



Chemicals in Private Drinking Water Wells Fact Sheet Florida Department of Health, Bureau of Environmental Health

This fact sheet discusses possible health risks from exposure to low levels of nitrates typically found in drinking water wells.

Nitrates

What are nitrates?

Nitrates are chemicals found in nature. Bacteria in soil change nitrogen into nitrates. Nitrogen comes from plants, fertilizer, and animal or human waste. Drinking water commonly contains low levels of nitrates; less than three thousand micrograms per liter (3,000 ug/L). You cannot see or taste nitrates. Therefore, water that tastes good might contain nitrates.

How might exposure to nitrates in drinking water occur?

- Drinking nitrate contaminated well water is the most likely type of exposure..

What are the current guidelines for nitrates in drinking water?

The Florida Department of Environmental Protection drinking water standard for nitrates is 10 thousand micrograms per liter (10,000 ug/L). There is no required sampling of private drinking water wells. However, private well owners are encouraged to test their well for nitrates on a regular basis.

How can nitrates affect my health?

The type and severity of health effects associated with exposure to a particular chemical depends on a number of factors:

- How much of the chemical was someone exposed to each time?
- How long did the exposure last?
- How often did the exposure occur?
- What was the route of exposure (eating, drinking, or breathing)?

How chemical exposures may affect someone can range widely from one person to the next. The drinking water standard is set to protect the most sensitive individuals. A number of personal factors also determine health effects. These include:

- How old are they?
- What gender are they?
- Is the person generally healthy or do they already have other health problems?
- What are their health habits? (For instance, do they drink alcohol or smoke tobacco?)
- How likely are chemical exposures to effect someone, in general?

Nitrates can affect red blood cells. It can reduce the cells' ability to carry oxygen to the body. In most cases, for adults and children affected blood cells quickly go back to normal. However, the blood cells of infants younger than six months can take much longer to do so. As a result, infants given water with more than 10,000 ug/L nitrates may develop a serious health condition due to the lack of oxygen. This is also true of infant formula or foods made with water with more than 10,000 ug/L nitrates. We call this medical condition **methemoglobinemia**. Many people call it "blue baby syndrome" since low oxygen in the blood causes babies to have blue-colored skin. Some studies show that diarrhea can make this problem even worse.

An infant with moderate to serious “blue baby syndrome” may have a brownish-blue color due to the lack of oxygen. This condition may be hard to detect in infants with dark skin. In mild to moderate cases, babies may have the same symptoms as when they have a cold or another infection. They may act fussy, tired, have diarrhea, or vomit. 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. Many other common illnesses cause the same symptoms.

If your baby has a brownish-blue color, bring your baby to a hospital immediately. There is a medication (methylene blue) that will quickly make your baby’s blood go back to normal.

Tests of breast milk have detected nitrates, also. However, there are no confirmed reports of “blue baby syndrome” being caused by a nursing mother who drank well water high in nitrates.

Some people have conditions that make them more likely to have health problems from nitrates. This includes:

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

How likely are nitrates to cause cancer?

No proof of a link to cancer from nitrates in drinking water exists.

Is there a medical test for exposure to nitrates?

There is a simple blood test to see if an infant has “blue baby syndrome,” but doctors may not think to do this test for babies with mild to moderate symptoms.

Is it safe to keep drinking water with nitrates in it?

The best way to prevent “blue baby syndrome” is not to give your baby water with more than 10,000 ug/L nitrates. Infants under one year of age should not drink water exceeding the drinking water standard of 10,000 ug/L of nitrates. Nitrates 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 bring your baby to the doctor.

Are there any special considerations for nitrates?

Boiling water will kill bacteria that are in well water but will not reduce the level of nitrates. In fact, boiling water with nitrates in it can increase the amount in the water. High levels of nitrates may mean that is likely other contaminants are in your well water. Nitrates in well water from human or animal waste may also have bacteria and viruses. Wells with nitrate contamination from fertilizers may also contain pesticides.

For additional health information, please call the Florida Department of Health at 850-245-4240 or visit us online at www.floridahealth.gov/environmental-health/drinking-water/Chemicals-HALs.html

For more information about the health effects from exposure to nitrates in different situations and at higher levels than those usually found in drinking water wells, please see the U.S. EPA consumer fact sheet at <http://water.epa.gov/drink/contaminants/>