

ASSOCIATION BETWEEN AIR POLLUTION AND MONTHLY RESPIRATORY PRESCRIBING IN PRIMARY HEALTH CARE

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Background and Aims: Asthma and Chronic Obstructive Pulmonary Disease (COPD) are two of the most common chronic respiratory diseases. The effect size of exacerbation of respiratory symptoms triggered by daily variation of air pollution has been found to be between 1% (Atkinson 2001; Medina-Ramon 2006) and 7% (Laurent 2009) per $10\mu\text{g}/\text{m}^3$. We aimed to assess the relationship between routinely collected respiratory prescribing and air quality at primary health care level using a multilevel statistical model including consideration of lags. Due to universal health care coverage in the UK this is a population based analysis.

Methods: We analysed respiratory medication (salbutamol) prescribed monthly by 64 primary care practices (400,000+ population) in the Northeast of England, (2002-2006) in two stages. Firstly, we used a harmonic dynamic regression model to reflect area-wide monthly average respiratory prescribing rates in relation to monthly temperature. Using the monthly prescribing rate as offset we then built the multilevel model using air quality, deprivation and demographic covariates by primary health care practice, using monthly respiratory prescribing rate as offset.

Results: Our final model showed that an increase of $10\mu\text{g}/\text{m}^3$ in ambient PM_{10} was associated with an increase of 1% (95% CI, 0.1- 2%) in monthly salbutamol prescribing. We demonstrated that monthly respiratory prescribing in primary care can be used as indicator of air pollution effect on asthma and COPD, increasing the scope of its use for health surveillance.

Conclusions: The magnitude of effect found in this study was in the order that could be expected from studies of daily level associations between air pollution and asthma outcomes. The use of a multilevel model with offset provided a realistic representation of the relationship, as it allowed to both handle the grouped nature of primary care data and account for the seasonal variation of respiratory health outcomes.

References:

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