Traffic-related air pollution, asthma and hay fever at the age of 11

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Background and aim: In the PIAMA-study, we found positive associations between residential exposure to traffic-related air pollution and the incidence and prevalence of asthma and allergy symptoms until age 8. Puberty is an important milestone for the development of asthma and allergy. We therefore extended our previous analyses with three years of follow-up and studied the association between residential exposure to traffic-related air pollution and asthma and hay fever at age 11 years.

Methods: We estimated exposure to NO\textsubscript{2}, fine particulate matter, and soot at the birth address by land-use regression models. Associations of exposure to air pollution with questionnaire-reports of diagnoses and symptoms of asthma and hay fever and were explored by multiple logistic regression analysis in approximately 2600 children. Effects were first estimated for all children and then for boys and girls separately by adding a gender-air pollution interaction term to the model.

Results: The participants' median age was 11.3 years (range 10.1-12.8). Overall, air pollution was (marginally) significantly associated with shortness of breath [adjusted odds ratio (95% confidence interval) 1.36 (1.05-1.77) per 3.5 \( \mu g/m^3 \) (interquartile range) change in \( PM_{2.5} \)] and nocturnal dry cough [1.30 (0.99-1.69)]; doctor-diagnosed hay fever [1.43 (1.03-1.97)], and symptoms of allergic rhinitis [1.25 (0.96-1.63)] during the past 12 months. Associations between \( PM_{2.5} \) and these symptoms of asthma were largely limited to girls, while associations with hay fever were found in boys and girls. However, effects of air were not significantly different between boys and girls. Air pollution was associated with doctor-diagnosed asthma in girls [1.72 (1.00-2.96)], but not in boys [0.83 (0.50-1.35)], p-value interaction < 0.05.

Conclusions: Exposure to traffic-related air pollution is positively associated with symptoms of asthma, hay fever and related symptoms at age 11 years. The association with asthma may be stronger in girls than in boys.