



Benzene

General Information

Key Points

- benzene is a colourless, volatile liquid with a characteristic sweet odour
- it is an important chemical required for the manufacture of a wide range of materials including plastics, foams, dyes, detergents, solvents, and insecticides
- major sources of benzene include vehicle exhaust, evaporation of petrol, petrol manufacturing and other industries
- exposure to benzene is mainly through inhalation
- tobacco smoke is also a significant source of exposure to benzene
- short term exposure to benzene in air may cause irritation to the eyes nose and throat, cough, a hoarse voice and breathing difficulties
- exposure to larger amounts can cause swelling of the airways and a build-up of fluid in the lungs
- ingestion of benzene may cause a burning feeling throughout the digestive tract, nausea, vomiting and pain
- benzene may cause redness and swelling if in contact with skin and burning and irritation to the eyes
- occupational exposure in the past has been linked to illnesses including a decrease in white blood cells, leukaemia and damage to DNA
- benzene has been classified as a cancer causing chemical

Public Health Questions

What is benzene?

Benzene is a colourless, volatile liquid with a characteristic sweet odour. It is described as an “aromatic” hydrocarbon; each molecule of benzene is composed of a ring of six carbon atoms (each connected to a hydrogen atom). The vast proportion of benzene is currently obtained from crude oil by processes known as ‘cracking’, ‘reforming’ and/or ‘disproportionation’.

What is benzene used for?

Benzene is an important chemical; it is used a starting material for a wide range of chemicals which feed into major industrial manufacturing processes. End products from processes requiring benzene include plastics, foams, dyes, detergents, solvents, and insecticides. Before its toxic nature was realised, benzene was previously used in cosmetics (e.g. aftershaves), domestic (cleaning) solvents and in the process of decaffeinating coffee. Its use in such consumer products or processes is no longer permitted.

How does benzene get into the environment?

Benzene will quickly evaporate when it is released into the environment. Major sources of benzene include vehicle exhaust, evaporation of petrol, petrol manufacturing and other industries. Benzene may also be present in the environment from industrial waste and from accidental spills.

Two measures have substantially contributed to the reduction of benzene emissions in the UK; the compulsory introduction of catalytic converters on car exhausts and legislation to reduce benzene levels in car fuels.

How might I be exposed to benzene?

Exposure to benzene is most likely to occur through inhalation. Benzene is a common air pollutant, present at higher levels in polluted areas (e.g. from industry or vehicle exhausts). Cigarette smoking is a significant source of exposure to benzene; the intake of a person smoking 20 cigarettes a day has been estimated at 4 times greater than that of a non-smoker.

Exposure to benzene may occur in occupations involving petroleum fuels and solvents. However, safe levels are enforced to protect employees who may be exposed to benzene at work. Such levels are below those that are thought to cause harmful effects.

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

The presence of benzene in the environment does not always lead to exposure. In order for it to cause any adverse health effects you must come into contact with it. You may be exposed to benzene by breathing or ingesting the substance, or by skin or eye contact.

Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Short term exposure to benzene in air may cause irritation to the eyes nose and throat, cough, a hoarse voice and breathing difficulties. Exposure to larger amounts can cause swelling of the airways and a build-up of fluid in the lungs. Ingestion of benzene may cause a burning feeling throughout the digestive tract, nausea, vomiting and pain. Following exposure by inhalation or ingestion benzene may cause neurological effects, problems with the heart and lungs, coma and convulsions. Benzene may cause redness and swelling if in contact with skin. It may cause a burning and irritation to the eyes.

In the past, long-term occupational exposure to benzene has been shown to produce a range of diseases, including a decrease in white blood cells (which normally help fight infections), leukaemia and damage to DNA.

Additionally, in the UK benzene levels are under stringent control and exposures to benzene at work, in water and air are reduced to the lowest practical level to minimise possible risks to health.

Can benzene cause cancer?

Benzene is known to cause acute myeloid leukaemia/acute non-lymphocytic leukaemia and potentially other cancers in humans. The International Agency for Research on Cancer (IARC) has classified benzene as carcinogenic to humans (group 1).

Does benzene affect pregnancy or the unborn child?

No definite association has been made between exposure during pregnancy and harm to the unborn child.

How might benzene affect children?

There is little information on the effects of benzene on children. They are expected to be affected by exposure in the same way as adults.

What should I do if I am exposed to benzene?

It is very unlikely that the general population will be exposed to a level of benzene high enough to cause adverse health effects. However, if you have any health concerns regarding exposure to phosgene seek guidance from your GP or contact NHS 111

Additional sources of information

HSE - Benzene and you: <http://www.hse.gov.uk/pubns/indg329.pdf>

HSE - Benzene in motor vehicle repair: <http://www.hse.gov.uk/mvr/topics/benzene.htm>

NHS Choices – Poisoning: <http://www.nhs.uk/Conditions/Poisoning/Pages/Introduction.aspx>

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

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