

Ethnic minorities and deprived communities hardest hit by air pollution

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Air pollution levels are linked to many forms of ill health, including higher risk of respiratory and cardiovascular diseases, especially for more vulnerable groups such as children and the elderly.

Researchers at Imperial College London and the National Institute for Public Health and the Environment in the Netherlands examined data on two types of air pollution: particulate matter (PM10) and nitrogen dioxide (NO₂). They compared air pollution exposures for small areas in England and the Netherlands with population characteristics including deprivation, ethnic makeup, and proportions of children and elderly people.

The EU Ambient Air Quality Directive set limits of 40 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) at monitoring stations for both PM10 and NO₂ pollution. Concentration averages across all neighbourhoods in England and all but two neighbourhoods in the Netherlands were within this limit for PM10, but 11 per cent of neighbourhoods in England and nine per cent in the Netherlands exceeded the NO₂ limit, accounting for an affected population of 5.4 million and 2.7 million respectively.

In England, the most deprived 20 per cent of neighbourhoods had higher [air pollution levels](#) than the least deprived neighbourhoods - 1.5 $\mu\text{g}/\text{m}^3$ higher PM10 and 4.4 $\mu\text{g}/\text{m}^3$ NO₂ after adjusting for other factors – but this was not the case in the Netherlands. The biggest differences in [air pollution levels](#) according to socioeconomic status were in London.

The worst air pollution levels were seen in ethnically diverse neighbourhoods, defined as those where more than 20 per cent of the population are non-white. Even after allowing for the fact that some of these neighbourhoods are more deprived, in England, this difference was 3.0 $\mu\text{g}/\text{m}^3$ for PM10 and 10.1 $\mu\text{g}/\text{m}^3$ for NO₂. In the

Netherlands, differences were lower, with 1.1 $\mu\text{g}/\text{m}^3$ higher PM10 and 4.5 $\mu\text{g}/\text{m}^3$ NO₂.

The findings are published in the journal *Environmental Pollution*.

The lead researcher, Dr Daniela Fecht from the School of Public Health at Imperial College London, said: "The study highlights the fact that inequalities in exposure to air pollution are mainly an urban problem, suggesting that measures to reduce environmental air pollution inequality should focus on cutting vehicle emissions in deprived urban neighbourhoods."

The reasons for the associations between ethnic minorities and air pollution are unclear. "England and the Netherlands have a long history of immigration. It's possible that immigrants settled in particular areas may tolerate poorer air quality for the benefits of living close to friends and family, even when their communities become less deprived," said Dr Fecht.

The study used data from 2001, which was the most recent year for which high resolution data were available for both countries. "Pockets of deprivation tend to be quite stable, and air pollution levels haven't fallen dramatically in this time, so it's likely that the relationships we observed are still present," said Dr Fecht.

The work relating to England was undertaken by staff working at the UK Small Area Health Statistics Unit (SAHSU) at Imperial College London. SAHSU is part of the MRC-PHE Centre for Environment and Health, which is funded by the Medical Research Council and Public Health England.

Ongoing work at the MRC-PHE Centre for Environment and Health will examine differences in exposure to traffic pollution by deprivation and ethnicity using more recent [air pollution](#) data in London.

More information: Fecht, D. et al. "Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands," Environmental Pollution (2014), [dx.doi.org/10.1016/j.envpol.2014.12.014](https://doi.org/10.1016/j.envpol.2014.12.014)

Provided by Imperial College London

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