Air Pollution Interacts With Past Episodes of Bronchiolitis in the Development of Asthma


PURPOSE OF THE STUDY. To evaluate whether air pollution affects the development of asthma in children with previous episodes of bronchiolitis.

STUDY POPULATION. A total of 1743 children, with a mean age of 6.83 years, were included in this study. Children were recruited from 16 elementary schools in 7 cities throughout Korea. A total of 1340 of these children were followed up 2 years later.

METHODS. All children had parental completion of the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire and an allergy evaluation consisting of pulmonary function tests, skin-prick testing, and a methacholine challenge at the time of enrollment. Air pollution was calculated as an average of the concentrations of ozone, carbon monoxide, nitric dioxide, sulfur dioxide, and particulate matter <10 μm in diameter between 2001 and 2005, based on a geographic sampling system.

RESULTS. Higher exposure to ozone and carbon monoxide was associated with airway hyperresponsiveness at the time of enrollment. Previous episodes of bronchiolitis increased the child’s risk of both current wheezing and physician-diagnosed asthma. When the 2 factors were combined, the risk of airway hyperresponsiveness, wheezing, physician-diagnosed asthma, and decreased pulmonary function test results was higher.

CONCLUSIONS. In children, those who had both a history of bronchiolitis and exposure to higher amounts of air pollution were found to have a higher prevalence of asthma, heightened bronchial reactivity, and decreased lung function compared with children without these exposures.

REVIEWER COMMENTS. This study is novel in that it is the first to reveal an apparently synergistic effect between bronchiolitis and air pollution on the development of asthma in children. Further research is needed into the mechanisms of this synergy, as well as possible targets for intervention, to prevent the development of asthma in this high-risk population.

Reduced Infant Lung Function, Active Smoking, and Wheeze in 18-Year-Old Individuals


PURPOSE OF THE STUDY. To test the hypothesis that reduced lung function in early life is associated with increased risk of persistent wheeze at age 18 years.

STUDY POPULATION. A total of 253 subjects were originally recruited at age 1 month.

METHODS. Maximal flow at functional residual capacity (VmaxFRC) was measured in 1-month-old infants who were then followed up at ages 6, 12, and 18 years. On the basis of symptoms reported, the subjects were categorized as having remittent wheeze (wheezing at earlier assessments but not at age 18 years), later-onset wheeze (wheezing at age 18 years but not earlier), persistent wheeze (wheezing at age 18 years and at least 1 earlier assessment), or no wheeze. Smoking status was also noted at age 18 years.

RESULTS. Of the subjects originally recruited, 150 were followed up at age 18 years. Thirty-seven of them had recent wheeze. Compared with the no-wheeze group (n = 96), persistent wheeze (n = 13) was independently associated with a reduced percentage of predicted VmaxFRC (mean reduction: 43%; 95% confidence interval [CI]: 13%–74%). Compared with the no-wheeze group, persistent wheeze was also associated with atopy in infancy (odds ratio [OR]: 7.1; 95% CI: 1.5–34.5), maternal asthma (OR: 6.8; 95% CI: 1.4–32.3), and active smoking (OR: 4.8; 95% CI: 1.0–21.3). When only wheeze at age 18 years was considered, a reduced percentage of predicted VmaxFRC was associated with wheeze at age 18 years only among current smokers (P = .04).

CONCLUSIONS. Persistent wheezing is associated with multiple factors, including reduced lung function at age 1 month, infant-onset atopy, maternal asthma, and active smoking. Wheeze at age 18 years, regardless of previous wheeze status, is associated with active smoking but only among those with reduced lung function in infancy.
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