



# ECHO

Environmental influences  
on Child Health Outcomes

A program supported by the NIH

## Study Summary

### ***Obesity, Diabetes, & High Blood Pressure Before and During Pregnancy are Associated with Higher Blood Pressure in Children***

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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?

High blood pressure in childhood is linked to a higher risk of experiencing high blood pressure and other heart-related complications later in life. Preventing high blood pressure during childhood could be a promising strategy to improve cardiovascular health into adulthood. Growing evidence suggests that maternal health during pregnancy may be a contributor. For this study, researchers wanted to look at how three common cardiometabolic risk factors— pre-pregnancy obesity, gestational diabetes, and high blood pressure (hypertension) during pregnancy—are related to blood pressure in their children between ages 2 and 18.

#### What were the study results?

A new finding from this study is that when mothers had more than one health issue during pregnancy— especially when high blood pressure occurred alongside gestational diabetes or pre-pregnancy obesity— their children’s blood pressure was higher than when the mother had only one of these conditions. Of the mothers included in this study, 44% had at least one cardiometabolic risk factor during pregnancy. The most common was pre-pregnancy obesity at 26%, followed by high blood pressure at 14% and gestational diabetes at 7.3%. Children whose mothers had any of these health issues during pregnancy had higher average blood pressure when compared to those born to mothers who did not. This was true for [the top \(systolic\) and the bottom \(diastolic\) numbers](#) in a blood pressure reading, even after accounting for the child’s age, sex, and height. These children also showed an increased rate of blood pressure change between ages 2 and 18. The association was stronger for diastolic blood pressure in female children and for systolic blood pressure in non-Hispanic Black children whose mothers had gestational diabetes or high blood pressure during pregnancy.

#### What was the study’s impact?

This study can help researchers and clinicians better understand how a mother’s heart and metabolic health during pregnancy may influence a child’s long-term cardiovascular health. This highlights the potential value of early-life interventions aimed at monitoring and managing blood pressure in children with prenatal exposure to these maternal risk factors.

## Who was involved?

The research included 12,480 mother-child pairs from study sites in the ECHO program. The mother's average age at pregnancy was 30 years, and 47% of participating mothers were non-White. At least one maternal cardiometabolic risk factor was present in 44% of the mothers.

## What happened during the study?

Researchers gathered information about mothers' heart and metabolic health from medical records or surveys. They also collected blood pressure readings from their children, either during study visits or from their medical records. They used statistical methods to look at how a mother's health before and during pregnancy might be linked to her child's blood pressure—both at the youngest age and as the child grew from age 2 to 18. They also looked at whether these links were different depending on the child's sex or race and ethnicity.

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?

More research could help researchers understand how combinations of maternal cardiometabolic risk factors influence children's blood pressure over time. Future studies could also examine how structural and social factors contribute to maternal health during pregnancy and shape long-term cardiovascular health in children.

## Where can I learn more?

Access the full journal article, titled "Maternal cardiometabolic risk factors in pregnancy and offspring blood pressure at age 2-18 years," in [JAMA Network Open](#).

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