(NO$_3$)$_x$ were estimated by using measurements of these pollutants at 940 locations in the studied communities over a 2-week period.

RESULTS. Among children in high-stress households (perceived stress scale >4), flow in the large airways (forced expiratory volume 1 [FEV1]) decreased by 4.5% and 2.8% for each 21.8 ppb increase in NO$_x$ at homes and schools, respectively. Pollutant effects were significantly larger in the high-stress households compared with lower-stress households ($P = .007$ for residential NO$_x$, $P = .05$ for school NO$_x$). Similar results were observed for lung function volume (forced vital capacity [FVC]). These associations remained after adjustment for sociodemographic factors and in an analysis restricted to children who do not have asthma.

CONCLUSIONS. Results suggest that a high-stress environment in the home, as determined by parental perceived stress, is associated with increased susceptibility to lung function effects of air pollution at home and school.

REVIEWER COMMENTS. Evidence has shown an association between exposure to air pollution and an increase in asthma prevalence, exacerbation rate, and lung function deficits. Additionally, psychosocial stress is associated with increased endogenous steroid production, leading to steroid resistance and diminished anti-inflammatory effect of cortisol. This study examined the detrimental effects of both, with results suggesting that children with high psychosocial stress in the home are more susceptible to the known health effects caused by air pollution. Furthermore, this study evaluated patients both with and without asthma, and showed consistent results in all children with traffic-related air pollution exposure. Those whose parents reported a stressful life during the child’s early school age experienced damaging effects in both FVC and FEV1. Further studies with longitudinal measurement of parental stress, personal stress, and lung function measurement are needed to evaluate this possible association.


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The Respiratory Health Effects of Nitrogen Dioxide in Children With Asthma

PURPOSE OF THE STUDY. To determine the impact of nitrogen dioxide on the respiratory health of children with asthma.

STUDY POPULATION. New Zealand subjects ($n = 349$), ages 6 to 12, with physician-diagnosed asthma and symptoms in the past 12 months, who lived in a home with an unflued gas heater or plug-in electric heater for at least 2 winter periods, were included in this prospective study.

METHODS. Passive diffusion tubes were used to measure nitrogen dioxide levels over four 4-week periods in the 349 living rooms. The subjects measured their peak expiratory flow rate (PEFR) and forced expiratory volume in 1 second (FEV1) daily via small handheld spirometers. Daily measures of asthma severity (cough and wheeze at night, waking, and during the day; and number of preventer and reliever medication puffs) and upper respiratory symptoms (runny nose, sore throat, hoarse voice) were recorded by symptom diaries.

RESULTS. There was a consistent and significant increase in asthma severity symptoms and upper respiratory tract symptoms when subjects were exposed to increased nitrogen dioxide (1.14, 95% confidence interval [CI] 1.12–1.16). Increased indoor nitrogen dioxide was associated with a decrease in lung function as measured by FEV1 and PEFR (–13.21, 95% CI −26.03 to −0.38; and −17.25, 95% CI −27.63 to −6.88, respectively). Outdoor nitrogen dioxide was not found to be associated with respiratory tract or asthma symptoms, medication use, or lung function measurements.

CONCLUSIONS. The results of the study indicate that high levels of indoor nitrogen dioxide (most commonly from unflued gas heaters) are associated with poor pulmonary function and more frequent cough and wheeze in children with asthma.

REVIEWER COMMENTS. Children breathe more air per kilogram of body weight than adults, exposing their airways to a higher percentage of gaseous constituents that can potentially negatively impact respiratory disease. This study adds to the growing literature that nitrogen dioxide from unflued gas heaters (that is, gas heaters with exhaust vents that empty into the home) is a significant contributor to worse asthma severity in children. Health care providers should inquire how their patients’ families heat their homes during the winter in their assessments of potential asthma triggers.


FOOD ALLERGY
The Prevalence, Severity, and Distribution of Childhood Food Allergy in the United States

PURPOSE OF THE STUDY. The purpose of this study was to estimate the overall prevalence of childhood food allergy, and the severity of food-related allergic reactions in the United States.
# The Respiratory Health Effects of Nitrogen Dioxide in Children With Asthma

Katherine Larabee and Wanda Phipatanakul

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