# News Release

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ATS Press Room: 504-670-6926 (May 15 to 20)

Poster session time: 1:30-4:00 p.m. May 18
Location: CC-Room 293-294 (Second Level), Morial Convention Center

## Heavy Exercise May Produce Asthma-Like Symptoms Even in Healthy Children

ATS 2010, NEW ORLEANS— Children who undergo brief periods of intense exercise may exhibit lung dysfunction or other symptoms similar to those experienced by asthma patients, even when no history of asthma exists, according to a study conducted by researchers at the University of California's Irvine and Miller Children's Hospital.

The results of the study will be presented at the ATS 2010 International Conference in New Orleans.

"Studies have shown that in adults, vigorous exercise can cause wheezing and a decrease in pulmonary function testing (PFT), even when there is no prior history of asthma," said lead author and hospital clinician Alladdin Abosaida, M.D. "However, the extent of exercise-associated PFT abnormality in healthy children has received relatively less attention.

"The results of this study indicate that short bouts of heavy exercise do cause a decrease in lung function testing in healthy children without a history of asthma or allergies," he said

Dr. Abosaida and colleagues examined the effects of exercise in 56 healthy children with no clinical history of asthma or allergy, measuring lung function following each exercise test.

"We evaluated two exercise protocols in each child – a constant work rate exercise test commonly used for evaluation of exercise-induced asthma, and a progressive exercise test typically used to determine an individual's aerobic capacity," Dr. Abosaida said.

Nearly half of the children tested had at least one abnormal result when pulmonary function was measured following exercise, he noted. Decrements in PFT measurements typically occurred when bronchial tubes – the primary airways allowing air to enter and exit the lungs – become constricted in response to rigorous activity. This effect, called bronchoconstriction, can arise as the result of an inflammatory response triggered by heavy exercise.

Dr. Abosaida said the results were surprising.

"We did not expect to see pulmonary function abnormalities after short periods of heavy exercise in such a large number of healthy children in our subject population," he said. "We speculate that either the inflammatory response to exercise or cellular changes that may occur as the result of dehydration of the airway surface, or both, led to mild airway obstruction."

Additional research will need to be focused on determining the mechanism of lung dysfunction in children following heavy exercise, and may help identify potential interventions, Dr. Abosaida said.

"More studies are needed to understand the pathogenesis and management plan of exercise-induced bronchoconstriction in healthy children," he added. "In addition, further comparisons are needed between the two exercise protocols for screening of bronchoconstriction to avoid the false negative results that may occur by using a single type of test."

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"Vigorous Exercise Can Cause Abnormal Pulmonary Function in Healthy Children" (Session C109, Tuesday, May 18, 1:30- 4:00 p.m., CC-Room 293-294 (Second Level), Morial Convention Center; Abstract 1450)

**Please note that numbers in this release may differ slightly from those in the abstract. Many of these investigations are ongoing; the release represents the most up-to-date data available at press time.*

# Vigorous Exercise Can Cause Abnormal Pulmonary Function in Healthy Children

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**RATIONAL:** Exercise induced asthma (EIA) is common in children. In adults, it is known that wheezing and decrements in pulmonary function testing (PFT) can occur with vigorous exercise even in those with no prior history of asthma. The extent of exercise associated PFT abnormality in healthy children is relatively unstudied.

**OBJECTIVES:** The aim of the study was to determine if relatively brief periods of heavy exercise would lead to decrements in PFTs in healthy children.

**METHOD:** We evaluated two exercise protocols in each participant--a constant work rate exercise test commonly used as a provocation for EIA (ATS test) and a progressive (RAMP) exercise test typically used to determine the maximal oxygen consumption or aerobic capacity ($VO_2$max). 56 healthy children (28 male) without clinical history of asthma or atopy (mean age 14.7±0.4 [SEM] years, mean BMI% 55±4%) volunteered for this IRB-approved study. The exercise protocols occurred on different days, and gas exchange was measured breath-by-breath. Spirometry was obtained before and 5,10,15,20 and 30 min after each exercise bout. The mean duration of the ramp test was 9.8±0.2 min comparable to the ATS 10.1±0.1 min. The $VO_2$max was 2.14±0.11 l/min while the mean $VO_2$ for the ATS test was 1.6±0.09. The maximum minute ventilation ($V_E$max) was 79.1±3.8 l/min much greater than the mean $V_E$max for the ATS, 53.5±2.4. The mean work rate (WR) for the ramp was 84.7±4.5 watts and was significantly less than the mean WR for the ATS, 102.2±5.8 watts ($p<0.001$). We identified as abnormal exercise-associated decreases in forced expiratory volume in 1 second, FEV1 (≥10%), forced expiratory flow between 25-75% of forced vital capacity, FEF25-75% (≥26%) or peak expiratory flow rate, PEFR (≥15%).

**RESULTS:** 25 subjects (45%) had at least one abnormal result, 8(14%) after the constant WR protocol and 11 (20%) after the RAMP test. Six (11%) subjects had at least one abnormal PFT after both tests. There was no significant difference in the number of abnormal PFTs between the two exercise protocols. **CONCLUSION:** Following heavy exercise, abnormalities in PFTs occurred in a surprisingly large number of healthy children with no history of asthma. We speculate that either the inflammatory response to exercise and/or change in airway osmolarity at high $V_E$ led to mild airway obstruction. Moreover, EIA may represent an augmented inflammatory or allergic element to a naturally occurring phenomenon.