



**DARTMOUTH TOXIC METALS
SUPERFUND RESEARCH PROGRAM**

Bruce Stanton, Ph.D.
Andrew C. Vail Professor
Director, Dartmouth Toxic Metals Superfund Research Program
The Geisel School of Medicine at Dartmouth
Hanover, NH 03755

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The Honorable Kevin Avar
Chair, Senate Energy and Natural Resources Committee
State House, Room 103
Concord, NH 03301

RE: HB 1592 as passed by the House - requiring the Commissioner of the Department of Environmental Services to review standards relative to arsenic contamination in drinking water

Dear Chair Avar and Members of the Committee:

The Dartmouth Toxic Metals Superfund Research Center has been studying the effects of arsenic on human health since the inception of our program in 1995, due to the high incidence of naturally occurring arsenic in New Hampshire and its impact on the health of our residents. In particular, our studies have focused on the 46% of our population who receive their drinking water from private wells where no regulatory standards apply. Our research showing arsenic as an endocrine disruptor was instrumental in lowering the U.S. Environmental Protection Agency (U.S. EPA) Maximum Contaminant Level (MCL) for arsenic from 50 parts per billion (ppb) to 10 ppb in 2001.

Since that time, our continued research into health effects from low-dose chronic exposure to arsenic has provided a much greater understanding of the broad range of arsenic health effects and of the potential health effects at exposures below 10 ppb.

For example, our studies, as well as those by other institutions, have shown that ingestion of well water containing relatively low levels of arsenic (5 to 10 ppb) by pregnant mothers in the United States has adverse effects on babies and infants including low birth weight, lower mean gestational age, reduced newborn length, increased respiratory tract infections and levels at 5 ppb and above may cause increased risk of blood vessel dysfunction in mothers and infants (1-5). Furthermore, a study conducted in Maine found that arsenic in drinking water greater than 5 ppb has been associated with a 5-6 point reduction in IQ in school-age children (6), and low to moderate arsenic levels in drinking water (less than 50 ppb) have been associated with gestational diabetes in pregnant women, decreases in the ability of the lung to fight bacterial infection in adults, increased heart disease incidence and overall mortality in the U.S. (7-10), as well as with several cancers (11-14).

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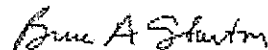
Bladder cancer is the third most diagnosed cancer in New Hampshire and ranks 8th for deaths from cancer in our state. A 2016 population-based study examined historically-elevated bladder cancer rates in Northern New England and found that low-to-moderate levels of arsenic in drinking water were associated with an increased risk of bladder cancer (15). Squamous Cell Carcinoma (SCC), a type of skin cancer, has long been associated with high-dose arsenic exposure. A 2013 population-based study in New Hampshire found that exposure to low-doses of arsenic also is linked to SCC (12).

* Researchers at Columbia University recently completed a review of National Health and Nutrition Examination Survey data looking at trends of urinary arsenic concentrations in public water users vs. private well users after the U.S. EPA's lowering of the MCL in 2001. They found a reduction in urinary arsenic among public water users, estimating a reduction of 200-900 lung and bladder cancer cases annually depending on the method used. They saw no reduction in urinary arsenic among private well users (16).

* Based on these studies, it is clear that examining a potential reduction in the amount of arsenic present in our state's public drinking water is an important step forward toward improving the health and well being of children and adults in New Hampshire. Supporting HB 1592 is a prudent and advisable step toward protecting New Hampshire residents from a contaminant that presents a much higher risk than many others which already have stricter regulatory standards.

Thank you for the opportunity to submit this letter on behalf of our Center.

Best regards,



Bruce A Stanton, Ph.D.
Director

Scientific articles

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8. Goodale BC, Rayack EI, Stanton BA. 2017. Arsenic Alters Transcriptional Responses to *Pseudomonas Aeruginosa* Infection and Decreases Antimicrobial Defense of Human Airway Epithelial Cells. *Toxicology and Applied Pharmacology*. *Toxicol Appl Pharmacol*. 2017 Sep 15;331:154-163. doi: 10.1016/j.taap.2017.06.010.
9. Moon KA, Guallar E, Umans JG, Devereux RB, Best LG, Francesconi KA et al. Association between exposure to low to moderate arsenic levels and incident cardiovascular disease. A prospective cohort study. *Annals of internal medicine*. 2013;159(10):649-59. doi:10.7326/0003-4819-159-10-201311190-00719.
10. James KA, Byers T, Hokanson JE, Meliker JR, Zerbe GO, Marshall JA. Association between lifetime exposure to inorganic arsenic in drinking water and coronary heart disease in Colorado residents. *Environmental health perspectives*. 2015;123(2):128-34. doi:10.1289/ehp.1307839.
11. Garcia-Esquinas E, Pollan M, Umans JG, Francesconi KA, Goessler W, Guallar E et al. Arsenic exposure and cancer mortality in a US-based prospective cohort: the strong heart study. *Cancer epidemiology, biomarkers & prevention : a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology*. 2013;22(11):1944-53. doi:10.1158/1055-9965.EPI-13-0234-T.

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