

# LOCAL AIR POLLUTION AND ASTHMA AMONG OVER-50S IN IRELAND

PHILIP CARTHY, AONGHUS Ó DOMHNAILL, MARGARET  
O'MAHONY, ANNE NOLAN, FRANK MORIARTY, BRIAN  
BRODERICK, MARTINA HENNESSY, AOIFE DONNELLY, OWEN  
NAUGHTON AND SEÁN LYONS



# Local air pollution and asthma among over-50s in Ireland<sup>1</sup>

---

Philip Carthy, Aonghus Ó'Domhnaill (TCD), Margaret O'Mahony (TCD), Anne Nolan, Frank Moriarty (TILDA, RCSI), Brian Broderick (TCD), Martina Hennessy (TCD), Aoife Donnelly (TU Dublin), Owen Naughton (IT Carlow), Seán Lyons\*

***ESRI Research Bulletins provide short summaries of work published by ESRI researchers and overviews of thematic areas covered by ESRI programmes of research. Bulletins are designed to be easily accessible to a wide readership.***

## 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 (NO<sub>2</sub>) air pollution. NO<sub>2</sub> 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 NO<sub>2</sub> concentrations around their home addresses, based on a model developed for Ireland in earlier research.<sup>2</sup> 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 NO<sub>2</sub> 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

---

<sup>1</sup> This Bulletin summarises the findings from Carthy, P. *et al.*, 2020, Local NO<sub>2</sub> concentrations and asthma among over-50s in Ireland: a microdata analysis, *International Journal of Epidemiology*, in press.

DOI: <https://doi.org/10.1093/ije/dyaa074>

This research was supported by the Economic and Social Research Institute's Environment Research Programme, which is funded by Ireland's Environmental Protection Agency (EPA), and by the project *Impact of NO<sub>2</sub> on health with particular emphasis on vulnerable groups* also funded by the EPA (grant 2016-CCRP-MS.42).

\*Corresponding author: Sean.Lyons@esri.ie.

<sup>2</sup> 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 NO<sub>2</sub> concentrations was found to be associated with an increased probability of asthma. For example, a 1ppb increase in local NO<sub>2</sub> 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 NO<sub>2</sub> in this sample was 4.8ppb, with 95 per cent of the sample exposed to NO<sub>2</sub> levels below 13 ppb.

## **CONCLUSIONS**

Our study adds to the evidence that there is an association between NO<sub>2</sub> 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.

Whitaker Square,  
Sir John Rogerson's Quay,  
Dublin 2  
Telephone **+353 1 863 2000**  
Email **admin@esri.ie**  
Web **www.esri.ie**  
Twitter **@ESRIDublin**