



Carbon Monoxide

General Information

Key Points

- carbon monoxide is a colourless, tasteless, odourless, non-irritating gas produced during incomplete combustion of fuels
- it is released to the atmosphere by natural (such as volcanos) and man-made (such as fossil fuel burning) sources
- fuel burning appliances which are poorly installed, faulty or used inappropriately are a major source of exposure to carbon monoxide for the general public
- outdoor exposure may occur from vehicle exhausts
- carbon monoxide attaches to the body's oxygen carrier, haemoglobin and reduces the amount of oxygen that can be carried round the body
- brief exposure to small amounts of carbon monoxide may cause headache, flushing, nausea, dizziness, vertigo, muscle pain or personality changes
- people who have diseases that affect the delivery of oxygen to the heart or brain and the unborn child may be more vulnerable to the effects of carbon monoxide
- exposure to carbon monoxide during pregnancy may be harmful to the unborn child

Public Health Questions

What is carbon monoxide?

Carbon monoxide is a colourless, tasteless, odourless, non-irritating gas produced during incomplete combustion of fuels due to there being insufficient oxygen present. Complete combustion occurs when sufficient oxygen is present and leads to the production of carbon dioxide. Most combustion processes (natural or man-made) produce some carbon monoxide.

What is carbon monoxide used for?

Carbon monoxide is used to manufacture other chemicals, including methanol and phosgene. It is also used in certain lasers.

How does carbon monoxide get into the environment?

Between 1970 and 2013, total releases of carbon monoxide to the environment have decreased by 79% in the UK. Road transport is the major contributor to atmospheric carbon monoxide concentrations, though these releases have decreased by 91% from 1990 to 2013. The iron and steel industries, and industrial fuel burning in general also provide large contributions to carbon monoxide emissions. In indoor environments, oil, gas or kerosene heaters and faulty gas appliances produce significant amounts of carbon monoxide. Natural sources of carbon monoxide in the air include volcanoes, chemical reactions with light and natural fires.

How might I be exposed to carbon monoxide?

Carbon monoxide is produced when fossil fuels burn without enough oxygen. The most important source of exposure to carbon monoxide for the general public is from cooking or other fuel burning appliances which are poorly installed, faulty or used inappropriately (including inadequate ventilation). For example, home boilers that are installed incorrectly, the use of BBQs and portable generators inside homes, caravans and tents. Inhaling smoke from a house fire may lead to carbon monoxide exposure. For smokers, cigarettes are the major source of carbon monoxide. Use of shisha/hooka pipes may also lead to exposure. Exposure to low levels of carbon monoxide can occur outdoors, as it is produced by vehicle exhausts and industrial processes.

Very small amounts of carbon monoxide are also produced naturally in the human body, though this is not linked to health problems.

Workers may be exposed to carbon monoxide (for example those using LPG or petrol powered equipment in enclosed spaces). However safe levels of exposure are enforced to protect workers. Such levels are below those that are thought to cause harmful effects.

If I am exposed to carbon monoxide how might it affect my health?

When breathed in, carbon monoxide enters the blood through the lungs and attaches to the body's oxygen carrier, haemoglobin. This reduces the amount of oxygen that can be carried round the body. A brief exposure to small amounts of carbon monoxide may cause headache, flushing, nausea, dizziness, vertigo, muscle pain or personality changes. Exposure to higher amounts may cause movement problems, weakness, confusion, lung and heart problems, loss of consciousness and death.

Exposure to small amounts of carbon monoxide for a long time may lead to flu like symptoms with tiredness, headaches, nausea, dizziness, personality changes, memory problems, loss of vision and dementia. It can be hard to tell the difference between the effects of being exposed to carbon monoxide at low levels for a long time and other common illnesses.

Can carbon monoxide cause cancer?

Carbon monoxide would not be expected to cause cancer.

Does carbon monoxide affect pregnancy or the unborn child?

Carbon monoxide is transported across the placenta and can reduce the oxygen supply to the baby. Exposure to carbon monoxide during pregnancy may cause harm to the unborn child.

Information on exposure to chemicals during pregnancy can be found at the following website: <http://www.medicinesinpregnancy.org/>

How might carbon monoxide affect children?

Children may be more sensitive to the harmful effects of carbon monoxide than adults.

Are certain groups more vulnerable to the harmful effects of carbon monoxide?

People with diseases that affect the delivery of oxygen to the heart or brain, such as those with coronary heart disease, angina, asthma or anaemia are particularly at risk from carbon monoxide poisoning as the amount of oxygen being carried to the heart or brain is further reduced by carbon monoxide. Children, pregnant women (see above) and older people are more at risk of harm following exposure to carbon monoxide. Altitude, activity, existing and previous exposure to carbon monoxide may also affect how sensitive a person is to the negative effects of carbon monoxide.

How will I know that I have been exposed to carbon monoxide?

Carbon monoxide is colourless, tasteless and odourless, so you will not necessarily know that you have been exposed to it.

A carbon monoxide alarm can help detect an increase in carbon monoxide levels, but it is not a substitute for proper use and maintenance of fuel burning appliances.

What should I do if I think I am being exposed to carbon monoxide?

If your carbon monoxide alarm sounds or you believe there to be a leak (unignited gas does not contain carbon monoxide):

- stop using all appliances and evacuate the property immediately (try to stay calm and avoid raising your heart rate)
- call the gas emergency number on 0800 111 999 to report the incident or the Health and Safety Executive (HSE) Gas Safety Advice Line on 0800 300 363
- do not go back into the property (wait for advice from the emergency services)
- get immediate medical help

If you think you have been exposed to carbon monoxide and feel unwell or are worried call NHS 111, contact your GP or in an emergency contact emergency services 999. When people are removed from the source of carbon monoxide exposure, their health usually improves and their symptoms subside, but it is still important to seek medical advice.

What symptoms should I look for if I think I have been exposed to carbon monoxide?

Headaches, tiredness, difficulty in thinking clearly and feeling sick are common symptoms of carbon monoxide poisoning. Symptoms of carbon monoxide poisoning can also be similar to those for food poisoning and flu.

What can I do to protect myself from carbon monoxide?

Have all cooking and heating appliances which use fossil fuels (such as gas, oil and coal) serviced regularly by a qualified and registered engineer, for example Gas Safe Register (for gas appliances), HETAS (for solid fuel appliances) and OFTEC (for oil appliances).

It is important to make sure that you have adequate ventilation when using these appliances, therefore chimneys and flues should be kept clean by being swept from top to bottom at least once a year by a qualified sweep and should not be blocked. Fitting an audible carbon monoxide alarm that meets British or European Standards (BS Kitemark or EN 50291) will help to protect you from exposure to high levels of carbon monoxide. The alarm will not go off if you are being exposed to lower levels of carbon monoxide so it should not be used as a substitute for regular servicing of appliances. You can buy a carbon monoxide alarm from a DIY or hardware store.

Additional sources of information

HSE - Domestic gas health and safety: <http://www.hse.gov.uk/gas/domestic/index.htm>

NHS Choices – Carbon monoxide poisoning:

<http://www.nhs.uk/conditions/carbon-monoxide-poisoning/Pages/Introduction.aspx>

This information contained in this document from the PHE Centre for Radiation, Chemical and Environmental Hazards is correct at the time of its publication.

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