HOUSE OF LORDS

In Focus

Air Quality and Health in the UK

A new study from King's College London indicates that air pollution in London is now at levels which are more detrimental to health than previously thought, amounting to a 'mortality burden' of the equivalent of nearly 9,500 people per year. The World Health Organisation notes that there is an established link between air pollution and increased risk of disease and premature mortality, and the Government's own data reveal that air pollution in some areas of the UK—such as London, the West Midlands, and West Yorkshire—is in breach of legal limits.

Pollutants and Causes of Pollution

Air pollution contains many different substances including particulate matter, oxides of nitrogen, ozone and carbon monoxide. The main pollutants which have been identified as having significant negative impacts on human health in the UK are fine particles, called $PM_{2.5}$, and NO_2. According to the Department for Environment, Food and Rural Affairs (DEFRA) the biggest anthropogenic (human-made) sources of $PM_{2.5}$ in the UK are stationary fuel combustion and transport, and the biggest contributor to oxides of nitrogen (including NO_2) in the UK is road transport, particularly diesel engines.

Impact on Health

DEFRA states that both short-term and long-term exposure to particulate matter is "consistently associated with respiratory and cardiovascular illness and mortality as well as other ill-health effects", and states that the "associations are believed to be causal". NO_2 is also associated with adverse effects on human health; at high levels it can cause inflammation of the airways, and long term exposure may affect lung function and respiratory symptoms. A 2013 World Health Organisation assessment concluded that "outdoor air pollution is carcinogenic to humans", with the particulate matter component of air pollution most closely associated with increased incidence of cancer, especially lung cancer. According to a report from the UK Government's Committee on Medical Effects of Air Pollutants, at 2008-levels the mortality burden of anthropogenic particulate matter in the UK's air was a loss of life expectancy from birth of approximately six months, equivalent to nearly 29,000 deaths at typical ages.

A recent study by King's College London (KCL), published on 14 July 2015, provided an estimate of premature deaths as a result of fine particulate matter and NO_2 in London based on 2010 levels of air pollution. The study updated estimates of premature deaths from $PM_{2.5}$ based on 2006 pollution levels, and for the first time estimated the effect on mortality of exposure to NO_2 in the capital. The study found that the total mortality burden from $PM_{2.5}$ and NO_2 can be added together to give an effect on mortality of up to 9,416 deaths at typical ages in London, assuming a 30 percent overlap between the effects of $PM_{2.5}$ and NO_2. Regarding $PM_{2.5}$ alone, the total mortality burden in London is estimated to have fallen from an estimated 4,267 deaths (based on 2006 concentrations) to 3,537 deaths at typical

Emily Haves
LIF 2015/024
18 November 2015

ages, partly due to a decrease in concentrations. Regarding NO_2, the study found that, whilst much less certain than for $PM_{2.5}$, the total mortality burden of long-term exposure to NO_2 in London is estimated to be up to 5,879 deaths at typical ages.

The KCL study argues that air pollution has other negative health impacts in addition to premature mortality: the authors state that in London in 2010 "$PM_{2.5}$ and NO_2 were associated with approximately 1,990 and 420 respiratory hospital admissions respectively, with an additional 740 cardiovascular hospital admissions associated with $PM_{2.5}$".

Regulation and Legal Challenges

In the UK, DEFRA states that action to manage and improve air quality is largely "driven by" European legislation. The 2008 ambient air quality directive (2008/50/EC) sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health, such as particulate matter and nitrogen dioxide. The 2008 directive was enacted in England through the Air Quality Standards Regulations 2010, and equivalent regulations exist in Scotland, Wales and Northern Ireland.

An article by the *British Medical Journal*, published in May 2015, stated that the UK meets all the European targets for particulate matter but does not meet those for reducing levels of nitrogen dioxide. In 2014, the Government published revised projections for oxides of nitrogen emissions showing that 40 out of the UK's 43 air pollution monitoring zones exceeded permitted pollution levels in 2011, and that three zones—the Greater London Urban Area, the West Midlands Urban Area and the West Yorkshire Urban Area—are likely to be in breach of the regulations until after 2030.

Air quality in the UK has also been the subject of legal challenge. In 2013, the UK Supreme Court delivered a judgment in a case brought by the charity ClientEarth, concerning the UK's non-compliance with European legal limits for nitrogen dioxide in certain zones. The Supreme Court ruled that the UK was in breach of Article 13 of the European Directive, which specifies limit values of certain substances in the air. However, the Supreme Court requested guidance from the Court of Justice of the European Union (CJEU) on several other points, specifically those concerning extensions to the deadlines for meeting air quality standards and the duty on the state to prepare plans to bring levels within the legal limits. Having received guidance from the CJEU, in April 2015 the Supreme Court delivered a second judgment in the case, requiring that the Government draw up plans by the end of 2015 to meet the EU rules. In addition, in 2014, the BBC reported that the European Commission had launched legal proceedings against the UK for its failure to meet air pollution targets.

Recent Developments

In September 2015, DEFRA published draft plans for reducing nitrogen dioxide in towns and cities. It then launched a consultation to solicit views on these plans, which closed on 6 November. On 22 October 2015, the House of Commons Environment, Food and Rural Affairs Committee launched an inquiry into DEFRA's responsibility for air quality; this will look at DEFRA's policies for reducing pollutants emitted by the transport, energy and industrial sectors, as well as from households and farming. The deadline for submissions to this inquiry is 23 November.