

Exposure to air pollution 30 years ago associated with increased risk of death

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Credit: Alfred Palmer/Wikipedia

The new report comes from one of the world's longest running air pollution studies, which included 368,000 people in England and Wales followed over a 38 year period. The team, from the MRC-PHE Centre for Environment and Health, estimated air pollution levels in the areas where the individuals lived in 1971, 1981, 1991 and 2001, using measurements from Britain's extensive historic air pollution monitoring networks.

Highest risks were seen for respiratory disease, such as bronchitis, emphysema and for pneumonia. Air pollution also affected [mortality risk](#) from cardiovascular diseases, such as heart disease.

Dr Anna Hansell, lead author of the study, from the MRC-PHE Centre for Environment and Health at Imperial, said: "Air pollution has well established impacts on health, especially on heart and lung disease. The novel aspects of our study are the very long follow-up time and the very detailed assessment of [air pollution exposure](#), using air

quality measurements going back to the 1970s.

"Our study found more recent exposures were more important for mortality risk than historic exposures, but we need to do more work on how air pollution affects health over a person's entire lifetime.

"We were surprised to find pollution has effects on mortality that persist over three decades after exposure."

In the study, published in the journal *Thorax*, the researchers assessed levels of black smoke and sulphur dioxide air pollution from 1971 to 1991 and PM10 air pollution in 2001. Both black smoke and PM10 are measures of small particles in the air. Black smoke and sulphur dioxide were produced mainly by burning fossil fuels (including coal, oil, diesel, petrol).

Today, the methods of measuring air pollution have changed. A common measure is PM10, which measures very small particles that are less than 10 microns in size. These can travel deep into the lungs and may even be small enough to enter the bloodstream. This type of air pollution is mainly produced by transport and industry with a contribution from construction activities and natural sources (e.g. sea salt, soil).

In the study, risks from pollution exposures were reported in units of 10 micrograms per cubic metre of air. Researchers compared these levels of exposure with data on disease and deaths. The study suggests that for every additional unit of pollution that people were exposed to in 1971, the risk of mortality in 2002 to 2009 increases by two per cent.

The researchers also looked at more recent exposure and found a 24 per cent increase in mortality risk in 2002 to 2009 for each additional unit of pollution people were exposed to in 2001.

Dr Rebecca Ghosh, co-author of the study from the School of Public Health at Imperial, said "Putting this in context, an individual who lived in a higher polluted area in 1971 had a 14 per cent higher risk of dying in 2002 to 2009 than someone who had lived in a lower polluted area. An individual living in a higher polluted area in 2001 also had an increased risk of mortality of 14 per cent compared to someone in a low pollution area.

"However, although there are similar sizes of risk from exposure in 1971 and 2001, there are much lower exposure levels. For instance, comparing highest and lowest polluted areas in 1971, there was a 52 micrograms difference in black smoke per cubic metre of air, but in 2001 the comparable difference was 6 micrograms per cubic metre of air of PM10.

Dr John Gulliver, co-author and Senior Lecturer at the MRC-PHE Centre for Environment and Health at Imperial, said: "Levels of all types of air pollution in the UK have reduced dramatically since the start of our study period, with levels of black smoke currently estimated to be about 20 per cent of what they were in the 1970s."

Dr Anna Hansell added: "It's important to remember that the effects of air pollution are small compared to other risk factors. Your risk of dying early is much more dependent on other aspects of your lifestyle, like whether you smoke, how much you exercise, whether you are overweight, as well as on medical factors like your blood pressure. This was true even with the higher [air pollution levels](#) in the 1970s.

"However, our study adds to the weight of evidence that suggests breathing in air pollution isn't good for us in either the short or long-term. We need to continue collective efforts to reduce [air pollution](#) levels, both in the UK and internationally."

More information: Anna Hansell et al. Historic air pollution exposure and long-term mortality risks in England and Wales: prospective longitudinal cohort study, *Thorax* (2016). [DOI: 10.1136/thoraxjnl-2015-207111](#)

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