

## The role of local government in improving air quality

There is an opportunity for a step change improvement in environment, human health, and quality of life but action is required at all levels of government including local authorities.



**Living With Environmental Change  
Policy and Practice Notes**

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**The Living With Environmental Change Partnership** brings together 22 public sector organisations that fund, carry out and use environmental research and observations. They include the UK research councils, government departments with environmental responsibilities, devolved administrations and government agencies. The private sector is represented by a Business Advisory Board.

**Improving air quality in the UK, which could lead to enormous positive impacts on environment and health, requires further action at all levels, from town hall to Whitehall. Air pollution over the UK currently reduces life expectancy by an estimated six months, equivalent to 29,000 deaths per year. These health impacts are mainly related to pollution sources that are produced by human activity, such as motor vehicle emissions. Although they cannot solve all air quality problems, policy makers - particularly at local and regional government level - can influence air pollution impacts through traffic management and wider planning decisions, often with additional economic and health co-benefits.**

## What are the sources of air pollution in the UK?

### **Pollution comes from a variety of sources:**

- Road transport is responsible for over 50% of air pollutants such as particulate matter and nitrogen dioxide in urban areas.
- Not all particulate matter from road transport is derived from fuel combustion; there are also non-exhaust sources (eg brake and tyre wear).
- Particulate matter is emitted from industrial combustion plants and public power generation, commercial and residential combustion, and processes such as construction and quarrying.
- To date, measures have concentrated predominantly on outdoor air quality. However, personalised monitoring, and indoor air quality modelling studies are now showing that pollution levels from indoor sources can form a significant part of exposure, meaning that we should also pay attention to indoor air quality.
- Indoor exposure is thought to be highest in more draughty buildings and in buildings with a large exposed external surface area, allowing for outdoor pollution to move indoors.
- Smaller, more airtight dwellings have lower levels of outdoor air pollution, but may suffer from higher levels of air pollution from other indoor sources.

## What are the effects of air pollution?

**Exposure to air pollutants can affect human health in a variety of ways, causing or exacerbating conditions such as respiratory illness (eg asthma), allergenic illnesses, diabetes, heart disease, cancer, adverse pregnancy and birth outcomes, and a lowering of male fertility.**

### **In the UK:**

- In 2008, more than one death in 20 was due to long-term exposure to air pollution. These deaths were premature, with an average loss of length of life of 11.5 years, and more than 340,000 life years lost.
- In 2011, the Environmental Audit Committee noted that the costs to UK society from poor air quality are on a par with those from smoking and obesity, at a cost of around £16 billion per annum.
- Nitrogen dioxide concentrations found in busy urban streets cause inflammation of the airways and long-term exposure can affect lung and respiratory function.
- Particles less than 10 micrometers in diameter (PM10) can be inhaled and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as "fine" particles and can pose the greatest health risks. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply in the lungs.
- Small particles (including nano), which can be produced in excess by diesel engines, cause a range of negative health effects.

## Who is affected?

### **Air pollution can have an impact on everyone. However:**

- It is the most vulnerable people, older people and those with heart and respiratory conditions, who feel the effects most.
- Children are also vulnerable as their lungs are still developing and they breathe in greater volumes of (polluted) air per unit body weight.
- People living in deprived areas are more affected by poor air quality, in part because these areas are often near busy roads.
- People living in cities tend to be more seriously affected. Death rates as a result of particulate air pollution can vary from around 3% in rural areas to more than 8% in parts of London.

## What additional benefits could tackling air quality bring?

### **Air quality can be addressed alongside:**

- Encouraging people to increase physical activity to improve their health.
- Climate change mitigation.
- Limiting the impact of potentially damaging trade-offs in the future eg energy efficiency and indoor air quality in homes.

By tackling these challenges together we can keep overheads low and impacts high. For example, experts have highlighted that, given the health co-benefits that accrue from actions for a sustainable economy, tackling climate change could be the greatest global health opportunity of this century. It is also important that the benefits of interventions intended to improve air quality are maximised and any unintended negative effects (eg road injuries from increased use of bicycles) are minimised.

## How can local authorities help in the shorter term?

### **Local authority decision makers can begin by:**

- Implementing business engagement programmes (such as encouraging electric vehicle use, or using active transport) to reduce air pollution.
- Establishing and expanding council-run income-generating car clubs which can lead to a reduction in vehicle use through car sharing.
- Promoting zero emission “last mile” delivery of as many goods and services as possible with delivery to final destination by zero carbon vehicles.
- Organising “eco-driving” training for taxi-drivers to encourage more fuel-efficient driving practices.
- Leading by example in their own organization by introducing measures that reduce air pollution (eg car sharing, rewarding active travel, providing incentives for using public transport).
- Encouraging and, where practical, providing, more demand-responsive transport services to people living in urban and rural areas so that they can choose to travel sustainably.
- Ensuring housing is well insulated, and equipped with functioning extractor fans, and that occupants are aware of the need for ventilation during cooking or smoking.
- Encouraging home and flexible working to reduce the need for travel.
- Where possible, working with local Health and Wellbeing Boards to link air quality monitoring with an analysis of health impact, helping to join up national-level research and advice on air pollution with local government action.
- Communicating the positive narrative of tackling air quality and bringing benefits to individuals, health and the economy.
- Encouraging use of sensor technology by individuals to monitor air pollution levels themselves.

## How can local authorities help in the longer term?

**In the longer term local authorities need to be able to facilitate investment in changes with potentially greater impacts such as:**

- Vertical roof exhausts for buses, and replacing diesel vehicles with zero emission alternatives when available.
- Ensuring that new buildings on their estate are air quality neutral.
- Working with developers and planners to ensure all developments within their area consider air quality and incorporate design features, mitigation or alternative provision to reduce or minimise emissions that may affect air quality or climate change.
- Encouraging people to make more journeys by bicycle or by foot, through integrated, harmonised and safe active transport networks.
- Where it is appropriate and cost effective, developing low emission or congestion charge zones.
- Ensuring real time air quality data is available to everyone in their catchment, to allow individuals to make a choice about where, when and how they travel. Access to this data should be facilitated to ensure it is fully understood and interpreted correctly.

## Further information

**This Policy and Practice Note was written by Dr David Hutchinson, Environment Facilitator, University of Portsmouth Environment Network. It draws on the Environmental Exposure and Health Initiative, co-funded by a partnership of RCUK funders and government departments: NERC, MRC, ESRC, DEFRA and DoH (Awesome and Traffic only). All funders are part of the LWEC network.**

### Useful resources:

Environmental Exposure and Health Initiative (EEHI)

<http://www.environmentandhealth.net/>

### EEHI projects:

AWESOME - Air pollution and Weather-related health impacts

<http://awesome.lshtm.ac.uk/>

FABLE - From Airborne exposure to Biological Effects - Pathways for health impacts of nanoparticles

<http://www.birmingham.ac.uk/research/activity/mds/projects/HaPS/IOEM/fable/index.aspx>

TRAFFIC - Health impacts of air pollution and noise from traffic in London

<http://www.kcl.ac.uk/lsm/research/divisions/aes/research/ERG/research-projects/traffic/index.aspx>

Atkinson R, Analitis A, Samoli E, Fuller G, Green D, Mudway I, Anderson HR, Kelly FJ. Short term exposure to traffic-related air pollution and daily mortality in London, UK Journal of Exposure Science and Environmental Epidemiology (in press) 2015 <http://bit.ly/1jQOqoV>

COMEAP The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom (2010)

<https://www.gov.uk/government/publications/comeap-mortality-effects-of-long-term-exposure-to-particulate-air-pollution-in-the-uk>

Davies A (2014). Claiming the Health Dividend: A summary and discussion of value for money estimates from studies of investment in walking and cycling. Department for Transport. <http://bit.ly/1jQOiG2>

Hampshire local travel scheme:

<http://myjourneyhampshire.com/workplaces>

Kelly FJ, Fuller GW, Walton HA and Fussell JC (2012). Monitoring Air Pollution: Use of Early Warning Systems for Public Health. *Respirology* 17: 7-19. <http://www.ncbi.nlm.nih.gov/pubmed/21942967>

Kilbane-Dawe, I (2012). Cost effective actions to cut central London air pollution. Par Hill Research Ltd. London.

Sanderson P, Delgado-Saborit JM, Harrison RM (2014). A review of chemical and physical characterisation of atmospheric metallic nanoparticles. *Atmospheric Environment*. 94: 353-365.

<http://bit.ly/1cJXUiy>

Taylor J, Shrubsole C, Davies M, Biddulph P, Das P, Hamilton I, Vardoulakis S, Mavrogianni A, Jones B, & Oikonomou E (2014). The modifying effect of the building envelope on population exposure to PM2.5 from outdoor sources. *Indoor air*. <http://bit.ly/1n8fjlp>

Tonne C, Halonen, JI, Beevers, SD, Dajnak D, Gulliver J, Kelly FJ, Wilkinson P, Anderson HR. Long-term traffic air and noise pollution in relation to mortality and hospital readmission among myocardial infarction survivors. *Int J of Hygiene and Environ Health* (in press) 2015

<http://1.usa.gov/1jQNTTU>

Watts N, Adger WN, Agnolucci P, Blackstock J, Byass P, Cai W, Chaytor S, Colbourn T, Collins M, Cooper A, et al (2015). Health and climate change: Policy responses to protect public health. *The Lancet*. <http://bit.ly/1LSHfM8>

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