect of phthalates on birth outcomes such as preterm birth and birth weight. These findings associated adverse birth outcomes with exposure to DEHP and its chemically similar substitutes, which can inform the development of policies, programs, and practices that can help prevent or lessen potentially harmful exposures during pregnancy.

### Who was involved?

The study included 5,006 mother-child pairs from 13 ECHO Cohort Study Sites across the U.S. Researchers included individuals with information on up to 20 urinary phthalate metabolites. The pregnant participants were aged 25 to 34 at the time they gave birth.

### What happened during the study?

The researchers analyzed levels of 20 phthalate metabolites in urine samples collected at three points during each participant's pregnancy. They also investigated the differences between specific types of phthalates, comparing DEHP with several newer alternatives developed to replace it. Then, the team looked for associations between these metabolite levels and preterm births. They also calculated the number of premature births that could be linked to phthalate exposure and the possible associated costs over the lifetime of the child.

### What happens next?

Future research could look at how exposure to replacement phthalates affects child development after birth. The European Union has prohibited the use of certain phthalates in some consumer products—as have California and a few other U.S. states.

### Where can I learn more?

Access the full journal article, titled "Prenatal phthalate exposure and adverse birth outcomes in the USA: a prospective analysis of births and estimates of attributable burden and costs," in [The Lancet Planetary Health](#).

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