Royal College of Physicians | Coleg Brenhinol y Meddygon (Cymru)

For more information, please contact:
Emily Wooster
policy and campaigns manager
RCP Wales and Northern Ireland
emily.wooster@RCP.ac.uk

'A breath of fresh air: responding to the health challenges of modern air pollution'

RCP Cymru briefing for Wales stakeholders

This briefing summarises the key evidence and recommendations for Welsh government and local authorities in Wales from the Royal College of Physicians' new report *'A breath of fresh air: responding to the health challenges of modern air pollution'* , which calls for air pollution to be recognised as a public health issue.

- In Wales, between 1,000–1,400 deaths each year are attributable to air pollution
- The RCP's new report estimates that air pollution could still be linked to around 30,000 UK deaths in 2025.
- New evidence from the last decade shows that air pollution affects almost every organ in the body, with significant new knowledge about its impacts on brain health, including mental health and dementia.
- New modelling in the RCP's report estimates that the health impacts of air pollution across the UK has an annual core cost of 27 billion.

Summary

In 2016, the Royal College of Physicians (RCP), alongside the Royal College of Paediatrics and Child Health (RCPCH) published *Every breath we take: the lifelong impact of air pollution*, highlighting the dangerous short- and long-term impact of air pollution on our nation's health. Over the past decade, we have gained new evidence about the harmful health impacts of air pollution that occur even at low air pollution concentrations. The RCP's new report highlights this new evidence and calls for ambitious action to reduce avoidable deaths and improve population health.

Air pollution emissions have reduced significantly over the years – but advances in exposure assessment, modelling and health studies show that current levels of air pollution continue to affect our health.

With impacts on mortality and healthy life expectancy, the effects of toxic air on society, the economy, the NHS and social care are significant. Estimates of the mortality burden of air pollution in the UK in 2019 for $PM_{2.5}$ and NO_2 range between 29,000 and 43,000 deaths per year, giving a central estimate of 36,000 deaths. The RCP report projects that air pollution could still be linked to around 30,000 UK deaths in 2025. While a welcome reduction from the 40,000 estimated deaths in the 2016 RCP report, air pollution clearly still has a significant impact on population health. 30,000 deaths attributable to air pollution is 30,000 too many.

The health harms of air pollution

Whilst air quality is often seen an as environmental issue, air pollution is the largest environmental health risk causing loss of healthy years of life and premature death. In 2021, there were 8.1 million preventable deaths linked to outdoor and indoor pollution worldwide, 90% being attributable to non-communicable diseases.[i] At an individual level, exposure to air pollution shortens the average person's lifespan by 1.8 years, an impact that ranks just behind some of the leading causes of death and disease worldwide – cancer 2.5, tobacco smoking 2.1, malaria 0.3 and inadequate water/sanitation/hygiene 0.6 years, respectively.[ii]

In addition to the mortality impacts, air pollution worsens people's health. Estimates on the morbidity impacts of air pollution have found that in the UK in 2019, there were 3,010 new cases of lung cancer in adults and 9,750 new cases of asthma in children attributable to air pollution.

The air pollutants with the greatest effect on the health of the UK population are particulate matter, nitrogen dioxide (NO_2) and ozone. The greatest effects are attributable to particulate matter, measured in the UK's atmosphere as $PM_{2.5}$.

Indoor air is also a growing concern, with people spending around 80–90% of their time indoors in the UK.iii Poor ventilation, damp and mould, and emissions from domestic heating, gas cooking and household products all contribute to exposure.

Air quality impacts across the life course

For a long time, it was thought that air pollution's health impact in adults was mainly through respiratory health. We now know that there are links between air pollution and almost every organ system in the body and the major diseases that affect them. These include the lungs, cardiovascular systems, metabolism, renal, liver, gastrointestinal, bone, skin and cancers.

The volume of evidence on the impact of air pollution on health is rapidly growing, with new cohort studies – published since 2016 – that have follow-ups of over 25 years, showing how exposure from decades ago influences morbidity and mortality throughout life.

We now know that air pollution negatively affects health at all stages of life, beginning before conception and continuing throughout pregnancy. Exposure during pregnancy can affect birth outcomes; globally around 2.7 million babies with low birth weight and around 5.8 million preterm babies each year have been linked to ambient and household $PM_{2.5}$ exposure.[iv]

Most significant has been the new knowledge of the impacts of air pollution in the earliest period of life and on our brain health, including child and adult mental health, and dementia. Recent analysis using UK data has found that exposure to multiple air pollutants substantially increases the risk of dementia, especially among those individuals with high genetic susceptibility.[v] Recent analysis using UK data has found that exposure to multiple air pollutants substantially increases the risk of dementia, especially in individuals with high genetic susceptibility.[vi]

Health inequalities

Air pollution is harmful to everyone, but it disproportionately affects the most vulnerable groups in society. Vulnerabilities are most evident among those living in the most deprived communities in the UK, who are already at risk of health inequity. In 2023, individuals living in the 20% most deprived areas in England experienced 8% higher average $PM_{2.5}$ concentrations than those in the 20% least deprived. In addition, research has shown that in the UK, people from ethnic minority backgrounds typically experience a greater burden of air pollution compared with White populations – NO_2 and $PM_{2.5}$ concentrations are, on average, 83% and 27% higher, respectively.[vii] Policy action should account for health, risk and economic impact to deliver the greatest and most equitable health gains.

The economic burden of air pollution

Mae llygredd aer yn cael effaith negyddol ar iechyd y boblogaeth a'r amgylchedd, gan effeithio ar yr Air pollution has negative impacts on the population's health and the environment, impacting the economy. The economic impact of air pollution is linked to healthcare costs, productivity losses and lost utility – the benefits of being well and not suffering ill health. Looking at the core effects of air pollution, we estimate the economic cost in 2019 to be £27.0 billion.

Under current policies targeted at reducing air pollution, this 2019 figure declines to £19.1 billion in 2040. But when adding the wider impacts, such as dementia, the estimated economic costs of air pollution may be as much as £50 billion. Dementia is the largest sensitivity effect by some margin, causing utility losses to fall as a percentage of the total damage to around 74%. Healthcare costs to rise to 22% and productivity losses to rise to 4% in 2040.

The RCP's recommendations

There is compelling new medical evidence on the detrimental impact of toxic air on brain health across the lifecourse, including effects on early-life cognitive development, later-life neurodegenerative disorders, mental and brain health. Policy for the future needs to respond to new and emerging evidence to address health impacts across the lifecourse, especially for vulnerable populations.

Action can and should be taken to tackle air pollution across all parts of society and by all groups of people, including national, regional and local governments, industry, regulators, the NHS, clinicians, and individuals in society. Cross-governmental action is needed for the widespread improvement of air quality.
The report makes 19 recommendations to clean up toxic air. Key recommendations for Wales include:

- National and local governments in Wales must recognise air pollution as a key public health issue and take increasingly ambitious action to reduce people's short- and long-term exposure to outdoor and indoor air pollution.
- The Environment (Air Quality and Soundscapes) (Wales) Act 2024 has introduced new duties and responsibilities for national and local government, including a commitment to development of targets in

line with the most recent WHO guidelines on air quality limit values. It is imperative that the Environment (Air Quality and Soundscapes) (Wales) Act 2024 is implemented to meet the WHO guidelines on air quality.

- Welsh government should fund and deliver a public health clean air campaign to provide accurate and trusted information about the health impacts of short- and long-term air pollution exposure, the sources of indoor and outdoor air pollution, and practical advice to reduce personal exposure.
- All air quality policy developed by Welsh government and local government must consider the disproportionate impacts of air pollution on certain groups, including recognised ethnicity- and deprivation-based disparities. It should focus action on areas and populations with high levels of air pollution and greatest vulnerability to health harms from pollution.

The full report and executive summary are available on the RCP website.

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