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Local air pollution and asthma among over-50s in Ireland¹

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INTRODUCTION

Asthma affects over 300 million people worldwide. A growing body of research suggests that air pollution can contribute to the risk of developing asthma and the severity of the condition for those who suffer from it. However, the evidence of links between local air pollution and asthma is stronger for young people than for older adults. In this paper we examined whether asthma rates are higher among over-50s in Ireland who live in areas with higher levels of local nitrogen dioxide (NO₂) air pollution. NO₂ is one of several pollutants emitted by motor vehicles, and it is often used as an indicator of transport-related air pollution more generally.

DATA AND METHODS

This study used data from The Irish Longitudinal Study on Ageing (TILDA) on 8162 adults over 50 years old in the Republic of Ireland. Information on these individuals' socioeconomic background and health conditions were linked to estimates of annual average NO₂ concentrations around their home addresses, based on a model developed for Ireland in earlier research.² Respondents with asthma were identified in two ways: from a self-reported diagnosis or from the individual's use of medications normally prescribed for this condition. Regression models were then used to test whether individuals living in areas with higher NO₂ exposures were likely to have a higher risk of asthma than those living in areas with less air pollution. These models controlled for many other factors that might affect the

¹ This Bulletin summarises the findings from Carthy, P. *et al.*, 2020, Local NO₂ concentrations and asthma among over-50s in Ireland: a microdata analysis, *International Journal of Epidemiology*, in press.

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² Naughton O. *et al.*, 2018, Land use regression model for explaining spatial variation in air pollution levels using a wind sector-based approach. *Science of the Total Environment* 630:1324-1334.

likelihood of having asthma, including socioeconomic characteristics, age, sex, history of smoking and education level.

RESULTS

Overall, 9% of the sample aged 50+ reported an asthma diagnosis, and 6.9% reported using relevant medications (such as inhalers). Living in an area with higher NO₂ concentrations was found to be associated with an increased probability of asthma. For example, a 1ppb increase in local NO₂ was associated with a 0.24 percentage point increase in the probability of reporting an asthma diagnosis, and the effect size was similar for the probability of using asthma medication (0.21 percentage points). To put these results in context, the average exposure to NO₂ in this sample was 4.8ppb, with 95 per cent of the sample exposed to NO₂ levels below 13 ppb.

CONCLUSIONS

Our study adds to the evidence that there is an association between NO₂ exposure and asthma among older adults, a group for which pollution exposures have received less research attention than younger people. The study used a novel approach to identify asthma cases, taking account of both respondents' own reports of having asthma and separate evidence on their use of relevant medications. The results using the two methods were similar. Although levels of air pollution are relatively low in Ireland compared to many other countries and standard regulatory limits are rarely exceeded, we still found significant links between pollution and asthma rates. Finally, the individual-level data used in this study allowed us to control for many socioeconomic factors that might influence asthma rates and lead to misleading results if they were not taken into account.

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