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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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