Air pollution and asthma control in the epidemiological study on the genetics and environment of asthma

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Background The associations between exposure to air pollution and asthma control are not well known. The objective of this study was to assess the association between long-term exposure to NO(2), O(3) and PM(10) and asthma control in the follow-up of the Epidemiological study on the Genetics and Environment of Asthma (EGEA2) (2003-2007). Methods Modelled outdoor NO(2), O(3) and PM(10) estimates were linked to each residential address using the 4 km grid air pollutant surface developed by the French Institute of Environment in 2004. Asthma control was assessed in 481 subjects with current asthma using a multidimensional approach following the 2006-2009 Global Initiative for Asthma guidelines. Multinomial and ordinal logistic regressions were conducted adjusted for sex, age, body mass index, education, smoking and use of inhaled corticosteroids. The association between air pollution and the three domains of asthma control (symptoms, exacerbations and lung function) was assessed. ORs are reported per IQR. Results Median concentrations (in micrograms per cubic metre) were 32 (IQR 25-38) for NO(2) (n=465), 46 (41-52) for O(3) and 21 (18-21) for PM(10) (n=481). In total, 44%, 29% and 27% had controlled, partly controlled and uncontrolled asthma, respectively. The ordinal ORs for O(3) and PM(10) with asthma control were 1.69 (95% CI 1.22 to 2.34) and 1.35 (95% CI 1.13 to 1.64), respectively. When including both pollutants in the same model, both associations persisted. Associations were not modified by sex, smoking status, use of inhaled corticosteroids, atopy, season of examination or body mass index. Both pollutants were associated with each of the three main domains of control. Conclusions The results suggest that long-term exposure to PM(10) and O(3) is associated with uncontrolled asthma in adults, defined by symptoms, exacerbations and lung function
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