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## **Study reveals genetic testing's promise for predicting which children will grow out of asthma**

Genetic risk assessments could be used to predict which children with asthma are likely to grow out of the condition, and which will continue having symptoms as they grow older, new research emerging from the University of Otago's world-renowned Dunedin Study suggests.

A team of Otago and Duke University researchers set out to test how genetic discoveries about asthma predisposition relate to the developmental and biological characteristics of the condition. Their findings are newly published **Online First** in the UK journal *The Lancet Respiratory Medicine*.

After analysing data from the long-running Dunedin Multidisciplinary Health and Development Study of around 1,000 children born in 1972-73, the team discovered that those with childhood asthma and higher genetic risk scores for being predisposed to it were more than one-third (36%) more likely to develop asthma that persists throughout their lives than those found to have a lower genetic risk.

Approximately half of all children with asthma will grow out of it by the time they reach adolescence or adulthood. Currently, there are no tests that can predict which children will never grow out of asthma and which will recover as they get older.

Recent genome-wide association studies (GWAS) have identified several genetic variants (single nucleotide polymorphisms, or SNPs) which carry a small increased risk of asthma. The current study was designed to investigate whether these known genetic risks are related to the onset, persistence, and severity of asthma, and with disruptions to daily life (e.g. absence from school and work, and hospital admissions).

The researchers constructed a genetic risk score based on 15 GWAS-identified variants and then tested associations between the scores and physical manifestations\* of asthma in 880 Study members.

They established that boys and girls with higher risk scores had a greater likelihood of developing asthma over the 38 years of follow-up than those with a lower genetic risk, and developed asthma earlier in life.

Participants with asthma and a higher genetic risk were also more likely to develop atopic (allergic) asthma and impaired lung function (airway hyper-responsiveness and incompletely reversible airflow obstruction), and to miss school or work and to be hospitalised because of asthma, than those with a lower genetic risk.

Importantly, the predictive value of the genetic risk score was independent of, and provided additional information to, family history.

“Although our study revealed that genetic risks can help to predict which childhood-onset asthma cases remit and which become life-course-persistent, genetic risk prediction for asthma is still in its infancy,” explains lead author Daniel Belsky from Duke University

Medical Center in the USA. “As additional risk genes are discovered, the value of genetic assessments is likely to improve. But our predictions are not sufficiently sensitive or specific to support their immediate use in routine clinical practice.”

\*These manifestations included atopy, which is associated with a persistent and severe asthma; airway hyper-responsiveness, which provides indirect confirmation of active airway inflammation; and incompletely reversible airflow obstruction, which identifies harmful changes to the airways resulting from chronic asthma.

**Belsky, D. W., Sears, M. R., Hancox, R. J., Harrington, H. L., Houts, R., Moffitt, T. E., Sugden, K., Williams, B. S., Poulton, R., and Caspi, A.** Polygenic risk and asthma's development and course in the first 4-decades of life. *Lancet Respiratory Medicine, Online First*, [http://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(13\)70101-2/abstract](http://www.thelancet.com/journals/lanres/article/PIIS2213-2600(13)70101-2/abstract)

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