

FACT SHEET



ARSENIC

In response to concerns about water quality, the City of Longview asked a team of water quality experts to review our drinking water and determine whether some of the components of Longview's drinking water might have health impacts. This fact sheet was prepared by the City of Longview to answer questions commonly asked by our water customers.

What is arsenic?

Arsenic is odorless and tasteless. It's a naturally occurring semi-metal element found in the water, soil, plants, air, animals and food. Arsenic levels vary from place to place based on natural geological processes, as well as past and present farming and industrial activities. Most arsenic in drinking water comes from natural rock formations. As water flows through rock, it can dissolve arsenic and carry it into aquifers, streams or rivers that source the public drinking water supply.

How is arsenic measured?

Arsenic can be present in water in soluble or insoluble form. It's measured in micrograms (μg) of soluble or total arsenic per liter (L) of water, or $\mu\text{g}/\text{L}$. One $\mu\text{g}/\text{L}$ is often called one part per billion (ppb). Arsenic is also characterized as either organic (ie. carbon based) or inorganic. Inorganic arsenic is speciated as arsenite (As III) or arsenate (As IV) and occurs in a pure, semi-metallic form or in compounds bonded with non-carbon elements. Inorganic arsenic is toxic and has been closely associated with adverse health effects. Organic arsenic has compounds with covalent (molecular) bonds between arsenic and carbon, and is considered less toxic.

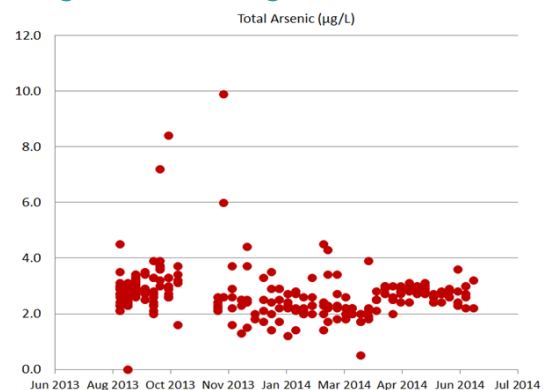
What is one part per billion?

One part per billion (ppb) is equal to:

- One second in 32 years
- One penny in \$10M
- One blade of grass on a football field

How much arsenic is in Longview's drinking water?

Data from water samples collected between July 2013 and April 2014 at 23 places in Longview show average level of total arsenic of 2.7 $\mu\text{g}/\text{L}$. Leaving the Mint Farm water treatment plant, total arsenic levels ranged from 1.7 to 3.8 $\mu\text{g}/\text{L}$. In the water distribution system, total arsenic levels ranged from 0.0 to 9.9 $\mu\text{g}/\text{L}$.



What does the EPA say about arsenic in drinking water?

The U.S. EPA establishes Primary Drinking Water Standards based on health considerations. For a long time, the Maximum Contaminant Level (MCL) for arsenic was 50 ppb. But in January 2001, EPA tightened the standard from 50 ppb to 10 ppb to reduce long-term exposure to arsenic in drinking water.³

How much arsenic is in the food I buy? ⁷

| Food or Beverage | $\mu\text{g}/\text{kg}$ |
|--|-------------------------|
| milk, whole / 2% / chocolate / skim, fluid | 0 |
| cheese, American, processed | 1 |
| turkey breast, oven-roasted | 6 |
| peanut butter, smooth/creamy | 4 |
| rice, white, enriched, cooked | 66 |
| fruit-flavored cereal, pre-sweetened | 29 |
| crisped rice cereal | 159 |
| grapes, (red / green), raw | 2 |
| wine, dry table, red/white | 8 |
| mushrooms, raw | 51 |
| candy, hard, any flavor | 1 |
| salmon, steaks/fillets, baked | 293 |
| olive / vegetable oil | 0 |

Should I be worried about how much water I drink?



World Health Organization set the Provisional Tolerable Weekly Intake (PTWI) for inorganic arsenic at 3 $\mu\text{g}/\text{kg}$ of body weight per day.⁶ Assuming 135 $\mu\text{g}/\text{day}$ from food (75% of the PTWI), a 130 lb. adult would have to drink (70) 8-oz glasses of water a day to ingest that much.

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What can I do about arsenic?

- Eat a well balanced diet.
- Vary your grains.
- Don't burn CCA-treated wood.
- Rinse and soak rice before cooking.
- Cook rice in excess water.
- Try iron-fortified cereals for infants.
- Visit NSF.org for ways to remove arsenic.
- Wash children's hands after playing in the dirt or on treated play equipment.

What else do I need to know?

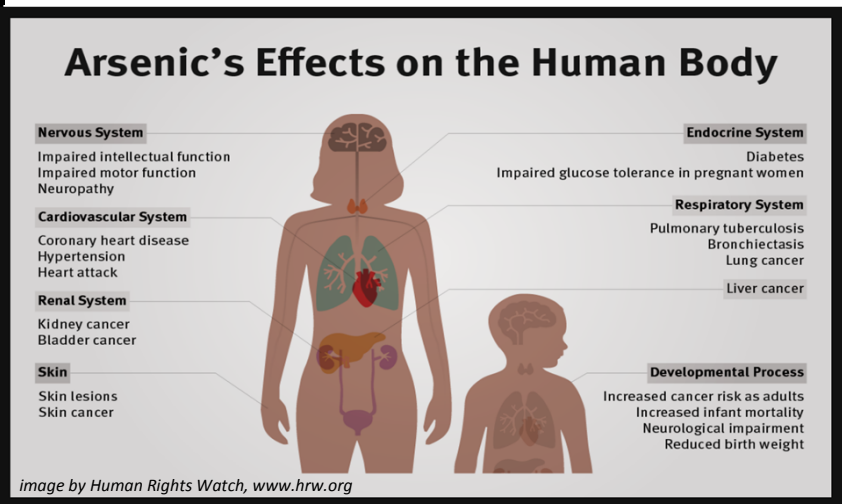
Arsenic has not been sold as a wood preservative since 2004, but it's still commonly found in wood treated with chromated copper arsenate (CCA) for exterior uses including decks, railings and outdoor structures including play equipment. Sealing CCA-treated wood with an oil based stain can help reduce arsenic residues from leaching to the surface. To reduce potential exposure, wash children's hands after playing on CCA-treated play equipment, don't burn CCA-treated wood and avoid breathing sawdust.

What about pesticides?

Arsenic compounds were widely used as pesticides and insecticides for agriculture uses into the 1980's. Arsenic from farming tends to bind strongly with the soil and remains near the surface for hundreds of years as a long-term source of exposure.¹

How does arsenic get in my food?

Arsenic can be found in many tobacco, food and beverage products including fruits, vegetables, grains, cereals, meat and dairy. As food plants grow, inorganic arsenic (naturally occurring or leftover from historical pesticide use) is absorbed through the soil and water. Absorption occurs regardless of whether plants are grown conventionally or using organic farming practices. Rice contains higher levels of inorganic arsenic than other foods because the rice plant and grain tend to absorb arsenic more readily than other foods. Some fish, shellfish and seaweed also contain high levels of less-toxic organic arsenic. The US Food & Drug Administration (FDA) limits the amount of inorganic arsenic in food products. For bottled waters and apple juice, the FDA action level is 10 ppb. For infant rice cereal, the action level is 100 ppb.⁴



Can I be tested for arsenic?

Most arsenic doesn't stay in the body for long. Measuring arsenic in urine is the best way to evaluate exposure that occurred in the last 1-2 days. Long term exposures can be measured by testing blood, hair or fingernails but results can be difficult to interpret. Arsenic has a short half-life in blood, and arsenic levels in hair and nails are normally higher than other parts of the body because of high keratin content. There is no standard procedure for hair and nail testing, and no widely accepted standard values to distinguish "normal" from "elevated" results.⁵

Where can I get more information?

EPA has a searchable website for Frequently Asked Questions about water quality at <https://safewater.zendesk.com/hc/en-us>

References

1. Arsenic, National Pesticide Information Center, Dec 2015. <http://npic.orst.edu/inqred/ptype/treatwood/arsenic.html>
2. Arsenic in Drinking Water, Department of Health, May 2011. <http://npic.orst.edu/inqred/ptype/treatwood/arsenic.html>
3. Technical Fact Sheet: Final Rule for Arsenic in Drinking Water, EPA Jan 2001. <https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=20001XXE.txt>
4. Arsenic, US Food & Drug Administration, Oct 2017. <https://www.fda.gov/Food/FoodborneIllnessContaminants/Metals/ucm280202.htm>
5. Biomarkers of Arsenic Exposure, 1999 National Academy of Sciences. <https://www.ncbi.nlm.nih.gov/books/NBK230898/#ddd00119>
6. Evaluations of JECFA on Food Additives, World Health Org 2011. <http://apps.who.int/food-additives-contaminants-jecfa-database/chemical.aspx?chem>
7. Total Diet Study, USDA, revised April 2017. <https://www.fda.gov/downloads/Food/FoodScienceResearch/TotalDietStudy/UCM184301.pdf>