



# ECHO

Environmental influences  
on Child Health Outcomes

A program supported by the NIH

## Study Summary

### ***ECHO Study Reveals Pregnant People Are Exposed to Dangerous Chemicals Found in a Variety of Household Products***

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#### Who sponsored this study?

This research was supported by the Environmental influences on Child Health Outcomes (ECHO) Program, Office of The Director, National Institutes of Health.

#### Why was this study needed?

Chemicals like melamine, cyanuric acid, and aromatic amines are commonly used to make a variety of household products. Melamine can be found in dishware, plastics, flooring, kitchen counters, and pesticides. Cyanuric acid can be found in disinfectants, plastics, and swimming pools. And aromatic amines can be found in hair coloring, mascara, tattoo ink, paints, tobacco smoke, and diesel fumes. People can be exposed to these chemicals through the air, contaminated food, household dust, water, plastics, products that contain dyes and pigments, and many other sources.

Melamine was globally recognized as toxic after baby formula poisoning incidents in 2007 to 2008, which resulted in health problems in children including kidney stones, kidney failure, and in some cases, death. Research suggests that melamine may also be linked to reduced brain development. There is limited research on the effects of melamine on adults, although preliminary evidence suggests that it may be linked to cancer and other negative health outcomes. Prior studies on melamine were only conducted among pregnant people in Asian countries or limited to non-pregnant people in the U.S. Despite melamine's potential harm and common use in household products, population-level exposure is not regularly monitored in the U.S.

#### Who was involved?

This study included 171 pregnant people from nine ECHO cohorts located in California, Georgia, Illinois, New Hampshire, New York, and Puerto Rico. Of these participants, 40% were Hispanic, 34% were White, 20% were Black, 4% were Asians, and the remaining 2% were from other or multiple racial groups.

#### What happened during the study?

Researchers measured the levels of 45 chemicals in urine samples collected from participants during pregnancy. They used new methods to capture the levels of these chemicals in the urine samples, even those present in small amounts. Then, the researchers compared chemical levels across participants with different sociodemographic backgrounds.

## What were the study results?

Melamine and cyanuric acid were found in over 99% of the study participants. Four types of aromatic amines were also found in nearly all pregnant participants. Levels of these chemicals were higher among Hispanic and non-Hispanic Black participants and in those exposed to tobacco smoke. For example, levels of 3,4-dichloroaniline—a chemical used in the production of dyes and pesticides—were more than 100% higher among Black and Hispanic women compared to White women.

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.

## Impact

This is the first national study to reveal that pregnant people in the U.S. are widely exposed to melamine, cyanuric acid, and aromatic amines—chemicals that may be harmful to maternal health and child development. This raises concerns for the health of pregnant people and babies.

## What happens next?

Researchers are expanding on this study to look at the effects of higher exposures to these chemicals during pregnancy in over 1,700 pregnant people and investigate whether these exposures are linked with child health outcomes.

## Where can I learn more?

Access the full journal article, titled “Exposure to melamine and its derivatives and aromatic amines among pregnant women in the United States: The ECHO Program,” in [Chemosphere](#).

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