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Air pollution exposures in the first year of life and time to first bronchiolitis-related hospital admission in a London birth cohort

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Objectives

Chronic exposure to air pollution in early life may be associated with an increased risk of bronchiolitis in children. We estimated the separate associations between fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂) during pregnancy and in the first year of life, and bronchiolitis-related hospital admissions in a London birth cohort.

Methods

Using a large national mother-child cohort, we identified London-resident mothers whose children were born in London from 2010 to 2013, and extracted information from birth and death registrations, and maternal and child longitudinal Hospital Episode Statistics. We linked daily average PM_{2.5} and NO₂ data to weekly residential postcode history to assign exposures during pregnancy and infancy. We applied a landmark approach with Cox proportional hazard models adjusted for maternal and child characteristics and housing energy efficiency, to estimate the association between either time-varying PM_{2.5} or NO₂ exposure before a given landmark from birth and first bronchiolitis admission during the following month or quarter.

Results

We included 415,311 children in our study. Here, we present results regarding infancy exposures. We did not find evidence of an association between PM_{2.5} exposure and admission for bronchiolitis using either monthly (e.g., adjusted Hazard ratio [HR_a] = 1.00, 95% confidence interval [CI] 0.96, 1.04 per a 5 ug/m³ increase during the third month) or quarterly (e.g., adjusted hazard ratio [HR_a] = 0.95, 95% confidence interval [CI] 0.86, 1.04 per a 5 ug/m³ increase during the second quarter) landmarks. We observed similarly null estimates for the association between NO₂ exposure and bronchiolitis-related hospital admissions.

Conclusion

We found no association between chronic (monthly or quarterly) ambient PM_{2.5} or NO₂ exposure and time to first bronchiolitis-related hospital admission in the next month or quarter during infancy. This is in contrast with the significant short-term effects found in the literature, suggesting that short-term fluctuations in air pollution may be more relevant for triggering bronchiolitis-related hospital admissions.

