Effect of Exposure to Traffic on Lung Development From 10 to 18 Years of Age: A Cohort Study

PURPOSE OF THE STUDY. To investigate the association between residential exposure to traffic and 8-year lung-function growth in children.

STUDY POPULATION. Two cohorts of 4th-grade children with a mean age of 10 years were recruited from 12 southern California communities and were followed for 8 years. All eligible children were invited, and 3677 (82%) participated; 1445 children were followed for the full 8 years.

METHODS. Yearly pulmonary-function data were obtained for each participant by trained technicians using standard equipment. Indicators of residential exposure to traffic were determined by proximity of the child’s residence to the nearest freeway or major nonfreeway road and by dispersion-model estimates including residence distance to roadways, vehicle counts, vehicle emission rates, and meteorological conditions. Regional air pollution was monitored at a central site within each community. Baseline questionnaires were completed regarding demographic data, doctor-diagnosed asthma, in utero exposure to maternal cigarette smoke, and household exposure to air pollutants. Yearly questionnaires updated information on asthma and personal or environmental tobacco-smoke exposure. Regression models also included adjustment for height, BMI, and recent exercise and respiratory illness.

RESULTS. Children living <500 m from a freeway had reduced 8-year lung-function growth compared with children living >1500 m from a freeway (forced expiratory volume in 1 second deficit: −81 mL [95% confidence interval: −143 to −18]). This effect was slightly greater after adjustment for socioeconomic status and indoor air pollution and after omission of children who changed residence within the study area and continued to participate. Reduced lung-function growth was independently associated with freeway distance and regional air pollutant levels, including nitrogen dioxide, acid vapor, elemental carbon, and particulate matter with aerodynamic diameters of <10 and 2.5 μm. At 18 years of age, lung function was decreased among children who lived <500 m from a freeway (forced expiratory volume in 1 second: 97.0% [95% confidence interval: 94.6 to 99.4]; P = .013).

CONCLUSIONS. The adverse effects of local exposure to freeway traffic on children’s lung development are independent of regional air quality and may result in lung-function deficits later in life.

REVIEWER COMMENTS. This well-designed study suggests a causal association between residential traffic exposure and adverse effects on children’s lung function, especially for children living closest to freeways. A number of other recent cohort studies in children have also suggested associations between traffic-pollution exposure and asthma, respiratory symptoms, and allergic sensitization. Future studies are needed to determine minimum safe distances from major roadways for homes and schools and to continue evaluation of the guidelines restricting levels of airborne pollutants. Concerns regarding the effects of traffic pollutants on children’s respiratory health should continue to be a focus of asthma research.

FOOD ALLERGY

Prevalence and Cumulative Incidence of Food Hypersensitivity in the First 3 Years of Life

PURPOSE OF THE STUDY. To investigate the prevalence and incidence of food hypersensitivity.

STUDY POPULATION. The authors studied a whole population-based birth cohort of 969 children (91% of the target population) born on the Isle of Wight (United Kingdom) between 2001 and 2002.

METHODS. At age 1, 2, and 3 years, all children/parents were invited to attend a clinic for a medical examination and to answer a questionnaire pertaining to food hypersensitivity (FHS), defined as any adverse reaction to food. In addition, all children were asked to participate in skin-prick testing (SPT) to milk, egg, wheat, peanut, sesame, fish, aero-allergens, and other allergens as
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