

Sodium in Your Well Water: A Health Concern

Knowing the amount of sodium in your drinking water is important for your health, especially if you have high blood pressure. Sodium is an essential mineral for maintaining a healthy fluid balance and is important for brain function and muscle contractions but consuming too much sodium can elevate your blood pressure.

In 2016, the Center for Disease Control and Prevention reported 75 million U.S. adults or one in every three adults had high blood pressure. In Maryland, an estimated 1.5 million adults or one in every three adults had high blood pressure. The American Heart Association (AHA) defines high blood pressure as:

130 mm Hg and higher for the systolic measurement
80 mm Hg and higher for the diastolic measurement

While you may be limiting your salt intake from food for high blood pressure and other health reasons, you may not realize that you could be drinking too much sodium as well.

How Much Sodium Should I Consume?

The 2015-2020 *Dietary Guidelines for Americans* recommends that healthy adults and healthy children ages 14 and over should **limit sodium intake to less than 2,300 mg per day**, which *equals about 1 teaspoon of salt*. Adults with high blood pressure should further limit their sodium intake to 1,500 mg per day.

Unfortunately, most adult Americans do not follow these guidelines and consume 3,000 to 5,000 mg/day; far higher than what is recommended by various health organizations.

Groups who should be particularly concerned about consuming too much sodium include infants and children, people with high blood pressure, kidney or heart disease, adults over the age of 50, and African Americans.

How Much Sodium Should Be in My Drinking Water?

Well water quality is not regulated and municipal water supplies are not regulated for sodium. The Environmental Protection Agency (EPA) does regulate other standards for public drinking water systems and has provided guidelines for sodium. To avoid an unpleasant taste, the EPA recommends sodium concentrations between **30 to 60 mg/L**. They further advise that sodium not exceed **20 mg/L** for those on a sodium-restricted diet.

In Maryland, elevated sodium levels in well water are being reported across the state. A Maryland Geological Survey study of aquifers serving homes in the coastal plain—essentially the portion of Maryland lying east of Interstate-95—found that the average level of sodium was 92.6 mg/L. If you follow a low-sodium diet of 1500 mg/day, drink the recommended 2.5-liters (85-fluid ounces) of water/day, and have 92.6 mg/L of sodium in your well water, you would consume 15% of your daily sodium through your drinking water.



Residents in other parts of Maryland have reported even higher levels of sodium in their well water. In some cases, the levels are so high that people on sodium-restricted diets could be consuming most of their daily allowance of sodium by drinking a few glasses of water. In addition, homes using water softeners can experience elevated chloride and sodium levels.

Since homeowners with private wells are responsible for testing their water, anyone with concerns about sodium should test their drinking water so that they can take the necessary precautions to protect their health.

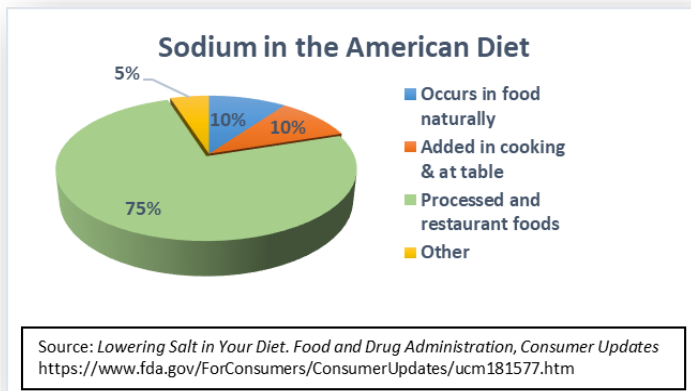
The University of Maryland Extension recommends:

- Using a state-certified lab for all water testing needs (contact your local health dept. for information on testing and labs).
- Testing for sodium every three years if high sodium levels are initially detected.

How Do I Know How Much Sodium I Am Consuming from Food and Drinking Water?

Sodium occurs naturally in many foods we eat such as grains, vegetables, meats and dairy products. However, most of the sodium Americans consume comes from packaged, processed, store-bought and restaurant foods (figure 1). Sodium from drinking water is a small percentage of daily intake, depending on the water source.

Figure 1. Percent of sodium sources in U.S. diets



You can find out how much sodium is in your well water by testing it at a state-certified lab (contact your county environmental health office for information). Once you have the results, use the sodium calculator in Figure 2 (functions in pdf format) below to determine how much sodium you consume from your well water and the remaining amount of sodium that you can consume from food to reach your daily sodium target.

To use the calculator, type in:

1. Your suggested daily sodium intake
2. Well water sodium concentration (the results from your water test)
3. Liters of well water you drink per day

The calculator will show the amount of sodium you consume from drinking your well water and the remaining sodium allowance for food.

Figure 2. Sodium calculator to determine how much sodium you consume from well water

Suggested daily sodium intake (mg)	
Sodium concentration in your water (mg/l)	
Liters of water intake per day (2.5 liters or 85 fl. ounces is recommended)	
Daily sodium intake from water (mg)	
Food sodium intake (mg) to meet suggested daily sodium intake	

* This calculator requires an open pdf document to function properly. If you have a print version use the following calculation steps:

- 1) Amount of water intake per day or 2.5 liters X Sodium concentration in your water (mg/l) Daily sodium intake from water = Daily sodium intake by water (mg);
- 2) Suggested daily sodium intake (mg) - Daily sodium intake by water (mg) = Food sodium intake (mg) to meet suggested daily sodium intake

Example:

- 1) 2.5 Liters intake of water per day X 100 mg/l sodium concentration in your water = 250 mg Daily sodium intake by water;
- 2) 1,500 mg Suggested daily sodium intake (mg) – 250 Daily sodium from water = 1,250 Food sodium intake to meet suggested daily sodium intake

How Does Sodium Get in My Drinking Water?

The level of sodium in well water depends on the types of naturally occurring minerals in the soil and underlying geology, as well as sodium derived from human activities, like deicing roads, home water softeners, and agricultural chemicals. Studies in Maryland have shown a trend of increasing sodium and chloride concentrations in streams and shallow groundwater due to salt used for deicing roads. State roads, major county roads, and/or emergency roads receive the most attention for snow removal. If you live along these routes, you should test your water for sodium to see if it exceeds the recommended levels.

Home water softeners treat hard water (calcium and magnesium ions), which can cause scaly build-up on dishes and plumbing fixtures and reduce the cleaning action of soaps. Softeners can also help remove iron and manganese. Water softeners pass hard water over a resin that replaces calcium, magnesium, iron, and manganese ions with sodium. One study showed that the average sodium concentration of softened well water was 278 mg/L. Therefore, if you must limit sodium to 1500 mg/day, you would consume 46% of your allotted daily sodium from drinking 2.5-liters per day of this water.

How Can I Remove Sodium from My Drinking Water?

To reduce the amount of sodium in your well water you can:

- Check the amount of hardness, iron and manganese that is removed by your water softener. It is possible that the softener is not needed if levels are low. To do this, test the water for hardness, iron and manganese before and after the softener.
- Use a water softener with potassium chloride instead of sodium chloride. Potassium chloride is more expensive than sodium chloride; however, it will not add sodium into your diet.
- Use a softener on the hot water supply and bypass the cold supply, since issues with scale and soap ineffectiveness occurs with the hot water supply. However, if you have elevated iron or manganese, this approach is not recommended.
- Use reverse osmosis or distillation filters. These systems only treat a small volume of water at a time, so they can be costly and require storage space for the treated water. They are typically installed to treat one faucet, like the kitchen sink, and termed point-of-use (POU) treatment.

Additional Information

For more information about your private well and drinking water quality, go to the University of Maryland Extension website (<http://extension.umd.edu/well-and-septic>).

References

- AHA 2018. *How Much Sodium Should I Eat Per Day?* AHA American Heart Association. Available at: https://sodiumbreakup.heart.org/how_much_sodium_should_i_eat
- Benham, B.R. et al. 2011. *Virginia Household Water Quality Program: Sodium and Chloride in Household Drinking Water*. Virginia Cooperative Extension. Publication 442-661. Available at: http://www.wellwater.bse.vt.edu/files/SodiumChloride442-661_pdf.PDF
- CDC. 2017. *Get the Facts: Sodium and the Dietary Guidelines*. CDC National Center for Chronic Disease Prevention and Health Promotion Division for Heart Disease and Stroke Prevention. Available at: https://www.cdc.gov/salt/pdfs/sodium_dietary_guidelines.pdf
- CDC. 2017. *Sodium and Food Sources*. CDC National Center for Chronic Disease Prevention and Health Promotion, Salt. Available at: <https://www.cdc.gov/salt/food.htm>
- Drummond, D.D. and D.W. Bolton. 2010. Report of Investigations No. 78. *Arsenic in Ground Water in the Coastal Plain Aquifers of Maryland*. Maryland Geological Survey. Report of Investigations No. 78.
- EPA. 2003. *Contaminant Candidate List Regulatory Determination Support Document for Sodium*. EPA-815-R-03-15. Available at: https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_sulfate_dwreport.pdf
- EPA. 2003. *Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sodium*. EPA- 822-R-03-006. Available at: https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_sodium_dwreport.pdf
- EPA. 2012. *2012 Edition of the Drinking Water Standards and Health Advisories*. EPA- 822-S-12-001. Available at: https://rais.ornl.gov/documents/2012_drinking_water.pdf
- FDA. 2017. *Lowering Salt in Your Diet*. Food and Drug Administration, Consumer Updates. Available at: <https://www.fda.gov/ForConsumers/ConsumerUpdates/ucm181577.htm>
- Koepenick, K. 2017. *Impacts of Whole House Reverse Osmosis Systems on Septic Systems*. 2017 National Onsite Wastewater Mega-Conference. Dover, DE.
- Moore, J., D.L. Bird, S.K. Dobbis, and G. Woodward. 2017. *Nonpoint Source Contributions Drive Elevated Major Ion and Dissolved Inorganic Carbon Concentrations in Urban Watersheds*. Environ. Sci. Technol. Lett., 2017, 4 (6), pp 198–204.
- Mullaney, J.R., Lorenz, D.L., Arntson, A.D., 2009, *Chloride in groundwater and surface water in areas underlain by the glacial aquifer system, northern United States*: U.S. Geological Survey Scientific Investigations Report 2009–5086, 41 p.
- U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 *Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.
- Yarows, S. A., W. E. Fusilier, and A. B. Weder. 1997. Sodium Concentration of Water from Softeners. *Archives of Internal Medicine* 157(2):218-222.

Andrew Lazur

lazur@umd.edu

Daphne Pee

dpee@umd.edu

Beverly Jackey

bjackey@umd.edu

This publication, Sodium in Your Well Water: A Health Concern (FS 1084), is a series of publications of the University of Maryland Extension and the Departments of Natural Resources and Family and Consumer Sciences.

The information presented has met UME peer review standards, including internal and external technical review.

For more information on this and other topics, visit the University of Maryland Extension website at extension.umd.edu

The University of Maryland, College of Agriculture and Natural Resources programs are open to all and will not discriminate against anyone because of race, age, sex, color, sexual orientation, physical or mental disability, religion, ancestry, or national origin, marital status, genetic information, or political affiliation, or gender identity and expression. color, sexual orientation, physical or mental disability, religion, ancestry, or national origin, marital status, genetic information, or political affiliation, or gender identity and expression.