

Exhaust emissions: what are they?

The exhaust fumes from a car or lorry's engine contains a large number of different chemicals or emissions.

Once released into the air, exhaust emissions are breathed in and transported in the bloodstream to all the body's major organs. Diesel seems potentially to be more of a problem than petrol.

Potentially dangerous vehicle emissions include:

- Sulphur dioxide
- Benzene
- Formaldehyde
- Polycyclic hydrocarbons
- Tiny suspended particles ('particulate matter')
- Carbon monoxide
- Nitrogen dioxide

What are the risks?

Although research has clearly linked exhaust emissions to a range of health problems in the population, the exact risk to any individual is difficult to define. However there is no doubt that the more you are exposed the greater the risk is likely to be and some people, for example those who already have respiratory conditions such as [asthma](#) or bronchitis, are especially vulnerable.

The most obvious health impact of car emissions is on the respiratory system. It's estimated that air pollution - of which vehicle emissions are the major contributor - is responsible for 24,000 premature deaths in the UK every year. Many of these deaths are due to asthma, bronchitis and other [respiratory diseases](#) - all of which are known to be aggravated by exposure to car fumes.

A Dutch study of 632 children aged seven to 11 years found that respiratory disorders worsened as air pollution increased and a longer term study of older Dutch residents, published in 2009 found that illness due to lung disorders increased in areas of high nitrogen dioxide and particulate matter associated with exhaust emissions.

Impact on blood

Many pollutants produce harmful effects on the blood and the coronary system. Researchers estimate that one in every 50 [heart attacks](#) in London may be triggered by air pollution.

Lead, for instance, interferes with the normal formation of red blood cells by inhibiting important enzymes. It also damages red blood cell membranes and interferes with cell metabolism in a way that shortens the survival of each individual cell. This can lead to [anaemia](#) - a shortage of blood cells - which can reduce the body's ability to circulate oxygen and vital nutrients.

Benzene has a suppressive effect on bone marrow and impairs the development of red blood cells. Exposure to the chemical may result in a diminished number of blood cells - cytopenia - or total bone marrow loss.

Carbon monoxide (CO) poisoning is similar to suffocation. CO binds to the haemoglobin contained in red blood cells 200 times more effectively than oxygen, and so can dramatically reduce the ability of the cells to transport and release oxygen to the tissues of the body.

Toxic chemicals may also stimulate the immune system to attack the body's own tissues, particularly the cells that line human blood vessels. The damage is initially slight, but it can build up with repetitive exposure to toxic substances and eventually lead to blockage of the blood vessels, increasing the risk of [high blood pressure](#) and [heart disease](#).

Central nervous system

Research has shown that exposure to lead can lead to behavioural changes. It can also impair mental function, causing problems with learning and memory. German research suggests that the impact of lead on the central nervous system may grow older with advancing age.

The immune system appears to be particularly vulnerable to the effects of pollution. Substances such as benzene, nitrogen dioxide and small particulate matter interact with the immune system and may cause changes, ranging from overactive immune responses to immunosuppression.

Cause of cancer

Long-term exposure to Benzene has been shown cause [leukaemia](#). It's also thought that the harmful impact that the chemical can have on the immune system may lower the body's defence against tumours.

Polycyclic hydrocarbons are also thought to be carcinogenic. Several of these compounds have caused tumours in laboratory animals when they ate them, when they were applied to their skin, or when they breathed them in the air for long periods of time. Studies in animals have also shown that polycyclic hydrocarbons can cause harmful effects on the skin and on body fluids and it's thought that polycyclic hydrocarbons are responsible for the higher incidence of [lung cancer](#) in gas and coke oven workers and foundry workers.

What can you do about it?

Government and a variety of environmental organisations are constantly working to reduce the impact of exhaust pollution. These are a good source of information if you are concerned.

You can also check that your employers are taking steps to prevent or control your exposure in the workplace, for example if you work in a motor or traffic related industry.

Under the [Control of Substances Hazardous to Health Regulations](#) 1994 (COSHH) employers have to make a suitable and sufficient assessment of the risks to your health if you are exposed to diesel or petrol fumes. They must then take the necessary steps to prevent or adequately control your exposure in the workplace, for example by putting in workplace air extraction fans or air vents, or fitting tailpipe exhaust extraction or filter systems. They should also provide suitable personal protective equipment

You can also take steps yourself such as avoiding exposure whenever possible, turning off engines when not required, keeping your vehicle in good repairs and dealing swiftly with any evidence that the engine may be producing high levels of emissions. It's also advisable not to eat or smoke in areas where there is likely to be exposure, to wash your hands and face before drinking, eating or leaving work, avoid skin contact with fuel, and to correctly wear any respiratory protective equipment or personal protective equipment when appropriate.

