



Can asthma be diagnosed in infancy?

Researchers have tested a new method for identifying infants and preschoolers at risk for asthma.

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Citation

Lu Z, Foong RE, Kowalik K, Moraes TJ, Boyce A, Dubeau A, Balkovec S, Gustafsson PM, Becker AB, Mandhane PJ, Turvey SE, Lou W, Ratjen F, Sears M, Subbarao P. Ventilation inhomogeneity in infants with recurrent wheezing. *Thorax*.

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What is this research about?

Asthma, the most common chronic disease of childhood, begins early in life—but doctors and scientists don't know exactly how early.

Asthma can damage a child's growing lungs and lead to lifelong respiratory problems, so detecting the first signs of airway change is critical so doctors can provide rapid treatment.

The Lung Clearance Index (LCI) is a sensitive marker of early airway disease that has been used to diagnose and monitor children with cystic fibrosis. This research explored whether or not the LCI could also be used to detect early lung changes in children with recurrent wheezing—a high-pitched whistling sound in the chest that is a common symptom of asthma.

What did the researchers do?

The researchers used the LCI to compare the lung function of infants with recurrent wheezing with the lung function of healthy infants. They collected data from 37 infants and young children, aged four to 36 months, seen at the asthma clinic at The Hospital for Sick Children—a regional referral centre for severe asthma. They also collected data from 113 healthy infants and children participating in the Toronto site of the Canadian Healthy Infant Longitudinal Development (CHILD) Study—a general-population birth cohort study.

The LCI was measured using a technique called the Multiple Breath Washout (MBW), in which the child breathes quietly through a face mask while sleeping. The mask delivers a special air mix containing oxygen and a tiny amount of a "tracer" gas, which has no effect on the body. Doctors measure how efficiently the lungs are working by tracking the time it takes the tracer gas to "wash out" of the body during normal respiration.

The researchers then compared the LCI scores of the children with recurrent wheezing to the scores of the healthy children

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What did the researchers find?

LCI scores

The researchers detected elevated LCI scores in 19% of the children with recurrent wheezing. Only 1.8% of the healthy children had elevated LCI scores.

Higher LCI levels indicate more severe lung disease. The children with wheezing were tested when they had no symptoms, which suggests that their lung function may be poorer than the lung function of healthy children, even when no symptoms are present. This finding suggests that the LCI may be a useful tool for diagnosing asthma and other respiratory problems at an early age.

Need for “local” control group

This study was unique because, for the first time, researchers compared the LCI’s of wheezing infants with healthy infants living in the same region (Toronto, ON) and tested at the same site (The Hospital for Sick Children) with the same equipment.

The researchers found that the LCI scores for the healthy children in this study differed significantly from previously published LCI data for healthy children. This finding suggests that local conditions can influence LCI scores. Therefore, it is recommended that future lung function studies recruit local healthy controls to be used in the research, rather than relying upon previously published LCI data.

How can this research be used?

This research suggests that the LCI may be a useful tool to measure lung function for children with recurrent wheezing even during routine medical visits when a child is well and without symptoms.

The research may also lead to the use of the LCI to help predict which children will have persistent wheezing and, therefore, are at higher risk for developing asthma in early childhood. In addition, this research may help us to understand the early-life impacts of asthma on the developing lung and to ultimately improve asthma care and treatment.