

# Arsenic & Health Fact sheet



# IOWA

College of Public Health

## Introduction

Inorganic arsenic is a toxic metalloid found naturally in Earth's crust. Arsenic can be detected in water, air, and soil globally and within the United States (1). While the metalloid can be found in many forms, inorganic arsenic is the environmental form that poses the greatest risk to public health (1). Arsenic is a colorless powder, with no smell or taste, making it imperceptible in water, food, air, and soil.

## Exposure Sources

Exposure to inorganic arsenic is associated with mining and smelting, proximity to hazardous waste sites, and its use as a pesticide, wood preservative, and alloy in semiconductors and batteries (1,2). While some exposure is attributable to the consumption of rice, the primary route of exposure to arsenic in the US is through drinking water where high concentrations of inorganic arsenic are present in the groundwater. Concentrations of inorganic arsenic may be high in groundwater used as a source of drinking water (3). Wells deeper than 100 feet have the highest risk of inorganic arsenic contamination.

## Health Risks Associated with Arsenic

### Cancer Health Risks

The U. S. Environmental Protection Agency (EPA) classifies inorganic arsenic compounds as carcinogenic to humans (4). Hundreds of epidemiological studies conducted worldwide have shown the exposure to arsenic causes cancers of the skin, bladder, and lung. There is also evidence of association with cancers of the kidney, nasal passages, liver, and prostate. Recent research in the U.S. has provided evidence of a significantly elevated risk at levels below the current drinking water standard of 10 micrograms per liter (7).

### Non-Cancer Health Risks

The EPA has conducted risk assessment on non-cancer effects of long-term exposure to inorganic arsenic including ischemic heart disease (IHD), Type II diabetes, adverse pregnancy and birth outcomes, and neurodevelopmental effects (7). Evidence demonstrates risk levels for IHD and Type 2 diabetes as high as 180 per 10,000 people with lifetime drinking water exposure to inorganic arsenic at the 10 micrograms per liter maximum contaminant level (MCL) (7).

## How is Arsenic regulated?

- The EPA established the MCL to be 10 micrograms per liter to protect against the cancer and non-cancer health effects listed above (5).
- Under the Safe Drinking Water Act, the EPA requires public water suppliers to test for inorganic arsenic on an ongoing basis(1,3).
- Private wells are unregulated for arsenic (1,3).
- The Food and Drug Administration (FDA) and Occupational Safety and Health Administration (OSHA) regulate dietary and occupational exposures, respectively (5).

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## What can you do?

- If your water is supplied from a private well, you should get your water tested annually for arsenic by contacting your local health department.
- If you are on a public water supply, read your annual Consumer Confidence Report to see what levels of inorganic arsenic are in your drinking water. Arsenic is not reported if the concentration is below 5 micrograms per liter (3).
- Certain methods can be used to enhance the removal of arsenic from drinking water. These include anion exchange, reverse osmosis, activated alumina, pH adjustment, enhanced lime softening, and pre-oxidation (3,6).
- Using a Brita filter, refrigerator filter, and boiling water are not reliable methods of arsenic removal (6).
- Rice should be rinsed thoroughly prior to cooking.

# References



1. United States Environmental Protection Agency (2001). Technical Fact Sheet: Final Rule for Arsenic in Drinking Water. <https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockkey=20001XXE.txt>
2. Centers for Disease Control and Prevention (2023). Routes of Exposure for Arsenic. Agency for Toxic Substances and Disease Registry. [https://www.atsdr.cdc.gov/csem/arsenic/what\\_routes.html](https://www.atsdr.cdc.gov/csem/arsenic/what_routes.html)
3. Moles, D. (2011) Arsenic in Iowa's Drinking Water. Iowa Department of Natural Resources. [https://www.iowadnr.gov/Portals/idnr/uploads/water/wells/Arsenic\\_information\\_sheet.pdf](https://www.iowadnr.gov/Portals/idnr/uploads/water/wells/Arsenic_information_sheet.pdf)
4. IARC Working Group on the Evaluation of Carcinogenic Risk to Humans (2012). IARC monographs on the evaluation of carcinogenic risk of chemicals to man. Arsenic, Metals, Fibres, and Dusts. IARC monographs on the evaluation of carcinogenic risk to humans, 100C.
5. Centers for Disease Control and Prevention (2023). What Are the Standards and Regulation for Arsenic Exposure? Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/csem/arsenic/standards.html>
6. Barnaby, R., Liefeld, A., Jackson, B. P., Hampton, T. H., & Stanton, B. A. (2017). Effectiveness of table top water pitcher filters to remove arsenic from drinking water. Environmental research, 158, 610–615. <https://doi.org/10.1016/j.envres.2017.07.018>
7. Environmental Protection Agency. (2023). Peer Review of the IRIS Toxicological Review of Inorganic Arsenic. EPA. [https://sab.epa.gov/ords/sab/r/sab\\_apex/sab/advisoryactivitydetail?p18\\_id=2631&clear=18&session=10072872086921#doc](https://sab.epa.gov/ords/sab/r/sab_apex/sab/advisoryactivitydetail?p18_id=2631&clear=18&session=10072872086921#doc)