

Savouré M, Lequy E, Bousquet J, de Hoogh K, Goldberg M, Vienneau D, Zins M, Nadif R, Jacquemin B

Association between long-term exposure to air pollution and rhinitis and asthma comorbidities in the Constances cohort

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ABSTRACT

BACKGROUND AND AIM - Asthma and rhinitis are two related respiratory conditions. However, studies that investigated their associations with air pollution have considered them separately. We aimed to study the association between exposure to air pollution and phenotypes of current rhinitis (CR) and current asthma (CA) in Constances, a large French population-based adult cohort. **METHODS** - CR was defined by the report of sneezing, runny or blocked nose in the last 12 months. CA was defined by the report of lifetime asthma plus having in the last 12 months: taken asthma medication or had an asthma attack, wheezed, woken up with breathing discomfort, been short of breath at rest or exercise, or woken up with shortness of breath. Four categories were considered: non-CR/non-CA, CR/non-CA, non-CR/CA, and CR/CA. Annual exposure to nitrogen dioxide (NO₂), particulate matter ≤2.5 μm (PM_{2.5}) and black carbon (BC) was estimated at the participants' residential address by land-use regression models. Cross-sectional analyses at inclusion were performed between air pollutants and the four phenotypes using a multinomial logistic model adjusted for age, sex, smoking, education level and French deprivation index. **RESULTS** - Among the 173,805 participants included in this analysis (mean age: 47, 54% women), 108,637 (63%) were classified as non-CR/non-CA, 48,712 (28%) CR/non-CA, 6,282 (4%) non-CR/CA, and 10,174 (6%) CR/CA. Using non-CR/non-CA as reference, an increase of an interquartile range of BC (0.86 10⁻⁵m⁻¹) was significantly associated with CR/non-CA (OR (CI95%): 1.17 (1.15-1.20)), non-CR/CA (1.10 (1.05-1.15)), and CR/CA (1.12 (1.08-1.16)). Similar associations were observed for PM_{2.5}, NO₂, and BC residuals. Regardless of pollutant, associations were significantly higher for the CR/non-CA than for the other groups. **CONCLUSIONS** - Our results suggest that CR/non-CA phenotype may be more sensitive to the effects of air pollution and that among traffic related air pollutants, BC may be of special interest.

KEYWORDS: Rhinitis; Asthma; Air pollution

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