Daily News epaper

Air pollution is causing dementia

Air pollution is fuelling a rise in dementia, the UK Government has acknowledged for the first time.

Toxic airborne particles from cars and fossil fuels have long been associated with rapidly increasing rates of the disease in the UK and the developed world.

Now, a major independent review has confirmed the link after analysing dozens of human studies.

The researchers concluded it was 'likely that air pollution can contribute to a decline in mental ability and dementia in older people'.

They believe the primary way this happens is by tiny toxic particles seeping into the bloodstream after being breathed into the lungs.

The pollutants then irritate blood vessels and disrupt circulation to the brain. Over time, this can lead to vascular dementia.

It is also likely that in rare cases very small air pollution particles can pass the blood-brain barrier and damage neurons directly.

But this does not seem to be an important mechanism at the level of air pollution currently in the UK, the report found.

IT HAS BEEN KNOWN FOR DECADES THAT AIR POLLUTANTS CAN CONTRIBUTE TO HEART DISEASE, STROKES AND OTHER CIRCULATORY ISSUES BY MAKING BLOOD VESSELS NARROWER AND HARDER

While a link has been established, there is not enough evidence yet to say how many dementia cases are the result of air pollution.

Some studies have suggested up to a fifth of patients with the disease are linked to exposure to toxic pollutants.

The 290-page report was carried out by the Committee on the Medical Effects of Air Pollutants (COMEAP), led by Imperial College London's Professor Frank Kelly.

Researchers looked at 70 human studies, which included population-based research, taken from the general public, and experiments in a laboratory.

It has been known for decades that air pollutants can contribute to heart disease, strokes and other circulatory issues by making blood vessels narrower and harder.

Scientists had theorised this process could also lead to vascular dementia, which is caused by damage to the blood vessels in the brain and is the second most common form of the disease after Alzheimer's.

Evidence

Writing in the report, the researchers said the evidence for this had become stronger over the past 15 to 20 years.

They concluded: 'We think there is a strong case for the effects of air pollutants on the cardiovascular system having a secondary effect on the brain.

'...we think it likely that such effects have an effect on the blood supply to the brain. That such an effect might well lead to damage to the brain seems, to us, likely.

'We, therefore, regard the association between exposure to air pollutants and effects on cognitive decline and dementia as likely to be causal with respect to this mechanism.'

The most dangerous type of air pollution is known as PM2.5, which have a diameter of less than 2.5 micrometres across.

That is one-four-hundredth of a millimetre, or about 3 per cent of the width of a human hair.

Some scientists believe PM2.5 can also have a direct effect on the brain, by travelling straight from the lungs to the brain via the bloodstream.

The current evidence suggests only a small proportion of the tiny particles can pass the blood-brain barrier, the report found.

And it's not clear whether enough of them can get into the brain and cause enough damage to lead to dementia.

The researchers did find, however, that once in the brain, the particles are cleared only slowly, if at all.

'This is clearly a point in favour of the suggestion that particulate material which does enter the brain might produce detrimental effects,' they wrote.

In animal studies, diesel engine exhaust has been shown to create an inflammatory response in the brain and damage cells. But it's unclear how this translates to humans.

'We regard the current evidence base as inadequate for direct quantification of the effects of air pollutants on cognitive decline or dementia,' the researchers said.

It comes as the Government today invited councils across England to bid for funding from a £7million pot to find innovative ways to improve the air quality in their areas.

The Air Quality Grant will go towards implementing measures that benefit schools, businesses and communities impacted by high levels of pollution.

Areas can only qualify if air pollution levels exceed UK targets.

'WE THINK THERE IS A STRONG CASE FOR THE EFFECTS OF AIR POLLUTANTS ON THE CARDIOVASCULAR SYSTEM HAVING A SECONDARY EFFECT ON THE BRAIN

'Green industrial revolution'

Earlier this year, the Government revealed the legal limit on PM2.5 will be cut in half by 2040 as part of the outcoming Prime Minister Boris Johnson's 'green industrial revolution'.

Currently, England's maximum permissible level on PM2.5 is set at an annual average of 20 micrograms per cubic metre of air (mcg/m3).

But this will be slashed to 10mcg/m3 over the next two decades.

A report by the British Heart Foundation in 2020 estimated 15million people — a quarter of the British population — live in areas where average levels of toxic particles in the air exceed 10mcg/m3.

In London, PM2.5 concentrations sit in the region of 13mcg/m3 on average, while in Birmingham it is around 14mcg/m3 and in Bristol it rises above 20mcg/m3.

Rates of pollution fluctuate day-to-day, however, with research suggesting tens of thousands of air pollution deaths were avoided worldwide during the pandemic as people used their cars less during lockdown.

Only rural areas, mostly situated in the north and south west of England, meet the WHO recommendation of 5mcg/3.

Ministers have repeatedly said leaving the EU has enabled them to beef-up targets for reducing air pollution.

The bloc has revealed it will stick to its 20mcg/m3 target.

A Defra spokesperson said: Air pollution at a national level continues to reduce significantly, with nitrogen oxide levels down by 44 per cent and PM2.5 down 18 per cent since 2010, although we recognise we need to go further.

'We have committed nearly £900million to tackle air pollution and improve public health.

'We have also recently consulted on stretching new targets for air quality to be set through our world leading Environment Act.

'We are seizing this opportunity to set air quality targets which will focus interventions to improve public health.'

- dailymail.uk

What is particulate matter and nitrogen dioxide?

Particulate matter (PM) is everything in the air that is not a gas.

It consists of a huge variety of chemicals and materials, some of which can be toxic.

Due to the small size of many of the particles that form PM some of these toxins can enter the bloodstream and be transported around the body, lodging in the heart, brain and other organs.

Therefore, exposure to PM can result in serious impacts to health, especially in vulnerable groups of people such as the young, elderly, and those with respiratory problems.

Nitrogen dioxide (NO2) is a gas mainly produced during the combustion of fossil fuels.

Short-term exposure to concentrations of NO2 can cause inflammation of the airways and increase susceptibility to respiratory infections and to allergens.

NO2 can exacerbate the symptoms of those already suffering from lung or heart conditions.