



Nitrate in Drinking Water

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What is Nitrate?

Nitrate is a chemical found in fertilizers, manure, agricultural runoff, dairy lagoons, and liquid waste discharged from septic tanks. Nitrate also naturally occurs at safe levels in vegetables. Rain or irrigation can carry nitrate down through soil into groundwater. Your drinking water may contain nitrate if your well draws from this groundwater.

Does the state regulate nitrate in drinking water?

Yes. Washington state law requires public water systems to sample for nitrate on a regular basis. The drinking water quality standard for nitrate (measured as nitrogen) is 10 milligrams per liter (mg/L). Public water systems with nitrate levels over 10 mg/L must notify people who receive water from them.

Can nitrate affect adults?

Most adults are not at risk from nitrates. However, some health conditions can make people more susceptible to health problems from nitrate in drinking water.

Pregnant individuals are at increased risk for methemoglobinemia because pregnancy increases the oxygen demand of the body. Some studies have found an increased risk of miscarriage or birth defects from drinking water contaminated with nitrates. Do not drink water with nitrate levels above 10 mg/L if you are pregnant or trying to become pregnant.

Additional health conditions that increase the risk for methemoglobinemia in adults are:

- ◆ Low levels of stomach acids,
- ◆ Anemia, cardiovascular disease, lung disease, acidosis, or sepsis,
- ◆ A genetic condition such as reduced NADH diaphorase, cytochrome b5 reductase, pyruvate kinase, methemoglobin reductase, and/or glucose-6-phosphate dehydrogenase.

Can nitrate affect babies?

Ingesting high levels of nitrate reduces the ability of red blood cells to carry oxygen. These red blood cells rapidly return to normal in most adults and children, but not in babies. Babies who drink formula mixed with water containing high levels of nitrate (or eat foods made with nitrate-contaminated water) may develop a serious health condition due to the resulting lack of oxygen. This condition is called methemoglobinemia, which is often called "blue baby syndrome." Diarrhea can make blue baby syndrome worse.

Levels of nitrate in water below 10 mg/L will not have a long-lasting effect on your baby. If your baby has any of the signs of blue baby syndrome listed below and your well water has levels of nitrate above 10 mg/L, you should have a doctor test your baby for methemoglobinemia.

What are the signs of blue baby syndrome?

Methemoglobinemia can occur quickly or over a few days. It is important to seek medical care immediately if you notice any of the below signs.

Moderate to severe methemoglobinemia may cause an unusual brownish-blue skin tone due to lack of oxygen. This condition may be hard to detect in babies or people with dark skin. For people with dark skin, look for a bluish color inside their nose and mouth, on their lips, or in their fingernail and toenail beds. Severe methemoglobinemia can cause coma or even death if not treated quickly.

Mild blue baby syndrome may cause symptoms similar to a cold or other infection (shortness of breath, fussy, tired, diarrhea, or vomiting). Unusual brownish-blue skin may or may not appear. While there is a blood test to see if an infant has blue baby syndrome, doctors may not think to do this test for babies with mild symptoms.

How do you treat blue baby syndrome?

Take anyone who has an unusual brownish-blue skin tone or bluish color to the lips, tongue, gums, nail beds, or nose to a hospital immediately. A medication called "methylene blue" will quickly return their blood to normal.

Can I prevent blue baby syndrome and other health effects?

Yes. Do not give babies younger than 12 months drinking water with nitrate levels above 10 mg/L. Do not offer high-nitrate vegetables such as beets, broccoli, carrots, cauliflower, green beans, spinach, and turnips until the baby is at least seven months old.

Nitrate in wells can vary throughout the year. If you have a private well and you're not sure about your water quality, use bottled water to prepare food, drinks, and baby formula.

Do not boil your well water if it contains high levels of nitrate. While boiling water kills bacteria, it may increase the nitrate level in the water because nitrate won't evaporate with the boiled water.

Will breastfeeding give my infant blue baby syndrome?

No. Very low levels of nitrate have been found in breast milk, but the levels are not high enough to cause blue baby syndrome.

How can I tell if my well water has nitrate?

Shallow, poorly sealed, or poorly constructed wells, and wells that draw from shallow groundwater are at the greatest risk of elevated nitrate levels. Damage to your well, recent flooding, new agricultural fields, new feedlots, and nearby waste disposal can also impact your well water quality. The only sure way of knowing if your well water contains nitrates is to test it.

If you own a private well, we recommend that you test for coliform bacteria and nitrate every year. If your nitrate test results are 5 mg/L or higher, you may want to re-sample in six months. Your county

health department can tell you where you can get your water tested and may have specific recommendations for testing. Many certified labs in Washington charge \$25 to \$50 per test.

For more information

If you get your water from a public water system, call your water utility or the Washington State Department of Health at 800-521-0323. You can also visit the [Office of Drinking Water](#) online.

If you have a private well, call your local health department. You can also find information in our publication [Private Wells: Information for Owners 331-349 \(PDF\)](#).

For a list of certified labs, visit the [Washington State Department of Ecology](#). Search for labs by city, county, or state. Click on the name of a lab to see if it tests for nitrate. Call the lab to make sure it's accredited to analyze for nitrate in drinking water.

Department of Health Office of Drinking Water

[Eastern Regional Office](#) 509-329-2100

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