What is arsenic?
Arsenic is a chemical element present in the environment from both natural and human sources, including erosion of arsenic-containing rocks, volcanic eruptions, contamination from mining and smelting ores, and previous or current use of arsenic-containing pesticides. Arsenic is a metalloid, which is an element that shares properties of both metals and nonmetals.

Are there different types of arsenic?
There are two types of arsenic compounds in food, water, air and soil. **Inorganic arsenic** refers to arsenic atoms that occur in their pure form or in compounds where they are bonded to non-carbon elements. In water, arsenic is primarily in the inorganic form. **Organic arsenic** refers to carbon-containing compounds that have covalently bonded arsenic atoms (organic arsenic is unrelated to organically-grown food).

Arsenic and your health
Arsenic affects a broad range of human organs and systems. Drinking water with arsenic for many years could lead to health problems, including:
- Cancer of the bladder, lung, liver, prostate, and skin;
- Cardiovascular, pulmonary, immunological, neurological, reproductive, and endocrine problems.

How can I be exposed to arsenic?
Water and food are the main sources of exposure. In NH, we are particularly concerned about people that drink well water, since households with wells are responsible for the quality and safety of their water.

Predicted probability of arsenic in NH groundwater
This map released by the U.S. Geological Survey in 2013 shows the probability of arsenic greater than or equal to 5 parts per billion in groundwater. Wells in the darker areas are more likely to contain arsenic above 5 parts per billion. The model does not predict actual concentrations; wells outside the darker areas may also have arsenic.

Protect your children
Studies show that developing fetuses and children are particularly sensitive to arsenic. Arsenic exposure has been associated with increased infant mortality, reduced birth weight, reduced ability to fight other diseases, neurological impairments, and greater potential for cancer later in life.

How is arsenic in well water regulated?
**Homeowners with wells are solely responsible for testing and treating their water.** The Safe Drinking Water Act (SDWA) of 1974 directs the U.S. Environmental Protection Agency to issue enforceable drinking water regulations for public water systems for contaminants that may cause health problems. The enforceable standard for arsenic in public drinking water is a maximum contaminant level (MCL) of 10 parts per billion. 10 parts per billion (ppb) of arsenic in water means that there are 10 parts of arsenic for every 999,999,990 molecules of water. That is roughly equivalent to a few drops of ink in an Olympic-sized swimming pool.
Reduce Your Family’s Exposure

Step 1: Test Your Drinking Water
Testing is required to determine whether your drinking water has arsenic. Arsenic is colorless, odorless and tasteless in water. If you drink water from a well, it is your responsibility to test your water for contaminants. The NH Department of Environmental Services has names of laboratories that are certified to test drinking water. The standard well water test at the NH State Lab includes a test for arsenic. The NH DES recommends that households test for bacteria every year and get a standard analysis at least every 3 to 5 years. For questions, call 603-271-2513.

Step 2: Treat Your Drinking Water
If your water contains arsenic, purchase a water treatment system or find an alternative source of water. Boiling water will not remove arsenic. The NH Department of Environmental Services has a handout on water treatment. The Environmental Working Group maintains a website about water filter types.

Step 3: Diversify Your Diet
Food is a significant source of arsenic in Western diets. Arsenic has been found in fish and seafood, cereals and cereal products, particularly rice and rice-based products, bran and germ, fruits and fruit juices, vegetables, and beer and wine. Eat a wide variety of grains—not only for nutrition but also to minimize any potential consequences from consuming any one particular food. The UK Food Standards Agency states that “as a precaution, toddlers and young children between 1 and 4.5 years old should not have rice drinks as a replacement for cows’ milk, breast milk, or infant formula.”

Examine the ingredient list and the weight of energy bars. Dartmouth tested 29 bars (multiple brands) of the hundreds of cereal/energy bars on the market. The amount of inorganic arsenic in each bar depends on the size of the bar, the concentration of total arsenic, and the percentage of total arsenic that is in the inorganic form. Eating 2 to 3 of the larger bars (approximately 70 grams) that contain brown rice syrup per day could contribute 10 ppb of inorganic arsenic to your diet. Last, consume fruit juices and alcohol in moderation. Previous tests confirm arsenic in both.

Step 4: Choose Rice Wisely and Wash it Thoroughly
The FDA and Consumer Reports tests show higher levels of arsenic in brown rice than white rice. Basmati generally contains the least arsenic. There are also higher levels in rice produced in the Southern U.S. states than in rice from California and Asia. Dartmouth tests show arsenic may also be high in products that contain rice syrup and other rice by-products. Research indicates that thoroughly rinsing rice reduces the total arsenic content by ~25-30%.

Dartmouth Toxic Metals Superfund Research Program
http://www.dartmouth.edu/~toxmetal

NH Department of Environmental Services Private Well Testing Program
http://des.nh.gov/organization/divisions/water/dwgb/well_testing

U.S. Environmental Protection Agency: Arsenic in Drinking Water
http://www.epa.gov/safewater/arsenic

Environmental Working Group’s Water Filter Buying Guide

Watch our ten minute movie about exposure to potentially harmful amounts of arsenic in private well water.
www.InSmallDoses.org

Test for Arsenic
$15
www.des.nh.gov
Type “private well testing” into the search tool, or call: 603-271-3503

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