

# Air pollution is significantly weakening our hearts, major new study finds

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The hearts of people who live in polluted areas are weaker than those who regularly breathe cleaner air, according to a new study which adds to the growing volume of evidence that fossil fuels are killing us.



The researchers said they found evidence of harmful effects even when levels of pollution associated with

diesel vehicles were less than half the safety limit set by the European Union. This showed the current permissible levels of air pollution were “not safe and should be lowered”, a cardiologist involved in the study said. When walking on the pavement, people should stay as far away from the kerb as possible to reduce exposure to exhaust fumes.

According to a recent report by the World Health Organisation, the mortality rate attributed to air pollution in the UK is 25.7 per 100,000 people, compared to just 0.4 per 100,000 in Sweden and 14.7 per 100,000 in Spain. According to a government estimate, about 40,000 people die prematurely because of the air they breathe.

In the new study, researchers used magnetic resonance imaging to examine the hearts of 4,255 people with an average age of 62. The size and function of parts of their hearts were then compared with the annual average level of fine particles of pollution, known as PM 2.5, at their home address.

Dr Nay Aung, a cardiologist at Queen Mary University of London, said: “We found that as PM<sub>2.5</sub> exposure rises, the larger the heart gets and the worse it performs. Both of these measures are associated with increased morbidity and mortality from heart disease.”

While there are parts of the UK where PM<sub>2.5</sub> can go above safety limits set by the European Union, the study found the average across the group was 10 micrograms per cubic metre of air.

“This is way below the European target of less than 25 micrograms per cubic metre and yet we are still seeing these harmful effects,” Dr Aung said. “This suggests that the current target level is not safe and should be lowered. There is strong evidence that particulate matter emitted mainly from diesel road vehicles is associated with increased risk of heart attack, heart failure and death.”

The study found every 5 microgram per cubic metre increase in exposure to PM<sub>2.5</sub> was associated with a 4 to 8 per cent increase in the size of the heart's left ventricle and a 2 per cent decrease in its pumping power.

Dr Aung, who presented the research at the European Association of Cardiovascular Imaging conference, advised people to avoid times and places where there were high levels of pollution.

"If you want to cycle into work and there is heavy traffic around that time then try to find a quieter route," he said. "Walk on the part of the pavement furthest from cars to reduce the amount of pollution you breathe in. Those with cardio-respiratory diseases should limit the time spent outdoors during highly polluted periods such as rush hours."

The process by which air pollution harms the body has been poorly understood. Until recently it was not known if fine particles could pass through the lungs into the bloodstream.

However, a study in which volunteers inhaled gold nanoparticles showed it was possible for this to happen with gold showing up in their blood and urine 15 minutes after they had breathed it in. The particles were still there up to three months later.

Dr Aung said the heart problems of those in the polluted areas “appears to be driven by an inflammatory response – inhalation of fine particulate matter causes localised inflammation of the lungs followed by a more systemic inflammation affecting the whole body”.

Professor Jeremy Pearson, associate medical director at the British Heart Foundation, which helped fund the research, said it was time to clean up Britain's air. “This adds to the growing evidence that air pollution, particularly from small particles in diesel fumes, is dangerous for your heart and health,” he said. “In the UK, heart attack and stroke account for eight in 10 of all deaths linked to air pollution.

“People have legal rights to clean, healthy air and we need a range of measures in order to make this a

reality. The evidence is now absolutely clear – tackling air pollution must be a major public health priority for the next government.”

And Andrea Lee, a healthy air campaigner at ClientEarth, lawyers who use environmental legislation to help the planet, said: “This report is another graphic example of the very real physical impact air pollution has on people's lives.

“In the UK, we have illegal levels of air pollution all year round, damaging not just our lungs but also our hearts. Every day, people are breathing in toxic air that is making them ill. Whoever is in power after the election on 8 June needs to get a hold of this public health crisis as soon as possible. As this report highlights, diesel vehicles are a major source of the problem. We need a national net-

work of clean air zones to keep the dirtiest diesel vehicles out of the most polluted parts of our towns and cities.”

ClientEarth has twice successfully won court orders forcing the Government to produce a better Air Quality Plan. The latest version – published only after ClientEarth opposed the Government’s attempts to win permission from a judge delay this until after the election – was described as “much weaker than we had hoped for” by ClientEarth’s chief executive, James Thornton.