



Royal College  
of Physicians

**RCPCH**

Royal College of  
Paediatrics and Child Health  
*Leading the way in Children's Health*

# Every breath we take: the lifelong impact of air pollution

Executive summary  
February 2016



# Why tackle this issue?

Each year in the UK, around 40,000 deaths are attributable to exposure to outdoor air pollution, with more linked also to exposure to indoor pollutants.

Air pollution plays a role in many of the major health challenges of our day, and has been linked to cancer, asthma, stroke and heart disease, diabetes, obesity, and changes linked to dementia.

Neither the concentration limits set by government, nor the World Health Organization's air quality guidelines, define levels of exposure that are entirely safe for the whole population. When our patients are exposed to such a clear and avoidable cause of death, illness and disability, it is our duty as doctors to speak out.

## How we approached the task

This report is a joint effort by the Royal College of Paediatrics and Child Health (RCPCH) and the Royal College of Physicians (RCP).

The two colleges assembled experts in medicine and environmental sciences to discuss the evidence and draw up recommendations. We searched the literature and heard detailed evidence from experts and key organisations. A draft of the report was circulated to a wide range of stakeholders for comment.

Full details of the scientific references, evidence heard and stakeholders consulted are available on the RCP website.<sup>1</sup>

## Effects across a lifetime

This damage occurs across a lifetime, from a baby's first weeks in the womb all the way through to the years of older age.

Gestation, infancy and early childhood are vulnerable times because the young body is growing and developing rapidly. We know that the heart, brain, hormone systems and immunity can all be harmed by air pollution. Research is beginning to point towards effects on growth, intelligence, and development of the brain and coordination. Harm to babies and children will have an impact that lasts far into the future. For the same reason, any air quality improvements we make now will have long-lasting benefits.

Older people, and adults with long-term conditions, are also vulnerable to the effects of air pollution. Improving air quality will help them to stay independent and well, benefiting individuals and easing the pressure on our NHS and social services.



## The most vulnerable suffer the most harm

Air pollution is harmful to everyone. However, some people suffer more than others because they:

- > live in deprived areas, which often have higher levels of air pollution
- > live, learn or work near busy roads
- > are more vulnerable because of their age or existing medical conditions.

Some chemicals in air pollution may be implicated in the development of obesity. It may be a vicious circle, because we also know that obese people are more sensitive to air pollution.

These vulnerabilities are heightened among those living in the most deprived communities. This is due to poor housing and indoor air quality, the stress of living on a low income, and limited access to healthy food and/or green spaces. Moving away from an area of high outdoor air pollution may be unaffordable for local residents. Some people may not want to leave their homes – and they should not have to.

## Costs of air pollution

The annual mortality burden in the UK from exposure to outdoor air pollution is equivalent to around 40,000 deaths. To this can be added further impacts from exposure to indoor air pollutants such as radon and second-hand smoke.

The health problems resulting from exposure to air pollution also have a high cost to society and business, our health services, and people who suffer from illness and premature death. In the UK, these costs add up to more than £20 billion every year.

Vulnerable people are prisoners of air pollution, having to stay indoors and limit their activity when pollution levels are high. This is not only unjust; it carries a cost to these individuals and the community from missed work and school, from more health problems due to lack of exercise, and from social isolation.

Taking action will reduce pain, suffering and demands on the NHS, while getting people back to work, learning, and an active life. The value of these benefits far exceeds the cost of reducing emissions.

## Air pollution and climate change

Air pollution plays a key role in the process of climate change, which places our food, air and water supplies at risk, and poses a major threat to our health.

Several pollutants that cause this environmental damage are also toxic to our bodies. Therefore, many of the changes that would decrease air pollution to protect our health – especially using energy more efficiently and burning less solid fuel and oil – would also help to slow down the overheating of our planet.



# Recommendations for action a

Everyone has some responsibility for reducing air pollution. Real change will only occur when everyone accepts this responsibility, and makes a concerted effort. This includes European, national and local government, business and industry, schools and the NHS, as well as individuals in society at large.

**1 Act now, think long term.** As a community, we must act now, and with urgency, to protect the health, wellbeing and economic sustainability of today's communities and future generations. Government must empower local authorities and incentivise industry to plan for the long term.

**2 Educate professionals and the public.** The NHS and patient charities must educate health professionals, policymakers and the public about the serious harm that air pollution causes. Health professionals, in particular, have a duty to inform their patients.

**3 Promote alternatives to cars fuelled by petrol and diesel.** Government, employers and schools should encourage and facilitate the use of public transport and active travel options like walking and cycling. Active travel also increases physical activity, which will have major health benefits for everyone. Local transport plans, especially in deprived areas, should:

- > expand cycle networks
- > require cycle training at school
- > promote safe alternatives to the 'school run', based on walking, public transport and cycling instead of cars
- > encourage employers to support alternatives to commuting by car
- > promote leisure cycling
- > develop 'islands' of space away from traffic, for safer walking and cycling.

European, national and local policies should also encourage the use of hybrid electrical and hydrogen-powered vehicles.

**4 Put the onus on the polluters.** Polluters must be required to take responsibility for harming our health. Political leaders at a local, national and EU level must introduce tougher regulations, including reliable emissions testing for cars. They must also enforce regulations vigorously, especially in deprived areas where pollution levels are higher and people are more vulnerable.

**5 Monitor air pollution effectively.** Air pollution monitoring by central and local government must track exposure to harmful pollutants in major urban areas and near schools. These results should be communicated proactively to the public, in a clear way that everyone can understand. When levels exceed EU limits or World Health Organization guidelines, local authorities must immediately publish serious incident alerts.

**6 Act to protect the public health when air pollution levels are high.** When these limits are exceeded, local authorities *must* have the power to close or divert roads to reduce the volume of traffic, especially near schools.

**7 Tackle inequality.** Our most deprived communities are exposed to some of the worst outdoor and indoor air quality, contributing to the gap in life expectancy of nearly 10 years between the most and the least affluent communities. Regulators, local government and NHS organisations must prioritise improvements in air quality in our most deprived areas, setting high standards of emission control across all sectors of industry.

**8 Protect those most at risk.** Children, older people, and people with chronic health problems are among the most vulnerable to air pollution. Public services must take account of this disproportionate harm through local tools such as planning policies for housing and schools, equalities impact assessments, and joint strategic needs assessments. At an individual level, healthcare professionals should help vulnerable patients protect themselves from the worst effects of air pollution.

**9 Lead by example in the NHS.** The NHS is one of the largest employers in Europe, contributing 9.1% of the UK's gross domestic product (GDP). The health service must no longer be a major polluter; it must lead by example and set the benchmark for clean air and safe workplaces. In turn, this action will reduce the burden of air-pollution-related illness on the NHS. As pointed out in two earlier reports,<sup>2,3</sup> the Department of Health, NHS England and the devolved administrations must give commissioners and providers incentives to reduce their emissions, and protect their employees and patients from dangerous pollutants.<sup>4</sup>

# nd research – what must be done

**10 Define the economic impact of air pollution.** Air pollution damages not only our physical health, but also our economic wellbeing. We need further research into the economic impact of air pollution, and the potential economic benefits of well-designed policies to tackle it.

**11 Quantify the relationship between indoor air pollution and health.** We must strengthen our understanding of the relationship between indoor air pollution and health, including the key risk factors and effects of poor air quality in our homes, schools and workplaces. A coordinated effort among policymaking bodies will be required to develop and apply any necessary policy changes.

**12 Determine how global trends are affecting air quality.** From increased energy production and consumption to global economic development and urbanisation, we need to improve our understanding of how major social and economic trends are affecting air quality and its twin threat, climate change.

**13 Develop new technologies to improve air pollution monitoring.** We need better, more accurate and wider-ranging monitoring programmes so that we can track population-level exposure to air pollution. We also need to develop adaptable monitoring techniques to measure emerging new pollutants, and known pollutants that occur below current concentration limits. We must develop practical technology – such as wearable ‘smart’ monitors – that empower individuals to check their exposure and take action to protect their health.

**14 Study the effects of air pollution on health.** To appreciate fully the risk to health, we need further research on air pollution’s effects on the body. In addition to lung and cardiovascular disease, research into the adverse health effects of pollution should accommodate systemic effects such as obesity, diabetes, changes linked to dementia, and cancer, as well as effects on the developing fetus and in early childhood.

## What can I do?

Everyone can help by:

- > trying alternatives to car travel or preferably taking the active option: bus, train, walking and cycling
- > aiming for energy efficiency in our homes
- > keeping gas appliances and solid fuel burners in good repair
- > asking their local council and MP to take action
- > learning more about air quality and staying informed.

The collective effect of actions by a large number of individuals, together with action by local councils and governments, can make a significant difference to pollutant exposure.

1 [www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution](http://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution)

2 [www.nihr.ac.uk/policy-and-standards/nihr-carbon-reduction-guidelines.htm](http://www.nihr.ac.uk/policy-and-standards/nihr-carbon-reduction-guidelines.htm)

3 [www.sduhealth.org.uk/documents/Carbon\\_Footprint\\_summary\\_NHS\\_update\\_2013.pdf](http://www.sduhealth.org.uk/documents/Carbon_Footprint_summary_NHS_update_2013.pdf)

4 Tomson C. Reducing the carbon footprint of hospital-based care. *Future Hosp J* 2015;2:57–62.



# Recommendations

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## For action

- > Act now, think long term
- > Educate professionals and the public
- > Promote alternatives to cars fuelled by petrol and diesel
- > Put the onus on the polluters
- > Monitor air pollution effectively
- > Act to protect the public health when air pollution levels are high
- > Tackle inequality
- > Protect those most at risk
- > Lead by example in the NHS

## For research

- > Define the economic impact of air pollution
- > Quantify the relationship between indoor air pollution and health
- > Determine how global trends are affecting air quality
- > Develop new technologies to improve air pollution monitoring
- > Study the effects of air pollution on health

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