

# Inorganic Arsenic

## What is arsenic?

Arsenic is a naturally occurring element like oxygen and carbon. It makes up part of the earth's crust and is in many rocks. Arsenic can be found in the air, water, and soil from dust moved by the wind. There are two types of arsenic; inorganic and organic. Inorganic arsenic is toxic and found in soil and water, compared to organic arsenic that is not toxic and found in fish.



## How is my child exposed to arsenic?



Children can be exposed to arsenic by breathing air, drinking water, and eating food. The amount of arsenic in the children get depends on the level of arsenic in the groundwater. The United States naturally has high levels of arsenic in the groundwater. Common ways children are exposed to groundwater arsenic are by drinking, watering crops, mixing baby formula, and cooking food with groundwater. Water can have more arsenic in it from industries using arsenic, mining, and ore smelting.

The soil of farm lands may have some arsenic in them from past or present pesticide use. Children play in soil and often put their hands, dirt, and objects in their mouths, which leads to more arsenic exposure. Also, children can get arsenic by touching clothes of adults that have arsenic on them, like ones who work with pesticides or smelting factories.



Children playing on older picnic tables or play areas could increase their chances of eating arsenic from the wood preservatives that used to have arsenic in it. Children can also be exposed to arsenic through tobacco smoke, wood preservatives, and animal feed. Eating seafood has some arsenic in it, but is much less toxic than the arsenic found in the groundwater.

## Levels Found in Children

Median Urinary Arsenic Levels by Age in the United States	
Ages	Level (mcg/specimen)
6-11 years	7.4
12-19 years	5.0
Over 20 years	8.7

Median is the middle value in the set of data. Data are from 2009-2010 National Health and Examination Survey.

### Trends:

- Air levels are higher in urban areas than in rural.
- Arsenic levels in the soil are high in areas that use pesticides, and near smelter sites.
- Arsenic levels are higher in girls than boys.



## Health Effect Levels

Health effects depend on how much arsenic children are getting and for how long. Children may take longer to get arsenic out of their system than adults.

### Health Effects of Arsenic Water Levels:

- 10 µg/l or less: None
- 11-50 µg/l: Higher risk of lung, bladder cancer, and skin lesions
- 51-100 µg/l: Higher risk of heart diseases, skin, lung, bladder, and kidney cancer. Could impact IQ.

### Arsenic and the San Luis Valley:

- There are multiple areas that exceed the EPA safe levels.

EPA Safe Water Levels: 10 µg/l or less

EPA Soil Levels for Clean Up in CO: 0.38-0.41 mg/kg

EPA Ambient Air Level Standards: None

## How do I reduce or eliminate exposure?

Soil: Dust, change your air filters and clean your house often. Wash your kids hands before eating, and try to lower the number of times your children's hands go in their mouths.

Food: Eat a variety of food to lower the chances of eating too much arsenic from a single food item, like rice. Wash the fruits, vegetables and your children's hands before eating.

Wood Products: Do not burn treated wood, if in doubt, throw it out. Wash your children's hands after playing on wood products. If wood is already sealed, continue to seal it every six months. Use protective clothing (like a mask) when doing home projects with treated wood.

Products containing arsenic: Keep pesticides and household cleaners away from children. Do not use pesticides that have arsenic. Change an adult's clothes at work and do their laundry in a separate load if he or she works with fertilizer, pesticides, or ore smelting.

Drinking Water: Use another source of water to drink like surface water, bottled water, or a water filter.

### Types of Filters to Reduce Arsenic in Water:

#### *Reverse Osmosis (Recommended):*



- Removes 95% of Arsenic (V) and 50-60% of Arsenic (III)
- Attaches under the counter to the kitchen sink and you use the sink as you normally would.
- Costs \$150 or more

#### *Ion Exchange:*



- Removes 90-100% of arsenic
- Attaches under the counter to the kitchen sink and you use the sink as you normally would.
- Costs \$350 or more

#### *Distillation:*



- Removes 98% of arsenic
- Costs \$180 or more
- Sits on countertop
- Fill up one gallon of water and wait five hours to use.

#### *Activated Carbon:*



- Removes 40-70% of arsenic
- Costs \$575 or more
- Attaches under a kitchen sink and use sink normally.