

NITRATES, BLUE BABY SYNDROME, AND DRINKING WATER: A Factsheet for Families



How to Keep Your Baby Safe from Nitrates in Drinking Water

Nitrates are chemicals that occur naturally in drinking water and also result from human activities, such as nitrogen fertilizer use, livestock operations (animal waste), and septic systems. In some locations, private wells are contaminated with nitrates. Excessive ingestion of nitrates can cause methemoglobinemia, which is also called "blue baby syndrome," in babies less than one year old. Blue baby syndrome can lead to a (temporary) change in an infant's skin to a bluish or brown color. This color change may also be noticed inside the nose or mouth, the lips, or the fingernail and toenail beds. This change in coloring may occur before the baby develops any symptoms, but it is important to contact a doctor immediately if you see these changes in your baby.

Tips to Reduce Exposure

- Use water from public water supplies, water that has been tested and approved, or bottled water.
- Test your well water for nitrates to ensure it is safe to drink. A nitrate test costs around \$50.
- Do not use nitrate-contaminated well water to make baby formula or to make baby food.
- Do not let your baby drink nitrate-contaminated water.
- If you are pregnant or trying to become pregnant, do not drink nitrate-contaminated well water.
- Breastfeeding is a safe practice even if the mother drinks water contaminated with nitrates.

What are the sources of nitrates in drinking water?

Nitrates are chemicals that occur naturally in water at low concentrations. They are also present due to human activities, such as the use of fertilizers and manure on irrigated farm fields that can run off and seep into wells. Nitrate-contaminated water can also be caused by improper management of human and animal waste (such as cow manure), leaky sewage pipes and septic system failures.

How are young babies exposed to nitrates?

Infants are exposed to nitrates when they drink contaminated well water, or when contaminated well water is used to make infant formula or baby food. Nitrates in water cannot pass through a baby's skin.

Are there other important sources of nitrates in addition to drinking water?

Nitrates can also be present in significant amounts in some vegetables, including spinach, beets, lettuce, cabbage, green beans, squash, carrots, and turnips. Because these vegetables may contain higher amounts of nitrates than other foods, avoid these food items until the baby is 7 months old. Doctors recommend that no solid foods be given to a baby before he/she is 4 - 6 months old.

How do nitrates harm young babies?

In the body, nitrates can be converted into nitrites. Nitrites change the iron in red blood cells from normal hemoglobin (which carries oxygen) to something called methemoglobin (which cannot carry oxygen). When there is too much methemoglobin, the body does not receive enough oxygen. Oxygen is needed everywhere in the body in order for cells and organs to function properly. Children older than 12 months and adults are less likely to be harmed by nitrates because they have a more fully developed ability to break down nitrates in the body. Some adults with doctor-identified digestive or genetic medical problems may also be sensitive to elevated nitrates in drinking water.

What health symptoms are expected when a baby is exposed to nitrates?

Nitrates can make a baby's skin turn brown or blue. This may be noticed inside the nose or mouth, the lips, or the fingernail and toenail beds. When a baby has consumed significant amounts of nitrates, the baby may become unusually fussy, tired and/or short of breath. Babies who have vomiting or diarrhea are at higher risk of developing symptoms when also exposed to excessive nitrates.

Is it safe to breast feed my baby?

Yes. Adults have more functional mechanisms to break down nitrates, so even if a mother drinks contaminated water, her breast milk is safe for her baby. Breast milk makes babies strong and healthy. Doctors recommend breast feeding.

Can nitrates harm the developing fetus?

Although the evidence is weak, nitrates may increase the risk of birth defects or spontaneous abortion. For this reason, women who are thinking about pregnancy or who are pregnant should avoid water contaminated with nitrates. Women considering pregnancy or who are pregnant should drink water from public water supplies, water that has been tested and has safe nitrate levels, or bottled water.

Why is it important to test my drinking water?

The only way to know if the nitrates in well water are at a safe level is to have the well water tested by a certified laboratory.

How do I test my drinking water for nitrates and how much will it cost?

All private wells should be tested before use and once per year for nitrates. Contact your state health department for assistance with selecting a certified laboratory. Generally the cost is around \$50, although prices will vary by region.

What does my nitrate drinking water test result mean?

The United States Environmental Protection Agency's (EPA) Maximum Contaminant Level (MCL) for nitrates is 10 mg/L (10 milligrams of nitrate in one liter of water) or 10 ppm (10 parts per million). The 10 mg/L standard was set to protect infants from nitrates. When a nitrate water test result is 10 mg/L or less, then the drinking water is considered safe with respect to nitrates.

Nitrates may change seasonally or randomly throughout the year. If the nitrate water test result is between 5 – 10 mg/L, test the well water every 3 months to confirm the water is still safe. When nitrates are present, pesticides or bacteria may also be present and additional water tests may be need. Contact your local health department for guidance.

Resources

- For acute poisoning assistance, contact your state poison center at 1-800-222-1222.
- For clinical and public health assistance, contact your regional PEHSU office. To find your regional office, call 1-888-347-2632 or go to <http://www.aoec.org/PEHSU.htm>.

References

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