Be Well Informed: A Web Tool for Private Well Owners

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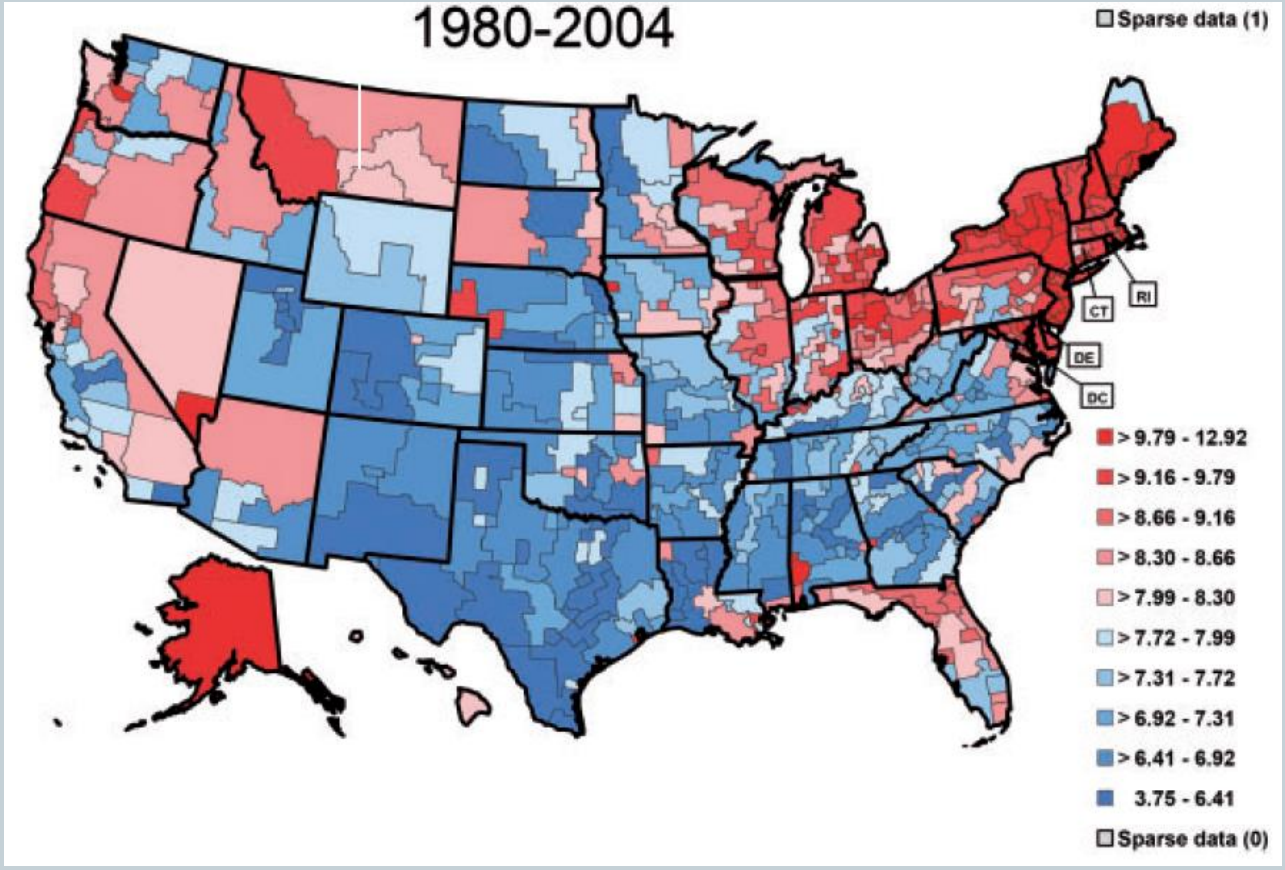
Private Wells & Public Health

Low-to-moderate levels of arsenic in drinking water and bladder cancer risk.



Elevated Bladder Cancer in Northern New England: The Role of Drinking Water and Arsenic, J Natl Cancer Inst (2016)

Purpose of Be Well Informed

- Interpret lab results in terms of water quality standards
- Provide treatment guidance concerning treatment technologies
- Provide information on health and home appliance impacts

Private Wells: The NH Rundown

Private wells serve 46% of New Hampshire's population, ~ 520,000 people.

No uniform testing or treatment requirement(s) for private wells in New Hampshire.

New Hampshire has abundant groundwater, generally free from harmful anthropogenic contaminants

Probable Exposure & Estimated Morbidity

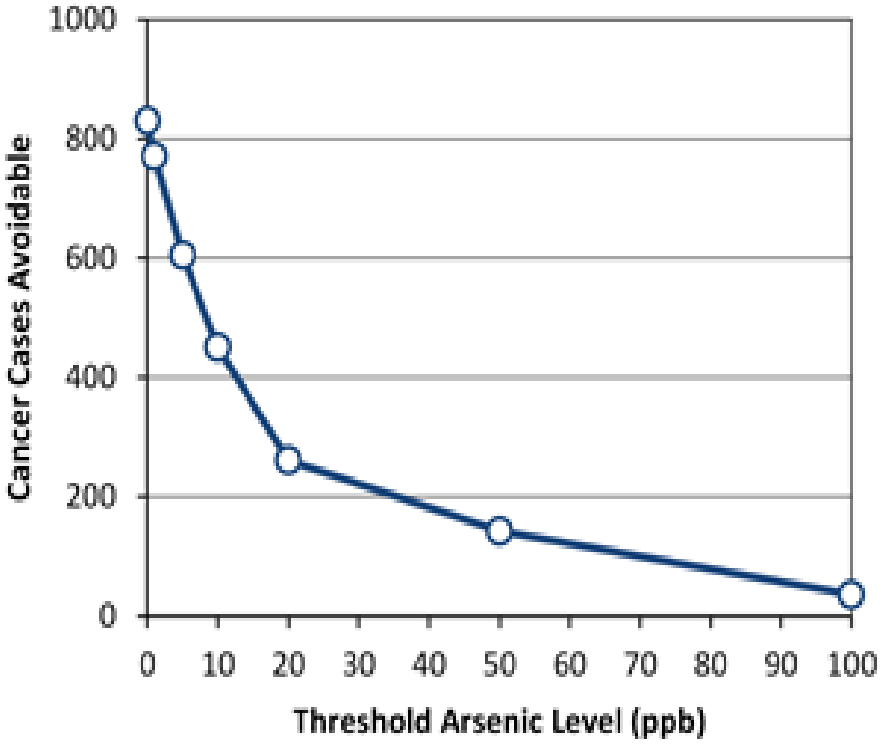


Figure 3. The estimated number of bladder, lung, and non-melanoma skin cancers avoidable by removing arsenic from well water down to a range of threshold levels from 0 to 100 ppb.

USGS
science for a changing world

Prepared in cooperation with the
New Hampshire Department of Health and Human Services and the
New Hampshire Department of Environmental Services

Estimated Probability of Arsenic in Groundwater from Bedrock Aquifers in New Hampshire, 2011

Scientific Investigations Report 2012–5156

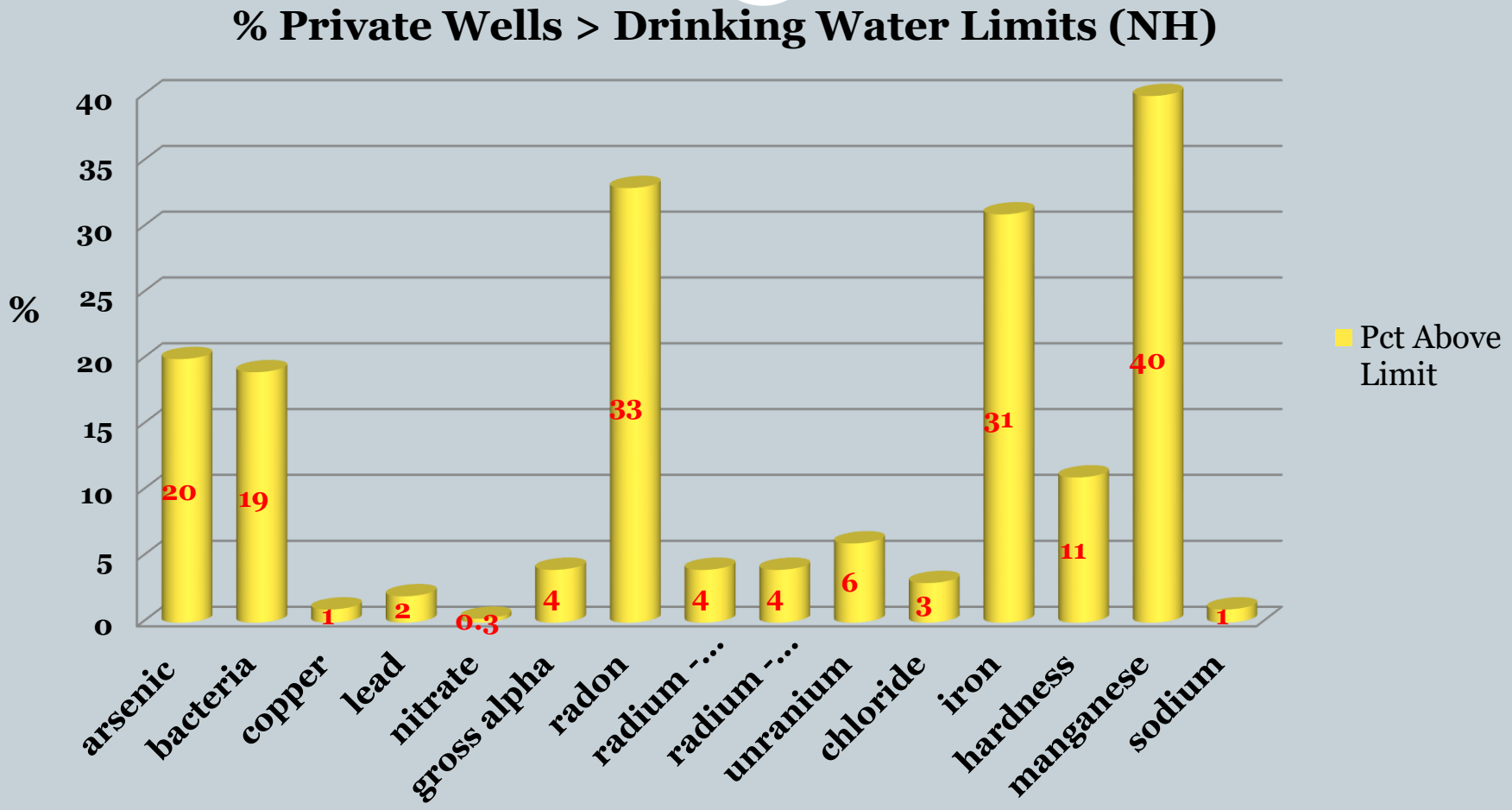
Health Impacts - Arsenic

Low dose, chronic, long term exposure to Arsenic in drinking water can lead to:

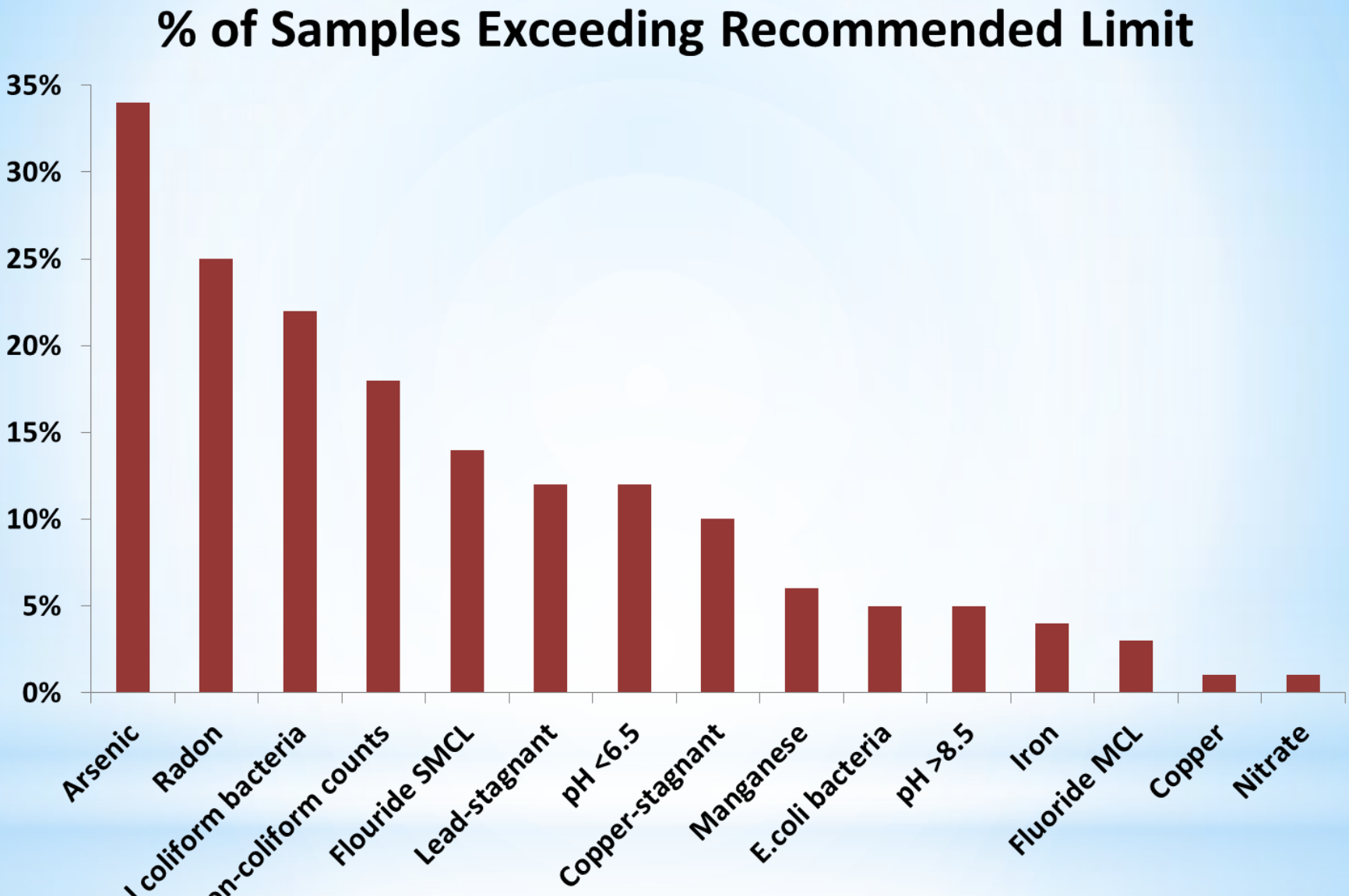
- Cancers (bladder, skin, kidney, liver, prostate and lung)
- Vascular and cardiovascular disease
- Reproductive and developmental effects
- Cognitive and neurological effects
- Diabetes and other metabolic disorders
- Neuropathy

Hughes et al. (2011). “Arsenic Exposure and Toxicology: A Historical Perspective” *Toxicological Sci* 123(2): 305–332.

Statewide Averages: Estimated % of Private Wells Above MCL



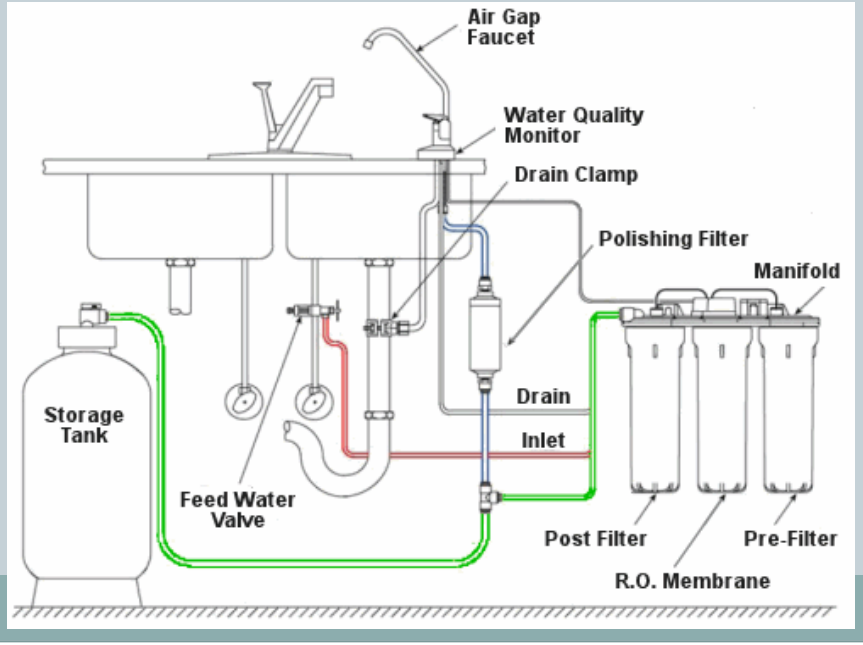
Source of Data: NHDES, NH Public Health Lab, USGS



*Tuftonboro, NH (July 2012)

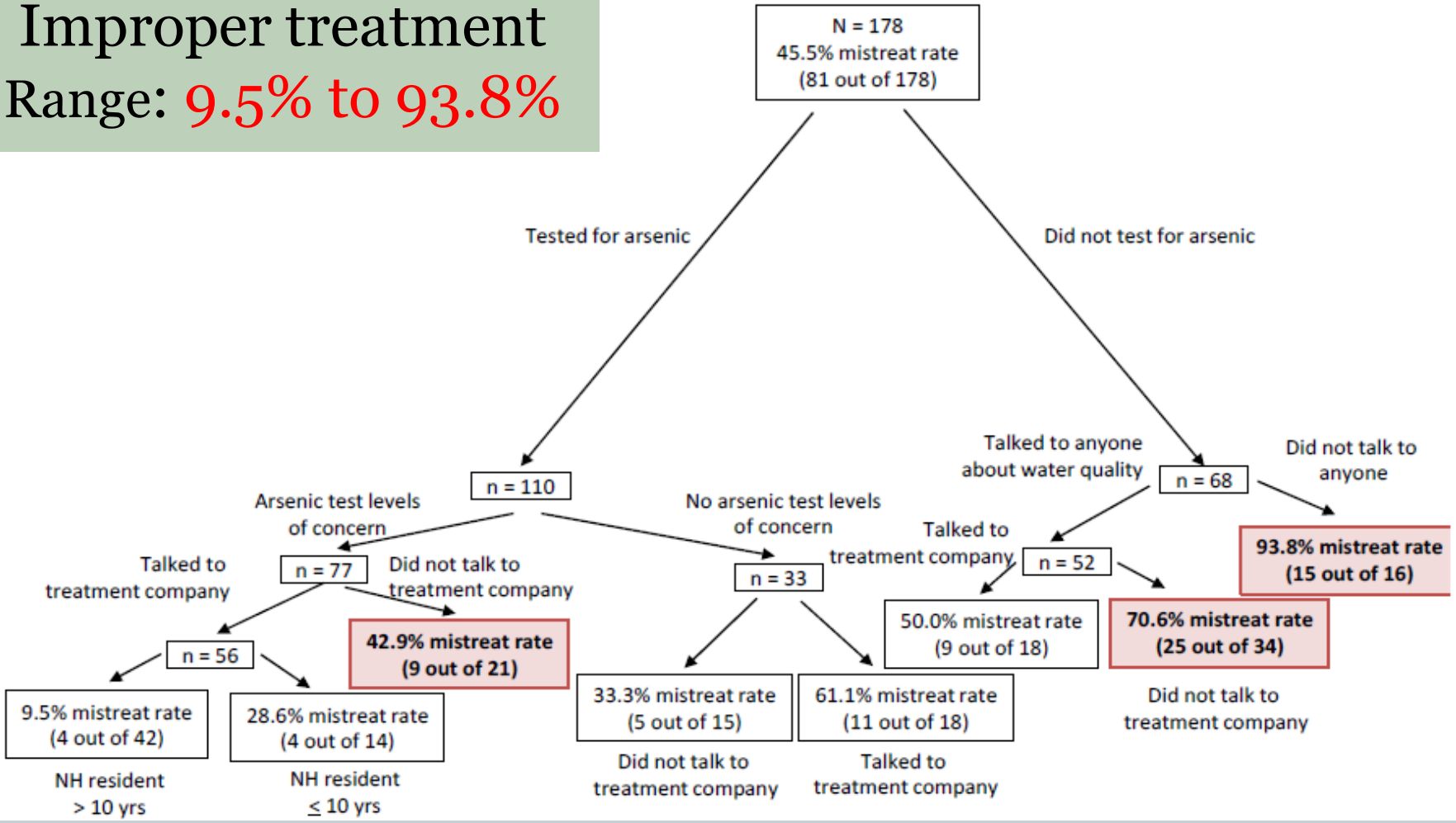
Many Questions, Many Choices

(37%) of residents surveyed in NH in 2014 were not clear about what actions to take after receiving water test results.



Many Residents Not Selecting Proper Treatment

Improper treatment
Range: 9.5% to 93.8%



(M.Borsuk, 2014)

BWI Inputs (Lab Report)

Invalid Entry – Please try again

NH Town or City *: Anonymous

Please Make A Selection

Routine Water Analysis

		Units			Units
Arsenic (As)	.009	mg/L	Lead (Pb)	.016	mg/L
Chloride (Cl)	251	mg/L	Lead, Stagnant (Pb)		mg/L
Copper (Cu)		mg/L	Manganese (Mn)		mg/L
Copper, Stagnant (Cu)		mg/L	Nitrate-N	11	mg/L
Fluoride (F)		mg/L	Nitrite-N	1.1	mg/L
Hardness as CaCO3		mg/L	pH		units
Iron (Fe)		mg/L	Sodium (Na)		mg/L

Bacteria

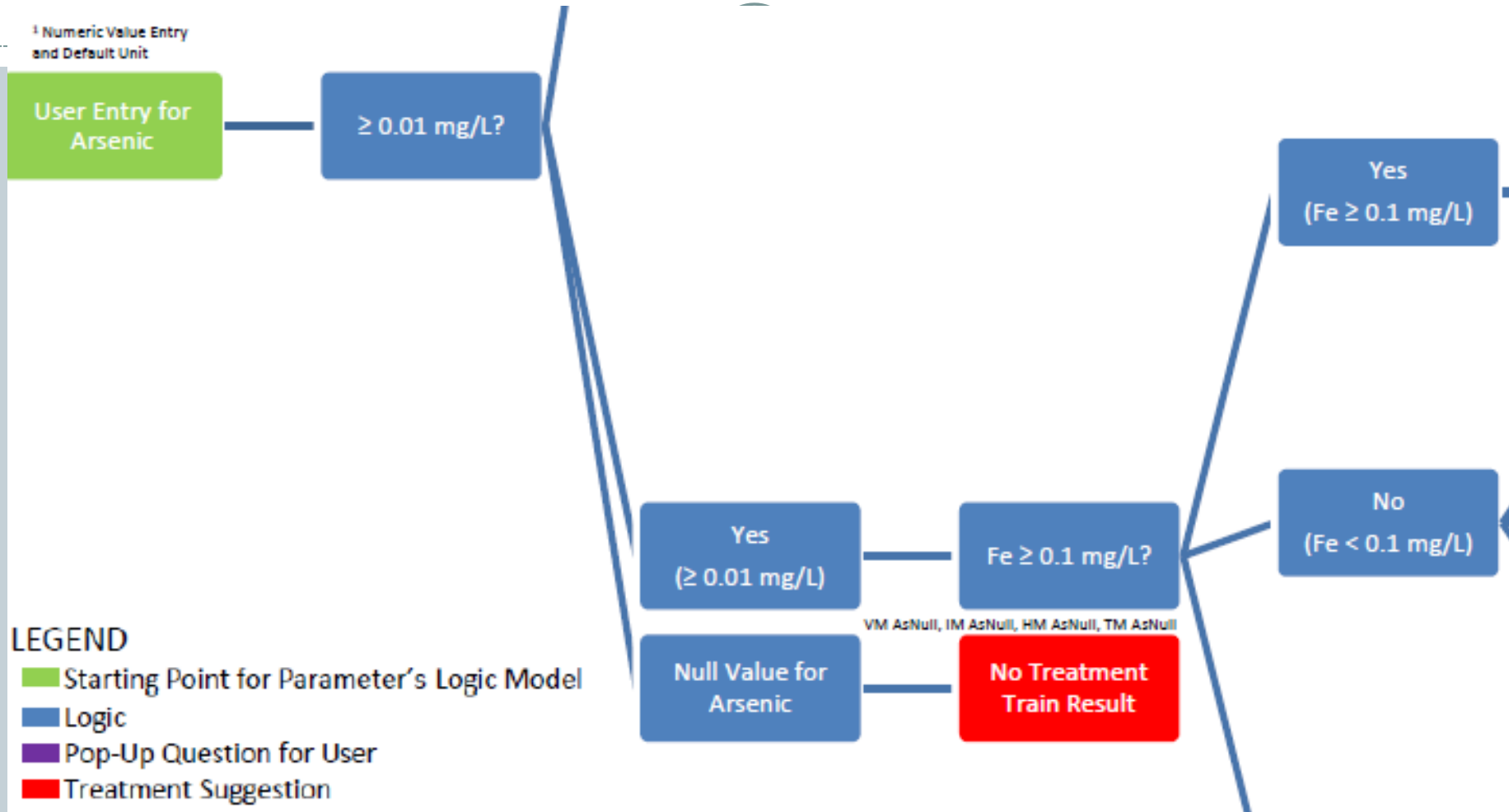
		Units
Total Coliform		CFU/100 mL
or choose	○ Present	○ Absent
E. coli		CFU/100 mL
or choose	○ Present	○ Absent

Radionuclides

		Units
Radon (Rn)		pCi/L
Uranium (U)		µg/L
Gross Alpha		pCi/L

As Water Treatment Logic

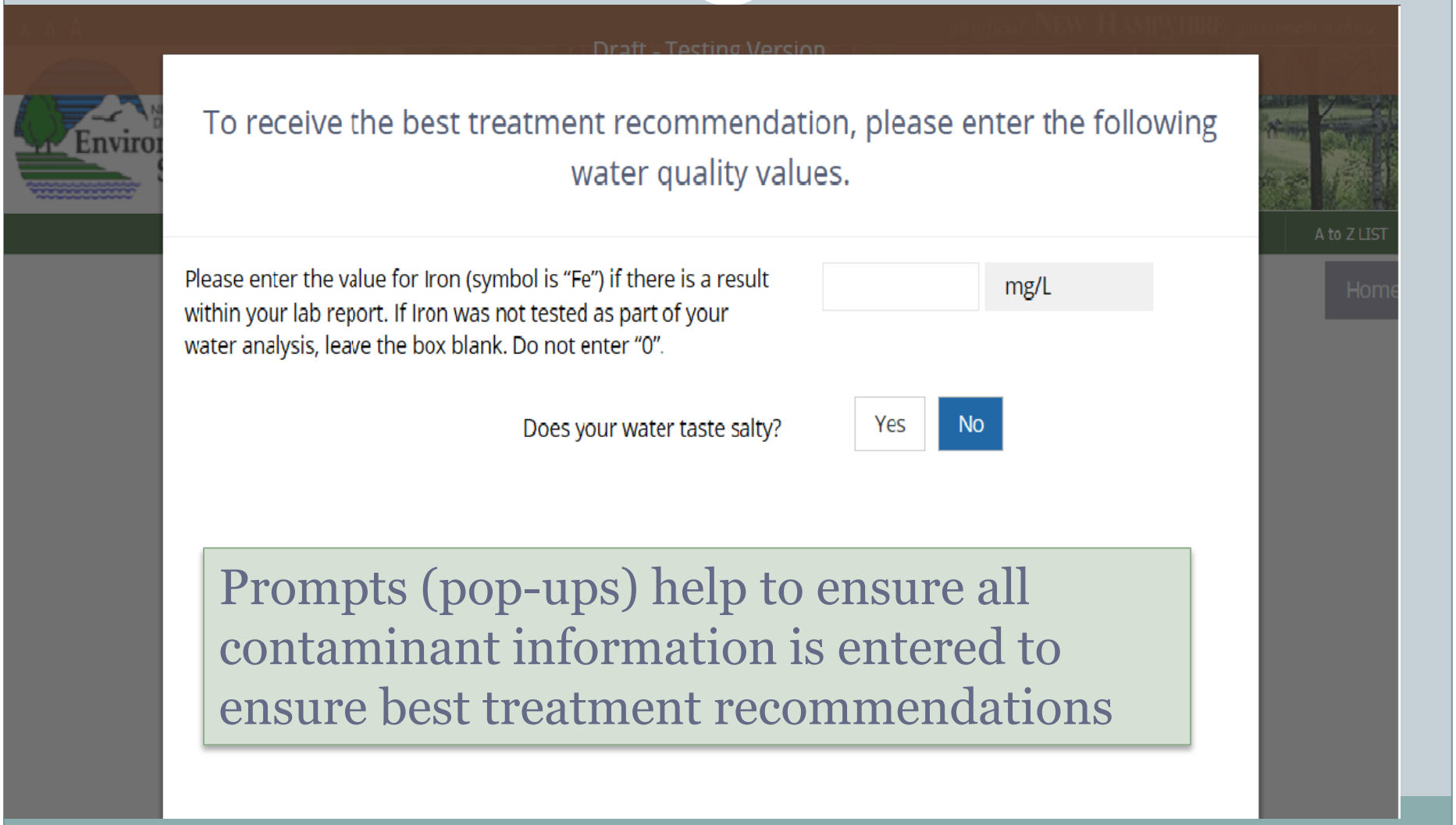
BWI has 17 treatment logic charts – One for each Contaminant



1 Numeric values in flow charts will be adjusted in accordance with the units specified by the user. Default units of measure for arsenic will be mg/L.

2 A Pop-Up message will appear on the screen, posing a question to the user, and the answer will be

User Questions ("Pop ups")



Prompts (pop-ups) help to ensure all contaminant information is entered to ensure best treatment recommendations

BWI User "Outputs"

Recommends appropriate treatment technologies, not products.

- "Part 1 Results Summary" interprets water quality data
  - Easy to understand text and graphics
- Part 2 Provides a dynamic "treatment train"
  - Graphic showing one or more treatments in sequence
- Part 3 Short narratives on health/home impacts
  - Yields printable PDF reports
  - Provides links and offers phone support from DES

Printable Web App Report: Part 1: "Results Summary"

Click Here To Start Over

Results Summary

✔ Value entered meets the Drinking Water Limit.

! Value entered is close to the Drinking Water Limit.

✖ Value entered exceeds the Drinking Water Limit.

Routine Analysis		Water Test Value Entered	Drinking Water Contaminant Limit or Radon Advisory Level	About Your Well Water?
✖	Arsenic	.011 mg/L	0.01 mg/L	The value entered exceeds the drinking water standard
✔	Iron	.2 mg/L	0.3 mg/L	The value entered meets the drinking water guideline
✖	Lead Stagnant	.15 mg/L	0.015 mg/L	The value entered exceeds the drinking water standard
✖	Manganese	400 mg/L	0.05 mg/L	The value entered exceeds the drinking water guideline
✖	Nitrite-N	2 mg/L	1 mg/L	The value entered exceeds the drinking water standard. YOUR WATER IS NOT SAFE FOR BABIES UNDER SIX MONTHS OLD TO CONSUME.

Part 2: Treatment "Train"

Recommended Water Treatment To Remove Arsenic, Lead Stagnant, Manganese

The following recommended water treatment is based on the water quality information you entered. Details concerning water treatment are below.

Treatment Order

Step 1

Whole House Oxidizing Filter System

OR

Whole House Cation Exchange Water Softener

Step 2

Whole House Acid Neutralizer System

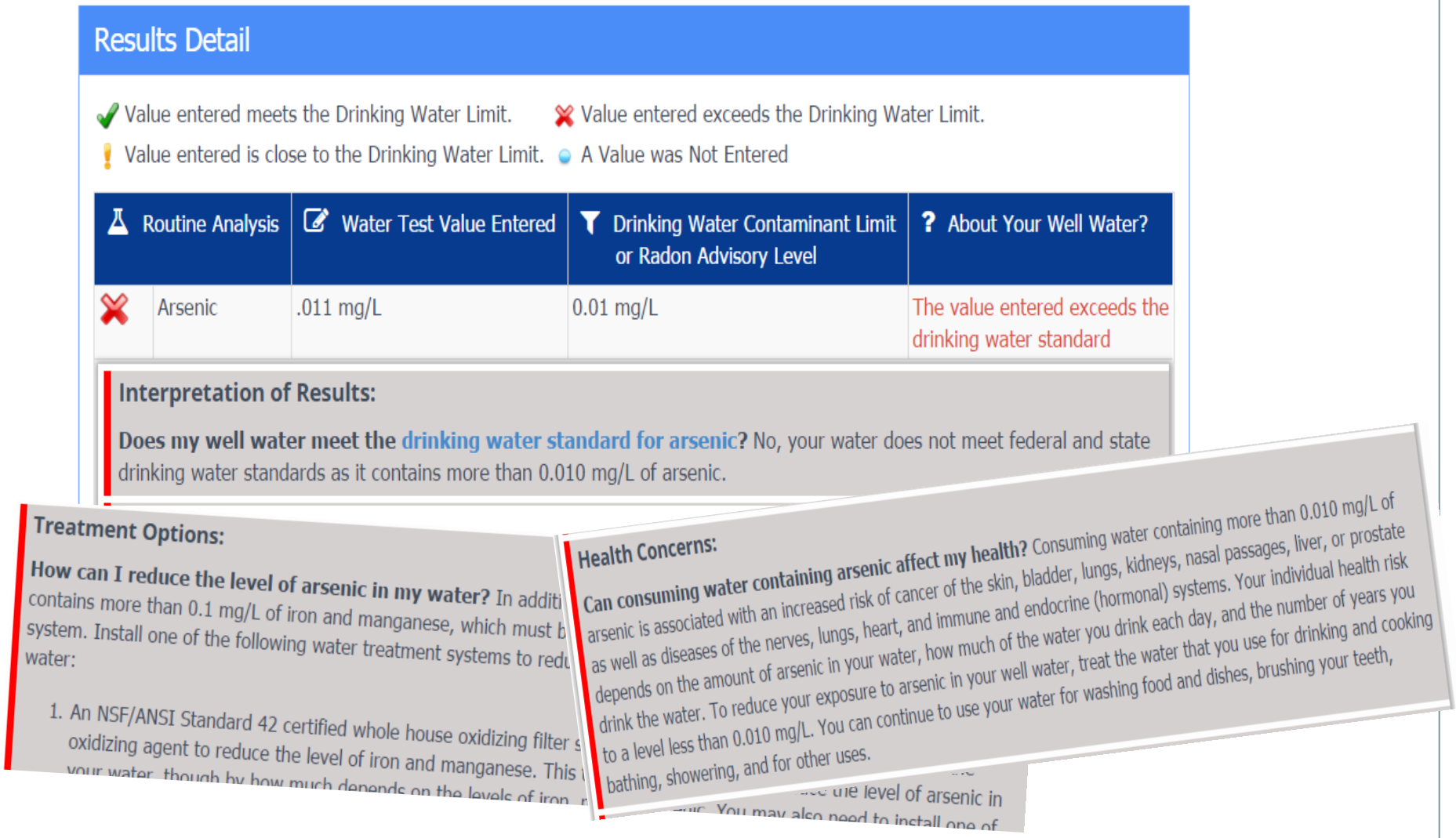
Step 3

Point-of-Use (POU) Arsenic Adsorption Media Filter System

OR

Point-of-Use (POU) Reverse Osmosis (RO) System

Part 3: Interpretation, Health, Treatment



Results Detail

✔ Value entered meets the Drinking Water Limit. ✘ Value entered exceeds the Drinking Water Limit.

! Value entered is close to the Drinking Water Limit. ● A Value was Not Entered

Routine Analysis	Water Test Value Entered	Drinking Water Contaminant Limit or Radon Advisory Level	About Your Well Water?
✘ Arsenic	.011 mg/L	0.01 mg/L	The value entered exceeds the drinking water standard

Interpretation of Results:

Does my well water meet the drinking water standard for arsenic? No, your water does not meet federal and state drinking water standards as it contains more than 0.010 mg/L of arsenic.

Treatment Options:

How can I reduce the level of arsenic in my water? In additi
contains more than 0.1 mg/L of iron and manganese, which must b
system. Install one of the following water treatment systems to redu
water:

1. An NSF/ANSI Standard 42 certified whole house oxidizing filter s
oxidizing agent to reduce the level of iron and manganese. This
your water, though by how much depends on the levels of iron

Health Concerns:

Can consuming water containing arsenic affect my health? Consuming water containing more than 0.010 mg/L of arsenic is associated with an increased risk of cancer of the skin, bladder, lungs, kidneys, nasal passages, liver, or prostate as well as diseases of the nerves, lungs, heart, and immune and endocrine (hormonal) systems. Your individual health risk depends on the amount of arsenic in your water, how much of the water you drink each day, and the number of years you drink the water. To reduce your exposure to arsenic in your well water, treat the water that you use for drinking and cooking to a level less than 0.010 mg/L. You can continue to use your water for washing food and dishes, brushing your teeth, bathing, showering, and for other uses.

the level of arsenic in
You may also need to install one of

Certified Treatment professionals

Certified Treatment products

Treatment background

Water Quality Association

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Find Certified Water Treatment Professionals

Certified water treatment professionals are individuals who have completed a voluntary credentialing process through WC
WQA certified professional, the candidate must pass a comprehensive examination and accept WQA's Code of Ethics fo
program tests and certifies only individuals, not dealerships or companies. Certified professionals are typically employed
not required for certification.

Professional Designations

Certified Water Treatment Representative (CWR): This designation is best suited for the professional whose job focuses on solving aesthetic water problems.

Certified Water Specialist (CWS): This designation best suited for professionals who provide solutions to "problem water" issues and health-related contaminants.

Certified Installer (CI): This designation is ideal for professionals who specialize in installing water quality improvement products.

Certified Service Technic professionals who are resp of water quality improveme

Master Water Specialist (professionals responsible f applications.

Master Service Technicia experienced professionals

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Selecting a Home Water Treatment System

SHARE TWEET EMAIL

It can be difficult to determine whether you actually need a water treatment system or what type of system would be best for you. Although the choice to use a water treatment system is up to each individual, consider these factors in your product selection process.

INDEPENDENTLY NSF CERTIFIED

duction Need

be effective for the same group of contaminants. If you have identified a specific water that causes you concern, use NSF's contaminant selection guide to locate tified to reduce specific contaminants.

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Home Water Treatment Devices

Drinking Water and Human Health | December 06, 2010 | Print

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The table below outlines information on specific home water treatment approaches. Keep in mind that some water treatment can be for aesthetic as well as health factors. If drinking water poses a health risk, the consumer may also consider the cost of purchasing bottled water or tying into a public water system if available as an alternative to treatment. If you need to contact a water treatment professional to install or repair a home treatment system or to assess a problem, be prepared to ask questions that may save you time, money, and frustration in the future.

Device	Primary Use	Limitations
Activated Carbon Filter	Removes chlorine, volatile organic compounds	• Does not remove nitrate, bacteria or

Welcome

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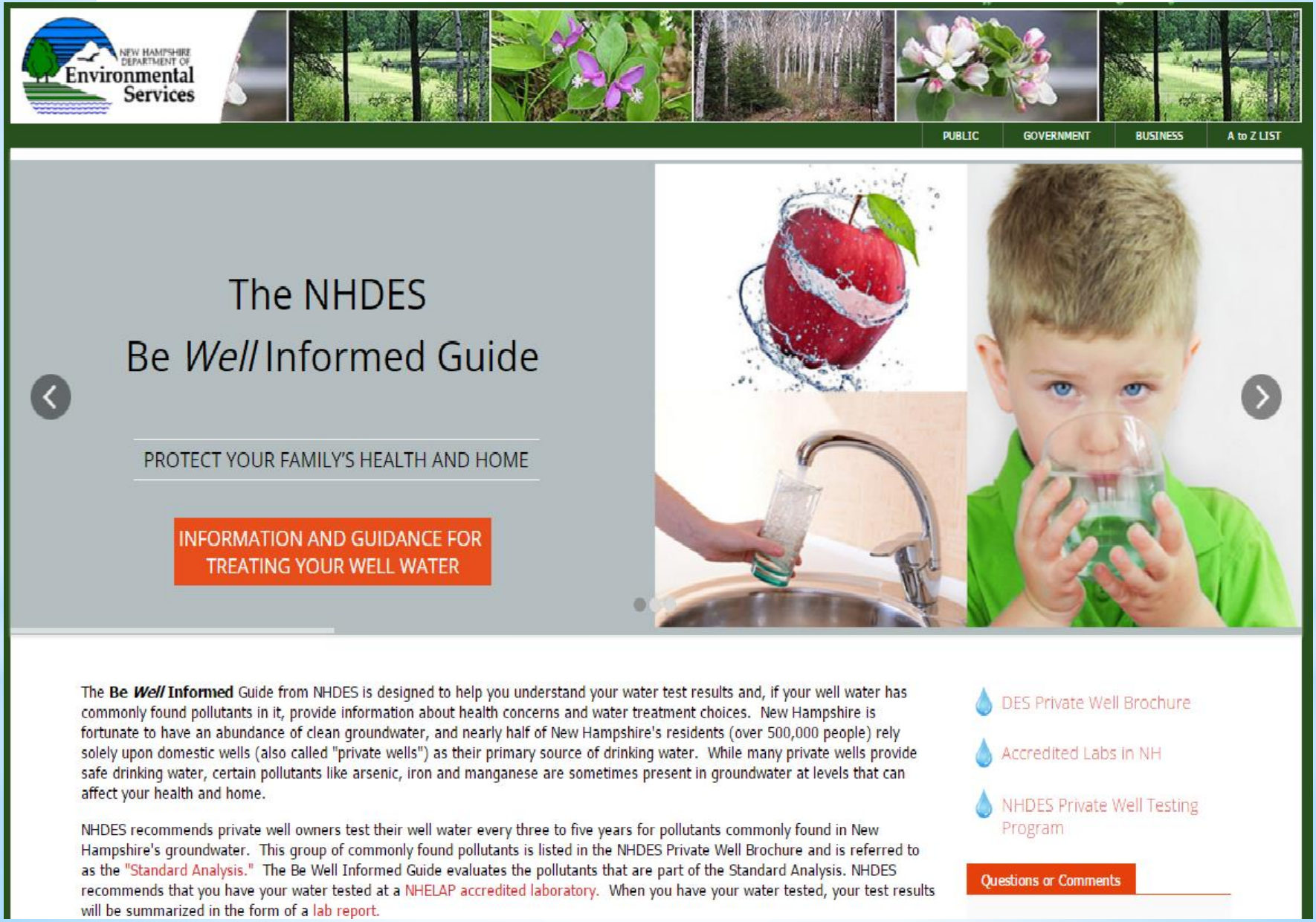
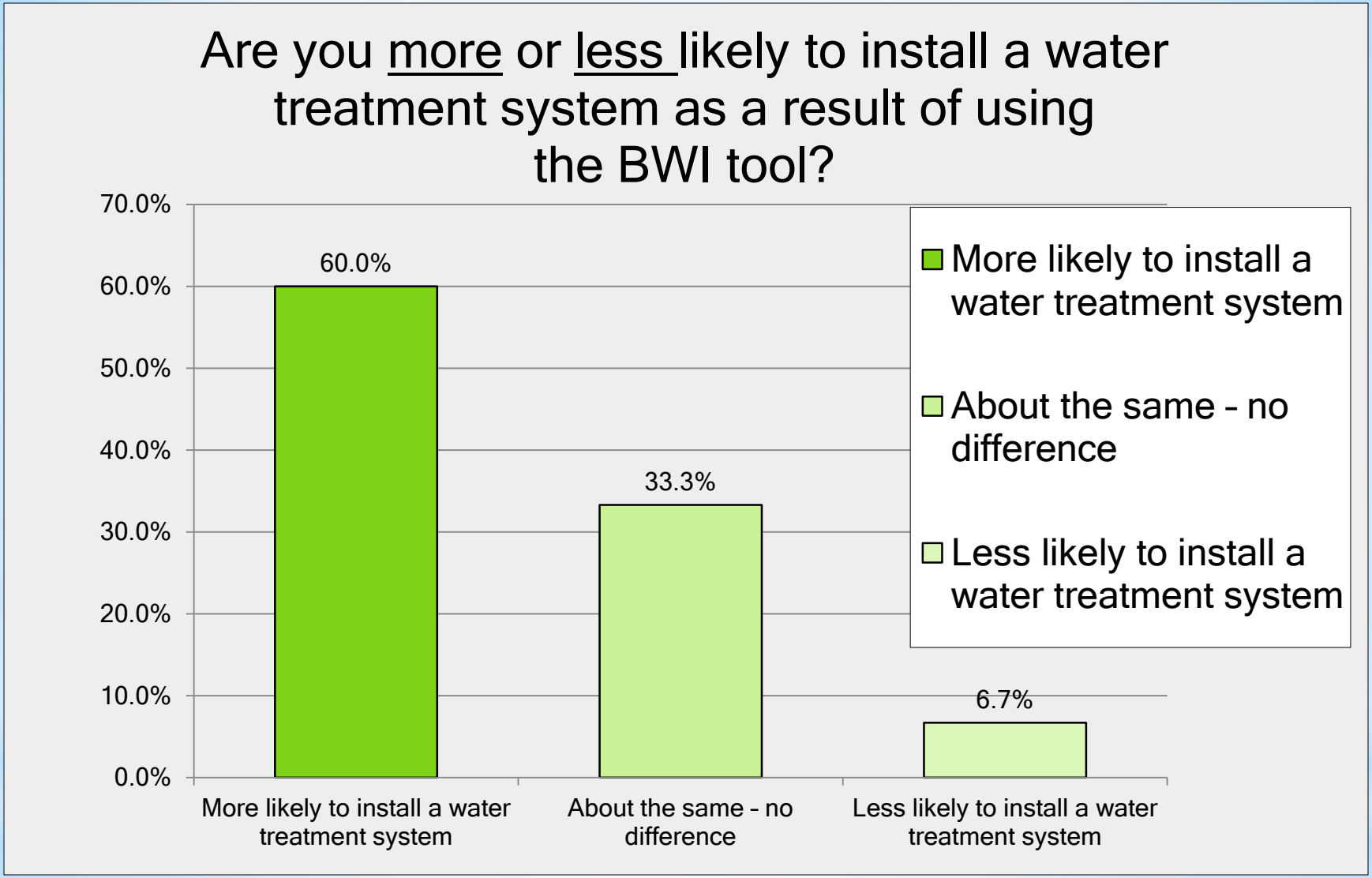
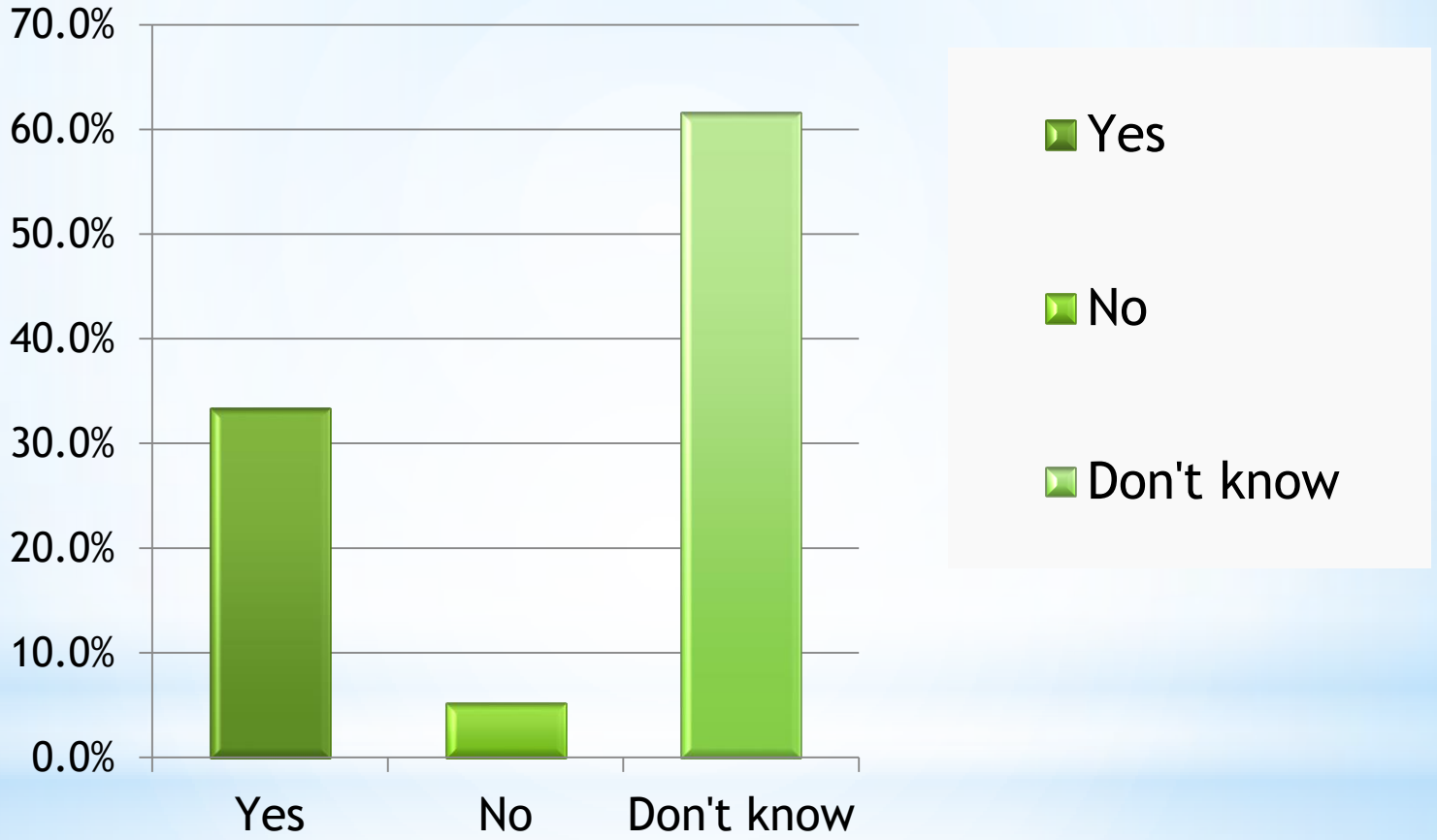


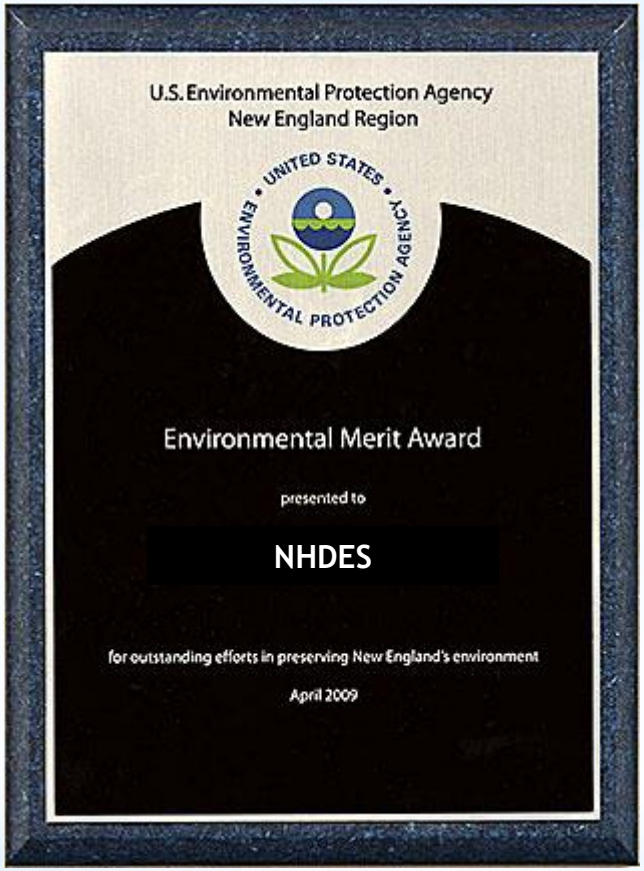


*Survey Monkey Results

Has the water treatment system you installed reduced the contaminant(s) in your water to the desired levels?



*Survey Monkey Results



* 2017 EPA Merit Award

11 States Interested in Adopting BWI-like App

* Minnesota
* Virginia
* Massachusetts
* Vermont
* Nevada
* Tennessee
* Lousiana
* Michigan
* North Carolina
* Ohio
* Maine

Project Partners

* US Centers for Disease Control
* NH Dept of Health & Human Services, Public Health Laboratories
* Toxic Metals Superfund Research Program, Dartmouth College
* United State Environmental Protection Agency

Image Credit, Pro Publica, 2009

*Questions