

Prof Nicola Carslaw (University of York), Professor Nicholas Pleace (University of York), Dr Sarah West (Stockholm Environment Institute – York, University of York)

Written evidence submitted by Professor Nicola Carslaw, Dr Sarah West, and Professor Nicholas Pleace, University of York

The Committee welcomes written submissions which address any or all of the issues raised in the following terms of reference, to be received by 5pm on Thursday 25 May 2023:

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

There is considerable evidence that air pollution directly and indirectly impacts the health of individuals and communities in England, and other parts of the world. Imperial College London's Environmental Research Group 2023 [evidence note](#) gives an excellent summary.

2. What evidence exists to demonstrate the impact of the Ultra Low Emission Zone in London, and other Clean Air Zones nationwide, on reducing public health risks or improving health outcomes within areas where they have been introduced?

The ULEZ One Year Report found that nitrogen oxides from road traffic dropped by 23% across London since 2019, and PM2.5 dropped by 7% over the same period. In the ULEZ area itself, these figures were 26% (NOx) and 19% (PM2.5). These reductions will have lowered the public health risks.

3. 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?

As the average amount of time spent outdoors in the UK is two hours a day, outdoor targets are insufficient to protect public health.

4. Are measures currently in place, and those proposed in the revised Air Quality Strategy for England, sufficient to achieve national targets?

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

At the moment, air quality exposure is not viewed in a sufficiently holistic manner. Targets are set for outdoors, but these ignore the fact that most of our exposure to air quality, whether to pollutants generated indoors or outdoors, happens indoors. We need to better understand personal exposures for the population, rather than indoor and outdoor air pollution separately. To do this well, we need more of a systems approach to understanding the combined impacts of indoor and outdoor air quality on health. Until we

have this understanding, we will be unable to set air quality targets that have the impact we want to achieve in terms of improving health outcomes.

6. Does the Government provide sufficient funding and devolved powers to local authorities in England to improve local air quality? If not, what additional funding or devolved powers are required?

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

Nobody can really answer this question at the moment, because we haven't carried out the relevant research. We would need the same sort of long-term studies that have been carried out for outdoors, linking air pollutant concentrations to health effects. These studies would include longer-term air pollutant measurements indoors, similar to those collected outdoors over many years now. They would need to be carried out in representative buildings (schools, homes, hospitals, offices etc.) that aimed to cover living and working environments for most of the population.

As said above, we need to understand personal exposures for the population, rather than indoor and outdoor air pollution separately. This point is particularly important for the most vulnerable in society such as the elderly and the sick who probably spend all of their time indoors. Our current methods of estimating exposure to air pollution (e.g. focusing on outdoor concentration measurements) are unlikely to be relevant for these groups.

We need a better awareness of the sources of indoor air pollution, and how the pollutants they generate differ from what we experience outdoors. One key area is how the toxicity of PM varies indoors and outdoors, e.g. between cooking activities indoors versus diesel engines outdoors. More measurements in homes will help us to understand which pollutants accumulate and under which conditions (either by activity or by building characteristics/operation), and enable us to rank some priority pollutants to target for toxicological measurements.

8. **What steps can the Government take to improve indoor air quality?**

There are several large [consortia projects](#) running at the moment supported by UKRI and these will provide vital information to the UK Government. We already know about some of the simple steps that can be taken to improve indoor air quality: remove sources if you can, reduce usage of pollutant generating products if you need to use them and improve ventilation where possible.

There are some relatively simple messages around cooking:

- use a cooker hood/open a window
- use the back rings of the hob
- use induction/electric rather than gas

Similarly with cleaning:

- use liquid products not sprays
- use low emission products

These could easily be communicated, such as through videos like these on [cleaning](#) and [cooking](#) respectively. There could also be stricter regulation around cleaning products, particularly the tendency to make false claims about some of them being chemical-free, or implying that because they are based on natural products they are better for health.

The Government could also improve regulation around air cleaning devices, by requiring them to show efficacy and absence of harmful pollutant formation through their operation, before they are allowed to go to market. The market at the moment is completely unregulated, and there are many units that generate harmful pollutants such as ozone through their operation.

9. What are the differential impacts, geographically, and across socioeconomic groups, of poor outdoor and indoor air quality? Are measures to address poor air quality appropriately targeted?

There needs to be more research on inequalities and we are hoping to address this in part through our INGENIOUS project. One concern is people in social housing and private rental properties who may not have the agency to make home improvements needed, such as improving ventilation in kitchens and bathrooms. There are also major issues for those living close to busy roads, who may not want to open their windows because of high concentrations of outdoor air pollution and/or noise.

10. How well is the Government spreading awareness of the impacts of poor air quality and promoting action being taken to tackle the issue?

We're not aware of anything relevant for indoor air quality. There has been some concern about mould recently following the tragic case of [Awaab Ishak](#), but no concerted effort to do anything serious about it. There is also a tendency to define and respond to problems like these in behavioural terms (e.g, blame the tenants), rather than addressing the numerous physical issues with building standards. The impact of activities such as cooking, cleaning on indoor air quality are still not fully understood.

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

The Government needs to think bigger and to address how air pollutant exposure will change into the future, and how we prepare for that. Vehicle emissions outdoors are improving, and we need to give more thought to other sources of pollution, such as agriculture and the non-exhaust emissions that will continue for some time. Also, how

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the reduction of one pollutant (e.g. nitrogen oxides), might lead to the increase of another (e.g. ozone) and what are the overall impacts of that? We also need to know far more about indoor air pollution as discussed above.

The authors

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The authors of this submission are part of the [INGENIOUS](#) project funded by the UKRI. We are aiming to understand air pollution in homes, through combining measurements and modelling studies and linking to the Born in Bradford Health Cohort.

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