

# UNH Research Leads to New Drinking Water Standard in Granite State

**Reducing Arsenic Results in Substantial Public Health and Economic Benefits**

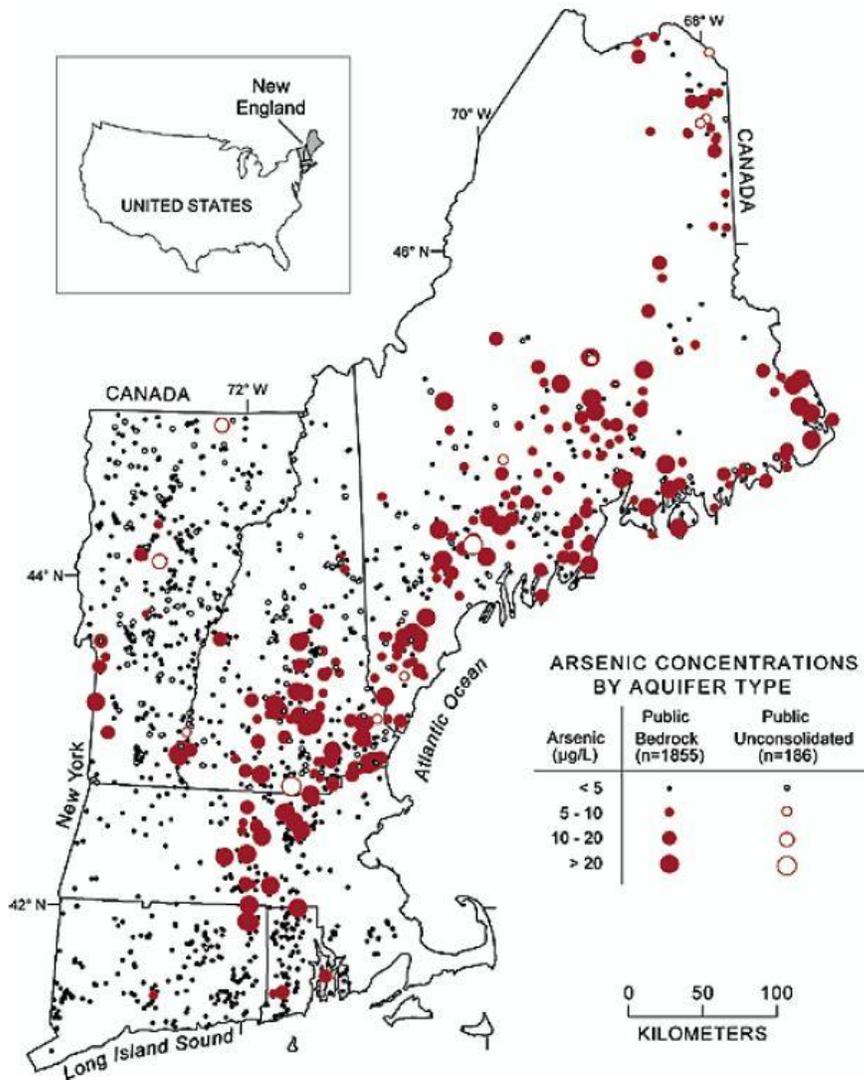
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NEW HAMPSHIRE JOINED ONLY NEW JERSEY IN SETTING THE LOWEST-IN-THE-NATION DRINKING WATER STANDARD. CREDIT: STEPHAN MÜLLER



*Arsenic*

concentrations by aquifer type. [Credit: U.S. Geological Survey](#)

The state of New Hampshire has adopted a new, lower drinking water standard for arsenic after University of New Hampshire researchers found Granite Staters would be willing to invest in water treatment infrastructure improvements that make drinking water more safe and avoid the substantial negative health effects of high arsenic levels.

“Our research led to the conclusion that the benefits of reduced mortality and morbidity from reducing the incidence of bladder and lung cancers far outweighed the costs of additional water treatment to remove arsenic. The report we compiled was distributed to the New Hampshire State Legislature for consideration. Subsequently, this body approved the reduction to 5 parts per billion, and the new standard was signed into law

by New Hampshire's governor," said John Halstead, researcher with the New Hampshire Agricultural Experiment Station and professor of environmental economics in the UNH College of Life Sciences and Agriculture.

Gov. Chris Sununu signed HB 261 on July 12, 2019, to limit the amount of arsenic in public drinking water to half the federal limit, or 5 parts per billion (ppb). New Hampshire joined only New Jersey in setting the lowest-in-the-nation drinking water standard.

"Armed with the facts, we were able to change the maximum contaminant level and can now work to truly and positively impact the health of our citizens," said Thomas O'Donovan, New Hampshire Department of Environmental Services water division director.

Arsenic naturally occurs in ground water, surface water, and many foods. The EPA classifies arsenic as a human carcinogen; consuming water containing arsenic over a long period of time increases risk of bladder, lung, and skin cancer as well as cardiovascular disease. It also has been linked to increased risk of adverse birth outcomes, developmental disabilities, and loss of cognitive skills.

For example, previous research suggests has found that children who drink water with arsenic levels above 5 ppb have an IQ five to six points lower than children who drink water with lower arsenic levels. A 5.5-point reduction in IQ translates to \$26.9 to \$35.3 million in lifetime earnings and generates an estimated loss in lifetime earnings between \$148.0 and \$194.3 million.

In addition, the science about cardiovascular-related health benefits of lowering arsenic in drinking water suggests the benefits are at least 10 times greater than those from lowering cancer cases. Specifically, lowering the average arsenic standard reported per person for all Granite Staters to 3 ppb would avoid 517 deaths in New Hampshire over 70 years.

In 2018, the New Hampshire Department of Environmental Services asked UNH researchers to estimate the economic value of lowering allowable arsenic content in New Hampshire's municipal water systems from 10 ppb to 5 ppb. While beneficial for health reasons, tightening the water standard would result in additional treatment costs.

Using data from numerous sources, the economists estimated the net economic benefit to tightening the water standard to between \$4.3 billion and \$7.6 billion. They then surveyed 500 Granite Staters about whether they would be willing to spend more for safer water. Halstead and his collaborators from the Paul College of Business and Economics found that, on average, Granite Staters said spending \$35.50 a month more was worth the health benefits gained.

"I think the academic rigor that the UNH economists brought to NHDES's review of the arsenic standard helped to convince the legislature and the governor of the very real economic value of bringing the standard down to 5 parts per billion from the current level of 10 ppb," said Paul Susca, supervisor of the planning unit in the New Hampshire Department of Environmental Services Drinking Water and Groundwater Bureau responsible for conducting the review of arsenic standards.

In addition to Halstead, the research team included Bob Woodward, Forrest D. McKerley Professor of Health Economics emeritus; Robert Mohr, associate professor of economics; and Scott Lemos, economics lecturer. This research will be published in the forthcoming article "Valuing the Cancer Mortality Risk Reduction from Lowering the Arsenic Maximum Contaminant Level in New Hampshire Municipal Water Supplies" in the journal *Environmental Management*.

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Founded in 1887, the [NH Agricultural Experiment Station](#) at the [UNH College of Life Sciences and Agriculture](#) is UNH's original research center and an elemental component of New Hampshire's land-grant university heritage and mission. We steward federal and state funding, including support from the [USDA National Institute of Food and Agriculture](#), to provide unbiased and objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the Woodman and Kingman agronomy and horticultural research farms, the Macfarlane Research Greenhouses, the Fairchild Dairy Teaching and Research Center, and the Organic Dairy Research Farm. Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

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University of New Hampshire

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