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Childhood Body Composition May Help Determine Future Lung Health

Boys and girls with more muscle mass in childhood and adolescence have higher lung function

Barcelona, 11 January, 2019.- **How well we breathe as adults may depend on the amount of fat mass and lean body mass, or muscle, we have as children**, according to a new study led by scientists from the Barcelona Institute for Global Health (ISGlobal), a center supported by the "la Caixa" Foundation. This research has been conducted as part of the [Ageing Lungs in European Cohorts \(ALEC\) project](#), coordinated by Imperial College London.

The study, published online in the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*, reports that **boys and girls with more muscle mass in childhood and adolescence have higher lung function**. The researchers also found that boys, but not girls, with more fat mass have lower lung function.

Previous studies had looked at the association between overall body mass and lung function, but they found contradictory results.

"Some studies related higher body mass with higher lung function while others found higher body mass related to lower lung function," said **Judith Garcia-Aymerich**, senior study author and head of [Non-communicable Diseases and Environment](#) at ISGlobal. "We hypothesized that previous contradictory results could be attributed to the fact that overall body mass does not account for the different contribution of fat and muscle mass."

In the current study, the authors combined body measurements and measurements produced using dual-energy X-ray absorptiometry to distinguish between muscle mass and fat mass. Using common lung function tests, the researchers also measured lung function in children at ages eight and 15 and calculated the growth in lung function during that time. The study had **6,964 participants from the UK population-based Avon Longitudinal Study of Parents and Children (ALSPAC)** birth cohort, also known as the Children of the 90s longitudinal study.

Specifically, the study found:

- In boys and girls, **higher muscle mass was associated with higher levels and lung growth rates of Forced Vital Capacity (FVC)**, the total amount of air a person can exhale taking the deepest breath possible; Forced Expiratory Volume in one second (FEV₁), the amount of air a person can forcefully exhale in one second; and Forced Expiratory Flow at 25-75 percent (FEF₂₅₋₇₅), a measure of the speed that air comes out of the lungs.
- In boys and girls, **higher fat mass was associated with lower levels of FEV₁/FVC**, a measure of airflow limitation often used to help diagnose asthma and chronic obstructive pulmonary disease (COPD).
- In boys, but not girls, higher fat mass was associated with lower levels and lung growth rates of FEV₁ and FEF₂₅₋₇₅.

The researchers adjusted their analysis for a number of factors that might have biased results, including birthweight, maternal smoking during pregnancy and the age of the children at puberty, as well as lung function levels at age eight.

The authors believe their study **has important research and public health implications**: “Our results highlight that body composition, and not just overall body mass, should be assessed when studying the health effects of weight in children”, said **Gabriela P. Peralta**, ISGlobal researcher and first author of the study. “We believe that body composition in childhood and adolescence may play a role in future respiratory health”, she added.

“Public health strategies promoting healthy lifestyles may improve lung function and reduce respiratory morbidity in adult life,” Judith Garcia-Aymerich said. “Such strategies should aim **not only reduce body weight but also reduce fat and increase muscle mass.**”

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Reference

Gabriela P. Peralta, Elaine Fuertes, Raquel Granell, Osama Mahmoud, Céline Roda, Ignasi Serra, Deborah Jarvis, John Henderson, Judith Garcia-Aymerich. Childhood body composition trajectories and adolescent lung function: Findings from the ALSPAC study. *American Journal of Respiratory and Critical Care Medicine*.

About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between the “la Caixa” Foundation and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Parc de Salut MAR and in the academic sphere by the University of Barcelona and Pompeu Fabra University. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the institute’s Education and Policy and Global Development departments. ISGlobal a member of the CERCA programme of the Generalitat de Catalunya.

About ‘Children of the 90s’

Based at the University of Bristol, United Kingdom, the Children of the 90s study (also known as the Avon Longitudinal Study of Parents and Children or ALSPAC) is a long-term health-research project that enrolled more than 14,000 pregnant women in 1991 and 1992. It has been following the health and development of the parents and their children in detail ever since and is currently recruiting the children and the siblings of the original children into the study. It receives core funding from the Medical Research Council, the Wellcome Trust and the University of Bristol. Find out more at www.childrenofthe90s.ac.uk. For media enquiries, please contact alspac-media@bristol.ac.uk.

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