



ECHO

Environmental influences
on Child Health Outcomes

A program supported by the NIH

Study Summary

Location of Wheezing Gene Linked to Different Wheezing Patterns in Young Children

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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 under Award Number 5UH3 OD023282.

Why was this study needed?

Previous studies have shown that many children wheeze during the first few years of life—some later stop, while others can develop ongoing asthma. Other children do not wheeze during early life but still develop asthma later during childhood. Understanding where these patterns come from may shed light on how asthma begins and help doctors identify children who might need help earlier. Other studies identified small changes in specific genes that could be responsible for some cases of childhood asthma. This study tried to find possible connections between those small gene changes and different wheezing patterns in children. This is also the first study that looks at how small genetic changes may relate to specific patterns of wheezing in African American (AA) children.

Who was involved?

Data came from children enrolled at birth in seven different studies across the US. Nearly 3,700 children who experienced at least three wheezing events were included, and researchers analyzed the genes of 1,928 of these children. About 32% of these children were AA. Each study site used questionnaires and interviews to collect information from children and their parents over many years.

What happened during the study?

The team collected patient characteristics and data on wheezing and asthma and pulled those data together to group each child based on when and how often they wheezed from birth to age 11. Each site also collected DNA samples from the children and sent them to be analyzed for small changes in genes associated with asthma. The researchers used statistics to identify four different wheezing patterns and connect them with specific genetic changes.

What were the study results?

Four wheezing patterns were seen among the children: (1) infrequent—few wheezing episodes in the first three years then none after that; (2) transient—some wheezing in first few years then fewer and gone by around age six; (3) late onset—little wheezing in the first few years then slowly happens more often; (4) persistent—many wheezing episodes over the first 11 years.

About half of children experience wheezing before three years old, and 62% wheezed in the first 10 years of life. The wheezing may start because of a viral infection (like the common cold). Many children only wheeze as preschoolers. AA children were more likely than European American (EA) children to have persistent wheezing.

Several small gene changes were connected to transient, late onset, and persistent wheezing in EA children, but for both AA and EA children, only two specific small gene changes were connected with a greater likelihood of the child wheezing after the first three years.

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

For the first time, it is reported that genetic changes associated with childhood asthma are also associated with all wheezing patterns in young children. These wheezing patterns were found consistently in children located in different cities and born in different decades.

Wheezing in young children is often a result of common respiratory viruses that affect breathing. These findings, together with what we know about the genes associated with asthma, suggest that some of these small gene changes may be connected to a higher risk of colds and other viral airway infections that trigger wheezing in small children.

This study also highlights the importance of including multiple race/ancestry groups in genetic studies to understand how small changes in genes are connected to different health outcomes in diverse groups.

What happens next?

The team is looking at possible associations between children's insulin levels, genetic variations, and the development of asthma in childhood.

Where can I learn more?

Access the [full journal article](#), titled "Chromosome 17q12-21 Variants Are Associated with Multiple Wheezing Phenotypes in Childhood," in the *American Journal of Respiratory and Critical Care Medicine*.

Additional Details

This project would not have been possible without ECHO CREW support, as the data came from seven separate birth cohorts brought together by that program. In particular, combining those datasets was essential to getting a large enough sample size to include AA children.

[Read the corresponding article.](#)

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