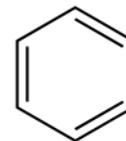


FREQUENTLY ASKED QUESTIONS ABOUT BENZENE



What is benzene?

Benzene is a colorless liquid with sweet odor. It evaporates into air very quickly and dissolves slightly in water. Benzene is highly flammable. It is widely used in United States as a constituent in motor fuels and as a solvent. Benzene is also used to make plastics, dyes, detergents, drugs and pesticides. Tobacco smoke and gasoline contain benzene, and natural sources of benzene include emissions from volcanoes and forest fires.

How might I be exposed to benzene?

Exposure to benzene can occur through inhalation and ingestion. Air may contain benzene from tobacco smoke, gas stations, exhaust from motor vehicles and industrial emissions. Smoking produces 50% of exposure to benzene in the United States. About 20% of the total national exposure to benzene account from auto exhaust and industrial emissions. Exposure to higher levels of benzene in air affects people living in cities or industrial areas more than those living in rural areas. For most people, the level of exposure to benzene through food, beverages, or drinking water is not as high as through air.



What happens to benzene when it enters the environment?

Most of the benzene released into the environment comes from automobile exhaust and industrial processes. Once in the air, benzene reacts with other chemicals and breaks down within a few days. Benzene in the air can also be deposited on the ground by rain or snow. It breaks down slowly in water and soil, can pass through the soil into underground water. Benzene does not build up in plants or animals.

How does benzene get into and leave my body?

Benzene enters the body primarily through inhalation or ingestion. When a person is exposed to high levels of benzene in air, about half of the benzene inhaled passes through the lining of the lungs and enters the bloodstream. When a person is exposed to benzene in food or drink, most of the benzene taken in passes through the lining of the gastrointestinal tract and enters the bloodstream. Once in the bloodstream, benzene travels throughout the body and can be temporarily stored in the bone marrow and fat. Benzene is converted to chemical products, called metabolites, in the liver and bone marrow. Some of the harmful effects of benzene exposure are caused by these metabolites and not benzene itself. Most of the metabolites of benzene leave the body in the urine within 48 hours after exposure.

How can benzene affect my health?

Acute Effects: Short-term inhalation of benzene can cause headaches, dizziness, drowsiness, confusion and unconsciousness in humans. Ingestion of large amounts of benzene may cause vomiting, irritation in stomach, sleepiness, convulsions, rapid heart rate and death. Studies in animals show neurologic, immunologic and hematologic effects from inhalation and oral exposure. Short-term exposure in rats and mice shows low acute toxicity.



Chronic Effects: Long-term inhalation exposure to benzene can affect bone marrow and can cause blood disorders in humans. Benzene causes anemia, excessive bleeding and damage to the immune system. Women who breathe high levels of benzene may have irregular menstrual periods and a decrease in the size of the ovaries. There is no information on the effects of fertility in men.

How likely is benzene to cause cancer?

Studies have shown that long-term exposure to benzene in air causes leukemia. The Environmental Protection Agency (EPA), the Department of Health and Human Services (DHHS), and the International Agency for Research on Cancer (IARC) have all classified benzene as a Group A carcinogen, which means that it is carcinogenic to humans.

Is there a medical test to show whether I have been exposed to benzene?

Benzene can be detected in human blood and breath. However, the test is not very useful because benzene does not stay in the body long. Breakdown products (metabolites) can be tested in blood and urine. This test is only useful if done shortly following exposure but cannot predict if any health effects will occur.



Has the government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) permissible exposure limit is 1 ppm benzene in workplace air. The Reference Concentration (RfC) for benzene is $30 \mu\text{g}/\text{m}^3$. Virginia's Significant Ambient Air Concentration (SAAC) for benzene hourly exposure is $64 \mu\text{g}/\text{m}^3$ and annually exposure is $1600 \mu\text{g}/\text{m}^3$. The Agency for Toxic Substances and Disease Registry's (ATSDR) Minimal Risk Level (MRL) for acute inhalation is $30 \mu\text{g}/\text{m}^3$, chronic inhalation is $10 \mu\text{g}/\text{m}^3$ and oral consumption is $0.0005 \text{ mg}/\text{kg}/\text{day}$. EPA Maximum Contaminant Level (MCL) is 5 ppb.

Where can my physician or I get more information?

If you need further information regarding the health effects of benzene, please contact the Virginia Department of Health, Division of Environmental Epidemiology, 101 North 14th Street, 15th Floor, Richmond, VA 23219, or call (804) 864-8182.

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