

Arsenic

Why Arsenic is in the Environment

Arsenic is a naturally occurring element that is normally present throughout our environment in water, soil, dust, air, and food. Levels of arsenic can vary from place to place due to farming and industrial activity as well as natural geological processes.

- Although they are no longer used, arsenic compounds were once the most widely applied pesticides in Washington.
- Past emissions from metal-refining smelters in Tacoma and Everett have contaminated soil with arsenic.
- The arsenic from farming and smelting tends to bind strongly to soil and is expected to remain near the surface of the land for hundreds of years as a long-term source of exposure.
- Wood that has been treated with chromated copper arsenate (CCA) is commonly found in decks and railing in existing homes and outdoor structures such as playground equipment. It has not been sold for those uses since about 2004.
- Some underground aquifers are located in rock or soil that has naturally high arsenic content. Well water pumped from these aquifers can have

arsenic levels that exceed public health safety standards.

How You Can Be Exposed

Everyone has daily exposure to arsenic. When natural or human activities have caused greater than normal amount of arsenic to collect in the environment, the risk of developing health problems can be increased. Generally, the greater your exposure, the greater the risk of illness. Ways in which people may be exposed to arsenic include:

- Drinking water, eating food, or ingesting other things that contain arsenic.
- People normally swallow small amounts of soil and dust. Young children normally put hands, toys, pacifiers, and other things in their mouths that can have dust or dirt on the surface. Arsenic isn't absorbed very well through the skin, but if hands are dirty, adults and children can swallow contaminated soil while eating. Dust that is carried by the wind can be trapped in the nose and mouth and be ingested.
- Breathing air, dust, or fumes that contain arsenic is usually not a major route of exposure. However, dust and fumes from sawing or burning arsenic-treated wood can be a danger when inhaled.

Health Effects

Arsenic can cause many different health problems in people, but it is difficult to predict how arsenic will affect a specific individual. Similar arsenic exposures may cause serious health problems for some people and may have no effect on others. The types of health problems that may occur are influenced by things such as the amount of arsenic to which a person is exposed, the length of time exposure occurs, and an individual's sensitivity to the harmful effects of arsenic.

Short-term Exposure to Large Amounts of Arsenic

Swallowing relatively large amounts of arsenic (even just one time) can cause mild symptoms, serious illness, or death. Milder effects may include swelling of the face, nausea, vomiting, stomach pain, or diarrhea. Serious effects may include coma, internal bleeding, or nerve damage causing weakness or loss of sensation in the hands, arms, feet, or legs. Levels of arsenic in Washington's soil and water are generally too low to cause health effects from short-term exposure.

Long-term Exposure to Small Amounts of Arsenic

Long-term ingestion (greater than 6 months) of smaller amounts of arsenic that can be found in the environment has the potential to cause many different health problems. Illnesses strongly linked to this type of exposure include bladder cancer, lung cancer, non-melanoma skin cancer, liver cancer, prostate cancer, kidney cancer, cardiovascular disease, diabetes mellitus, damage to peripheral nerves, and changes to the pattern of color or thickness of the skin. For cancer, there is usually a delay of several decades from the time exposure starts until tumors are seen.

Many of these health problems, such as cancer, diabetes, and cardiovascular disease, are common illnesses that affect many people and have several possible causes besides arsenic. Even in areas with relatively high levels of arsenic in soil and water, we expect that most cases of these health problems will not be the result of arsenic exposure, but due to other factors such as diet, genes, lifestyle, preexisting illness, and other chemicals. At the same time, arsenic can increase the risk of developing these illnesses and is likely to contribute to some of the cases. Based on what is known about arsenic levels in Washington, the most likely result of exposure would be a small increased risk of certain types of cancer.

Preventing Exposure to Arsenic

Drinking Water

The public health drinking water standard for arsenic is 10 parts per billion (ppb). The Department of Health recommends that water used for drinking, cooking, and preparing beverages such as coffee and tea contain no more than 10 ppb arsenic. If your water contains more than 50 ppb of arsenic, we recommend you stop using it immediately. Drinking water in Washington typically contains less than 3 ppb. It takes laboratory testing or in some instances, a field analysis kit to detect arsenic. Learn more about [arsenic in drinking water](#).

Public Water - If you get your water from a public water system with at least 25 customers, your water utility should already be testing for arsenic. Your water utility issues an annual Consumer Confidence Report that will tell you how much arsenic is in your drinking water. If elevated levels are detected, a public water system will rely on consulting engineers to determine the best treatment method to reduce arsenic.

Smaller Water Systems and Private Wells - If your water comes from a privately owned well or a small water system, we recommend testing your water twice- once in the late summer and once again in early spring, by a [state-certified laboratory](#). If elevated levels of arsenic are detected, there are some home treatment systems that use reverse osmosis, distillation, or special filtration material to reduce arsenic. Point-of-entry systems treat all the water used in the house and point-of-use systems treat water at a single tap, such as the kitchen sink faucet. Keep in mind that these treatment products may not be effective in all cases so it's important to continue testing your water after installing this equipment and keep the equipment well maintained. For more information, see [arsenic and your private well](#).

Soil and Dust

Although anyone can be exposed to arsenic in soil, young children who are in close contact with dusty floors and outdoor dirt are more likely than others to swallow contaminated soil and dust that gets on their hands and toys. Reducing their exposure involves covering, removing, or avoiding contaminated soil, and washing children's hands and faces with soap and water when they get dirty. Contaminated soil can be brought inside the home by the wind and on shoes and pets. Taking off your shoes before coming inside, keeping pets clean, and regular damp mopping and dusting will help keep indoor dust levels down. Adults can reduce exposure to contaminated soil when gardening or doing yard work by dampening dusty soils (or wearing a dust mask) in dry conditions, wearing gloves, and washing up with soap and water before eating. Vegetables and fruits grown in contaminated soil should be washed thoroughly before eating.

Treated Wood

Although copper chromated arsenate (CCA) is no longer used to make pressure-treated lumber for residential use in the United States, these wood products can still be found on decks and playground equipment older than 2004. Washing children's hands after playing on CCA-treated wood can reduce potential arsenic exposure. Sealing CCA-treated wood with an oil-based stain can help reduce arsenic residues from leaching to the surface of the wood. Avoid breathing sawdust and don't burn CCA-treated wood.

Testing Yourself for Arsenic

Several types of tests are available to measure exposure to arsenic, but they cannot predict whether the arsenic in your body will affect your health. Each test has certain limitations that should be considered when deciding whether to be tested, which test to use, and how to interpret the

results.

Most arsenic stays in the body only a short time. Measuring the level of arsenic in urine is the best way to evaluate exposure that occurred in the last 1 - 2 days. Two types of urine tests are available. The most common test measures the total amount of arsenic and does not distinguish between the toxic “inorganic” forms of arsenic that are a health concern and the less toxic “organic” forms that make up the majority of arsenic in seafood and other foods. High test results could occur by eating foods with high levels of the relatively nontoxic organic arsenic compounds 1 - 2 days before the test. The second type of test, for “speciated” or “fractionated” arsenic, measures exposure to just the toxic inorganic forms of arsenic and is better for evaluating exposures relevant to your health.

Measurement of arsenic levels in hair or fingernails can be useful to evaluate longer-term exposure, but these tests can be difficult to interpret because there are no standardized procedures for conducting the tests and there are no widely accepted standard values to distinguish “normal” from “elevated” test results.

More Resources

[Arsenic in Drinking Water](#)

[Dirt Alert, Department of Ecology](#) - Industrial smelters and agricultural areas with a history of arsenic contamination.

[Brochure - ToxGuide for Arsenic, ATSDR \(PDF\)](#)

[Report - Hazards of Short-term Exposure to Arsenic-Contaminated Soil \(PDF\)](#) - Arsenic toxicity and human soil ingestion was evaluated and used to determine soil arsenic concentrations protective of public health for acute exposures.

Content Source: [Environmental Toxicology Program](#)

