Written evidence submitted by the Royal College of Physicians (RCP)

Environment audit committee | Inquiry into outdoor and indoor air quality targets

May 2023

1. The Royal College of Physicians (RCP) is the membership body for physicians. Our role is to support physicians to deliver the best healthcare possible for patients and improve standards of care. We represent 41,000 members and fellows in the UK and internationally from over 30 medical specialties.

2. The RCP has campaigned on the need to improve air quality in the UK for a number of years and welcomes the opportunity to provide written evidence to the environmental audit committee's inquiry into outdoor and indoor air quality targets. Our submission particularly focuses on the health impact of air pollution, the adequacy of the government's current legislative targets for reducing PM2.5 pollution and the issues around indoor air pollution. We would be happy to provide any further information that the committee may require and to give oral evidence to the inquiry if this would be helpful.

What evidence exists of the extent of air pollution directly or indirectly impacting health of individuals or communities in England?

3. In 2016 the RCP and the Royal College of Paediatrics and Child Health (RCPCH) published a major report examining the impact of air pollution on health, Every breath we take: the lifelong impact of air pollution. This highlighted that every year in the UK around 40,000 deaths are attributable to outdoor air pollution, with more also linked to indoor air pollutants. A recent major cross-border assessment in Ireland reveals that around 2,600 premature deaths can be attributed to air pollution – 1,700 in the Republic and 900 in Northern Ireland – annually.

4. Air pollution plays a role in many of the major health challenges we face today and has been linked to cancer, asthma, COPD, stroke and heart disease, diabetes, obesity, osteoporosis and changes linked to dementia and other neurodegenerative diseases. Using the UK Biobank, air pollution was associated with several multimorbidity patterns with strongest associations observed for neurological (stroke, epilepsy, alcohol/substance dependency) and respiratory patterns (COPD, asthma).

5. Air pollution affects health throughout the life course, from a baby's first weeks in the womb through to old 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. 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.

6. Air pollution is harmful to everyone, but 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; and are more vulnerable because of their age or existing medical conditions. 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.

7. 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. Taking preventative 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.

Are the current national targets for outdoor air pollution ambitious and wide-ranging enough to provide adequate protection for public health and the environment in a) rural and b) urban areas?

8. PM2.5 is incredibly harmful to human health and we continue to learn more about air pollution and its effects every day. Government has to be prepared to take increasingly ambitious action if we are to mitigate the increasingly severe impacts of air pollution.

9. The RCP does not believe that the government's current targets for reducing outdoor air pollution are sufficiently ambitious. Following a public consultation in 2022 the government has set two legal targets for limiting levels of PM2.5 air pollution, as required under the terms of the Environment Act 2021. These are:

    - An annual mean concentration target – a target of 10 micrograms per cubic metre (µg m^{-3}) to be met across England by 2040.
    - A population exposure reduction target – a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

10. The RCP believes that the legal targets should go further than this. In our response to the public consultation which proposed the targets we highlighted that the World Health Organisation (WHO) originally set 10µg m^{-3} as a guideline value for PM2.5 as long ago as 2005, and has subsequently revised this down further to 5µg m^{-}

^{3}. In our view waiting until 2040 to reach the 10µg m^{-3} threshold, 35 years after the initial recommendation was made by WHO, is inadequate when the clear impact of air pollution on health and health inequalities is so grave.

11. The RCP's response to the public consultation called for annual mean concentration of PM2.5 to be reduced to 10µg m^{-3} as soon as possible, and by 2030 at the very latest (we also called for the target date for the population exposure reduction target to be brought forward to 2030 as well to align with this). We are one of many health and environmental organisations to have taken this position. A report published last year by the Clean Air Fund and Imperial College London, The Pathway to Healthy Air in the UK, projected that reaching the 10µg m^{-3} threshold by 2030 would lead to 3,100 fewer coronary heart disease cases and 388,000 fewer reported asthma symptom days in children each year, and that the total economic benefits would be in excess of £380 billion.

12. We also emphasised that 10µg m^{-3} must be seen as an interim target, and that government's ultimate objective should be to reduce annual mean concentration for PM2.5 to 5µg m^{-3} in line with WHO's updated air quality guideline values. Policy interventions should not simply seek to reach 10µg m^{-3} but go beyond it and provide a platform to achieve the 5µg m^{-3} currently recommended by WHO. We continue to learn more about air pollution and its health and wider environmental effects every day, so government must be prepared to take increasingly ambitious action to mitigate its impacts on health.

13. The government confirmed in December 2022 that it would keep 2040 as the target date for achieving both the annual mean concentration and population exposure reduction targets, a decision the RCP described as 'a huge missed opportunity for improving public health'. Subsequently, the government published its Environmental Improvement Plan in March 2023 which set two additional interim targets – these stipulate that by the end of January 2028:

    - The highest annual mean concentration in the most recent full calendar year must not exceed 12µg m^{-3} of PM2.5.
    - Compared to 2018, the reduction in population exposure to PM2.5 in the most recent full calendar year must be 22% or greater.

    While this provides additional clarity about the government's planned trajectory of PM2.5 reductions, the new interim concentration target still falls short of the air quality standard recommended by WHO nearly 20 years ago which has since been revised down further.

14. In March 2023 the RCP published a new position paper on healthcare sustainability and climate change, which recommended that the government should go further in its efforts to tackle environmental decline. The RCP continues to believe that government should aim to reduce the annual mean concentration of

PM2.5 to 10µg m^{-3} by 2030 at the latest, with a longer-term objective of reaching 5µg m^{-3}. Current air quality targets set out in legislation and the Environmental Improvement Plan should be viewed as a floor not a ceiling, and policy interventions should actively seek to go beyond these.

What are major barriers and challenges to achieving national targets on air quality?

15. The interventions necessary to improve outdoor air quality are well understood. The chief medical officer's annual report for 2022 focused on air pollution and recommended a series of measures across a range of sectors for improving air quality. These include accelerating the electrification of light vehicles and public transport, providing more options for reducing air pollution emissions for heavy vehicles, taking action to reduce air pollution emissions generated by wood stoves and other solid fuel heating, and further actions across the industrial and agricultural sectors as well as the NHS.

16. We also know that achieving the aim of reducing levels of PM2.5 to 10µg m^{-3} by 2030 is feasible. In The Pathway to Healthy Air in the UK the Clean Air Fund and Imperial College London highlight that many parts of the UK are on course to meet this target if pre-existing commitments are delivered – those which are forecast to exceed 10µg m^{-3} in 2030 are primarily locations close to roads in major cities, including London, and to some of the larger sources of industrial biomass burning.

17. Ultimately one of the most significant drivers of achieving the national targets on air quality, and doing so by 2030 rather than 2040, is political will. Even without a formal legislative mandate to reduce levels of PM2.5 to 10µg m^{-3} by 2030, policy makers can go further than required by current legal targets in their efforts to improve air quality, and doing so would yield significant public health benefits. We reiterate the point made in paragraph 12 of this response that the existing air quality targets should be therefore viewed as a floor not a ceiling, and that policy interventions should actively seek to go beyond these.

What are the long-term health impacts of indoor air pollution?

18. The health impacts of indoor air pollution, and the measures we need to take to tackle this effectively, are less well understood than they are for outdoor air pollution making this an important area for further research. In January 2020 the RCP and the RCPCH published an evidence review, The inside story, which examined the health effects of indoor air pollution on children and young people specifically. These included:

    - Birth and infancy: Respiratory problems (wheeze, rhinitis, atopic asthma, respiratory infections); low birth weight and pre-term birth.

- Pre-school: Respiratory problems (wheeze, allergies, asthma, risk of respiratory diseases and pneumonia); eczema and atopic dermatitis; greater hyperactivity, impulsivity and inattention.
- School age: Respiratory problems (wheeze, rhinitis, asthma, throat irritation, nasal congestion, dry cough); eczema, dermatitis, conjunctivitis, skin and eye irritation; reduced cognitive performance, difficulty sleeping.

19. The chief medical officer's annual report for 2022 also considered the health impact of indoor air pollution, particularly in the context of wood and solid fuel burning. It noted that there is some limited evidence that exposure to indoor wood burning is associated with asthma and respiratory infections in children, and for adults this was associated with an increased risk of lung cancer and chronic obstructive pulmonary disease (COPD). The recent discovery of an entirely new mechanisms for how particulate pollution (PM2.5) drives non-smoking lung cancer (10% of lung cancers) that involves inflammatory pathways is a concern.

20. The Chief Medical Officer's report also highlighted that 'people indoors are likely to be exposed to higher concentrations of volatile and semi-volatile organic compounds, including the known carcinogen, formaldehyde. These pollutants can be emitted from construction products, building materials for home building projects, paints and solvents, personal care products, cleaning products, carpets and furniture. Exposure to high concentrations may cause irritation of the eyes and respiratory tract, allergies and asthma, central nervous system symptoms, liver and kidney damage, as well as cancer risks.' (p. 13)

21. The inside story identified a number of potential avenues for future research to further develop our understanding of the health impact of indoor air pollution. These include:

    - Establish large-scale research of UK homes and schools on the indoor air quality, linking this with health and public health datasets. This should include provisions to monitor the impact of changes over time, to identify if improvements in indoor air are resulting in better health outcomes.
    - Further research into the potential adverse health effects for children is needed: to study a wider array of indoor pollutants; to increase the number of studies set in the UK; to study the effects from exposures in schools and nursery or day-care settings; for children with chronic respiratory conditions such as cystic fibrosis that may place them at greater risk.
    - Gather evidence on emissions and ventilation rates in buildings of differing age and design. This should identify the most cost-effective interventions and design choices for improving indoor air quality and lowering energy demand and carbon emissions.
    - Measure emissions and exposure in a more realistic indoor environment such as the House Observations of Microbial and Environmental Chemistry experiments.

- Set a research design to test the safety of chemicals used in buildings and household products under realistic indoor conditions. The test conditions should mimic an indoor environment, with mixtures of pollutants and the effects of humans included.

What steps can the government take to improve indoor air quality?

22. The Environmental Improvement Plan notes that the government has taken steps to build air quality into the planning process as part of its efforts to address indoor air pollution, including by amending the Building Regulations to set out ventilation requirements to maintain indoor air quality. While this is welcome, there is much more that needs to be done to address the issues of indoor air pollution.

23. The RCP and RCPCH's The inside story report made a series of recommendations for improving indoor air quality, including that the government and local authorities should provide the public with advice and information about the risks of, and ways of preventing, poor indoor air quality and that local authorities should have the power to require improvements where the air quality fails to meet minimum standards in local authority-controlled schools and wherever children live beyond damp and mould (where powers already exist) to include other pollutants.
24. The report also includes a number of further recommendations for government, local authorities, schools, medical professional bodies and those involved in the design, construction and management of buildings.

How well is the Government coordinating measures between national and local actors to improve air quality, both outdoors and indoors?

25. Co-ordination between national and local actors is crucial to addressing outdoor and indoor air pollution. It is essential that central government provides policy makers locally with the powers and resources necessary to deliver – and go beyond – the national targets for outdoor air quality and drive meaningful improvements in indoor air quality in their area.

26. In addition, it is also important that air quality is appropriately prioritised at a local level, particularly given the wider benefits that reducing air pollution will have for public health. Ensuring that there is effective collaboration between those with responsibility for air quality within local authorities and directors of public health, primary care, and hospitals and other NHS organisations is an important step in this regard.

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