

# Clean Water Is a Bedrock Issue

A Multi-Channel Approach  
to Promoting Well Testing in New Hampshire



We often take safe drinking water for granted. In many parts of the country, families drink private well water that looks and tastes clean but may in fact be contaminated with harmful substances like bacteria, nitrates, and arsenic. The good news is that with routine testing, treatment, and better access to alternative water sources, we can make sure everyone has safe, clean water to drink.

The New Hampshire Department of Environmental Services (NHDES) is one of many agencies around the country that are tackling the issue of poor water quality in private wells. This case study is part of a ChangeLab Solutions series on how state and local public health agencies can move beyond programming and begin to address policy, system, and environment (PSE) changes to improve the quality of private well water. This case study illustrates the role a state environmental protection agency can play in supporting PSE change to both improve water quality and address gaps in policy. The case study describes some of the strengths of NHDES's work:

- **Understanding and addressing barriers.** Using both formal research and direct public feedback, NHDES and its partners worked to identify major systemic and environmental barriers that were keeping well owners and users from addressing their water quality, then focused their efforts directly on overcoming those barriers.
- **Evaluating, then repeating what works.** NHDES partnered with Dartmouth College and the state's Department of Health and Human Services to find the most effective ways to spread the word about the importance of private well water quality and testing. NHDES and Dartmouth then worked to condense their experiences into a guide to help others replicate those successful interventions.
- **Approaching PSE change creatively.** When efforts to improve private well-testing rates through state legislation were unsuccessful, NHDES shifted its focus to changing local building codes. NHDES created a model code and has used its ongoing public outreach efforts to spread the word to local policymakers.

To learn more about what other communities are doing to tackle well water quality issues, visit [changelabsolutions.org/publications/closing-water-quality-gap](https://changelabsolutions.org/publications/closing-water-quality-gap).

# Introduction

Nearly half of New Hampshire residents get their drinking water from private wells, which are not subject to any testing requirements or meaningful water quality standards under state or federal law. Arsenic occurs naturally in the state's bedrock and can affect the quality of water drawn from wells. With support from a grant from the Centers for Disease Control and Prevention (CDC), the New Hampshire Department of Environmental Services (NHDES) worked to broaden public awareness of private well testing and water quality concerns through local well-testing events and created an online tool to help residents understand their well water test results. NHDES also helped lay the groundwork for policy change at the local level, where building codes can incorporate more stringent water quality standards to cover private wells.

# 46%

**OF NEW HAMPSHIRE  
RESIDENTS DRAW  
THEIR DRINKING  
WATER FROM PRIVATE  
WELLS, WHICH ARE  
EXEMPT FROM  
FEDERAL REGULATION**

## The Problem

An estimated 46% of New Hampshire residents draw their drinking water from private wells, which are exempt from federal regulation.<sup>1</sup> More than three-quarters of these wells are drilled bedrock wells, meaning they draw water from aquifers (underground layers of water-bearing permeable rock) via cracks in the rock deep underground.<sup>2</sup> The arsenic that occurs naturally in New Hampshire's bedrock can leech into the water that feeds these wells. A drilled bedrock well in New Hampshire has about a 20% chance of containing arsenic at concentrations above the limit of 10 parts per billion (the equivalent of 10 drops of water in an Olympic-size swimming pool)<sup>3</sup> set by the US Environmental Protection Agency (EPA) for public water systems.<sup>4</sup>

Naturally occurring arsenic poses a serious health risk to residents with private wells, given that high levels of arsenic in drinking water have both acute and long-term health effects, including nausea, vomiting, skin lesions, and neurological or circulatory problems. Drinking arsenic-contaminated water over a long period increases the risk of some types of cancer.<sup>5</sup>

Even in high concentrations, arsenic doesn't affect the smell, taste, or color of water; therefore, the only way to know how much arsenic is in water is to test it. Yet despite the natural prevalence of arsenic in its groundwater and the known risks of arsenic exposure, New Hampshire has no state law requiring testing of private wells and no meaningful water quality requirements apply to any wells that are tested. As a result, many New Hampshire residents remain unaware of potential water

quality problems that might affect their health. Further, even if residents are aware of some of the potential risks in regard to their drinking water, they may not be aware of the need for regular well testing to assess their water quality.<sup>6</sup>

Current state law does require that that all buildings used for human occupancy provide a “potable water supply.” But as NHDES Source Water Protection Supervisor Pierce Rigrod acknowledged, “The state plumbing code doesn’t define *potable water* very clearly.” New Hampshire uses the International Plumbing Code as the basis for its state plumbing code, which defines “potable water” only very loosely as “[w]ater free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming to the bacteriological and chemical quality requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction.”<sup>7</sup> With no reference to specific contaminants or requirements to assess potability on an ongoing basis, this definition leaves New Hampshire residents and health officials with effectively no water quality standards at all for private wells.

New Hampshire’s Department of Environmental Services is charged with ensuring the quality of the state’s water supplies, but since state law leaves the agency with few enforcement tools to address the quality of private well water, NHDES focuses its efforts primarily on outreach and education. The agency works, for example, to educate residents who draw their water from private wells about the potential health risks from contaminants like arsenic. NHDES also conducts outreach to encourage well owners to test their wells for harmful substances more frequently and, if necessary, to install treatment systems.

|||||

The Plumbing Code leaves New Hampshire residents and health officials with effectively no water quality standards at all for private wells.



NHDES *has* identified how changing state law could help more directly address the issue, but legislative attempts to bolster quality standards for well water through policy change have had little success. For example, a 2010 New Hampshire House bill would have required water testing when a new well was drilled, an existing well was significantly modified, or property with a well was sold, but it failed due to opposition from real estate and building interests.<sup>8</sup> Further, while a Real Estate Commission regulation was passed that requires some disclosure of well testing during property transactions, there is no obligation to test or treat a well before selling property.<sup>9</sup>

Building codes are one potential avenue for *local* policy change that NHDES and its partners working on well water quality in New Hampshire have identified. Municipalities in New Hampshire can adopt local building code requirements that are more stringent than the state's.<sup>10</sup> A city or town could adopt a definition of *potable water* that covers private wells and establishes specific standards for well water quality. But convincing officials to undertake a policy change on an issue with little public traction has proven challenging. To date, only one municipality has incorporated drinking water standards in its building code, while a few others have adopted health or zoning codes that require water testing before issuing a certificate of occupancy for a new home.

## The Project

With support from a CDC grant and in partnership with the New Hampshire Department of Health and Human Services and researchers at Dartmouth College, NHDES undertook a new set of outreach efforts aimed at raising public awareness of well water quality issues, especially arsenic, and driving increases in well testing. NHDES saw this outreach work as important in its own right but also as a way to generate conversations about local policy change. Educating residents and local officials about the need for well testing and the lack of state law protecting the water quality of private wells can help prompt local authorities to make their definitions of *potable water* more stringent. What NHDES's Pierce Rigrod called a "bubble-up approach" to policy change informed some of the work performed under the CDC grant.

### Research-Guided Outreach

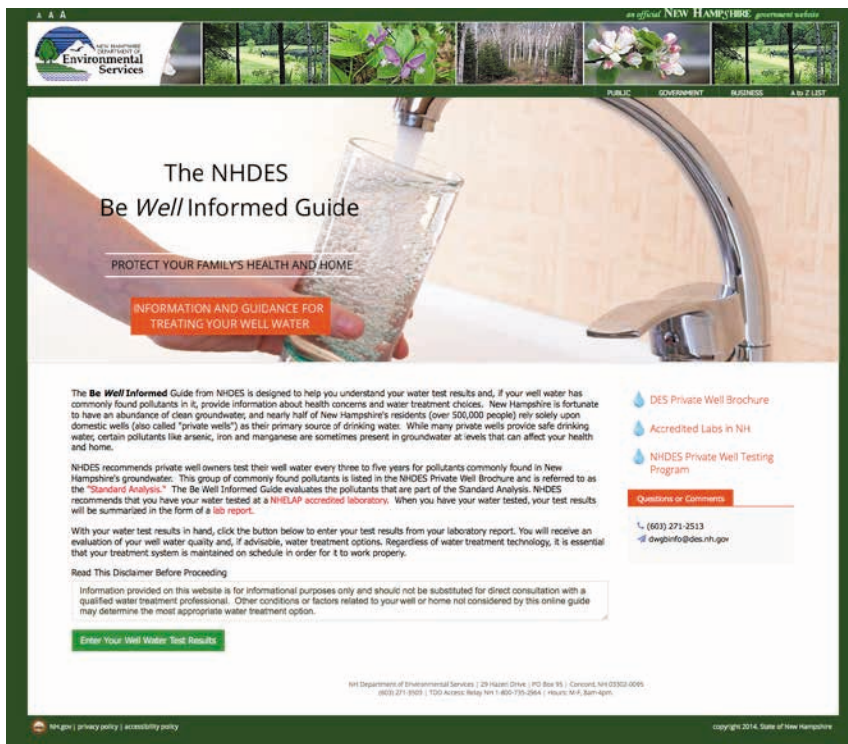
In early 2014, Dartmouth College researchers began a two-year study that assessed the state of public awareness of well water quality issues in New Hampshire and evaluated various outreach ideas. The study was intended to help NHDES and others most effectively spend their limited time and resources to spread the word about water contaminants like arsenic and increase well-testing rates.

Legislative attempts to bolster quality standards for well water through policy change have had little success due to opposition from real estate and building interests.

The Dartmouth study identified **community well-testing events** as one of the outreach methods most likely to be effective at generating local interest and action on well testing. In 2015, NHDES began setting up testing events in towns around the state. At these events, which have continued beyond the CDC grant period, NHDES staff and their partners share information about potential well water quality risks, distribute well-testing kits, and instruct residents on where to send their kits for testing and how to follow up on the results. In some cases, the towns hosting the events even help gather the completed test kits and send them to the state's Public Health Laboratories on behalf of residents. These events help address a systemic gap between knowledge and action: instead of simply teaching people about water quality issues, the NHDES staff make it easy for them to complete the well-testing process.

NHDES knew that well testing alone was not sufficient. The department was already receiving a few hundred inquiries per year from residents seeking help in understanding their water tests: Was their water safe to drink? Did they need to treat it? What kind of treatment was required? In addition to hosting community well-testing events, NHDES also used the CDC grant to develop an online tool, *Be Well Informed*, to help residents interpret their well test results and identify what steps to take to make sure their water was safe to drink. Now residents can enter the results of their water test – which usually include information about the levels of arsenic and other contaminants found in their water – and learn how safe their water is. If it's not safe to drink, the tool identifies specific treatment options that residents can implement to improve their well's water quality.

Over 4,000 people used the *Be Well Informed* online tool in its first 24 months.



*NHDES developed the online tool, Be Well Informed; residents can enter the results of their water test and learn how safe their water is. If it's not safe to drink, the tool identifies specific treatment options.*

This online tool addressed another systemic gap between knowledge and action – and very quickly found an audience. NHDES launched *Be Well Informed* on its website in September 2015. Over 4,000 people used the tool in its first 24 months, and NHDES has heard directly from users that the tool has helped them make informed decisions about water treatment. The EPA is working to incorporate New Hampshire’s app in their suite of online environmental health tools, retooling it to cover additional states (including Massachusetts and Wyoming). In addition, over a dozen other jurisdictions have expressed interest in building on NHDES’s work to develop their own versions of the app.

User statistics from *Be Well Informed*, along with data from New Hampshire’s Public Health Laboratories (which perform the majority of private well water tests in the state), have helped NHDES roughly track the impact of its outreach work – and it’s clear that the outreach is effective. According to NHDES’s Pierce Rigrod, “When we’ve [looked at] the data to see increases in testing, the clear signal we see is when there’s a local testing event.”

To help replicate the success of the events conducted during the CDC grant period, Dartmouth and NHDES staff (along with partners at the New Hampshire Department of Health and Human Services) developed a guide called the *Well Water Community Action Toolkit*. The toolkit is designed to help local officials and others initiate their own outreach efforts to increase well testing. It includes sample communication materials aimed at increasing public awareness of arsenic and water quality, a guide for planning a well-testing event, and examples of successful work from other New Hampshire towns.

## Laying the Groundwork for Policy Change

Throughout this period of intense outreach work and evaluation of those efforts, NHDES never lost sight of the policy element of well water quality. NHDES worked with the New Hampshire Building Officials Association, the New Hampshire Health Officers Association, and the New Hampshire Planners Association to develop a **guide to help local governments strengthen the definition of *potable water*** in their municipal building codes. The guide provides information about water quality in private wells, outlines municipal authority, and provides model language to add to local building codes.

“The alternative to going straight to the regulations was to do the local community-wide testing events, which raise awareness around the issues of contaminants and public health,” said NHDES’s Pierce Rigrod. But that outreach work had policy implications. “As part of those outreach events, we do mention to the local officials that show up, ‘By the way...you can adopt this code.’” NHDES smartly treats its education and outreach efforts on well testing as an element of a longer-term PSE change strategy.



### Well Water Community Action Toolkit

Congratulations on deciding to address private well water safety in your community. This toolkit was designed to help communities increase private well water testing and treatment. In this toolkit, you will find:

- Background information on private wells in New Hampshire
- A step-by-step guide for planning community activities
- Useful resources
- Communication materials
- Project planning worksheets

This toolkit may be used progressively from start to finish or you may choose to jump to the most relevant section that meets your community’s needs. Either way the guidance and information provided here will help you work with your community partners and, over time, will create lasting community change.



**1 in 5** household wells in New Hampshire contain unsafe levels of arsenic.

**15 dollars** is all it takes to test your well water for arsenic.

**10 minutes** is all it takes to collect a water sample.

**3-5 years** is the recommended frequency for testing.

**ARSENIC IS COMMON IN WELL WATER.**

- Arsenic is present in New Hampshire well water because of the state’s geology and other types of rock.
- Arsenic in well water can cause serious health issues over time, such as heart problems and bladder, skin, and lung cancer.
- Children are especially vulnerable to the effects of arsenic in water.
- Drinking well water need testing, so do not rely on the results of your neighbor’s well. Arsenic levels vary from house to house.
- Common treatment methods, such as boiling, pitcher filters, or water softeners, do not remove arsenic.
- There are many resources available to help! We suggest you start at <http://www.nhdes.gov/water/well-testing>.

**TESTING YOUR WATER IS EASY.**

- The first step to keeping your family safe is to test your well water for arsenic and other contaminants.
- The cost to test your water ranges from about \$25 for just arsenic to \$85 for a standard package of tests of the most common contaminants.
- Sample collection bottles are usually available from state or private labs. Bottles can be mailed to you and returns can be mailed back. Directions will be included in your kit.
- If testing shows that you have unsafe levels of arsenic, there are reliable options to address it.
- For a list of certified labs, visit <http://www.nhdes.gov/water/well-testing>.

**TEST YOUR WATER TODAY, AND THEN AGAIN EVERY 3 TO 5 YEARS.**

The Well Water Community Action Toolkit is designed to help local officials and others initiate their own outreach efforts to increase well testing.

# Lessons Learned

The New Hampshire Department of Environmental Services has worked hard to increase public awareness of water quality issues associated with private wells and to increase rates of well testing. Knowing that policy change was unlikely to address the issue in the near term, NHDES focused on promoting systemic and environmental changes. NHDES staff initiated a research-guided, multi-channel approach to public outreach that marries old-fashioned public events with online tools to help people understand their water quality test results and make better-informed decisions about the use of treatment systems. The department has also worked closely with partners, including Dartmouth College, other state agencies, and local officials, increasing their overall capacity. And they've used their ongoing outreach work to prepare the way for local policy changes.

This is not a “do everything” approach. NHDES has carefully chosen where to allocate its limited resources. It is especially worth noting how each element of the work described in this document – university-led research, testing events, the *Be Well* Informed website, the community action toolkit, and the policy guide for local officials – has supported the other elements. NHDES and its partners have built a collaborative, interlocking suite of tools to drive improvements in water quality, with an eye toward future policy changes.

The department’s strategy integrated lessons from the field and from their own experience, including the following:

- Community-focused research can help an agency “meet people where they are” and focus outreach on the methods and places that are most likely to be effective.
- Systemic change can help turn knowledge into action. By building an online tool to help interpret water test results, NHDES greatly expanded the scale of their impact.
- Systemic and environmental changes are not separate from policy change, but are in fact part of a larger process that may lead to policy change through creative means.

.....

NHDES has carefully chosen where to allocate its limited resources.





# Acknowledgments

This case study was written by Brock Winstead with input from Rebecca Johnson, Heather Lewis, and Gregory Miao. Additional support was provided by Carolyn Uno and Kim Arroyo Williamson. All are affiliated with ChangeLab Solutions.

This case study would not have been possible without the inspirational work of the New Hampshire Department of Environmental Services and its partners. Many thanks for participating in interviews and reviewing drafts of this case study are due to the following people:

- New Hampshire DES, Water Division – Pierce Rigrod
- New Hampshire DES, Water Division – Paul Susca

Additional thanks go to Brian C. Hubbard, MPH, health scientist at the Centers for Disease Control and Prevention's National Center for Environmental Health.

ChangeLab Solutions is a nonprofit organization that provides legal information on matters relating to public health. The legal information in this document does not constitute legal advice or legal representation. For legal advice, readers should consult a lawyer in their state.

This publication was supported by Grant or Cooperative Agreement Number 5U38OT000141-03 awarded to ChangeLab Solutions and funded by the Centers for Disease Control and Prevention. The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the US Department of Health and Human Services.

© 2018 ChangeLab Solutions

Design & Illustrations:  
Karen Parry | Black Graphics

## Notes

1. Lawlor, K., L. Rardin, J. Maccini, M. Borsuk. 2015. Well Water Community Action Toolkit. Dartmouth Toxic Metals Superfund Research Program, Hanover, NH. [www.dartmouth.edu/~toxmetal/assets/pdf/wellwatertoolkit.pdf](http://www.dartmouth.edu/~toxmetal/assets/pdf/wellwatertoolkit.pdf).
2. U.S. Census Bureau, 1999, Historical census of housing tables—Sources of water: U.S. Census Bureau, accessed October 2002, at [www.census.gov/hhes/www/housing/census/historic/water.html](http://www.census.gov/hhes/www/housing/census/historic/water.html).
3. Calculation based on 1 drop of water in an Olympic-size swimming pool equaling 1 part per billion. [www.tceq.texas.gov/assets/public/remediation/superfund/jonesroad/ppb\\_chart.pdf](http://www.tceq.texas.gov/assets/public/remediation/superfund/jonesroad/ppb_chart.pdf).
4. New Hampshire Department of Environmental Services, 2012, Environmental Fact Sheet: Arsenic in New Hampshire Well Water. Accessed May 2018, at [www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-2.pdf](http://www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-2.pdf).
5. Chemical Contaminant Rules. U.S. Environmental Protection Agency website. [www.epa.gov/dwreginfo/chemical-contaminant-rules](http://www.epa.gov/dwreginfo/chemical-contaminant-rules).
6. Borsuk, M., K. Lawlor, L. Rardin, T. Hampton. 2015. Arsenic in Private Wells in New Hampshire: Year 2 Final Report. Dartmouth Toxic Metals Superfund Research Program, Hanover, NH. [www.dartmouth.edu/~toxmetal/assets/pdf/desyear2report.pdf](http://www.dartmouth.edu/~toxmetal/assets/pdf/desyear2report.pdf).
7. Int'l Plumbing Code § 202 (Int'l Code Council 2009).
8. N.H. H.B. 1685 (2010), available at [www.gencourt.state.nh.us/legislation/2010/HB1685.html](http://www.gencourt.state.nh.us/legislation/2010/HB1685.html).
9. N.H. Code Admin. R. Ann. Rea. § 701.03. The residential property disclosure form can be viewed here: [www.mimbroker.com/mimforms/stateforms/NH/NH\\_PropertyDisclosure.pdf](http://www.mimbroker.com/mimforms/stateforms/NH/NH_PropertyDisclosure.pdf).
10. N.H. Rev. Stat. Ann. § 155-A:2(V).