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Are children who are treated for asthma and seasonal allergic rhinitis disadvantaged in their educational attainment when acutely exposed to air pollution and pollen? A feasibility study

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Background

There is a lack of evidence of the adverse effects which air quality has on cognition for people with air quality-related health conditions, these are not widely documented in the literature. Educational attainment, as a proxy for cognition, may increase with improved air quality.

Objectives

Prepare individual and household level linked environmental and health data for analysis within an anonymised safe haven; analyse the linked dataset for our study investigating: Cognition, Respiratory Tract illness and Effects of eXposure (CORTEX).

Methods

Anonymised, routinely collected health and education data were linked with high spatial resolution pollution measurements and daily pollen measurements to provide repeated cross-sectional cohorts (2009-2015) on 18,241 pupils across the city of Cardiff, using the SAIL databank. A fully adjusted multilevel linear regression analysis examined associations between health status and/or air quality. Cohort, school and individual level confounders were controlled for. We hope that using individual-level multi-location daily exposure assessment will help to clarify the role of traffic and prevent potential community-level confounding. Combined effects of air quality on variation in educational attainment between those treated for asthma and/or Severe Allergic Rhinitis (SAR), and those not treated, was also investigated.

Findings

Asthma was not associated with exam performance (p=0.7). However, SAR was positively associated with exam performance (p<0.001). Exposure to air pollution was negatively associated with educational attainment regardless of health status.

Conclusions

Irrespective of health status, air quality was negatively associated with educational attainment. Treatment seeking behaviour may explain the positive association between SAR and educational attainment. For a more accurate reflection of health status, health outcomes not subject to treatment seeking behaviours, such as emergency hospital admission, should be investigated.

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