

Long-term study reveals public health benefits from air pollution reductions

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Research led by the Centre for Ecology & Hydrology (CEH) tracked the levels of emissions of a variety of air pollutants between 1970 and 2010—a period in which there was a raft of national and European

legislation to tackle pollution. Oxford's Environmental Change Institute (ECI) joined the CEH and the Universities of Birmingham, Edinburgh and Exeter to carry out this interdisciplinary study.

The research found that total annual emissions of PM_{2.5} ([fine particulate matter](#) such as soot), [nitrogen oxides](#) (NO_x), [sulphur dioxide](#) (SO₂) and non-methane volatile organic compounds (NMVOC) in the UK have all reduced substantially since 1970—by between 58 percent and 93 percent.

Based on these reduced emissions levels, the percentage of deaths attributable to air pollution has also decreased since 1970. For PM_{2.5} the attributable fraction of mortality fell from 11.83 percent to 5.21 percent. For NO₂ it fell from 5.32 percent to 2.96 percent.

The study is ground-breaking due to the long timeframe studied and the removal of weather factors from modelling, meaning any changes in air pollution can be directly attributed to emission levels.

Dr. Clare Heaviside, senior research fellow at the ECI, said, "Despite the significant reduction in emissions highlighted by this research, human-made air pollution is currently estimated to account for more than 5 percent of total UK mortality each year, and ozone air pollution has actually increased slightly since the 1970s."

"Both short and long-term exposure to air pollution reduces life expectancy, mainly due to an increased risk or aggravation of cardiovascular and respiratory disease. While the results highlighted by this research are encouraging, tackling air [pollution](#) in the UK remains an ongoing and important challenge.

Edward Carnell of the Centre for Ecology & Hydrology, said, "Technology advances over the past 40 years, such as the three-way

catalytic converter for cars and equipment to reduce sulphur and nitrogen dioxide emissions from large power plants have contributed to significant reductions in [emission](#) levels and therefore improved public health. However, it is legislation that has driven these technological improvements.

"Our results demonstrate the effectiveness of a series of policies at UK and European level since 1970 and this research supports policy-makers' efforts to continue implementing much-needed measures to further improve air quality."

The research points to emissions of ammonia (NH₃)—which fell by 17 percent between 1970 and 2010 but have increased slightly in recent years—as a key area for future improvement.

Dr. Stefan Reis of the CEH added, "Ammonia contributes not only to threats to human health, but also causes biodiversity loss. However, for the past 30 years, it has been the 'forgotten pollutant.'" Therefore, we were very pleased to see Defra's new Clean Air Strategy aim for a 16 percent reduction of UK ammonia emissions by 2030 (compared with 2005 levels)."

Provided by University of Oxford

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