

Madbury: What's in Your Water?

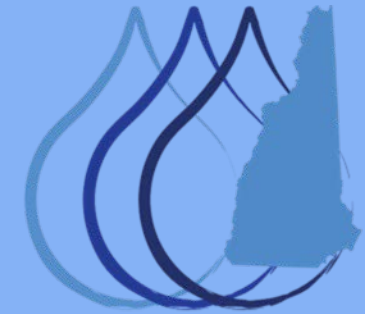
Tonight's presenters:

Lou Barinelli, Ph.D., Water Lab Program Manager
Public Health Laboratories, NH Department of Health and Human Services

Pat Bickford, Town of Madbury

Amy Hudnor, Private Well Coordinator
NH Department of Environmental Services

Jon Petali, Ph.D., Toxicologist, Environmental Health Program
NH Department of Environmental Services



NEW HAMPSHIRE DRINKING WATER
& GROUNDWATER TRUST FUND



OVERVIEW

- Private wells in New Hampshire
- Common contaminants & potential health impacts
- Water quality data for Madbury
- Testing recommendations
- Considering water treatment
- How to take your water samples
- Logistics of test kit pick up, dropping off samples, and receiving results
- Q&A

Private Wells: The Rundown

Main source of drinking water for approximately 46% of New Hampshire's population, more than 500,000 people.

No statewide testing or treatment requirements

Some municipalities require testing



Madbury Private Well Users

Population ~1,860

About 1,830 residents using private wells

There's a small public water system: Madbury Woods Apartments
serving appx 30

Drinking water contaminants—human-caused and natural

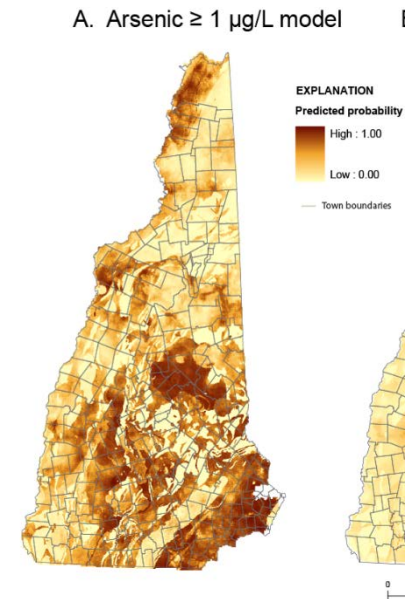


Human-caused contaminants in groundwater in some areas (PFAS & MtBE)



Human-caused contaminants leaching into water from plumbing (lead & copper)

Natural contaminants in groundwater in some areas (arsenic, uranium & radon)



Common risk perception mis-match

Human caused pollutants *feel* scarier, have more awareness & media coverage



Natural contaminants are often more common, but we don't always know about them, fear them, or take actions to protect ourselves from them

E. coli

A bacteria found in the fecal matter of mammals, including humans.

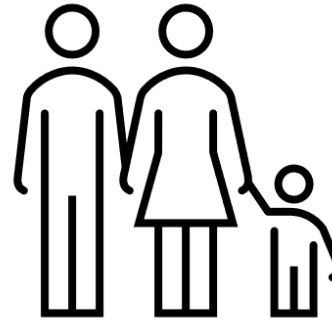
An immediate health hazard.

Indicator or poorly constructed wells or springs.

More Information:

NHDES:
<https://www.des.nh.gov/sites/g/files/ehbemt341/files/es/documents/2020-01/dwgb-4-1.pdf#:~:text=Contact%20NHDES%20Drinking%20Water%20and%20Groundwater%20Bureau%20at,a%20number%20of%20subsets%20within%20the%20coli%20form%20group>

If present in water

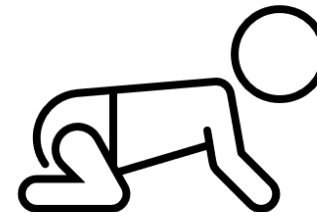


↑ risks for digestive system infections

- diarrhea
- Vomiting
- Cramps
- nausea
- headaches
- Fever
- fatigue



↑ risks for life-threatening infections



↑ risks for life-threatening infections

Arsenic

*“King of poisons and
poison of kings”*

Arsenic is a naturally-
occurring **element**
common in NH
bedrock.

More Information:

NHDES:

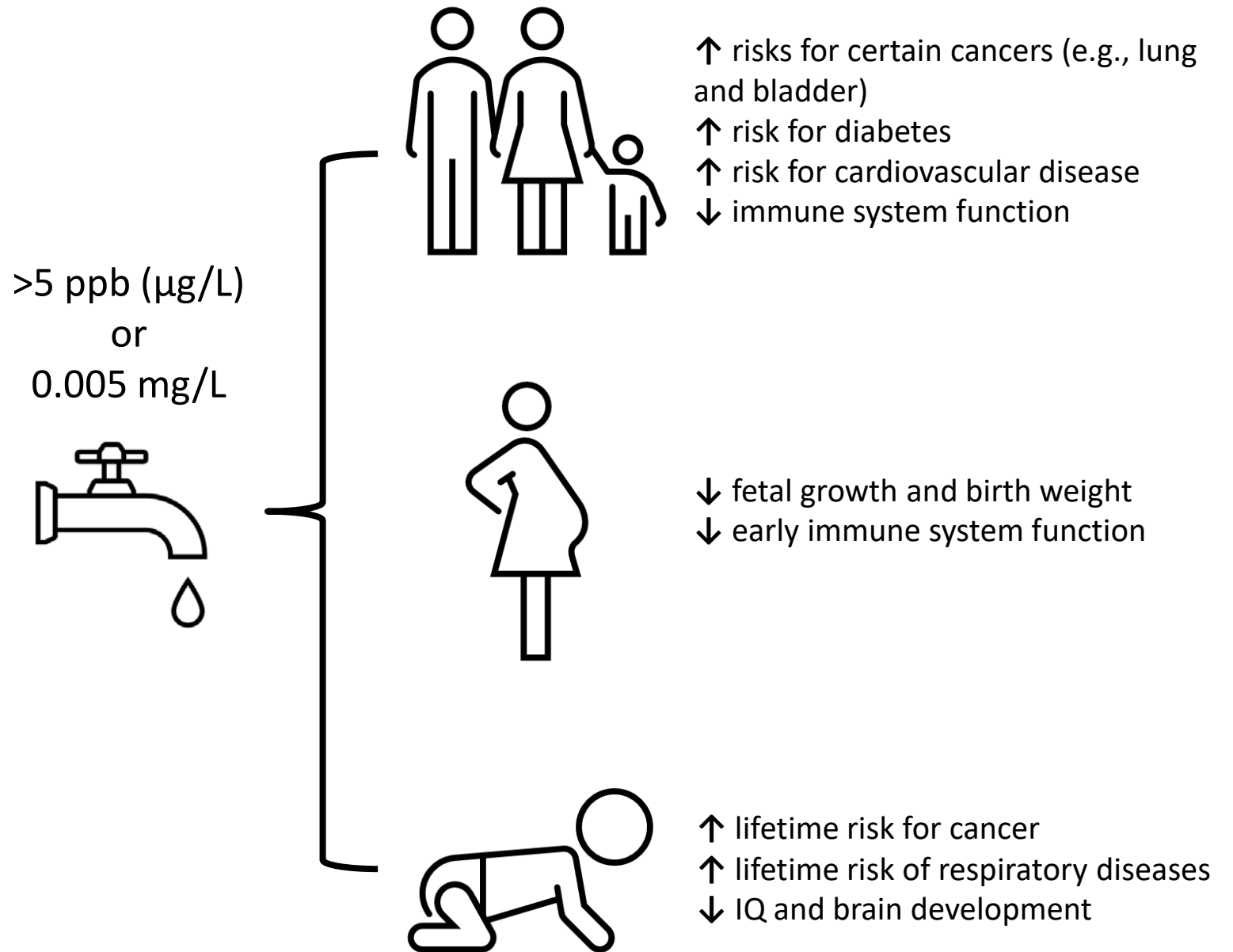
<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/dwgb-3-2.pdf>

Dartmouth College:

<https://sites.dartmouth.edu/arsenicandyou/>

CDC/ATSDR:

https://www.atsdr.cdc.gov/sites/toxzine/arsenic_toxzine.html



Lead

A natural element that was widely used in industry until its harm was recognized.

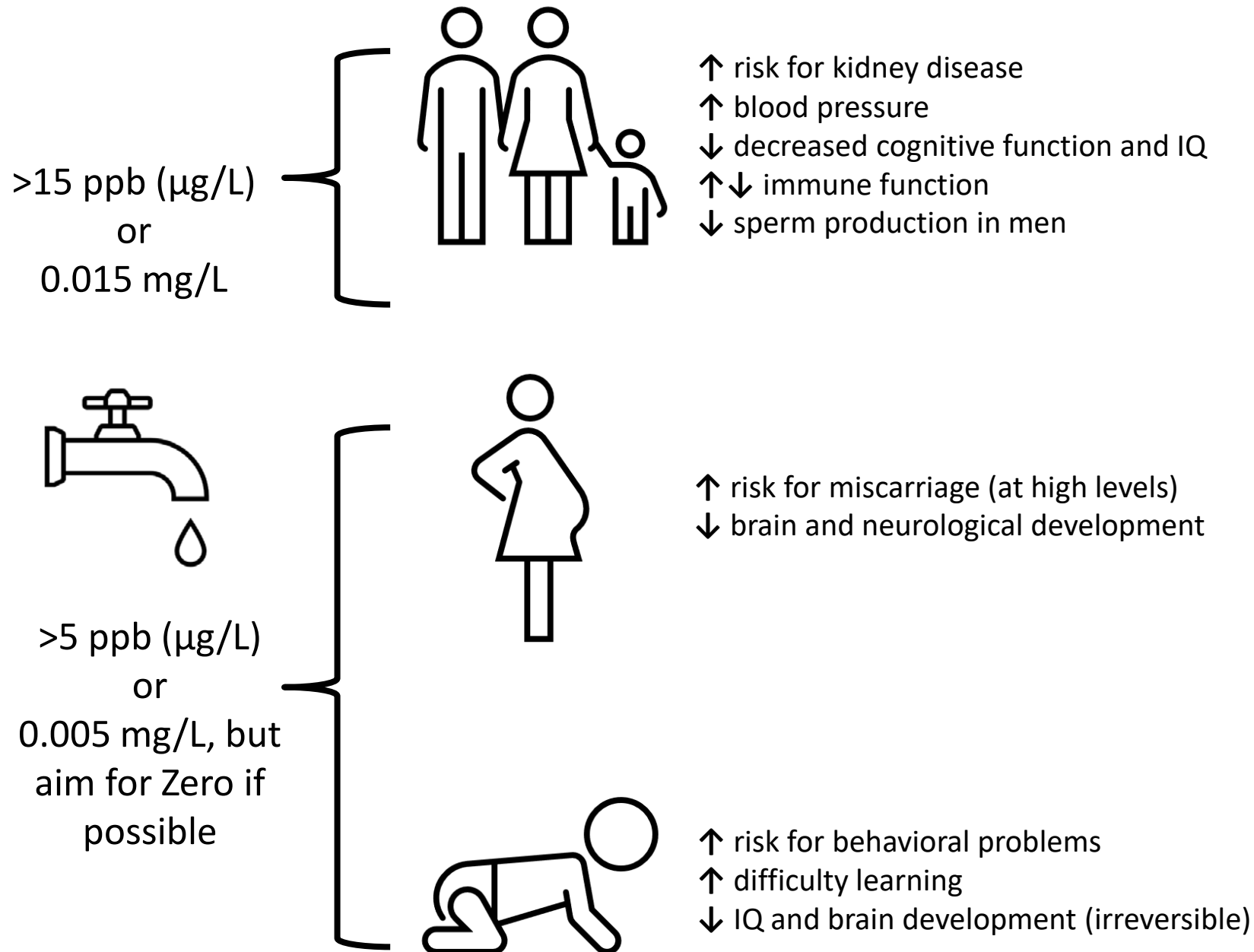
Found in **older plumbing** and leaches into “stagnant” water.

More Information:

NHDES: <https://www.des.nh.gov/water/drinking-water/lead/faqs>

US EPA (Water and other Sources of Lead): <https://www.epa.gov/lead>

CDC/ATSDR: https://www.atsdr.cdc.gov/sites/toxzine/lead_toxzine.html



Manganese

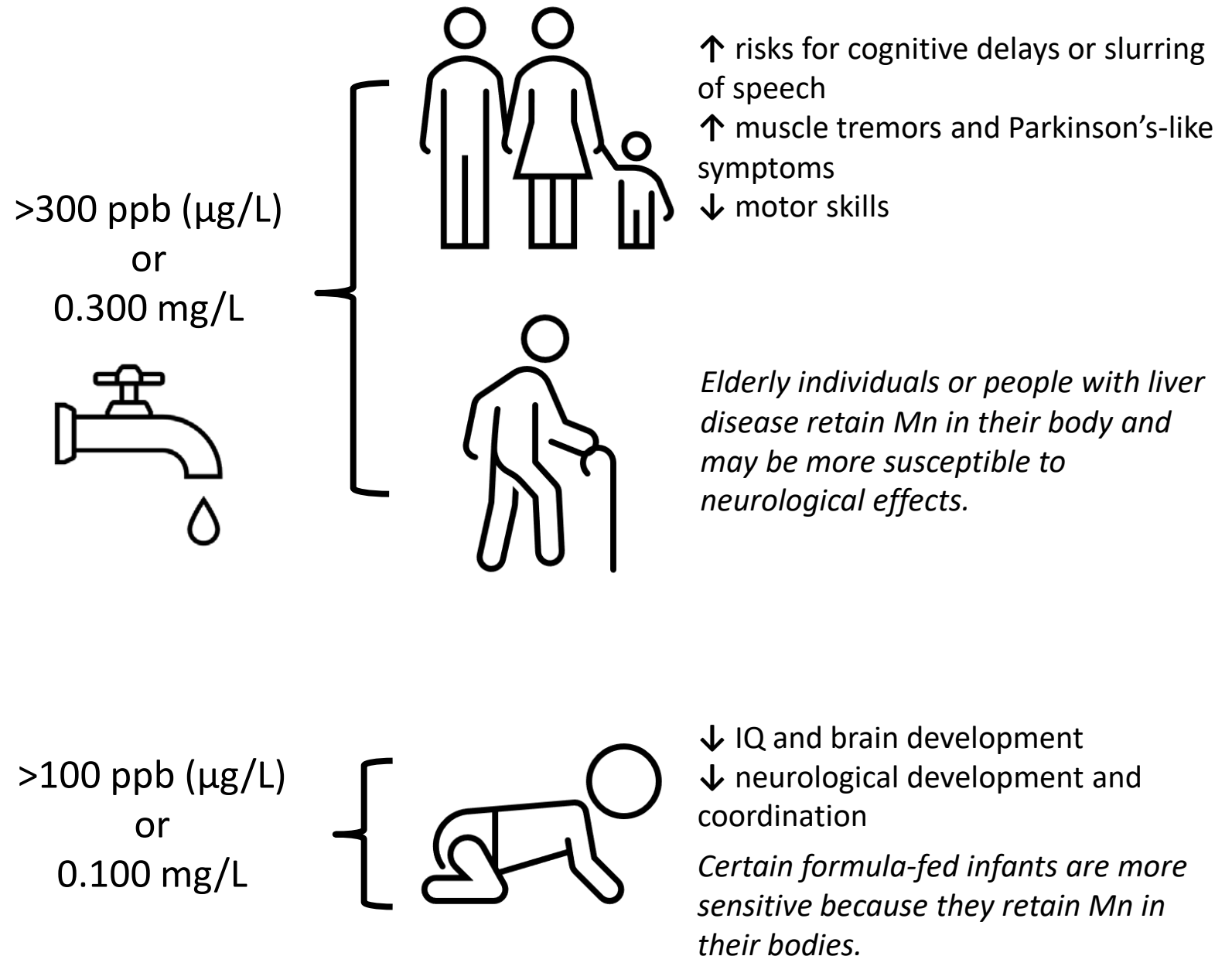
An essential nutrient at low levels, but a toxin at high levels.

Manganese is a **naturally-occurring element common in NH bedrock.**

More Information:

NHDES:
<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/ard-ehp-15.pdf>

CDC/ATSDR:
<https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=101&toxid=23>



Uranium

Uranium is a **naturally-occurring element common in NH bedrock.**

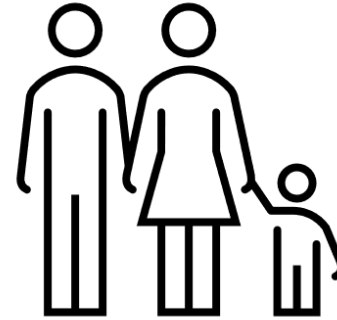
Primarily a chemical hazard in wells, with radioactivity playing a very minor role.

More Information:

US EPA:
<https://semspub.epa.gov/work/HQ/175267.pdf>

CDC/ATSDR:
https://www.atsdr.cdc.gov/sites/toxzine/uranium_toxzine.html

>30 ppb ($\mu\text{g/L}$)
or
0.030 mg/L



- ↑ risks for kidney cancer
- ↑ risk for chronic kidney disease
- ↓ kidney function



Uranium accumulates in bone, taking years to remove. This can prolong adverse health effects.

Radon

A naturally-occurring,
**radioactive gas found
in NH bedrock.**

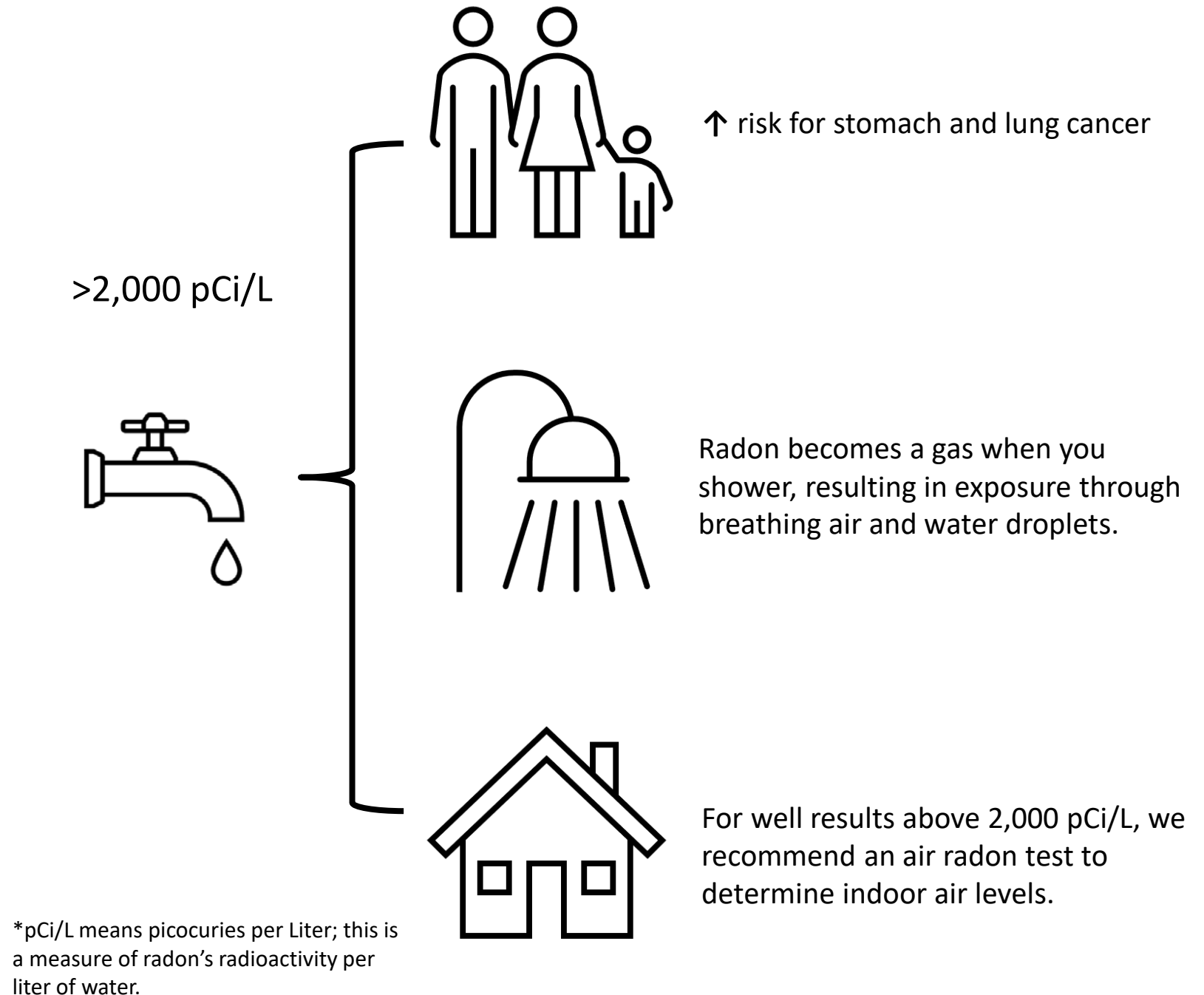
A wide-spread and
potent carcinogen in
our environment.

Consider air and water
results

More Information:

NHDES: <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/dwgb-3-12.pdf>

NH DHHS: <https://www.dhhs.nh.gov/programs-services/environmental-health-and-you/radon>

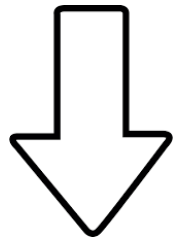


More about
radon, because it's
complicated:

Look at air &
water together

Reduce your
exposure as
much as you can

- Test your air for radon
- Test your water for radon and determine how much it's adding to the air (using 10,000 to 1 ratio)
- Get quotes for treating air and treating water and look at your budget
- Reduce the amount of radon in your air as much as possible, **below 4 pCi/L if you can.**
- Often there will be more exposure from air, and an air treatment system will give you more reduction. But not always, so it's important to test both air and water.



PFAS

PFAS stands for per- and polyfluoroalkyl substances.

These are **human-made chemicals** used in a wide variety of commercial and industrial applications.

More Information:

NHDES:

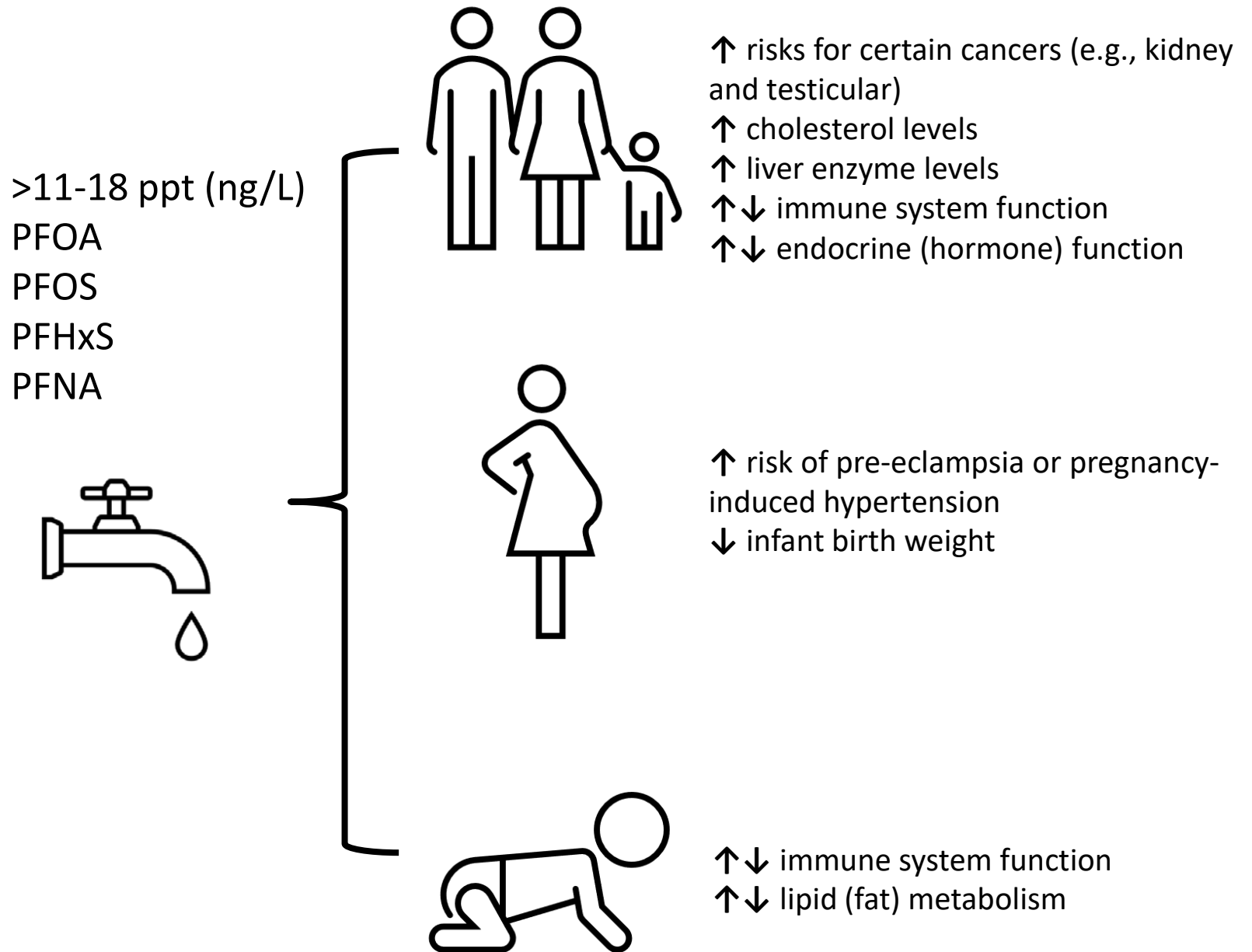
<https://www4.des.state.nh.us/nh-pfas-investigation/>

Dartmouth College:

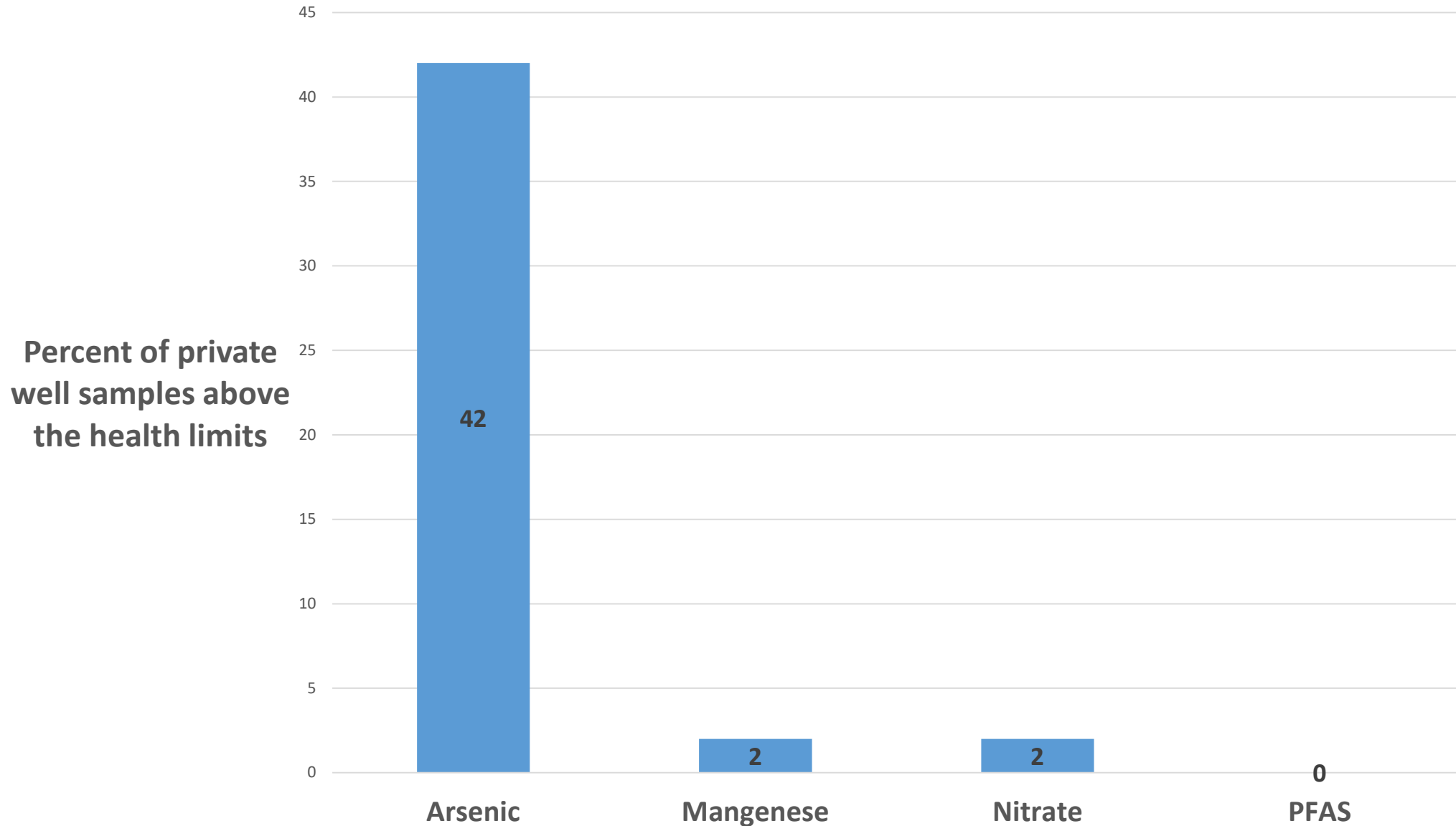
https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/PFASinNH_Fact-Sheet_20210805.pdf

CDC/ATSDR:

<https://www.atsdr.cdc.gov/pfas/index.html>

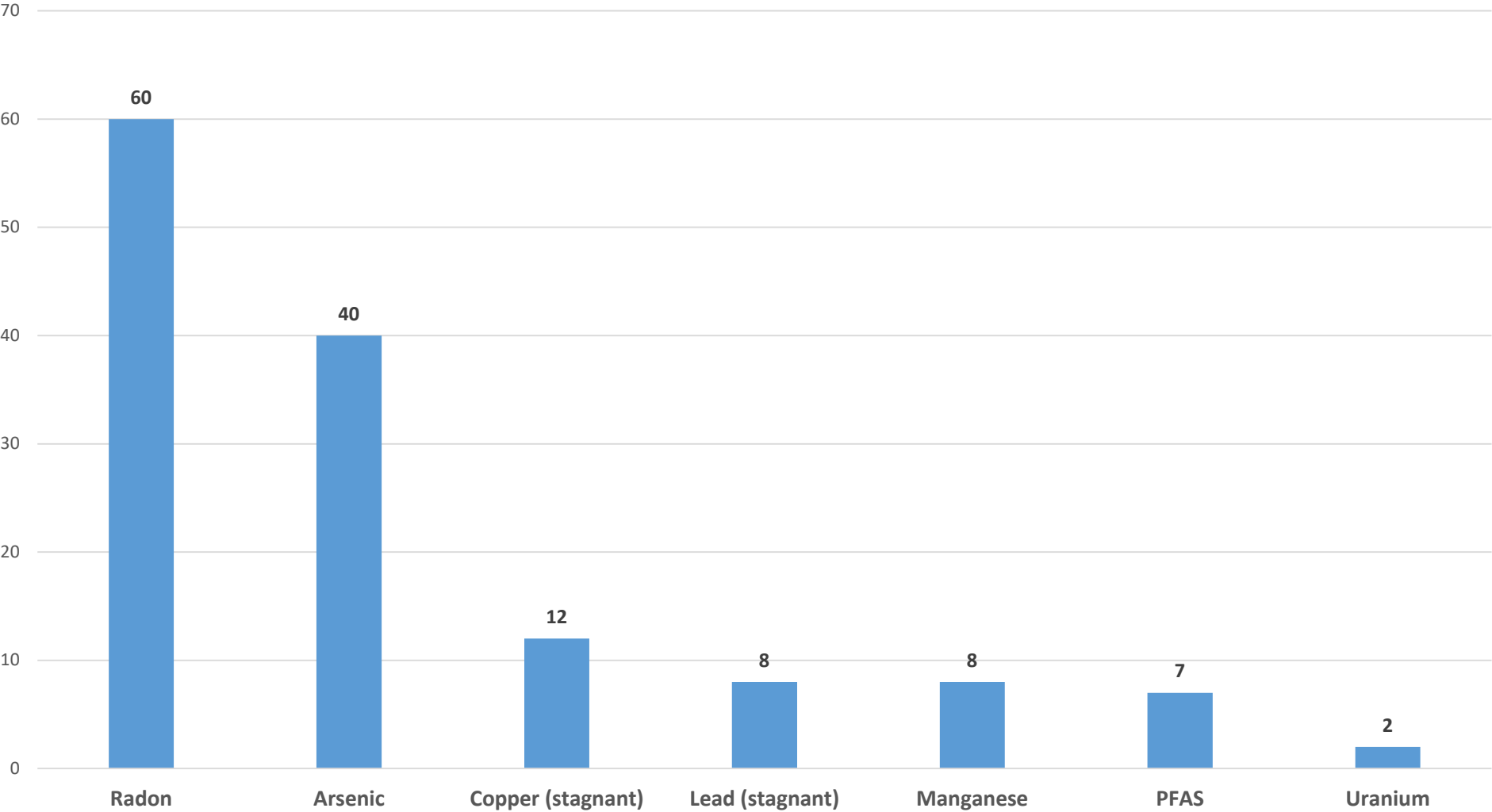


Limited Madbury data from private well sampling



Strafford County private well sample data

Percent of private
well samples above the
health limit



Recommendations

- Test your well for NHDES' recommended list of contaminants
- You'll receive your results, plus a NHDES ***Be Well Informed*** report
- Your ***Be Well Informed*** report will tell you which contaminants, if any, are above health limits.
- Consider treatment if you have contaminants above health limits
- Contact treatment vendors – use your ***Be Well Informed*** report, which will give treatment recommendations
- Maintain your system and retest your water every 3-5 years

When and What to Test

NHDES Recommendations for Private Well Testing

Private Well Users

Test every 3 to 5 years
(except for bacteria and nitrate,
which are recommended yearly)

"NH Well Water Test for Home Buyers"

Test during the inspection period as specified in
contract

Arsenic
Bacteria (Total Coliform and E. coli)
Chloride
Copper*
Fluoride
Hardness
Iron
Lead*
Manganese
Nitrate/Nitrite
pH
Radon**
Sodium
Uranium

Volatile Organic Compounds
PFAS

Other times to test:

- Buying / selling your home
- If the well has flooded
- Construction blasting nearby
- If you notice a change in the color, taste or smell of your water



Your test kit will come with instructions

But here's an overview:

1. You'll take your samples early in the morning on the day you're scheduled to bring samples to Town Hall. Read through the instructions the night before.
2. Take your samples at your main drinking water source (kitchen sink) using cold water.
3. If you have a treatment system, take samples of the ***treated water***.
4. Take samples in this order:
 - First draw Lead and copper
 - Sterile bacteria bottle
 - Non-sterile container
 - Bottle labeled fluoride/chloride/nitrate/nitrite
 - Radon vial
 - PFAS



And now some
instructions on
how to fill the
test bottles.....

You don't have to take notes, your test kit will come with instructions

NHDES Be Well Informed Web Tool

We'll e-mail your test results,
along with a BWI report,
which will include:

- Interpretation of lab results
- Risks to health
- Treatment guidance

The screenshot shows the 'Draft - Testing Version' of the NHDES Be Well Informed Web Tool. The header includes navigation links for PUBLIC, GOVERNMENT, BUSINESS, and AIR QUALITY. The main content area features the title 'NH DES's Be Well Informed Guide' with the subtitle 'PROTECT YOUR FAMILY'S HEALTH AND HOME' and a call to action 'INFORMATION AND GUIDANCE FOR TREATING YOUR WELL WATER'. To the right are images of a red apple being washed and a child drinking from a glass. Below the main content, there is a detailed explanation of the guide's purpose, a recommendation to test well water every three to five years, and a link to a disclaimer. A green button labeled 'Enter Your Well Water Test Results' is at the bottom. On the right side, there are links to 'DES Private Well Brochure', 'Accredited Labs in NH', and 'NH DES Private Well Testing Program', along with a 'Questions or Comments' section containing contact information: (603) 271-2513 and dwginfo@des.nh.gov.

Draft - Testing Version

NH DES's
Be Well Informed Guide

PROTECT YOUR FAMILY'S HEALTH AND HOME

INFORMATION AND GUIDANCE FOR
TREATING YOUR WELL WATER

The **Be Well Informed** Guide from NH DES is designed to help you understand your water test results and, if your well water has commonly found pollutants in it, provide information about health concerns and water treatment choices. New Hampshire is fortunate to have an abundance of clean groundwater, and nearly half of New Hampshire's residents (over 500,000 people) rely solely upon domestic wells (also called "private wells") as their primary source of drinking water. While many private wells provide safe drinking water, certain pollutants like arsenic, iron and manganese are sometimes present in groundwater at levels that can affect your health and home.

NH DES recommends private well owners test their well water every three to five years for pollutants commonly found in New Hampshire's groundwater. This group of commonly found pollutants is listed in NH DES's Private Well Brochure and is referred to as the "**Standard Analysis**." The Be Well Informed Guide evaluates the pollutants that are part of the Standard Analysis. NH DES recommends that you have your water tested at a **NHDES accredited laboratory**. When you have your water tested, your test results will be summarized in the form of a **lab report**.

With your water test results in hand, click the button below to enter your test results from your laboratory report. You will receive an evaluation of your well water quality and, if necessary, water treatment options.

Read This Disclaimer Before Proceeding

Information provided on this website is for informational purposes only and should not be substituted for direct consultation with a qualified water treatment professional. Other conditions or factors related to your well or home not considered by this online guide may determine the most appropriate water treatment option.

Enter Your Well Water Test Results

DES Private Well Brochure

Accredited Labs in NH

NH DES Private Well Testing Program

Questions or Comments

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dwginfo@des.nh.gov



YOUR DRINKING WATER RESULTS SUMMARY

Based on what you entered from your laboratory report, the Results Summary below indicates whether your water meets federal and state health-based standards (Maximum Contaminant Levels - MCLs) as well as other guidelines (Secondary Maximum Contaminant Levels - SMCLs, health advisory levels, etc.). These standards and guidelines are often referred to as "limits" on your laboratory report. If your water exceeds or is approaching established federal/state drinking water limits or advisory levels for the contaminant(s) entered, additional health information and treatment options will be shown. **Several contaminants, such as radon and sodium, do not have state or federal standards.** Instead, when radon is present in drinking water at 2,000 pCi/L or greater, NHDES recommends homeowners [consult NHDES Fact Sheet WD-DWGB-3-12](#). For sodium, the Be Well Informed tool provides health and treatment information when sodium is present at levels above 20 mg/L, U.S. EPA's federal "health advisory" for persons on a physician-prescribed "no salt diet." Water quality lab results entered containing significant digits are rounded down when their values are less than 5, and rounded up when equal to or greater than 5. Rounding may affect reported results.

[Click Here To Start Over](#)



This printer icon also allows you to save as a pdf

Results Summary

✔ Value entered meets the Drinking Water Limit. ⚠ Value entered is close to the Drinking Water Limit. ✖ Value entered is above the Drinking Water Limit.

⚠ Routine Analysis	📄 Water Test Value Entered	⚠ Drinking Water Contaminant Limit or Radon Advisory Level	? About Your Well Water?
✖ Arsenic	0.024 mg/L	0.005 mg/L	The value entered exceeds the drinking water standard
✔ Copper	0 mg/L	1.3 mg/L	The value entered meets the drinking water standard
✔ Iron	0 mg/L	0.3 mg/L	The value entered meets the drinking water guideline
✔ Lead	0 mg/L	0.015 mg/L	The value entered meets the drinking water standard
✔ Manganese	0 mg/L	0.3 mg/L	The value entered meets the drinking water guideline
✖ Uranium	83 µg/L	30 µg/L	The value entered exceeds the drinking water standard

Part 1: Results Summary

Part 2: Treatment

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:

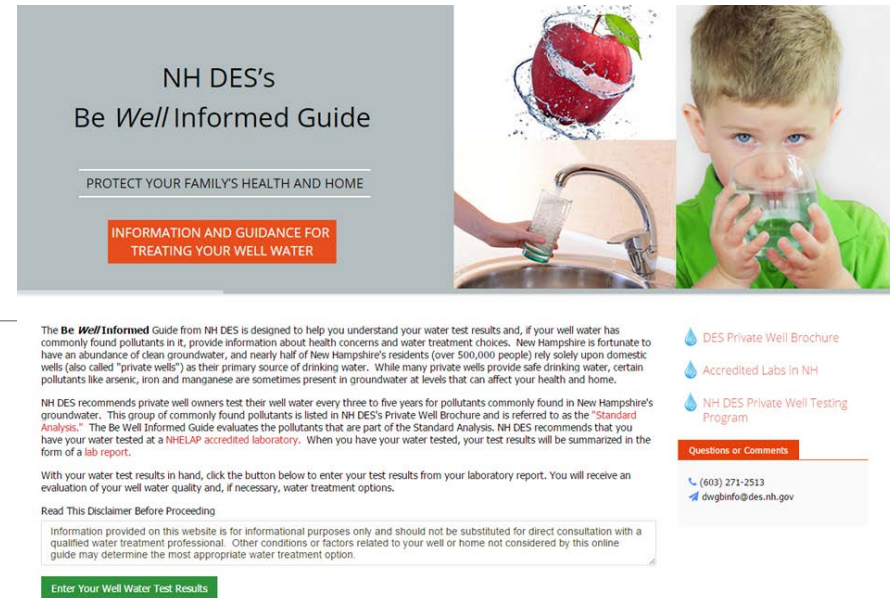
How can I reduce the level of arsenic in my water? In addition to arsenic, your water contains more than 0.1 mg/L of iron and manganese, which must be considered in your system. Install one of the following water treatment systems to reduce the level of water:

1. An NSF/ANSI Standard 42 certified whole house oxidizing filter system that uses an oxidizing agent to reduce the level of iron and manganese. This type of system will also reduce the level of arsenic in your water, though by how much depends on the levels of iron, pH, and arsenic.

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.

Be Well Informed can be found:



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Be Well Informed Guide

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Enter Your Well Water Test Results

DES Private Well Brochure
Accredited Labs in NH
NH DES Private Well Testing Program

Questions or Comments

(603) 271-2513
dwginfo@des.nh.gov

<https://www4.des.state.nh.us/DWITool/Welcome.aspx>

Or by typing 'NHDES Be Well Informed' into a search engine

Treatment

Use your Be Well Informed report when looking at treatment options



Home Water Treatment – Point of Use (POU)

Treats water at a single tap.

This is an example of an activated carbon filter.



In general, NHDES Recommends Using Point of Use for:

- Arsenic
- Uranium
- PFAS
- Fluoride

Home Water Treatment – Whole-House

Treats all the water entering the house and is typically installed in the basement.



In general, NHDES Recommends Using Whole House on:

- Radon
- Staining - Iron, Manganese
- Corrosivity – Lead, Copper
- Odor - Sulfide

Home Water Treatment – Filter Pitchers



- Check for NSF certification for specific contaminants—many pitchers will not lower arsenic, uranium, other harmful contaminants
- NHDES has verified the Zero Water pitchers are effective for a variety of NH's most common contaminants

With any treatment, make sure it's certified to treat the contaminant you are concerned about



**NSF/ANSI 58
TECHNICAL REQUIREMENTS**

REVERSE OSMOSIS SYSTEMS



NSF Certified Performance



REPLACEMENT
ELEMENT

NSF 53
Health Benefits

NSF 42
Aesthetic Benefits

NSF 372
Lead Free Material



Participants with
contaminant
exceedances that
have low house-hold
income will receive:

Please indicate your household size and income on
the intake form you fill out tonight, and we'll contact
you if your income and water sample results indicate
you are eligible for a free ZeroWater pitcher



A bit about bottled water....

- A temporary solution if your lab results reveal harmful contaminants
- Not recommend as a permanent solution due to plastic waste & cost over time
- Bottled water not as closely regulated as public water systems in NH—for example: arsenic
- Your lab results may indicate water quality that is better than the standards bottled water companies are held to

Free water testing: How's this going to work?

- Fill out the **intake form** and drop in the box. Fill out completely and give us **an e-mail address you check regularly**. Please do not leave income info blank as we're using it to determine info on free ZeroWater pitcher qualification.
- Choose a date that you know you can drop off your water samples to Madbury Town Hall:
 - Monday, **September 26**, between 7am-9am
 - Monday, **October 3**, between 7am-9am
 - Tuesday, **October 11**, between 7am-9am
- There are 3 tables of test kits. **Take your test kit from the table that's labeled with the timeslot you are committing to**. Your test kit will have a sticker with that timeslot.

Free water testing: How's this going to work?

- Read your instructions the night before. You'll be taking your samples in the morning of the date you've chosen.
- Bring your water samples to the Madbury Town Hall between 7am and 9am on the date you've chosen.
- Wait for your results to arrive around 4-6 weeks later. They'll be sent to the e-mail address you give us on your intake form, so check this e-mail, including your spam filter.
- 2 sets of lab results will be sent, along with a Be Well Informed report, and our contact info in case you have follow up questions.

You can call or
e-mail us with
testing or
treatment
questions



Amy Hudnor, NHDES Private Well Coordinator:
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Pat Bickford, Town of Madbury:
603-312-2038, pat.bickford01@gmail.com

Lou Barinelli, NHDHHS Water Lab Program Manager:
603-271-2994, lucio.s.barinelli@dhhs.nh.gov





Questions?????