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How air pollution affects your health

UK Prime Minister, Rishi Sunak, has delayed banning the sale of new petrol and diesel cars from 2030 to 2035. Following World Car Free day we look at the health effects of air pollution and the harmful levels in the UK.

"We have an air pollution crisis in the UK, and the government must take action to protect the nation's health." – Dr Noel Baxter, GP and chair of the [Primary Care Respiratory Society](#)

UK in dangerous pollution levels

Each year in the UK, [between 29,000 and 43,000 deaths](#) are attributable to exposure to outdoor air pollution. The annual cost to those affected, the NHS and business is thought to be more than £20 billion.

Poor air quality disproportionately affects the most vulnerable in society – those living in deprived areas, those who live, learn or work near busy roads, young children and the elderly, and those with existing medical conditions.

Although the years 2016 to 2021 saw a reduction in harmful nitrogen dioxide levels, [research](#) published in 2023 revealed that all cities in the UK are at or have exceeded WHO air pollution limits. As for the capital, every borough in London now exceeds these limits, according to [2023 data](#).

Sarah MacFadyen, head of policy at the [British Lung Foundation](#) (BLF), says "people in towns and cities across the UK are living in areas with dangerous, and in some cases illegal, levels of air pollution – that could be putting them at risk of a whole range of health problems further down the line.

"For people who are living with a lung condition, something like [asthma](#) or [chronic obstructive pulmonary disease](#) (COPD), they will often find that on days when pollution levels are high, sometimes they can't even leave their house because it is so much harder for them to breathe and it's making their symptoms so much worse than normal."

What is air pollution?

Health-wise, the most harmful air pollutants are gases such as nitrogen dioxide (NO_x) and solid and liquid particles in the air, known as particulate matter (PM).

NO_x in exhaust fumes emitted by petrol and diesel vans, lorries and private cars is a major problem in densely populated towns and cities. High levels of NO_x are also found close to indoor gas cookers.

PM, again primarily from road traffic in urban areas, is separated into two categories - larger particles such as dirt or dust (PM₁₀) and particles smaller than 2.5 micrometres (PM_{2.5}). The smaller particles are more harmful as they travel deeper into our lungs and cardiovascular system.

Other air pollutants include sulfur dioxide (SO₂) from the burning of fossil fuels mostly in power stations, ground-level ozone caused by chemical reactions between natural, traffic and industrial pollution in strong sunlight, and metals including lead emissions from iron and steel factories, mercury and arsenic.

Human made air pollution

Human made sources of air pollution include transport, power plants, industrial factories, agriculture, and electricity generation. These activities release significant levels of harmful toxins in the air, and reducing these activities can save lives. In 2022, this was the aim of a new clean air law - also called [Ella's law](#), named after 9-year-old Ella Adoo Kissi Debrah, the first person in England to have air pollution named as a cause of death by a coroner.

Despite this progress, in early 2023 the UK government [removed EU laws on reducing emissions](#). This means there is no longer a legal responsibility to meet safe air pollution targets.

Air pollution and weather

The weather and seasons also affect how harmful the air we breathe is at different times. We may be more vulnerable to certain airborne toxins, depending on the time of year.

Air pollution – summer vs winter

Hot summer temperatures trap tiny particles of dust, smoke, and dirt in the air and break them into smaller pieces. This means they can easily enter deep into your lungs, and mixed with ground level ozone pollution this can cause coughs, trigger asthma and hay fever symptoms. High exposure [may even cause heart disease and heart attacks](#), because once in the lungs these particles can affect your cardiovascular system.

In winter, thick slow moving cold air traps pollutants like a blanket that covers the ground. The things we do on cold days can further increase pollutants, such as driving instead of walking, and lighting fireplaces or wood stoves to heat our homes.

Air pollution and wildfires

As the risk of summer wildfires grows in the UK – brought about by [heatwaves](#) and droughts – so does the threat of higher carbon monoxide (CO) levels. Released into the atmosphere by fires, inhaled CO can reduce the amount of oxygen reaching your bloodstream, which is particularly dangerous for people with heart disease.

What are the health effects of air pollution?

Air pollution affects major organs including the lungs, pancreas, heart and brain, and is linked to respiratory disease, cancer, asthma, stroke and heart disease. There is also emerging evidence that it could be linked to diabetes, obesity, and [changes related to dementia](#).

Chair of the [Primary Care Respiratory Society](#), Dr Noel Baxter, a GP and medical adviser at the British Lung Foundation, says that the sudden or gradual worsening of asthma or COPD and other long-term lung conditions are the pollution-related problems that he encounters most often in patients.

"Breathing in dirty air is linked to lung cancer, asthma, heart disease and stroke," he says. "It can also stunt children's lung development, leading to chronic health problems later in life."

In England and Wales, the number of annual asthma deaths has been growing year on year, with a 17% increase in the last six years.

"From birth our lungs develop and grow, and at about age 25 they have reached their maximum potential," Baxter explains. "Damage in early age can be irreversible – it is therefore vital that our young people, who are expected to live so long, have the best lungs they can have at 25, so poor lung function doesn't disable them when they may be having an otherwise healthy retirement."

Issues with diagnosis

Identifying pollution as the sole cause of conditions such as asthma or COPD can be tricky, however.

"The evidence is clear that polluted air affects all our health, and pollution is especially harmful to anyone living with a lung condition," says Baxter.

"However, there are no specific symptoms or clinical signs that tell us that this is the cause, in the way that, say, a high temperature may suggest an infection-induced flare-up.

"It is likely we as primary care health professionals probably don't appreciate that air pollution is causing our patients to turn up in surgery. The same can be said of A&E services, as they might see patients for which air pollution is the straw that breaks the camel's back."

How can I protect myself?

While it's true that we need better education and research into the health effects of pollution, measures to tackle inequality, and better regulation and pollution monitoring, we also need to take action as individuals to protect ourselves.

Consider reducing your exposure to air pollution by:

- Avoiding busy roads and streets – where traffic air pollution is most toxic.
- Walking or cycling instead of driving – you can be exposed to more pollution inside your car, especially when stuck in traffic.
- Keeping an eye on local air pollution levels – on the [UK Air](#) website or on the [Defra Twitter page](#).

We can also promote change by:

- Trying cleaner alternatives to car travel - walking, cycling, or public transport.
- Promoting energy efficiency at home
- Keeping gas and fuel appliances in good repair.
- Demanding that your local council and MP tackle the problem.

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