Press Release

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Exposure to air pollution at young age raises early death risk

People exposed to significant air pollution in early childhood are more likely to die early than those raised in areas with better air quality, research suggests.

The analysis of nearly 3,000 people born in Scotland in 1936 is the first to shed light on the life-long effects of breathing dirty air in early life.

Findings show people exposed to high levels of air pollution aged three were more likely to die between the ages of 65 and 86 than those subjected to low levels. Exposure to high levels of air pollution also increased the chances of dying from cancer, especially from lung cancer in women.

Previous studies have investigated links between poor air quality and health over time, but few have investigated the effects beyond 25 years, researchers say.

The new study, led by the University of Edinburgh, has revealed links between air pollution and deaths over a 75-year period.

Data analysed by the team was taken from the Scottish Longitudinal Study Birth Cohort of 1936, an anonymised, long-term study providing a representative sample of Scotland’s population.

Historic air pollution levels were estimated using atmospheric chemistry models and matched to each participant’s home address in 1939, when they were three-years-old.

The analysis also used results from a national cognitive ability test taken by each participant aged 11, and national death records from 1947 to 2022.

Senior author Professor Chris Dibben, Director of the Longitudinal Studies Centre Scotland, based at the University of Edinburgh, said: “We are lucky, in Scotland, to have an increasing number of studies following people from childhood to old age.

“This is helping us to better understand what type of environments we need now to support healthy ageing in the future.”

Over the 75-year period, 1,608 of the participants died. Exposure to higher levels of fine particle air pollution – known as PM2.5 – increased the risk of dying between the ages of 65 and 86 by up to 5 per cent.

Early years exposure increased the risk of dying from cancer. In women, lung cancer was the main cause of cancer-related deaths, linked to an increased risk of 11 per cent.

In men, preliminary findings suggest early exposure could be linked to an increased risk dying from neurodegenerative disorders in older adulthood.

The findings indicate around 25 per cent of the total impact of air pollution on death was an indirect result of effects on participants’ cognitive ability.

Children exposed to higher air pollution levels tended to score lower in the cognitive ability test. These skills are important for achieving better educational outcomes and higher socioeconomic status, which are ultimately linked to living longer, the team says.

The new research, published in the journal *Environmental Research,* was funded by Health Data Research UK. The Scottish Longitudinal Study is supported by the Economic and Social Research Council/JISC, Scottish Funding Council, Chief Scientist’s Office and Scottish Government.

An open access version of the paper is available here: <https://www.research.ed.ac.uk/en/publications/early-life-pm25-exposure-childhood-cognitive-ability-and-mortalit>.

Lead author Dr Gergő Baranyi, of the University of Edinburgh’s School of GeoSciences, said: “It is striking to see that children growing up in polluted areas can have consequences that persist throughout their entire life.

“These findings suggest that the effects of air pollution on our health can endure for decades, even after significant efforts are made to reduce pollution levels.”

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