

Nitrate in Drinking Water

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How can nitrate get into my well water?

Nitrate is a chemical found in most fertilizers, manure and liquid waste discharged from septic tanks. Natural bacteria in soil can convert nitrogen into nitrate. Rain or irrigation water can carry nitrate down through the soil into groundwater. Your drinking water may contain nitrate if your well draws from this groundwater.

How does nitrate affect health?

Nitrate is an acute contaminant, which means a single exposure can affect a person's health. It reduces the ability of red blood cells to carry oxygen. In most adults and children these red blood cells rapidly return to normal. However, in infants it can take much longer for the blood cells to return to normal. Infants who drink water with high levels of nitrate (or eat foods made with nitrate-contaminated water) may develop a serious health condition due to the lack of oxygen. This condition is called methemoglobinemia or "blue baby syndrome." Some scientists think diarrhea can make this problem even worse.

Low levels of nitrate in water will not have a long-lasting effect on your baby. If your baby does not have any of the symptoms of "blue baby syndrome," you do not need to have a doctor test for methemoglobinemia.

How is nitrate in drinking water regulated?

Washington's drinking water quality standard for nitrate is 10 milligrams per liter (mg/L), or 10 parts per million (ppm). State law requires public water systems to sample for many contaminants, including nitrate, on a regular basis. Public water systems with nitrate levels over 10 ppm must notify the people who receive water from them.

Signs of "blue baby syndrome"

An infant with moderate to serious "blue baby syndrome" may have a brownish-blue skin tone due to lack of oxygen. This condition may be hard to detect in infants with dark skin.

An infant with mild to moderate "blue baby syndrome" may have symptoms similar to a cold or other infection (fussy, tired, diarrhea or vomiting). While there is a simple blood test to see if an infant has "blue baby syndrome," doctors may not think to do this test for babies with mild to moderate symptoms.

What to do about "blue baby syndrome"

If your baby has a brownish-blue skin tone, take him/her to a hospital immediately. A medication called "methylene blue" will quickly return the baby's blood to normal.



Preventing “blue baby syndrome”

The best way to prevent “blue baby syndrome” is to avoid giving your baby water that may be contaminated with nitrate and foods that are high in nitrate. Infants less than one-year-old should not be given drinking water with nitrate levels more than 10 ppm. High-nitrate vegetables such as beets, broccoli, carrots, cauliflower, green beans, spinach and turnips should not be offered until after six months of age.

Nitrate levels in well water can vary throughout the year. If you have a private well and the nitrate level is above five mg/L or if you haven’t tested your well, you may want to use bottled water for your baby’s foods and drinks. Although boiling water kills bacteria, it will not remove chemicals such as nitrate. In fact, boiling may actually increase the nitrate level.

Will breast-feeding give my infant “blue baby syndrome”?

Low levels of nitrate have been found in breast milk, but the levels are not high enough to cause “blue baby syndrome.”

Can nitrate affect adults?

Although red blood cells in older children and adults quickly return to normal, some health conditions make people susceptible to health problems from nitrate. They include:

- Individuals who don’t have enough stomach acids.
- Individuals with an inherited lack of the enzyme that converts affected red blood cells back to normal (methemoglobin reductase).

Some studies have found an increased risk of spontaneous abortion or certain birth defects if the mother drank water high in nitrate. Women who are pregnant or trying to become pregnant should not consume water with more than 10 mg/L of nitrate.

How can I tell if my well water has nitrate?

Shallow wells, poorly sealed or constructed wells, and wells that draw from shallow aquifers are at greatest risk of nitrate contamination. Manure and septic-tank waste may also contain disease-causing bacteria and viruses.

If you own a private well and are unsure about your water quality, you should test for coliform bacteria and nitrate. 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 \$20 to \$40 per test. If your nitrate test results are over 8 mg/L, we recommend annual testing. If results are less than 8 mg/L, we recommend you test every three years. (Also see *Important information for private well owners*, DOH Pub. #331-349).

Where can I get more information?

If you get your water from a public water system, call your water utility or the Washington State Department of Health, Office of Drinking Water at 1-800-521-0323 or visit us online at <http://www.doh.wa.gov/ehp/dw/> If you have a private well, call your local health department.

For a list of certified labs, visit the Washington State Department of Ecology online at <http://www.ecy.wa.gov/apps/eap/acclabs/labquery.asp> Under “Location,” select your state, city and county. Scroll down and click on “Show results.” Click on the name of a lab to see the tests it performs. Call the lab to make sure it is accredited for drinking water analysis of nitrate.

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