

## Lung Clearance Index a sensitive marker for infants at risk for asthma

HAMILTON, ON (2 August 2018)

Conventional lung function tests used to diagnose asthma and other childhood breathing problems may not detect subtle tell-tale changes in the small airways of very young children.

Now, researchers from the [CHILD Study](#) have studied the Lung Clearance Index (LCI) measurement and found that it can detect lung problems in children as young as four months of age.

The [research](#), published in the June 2018 issue of *Thorax*, was led by CHILD Study Director Dr. Padmaja Subbarao. Dr. Subbarao is a staff respirologist at The Hospital for Sick Children (SickKids) and an associate professor in the Departments of Paediatrics and Physiology at the University of Toronto.

“Asthma is the most common chronic disease of childhood and detecting airway changes early is critical so that doctors can provide appropriate treatment before lung damage occurs,” says Dr. Subbarao.

“LCI has been shown to be a sensitive marker of early airway disease in children with cystic fibrosis, so we set out to see if it would also be useful to identify infants with recurrent wheezing who are at risk of developing asthma.”

The researchers tested LCI in 37 infants with a history of wheezing who were referred from a hospital outpatient clinic and 113 healthy infants who are participating in the CHILD Study—a national health research project involving nearly 3,500 Canadian children and their families.

“We detected elevated LCI scores in 19% of the infants with recurrent wheeze, even though they had no chest symptoms at the time of measurement, while only 1.8% of the healthy infants had elevated LCI scores,” comments Dr. Subbarao.

LCI was measured using a technique called the Multiple Breath Washout (MBW), in which the infant 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 for the tracer gas to “wash out” of the body during normal respiration.

“Unlike other lung function measures, LCI is highly sensitive to a narrowing of the small airways, where lung disease often starts,” says AllerGen trainee and study first-author Zihang Lu, a PhD candidate at SickKids. “Higher LCI values indicate more severe lung disease. We found that LCI was elevated in kids with wheeze even when they had no symptoms, suggesting that the test could be useful at routine clinic visits when the child is well.”

This study is unique in that most previous papers describing lung function in infants with airway disease have not compared them to healthy controls, according to the study authors. By comparing

both groups, these results indicate that “LCI may be effective in detecting early lung disease, even before symptoms are apparent.”

“We are incredibly fortunate to have the CHILD Study right here in Canada to help us understand how chronic diseases, including asthma and other respiratory diseases, begin in early life,” adds Dr. Subbarao. “CHILD has been following thousands of Canadian children since before birth, which means that we can undertake continuous assessments of lung growth and development from infancy, offering us invaluable information on the progression of lung disease.”

### **About the CHILD Study and AllerGen NCE**

Funded by AllerGen and CIHR, the [CHILD Study](#) is collecting a vast range of health, lifestyle and environmental exposure information from more than 3,500 mothers and children from pregnancy to age five. The study spans four provinces (BC, AB, MB and ON), involving over 140 multidisciplinary researchers, students and research staff. St. Joseph’s Healthcare Hamilton hosts the CHILD Study’s National Coordinating Centre.

[AllerGen NCE Inc.](#) is a national research network dedicated to improving the quality of life of people suffering from allergic and related immune diseases. Funded by Innovation, Science and Economic Development Canada through the federal Networks of Centres of Excellence (NCE) Program, the Network is hosted at McMaster University in Hamilton, ON.

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