

This fact sheet answers the most frequently asked health questions (FAQs) about bromoform and dibromochloromethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Bromoform and dibromochloromethane are formed as by-products when chlorine is added to water supply systems. High levels of bromoform or dibromochloromethane can damage the liver and kidneys and affect the brain. Bromoform and dibromochloromethane have been found in at least 141 and 172, respectively, of the 1,636 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are bromoform and dibromochloromethane?

Bromoform and dibromochloromethane are colorless to yellow, heavy, nonflammable, liquids with a sweet odor. Small amounts are formed naturally by plants in the ocean. They are somewhat soluble in water and readily evaporate into the air. Most of the bromoform and dibromochloromethane that enters the environment is formed as byproducts when chlorine is added to drinking water to kill bacteria.

Only small quantities of bromoform and dibromochloromethane currently are produced in the United States. These chemicals were used in the past as solvents and flame retardants, or to make other chemicals, but now they are used mainly as laboratory reagents.

What happens to bromoform and dibromochloromethane when they enter the environment?

- When released to air, bromoform and dibromochloromethane are slowly broken down by reactions with other chemicals and sunlight or can be removed by rain.
- In water, these chemicals will evaporate to the air and/or be broken down slowly by bacteria.
- When released to soil, most will evaporate to the air, some will be broken down by bacteria, and some may filter into the groundwater.
- Bromoform and dibromomethane do not build up in the food chain.

How might I be exposed to bromoform and dibromochloromethane?

- The most likely way people are exposed to bromoform and dibromochloromethane is by drinking chlorinated water.
- You may breathe vapors released from chlorinated water in a swimming pool or during showering and bathing.
- Some bromoform and dibromochloromethane may enter your body directly through your skin while bathing or swimming.
- People that live near a waste site containing bromoform or dibromochloromethane could be exposed by drinking contaminated groundwater or breathing vapors released to the air.
- Exposure could occur by breathing bromoform and dibromochloromethane in the air in or near a laboratory or factory that makes or uses these chemicals; however, this is unlikely for most people.

How can bromoform and dibromochloromethane affect my health?

Eating or breathing a large amount of bromoform slows down the normal brain activities and causes sleepiness; this tends to go away within a day. Exposure to very high amounts may cause unconsciousness and even death. No studies are available about health effects in people exposed to dibromochloromethane.

Animals exposed to high amounts of bromoform or dibromochloromethane developed liver and kidney injuries. Exposure to low levels of bromoform or

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dibromochloromethane do not appear to seriously affect the brain, liver, or kidneys. We do not know if bromoform or dibromochloromethane affect fertility in humans, but studies in animals suggest that the risk of doing so is low.

How likely are bromoform and dibromochloromethane to cause cancer?

There is no conclusive evidence that bromoform or dibromochloromethane cause cancer in humans because no cancer studies of humans exposed exclusively to these chemicals are available. Long-term oral exposure to bromoform produced intestinal tumors in female rats and similar exposure to dibromochloromethane produced liver tumors in male and female mice.

The International Agency for Research on Cancer (IARC) concluded that bromoform and dibromochloromethane are not classifiable as to human carcinogenicity. The EPA classified bromoform as a probable human carcinogen and dibromochloromethane as a possible human carcinogen.

How can bromoform and dibromochloromethane affect children?

The only information regarding effects of bromoform on the health of children is that from the early 1900s when this chemical was used as a sedative to treat children with whooping cough. In some cases of overdosing with extremely high doses, children appeared drowsy, then lifeless, just before dying. A number of human studies examined the possible association between drinking chlorinated water (containing a number of chemicals including bromoform and dibromochloromethane) and birth defects. These studies are not conclusive. Data in animals exposed to these chemicals also are inadequate to establish firm conclusions. We do not know whether children are more susceptible to the effects of bromoform and dibromochloromethane than adults.

How can families reduce the risks of exposure to bromoform and dibromochloromethane?

- Families can reduce their exposure to bromoform and

dibromochloromethane from tap water by installing commercially available filter systems at home.

- While bromoform is no longer used as a medicine, keeping children away from, or supervising children with, chemicals brought into the home, will reduce the potential for accidental exposures.
- Families can reduce their exposure by taking shorter baths or showers in water in which these chemicals are present and opening bathroom windows or using ceiling ventilation fans whenever possible.

Is there a medical test to determine whether I've been exposed to bromoform and dibromochloromethane?

Tests are available to measure levels of these chemicals and their breakdown products in samples of your blood, breath, or fat. These tests are not routinely available in a doctor's office because they require special equipment. Because bromoform and dibromochloromethane are eliminated from the body fairly quickly, these tests are only effective in detecting recent exposures (within 1 or 2 days at the most).

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water contain no more than 0.7 parts per million (0.7 ppm) of bromoform and 0.7 ppm of dibromochloromethane.

The Occupational Safety and Health Administration (OSHA) set a limit of 0.5 ppm for the level of bromoform in workplace air during an 8-hour workday, 40-hour work week. Because dibromochloromethane has such a limited use, OSHA has not set limits of exposure for workplace air.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2003. Toxicological Profile for Bromoform and Dibromochloromethane (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

