The *Community Science Institute*, *in collaboration with the* *Tompkins County Health Department*, Presents:

Drinking Water Wednesdays

June 28, 2017

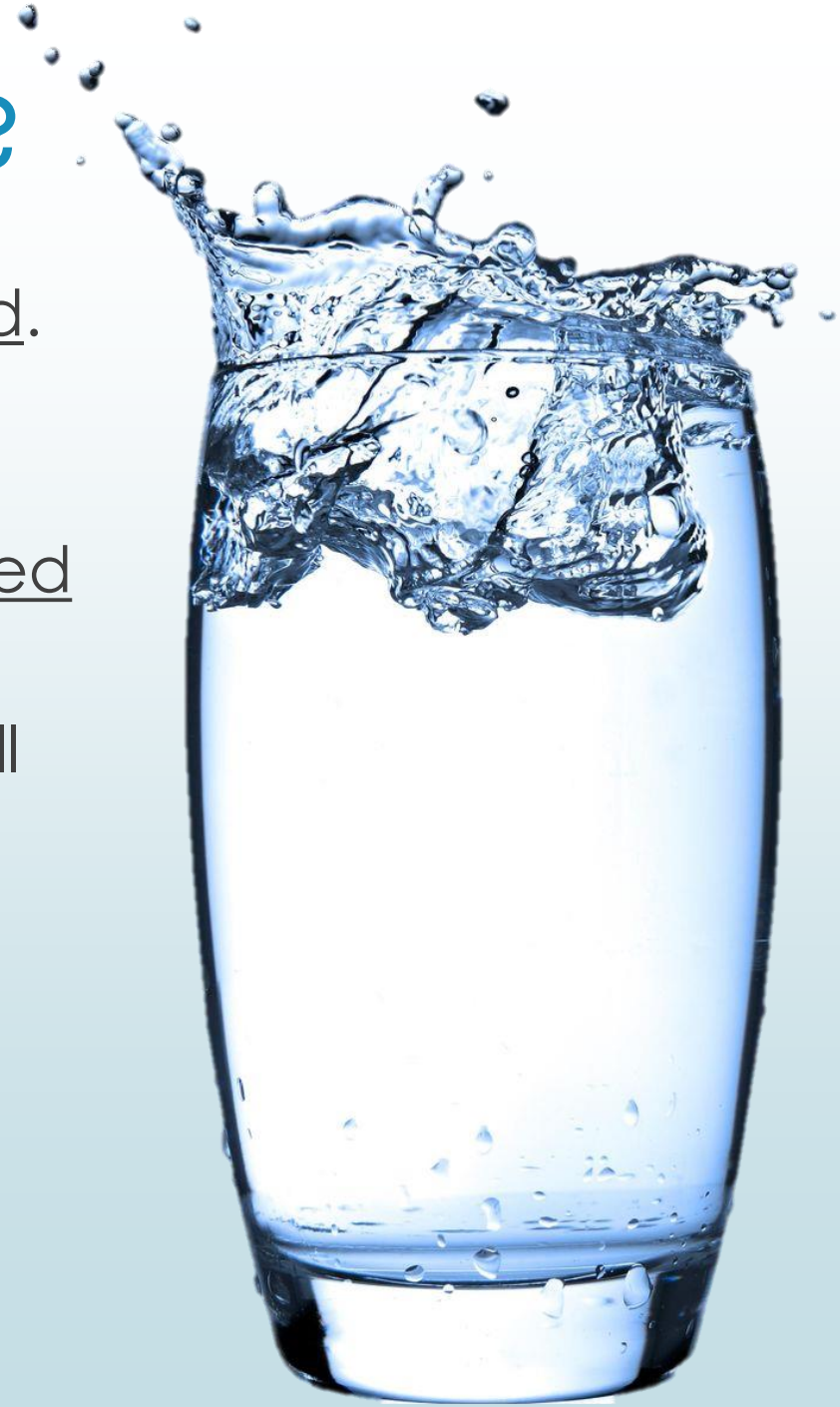
Tompkins County Public Library

Ithaca, NY

Supported in part by a grant from the Park Foundation

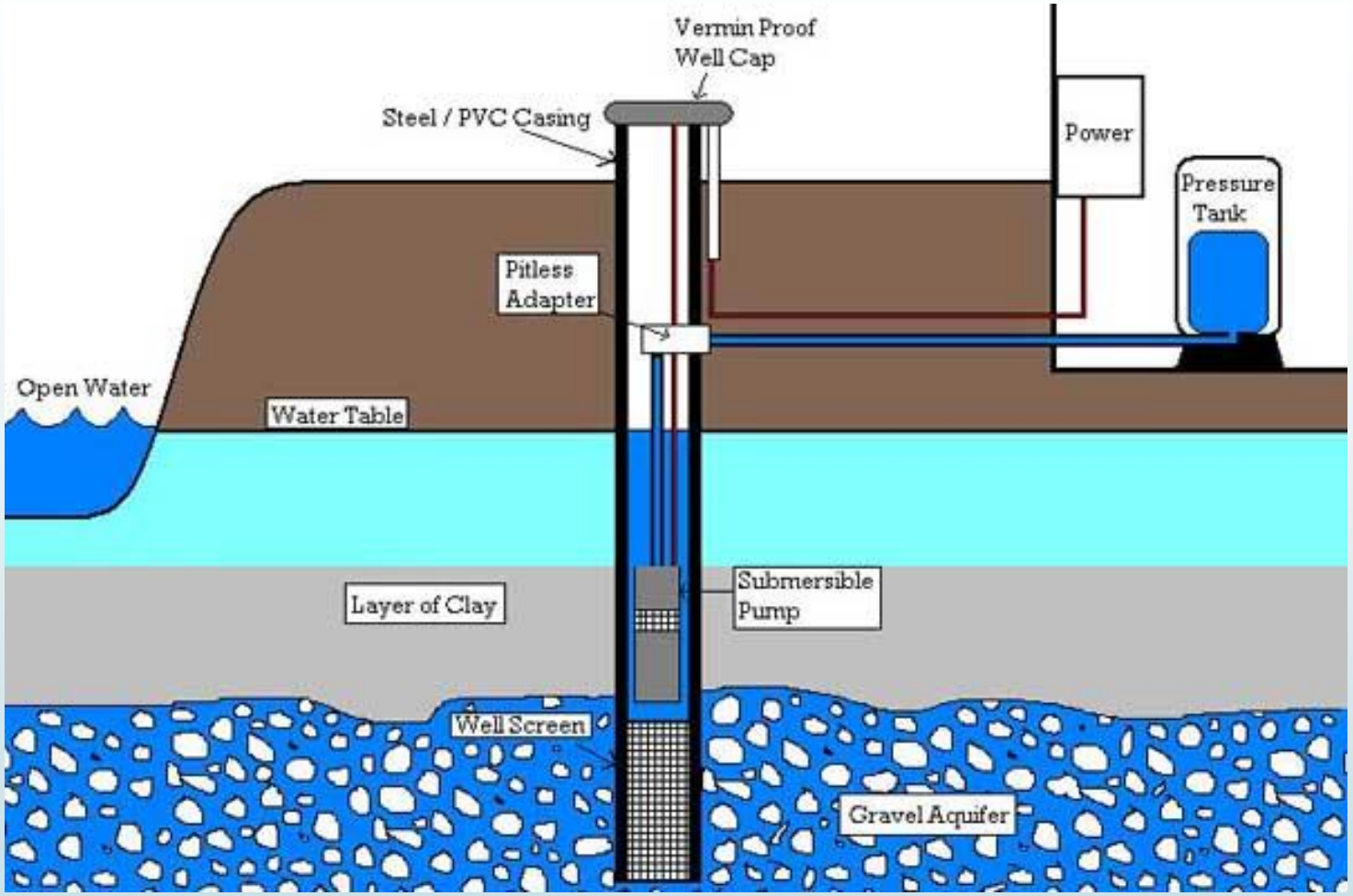
Is My Water Safe to Drink?

- If you are on city water your water is regulated. This means your water is frequently tested for bacteria and some other contaminants.
- Private homeowners' well water is not regulated unless mandated by the health department.
- If your source of drinking water is a private well there are some things you should consider.
  - Is your well structurally sound and properly maintained?
  - Are there potential sources of contamination nearby?
  - What should a private well user test for?



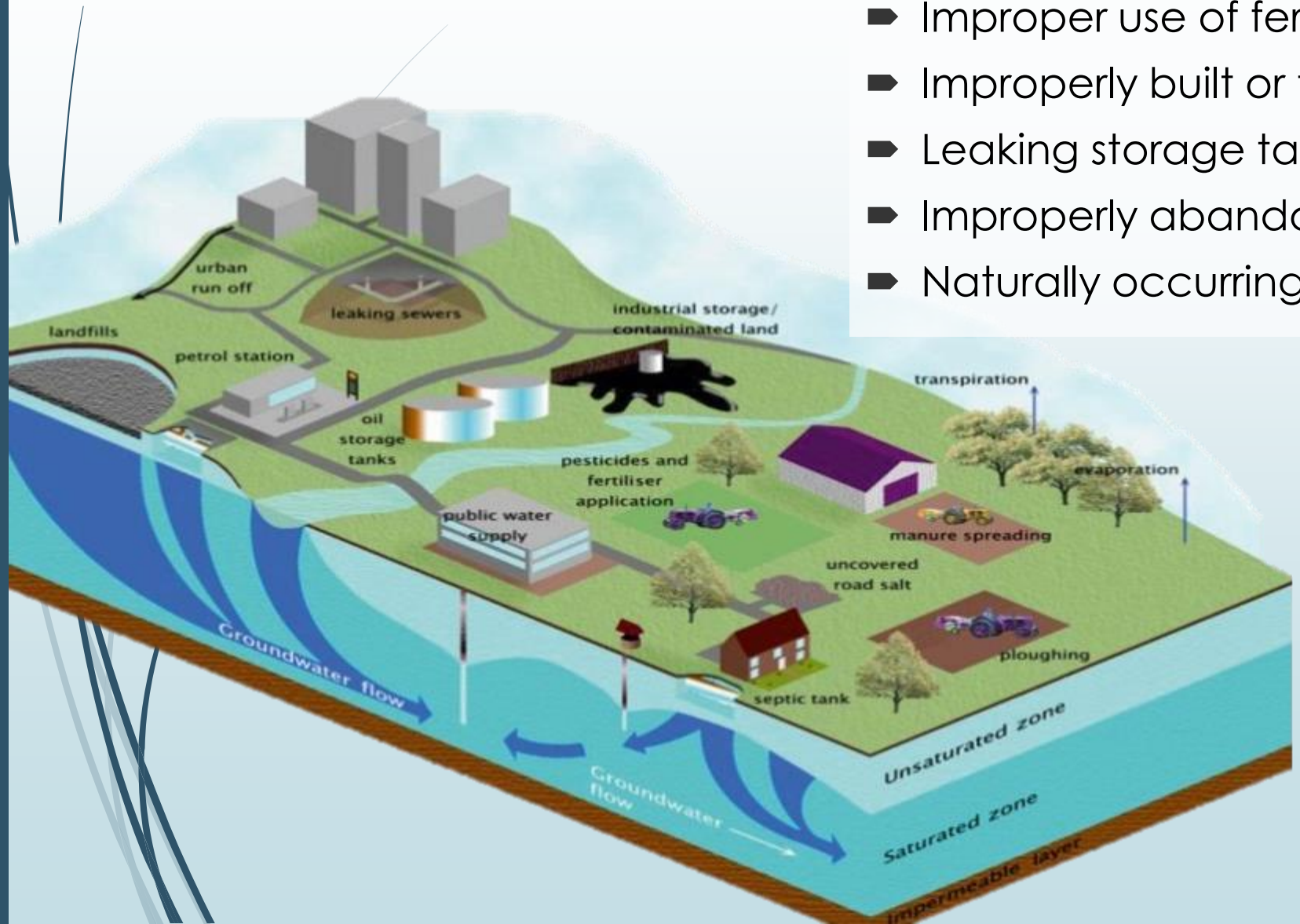
Well Maintenance Considerations

- Does the well cap provide a tight seal?
- Are there any potential contamination sources?
- Is the well casing visibly structurally sound?
  - Prevent pooling around well cap.



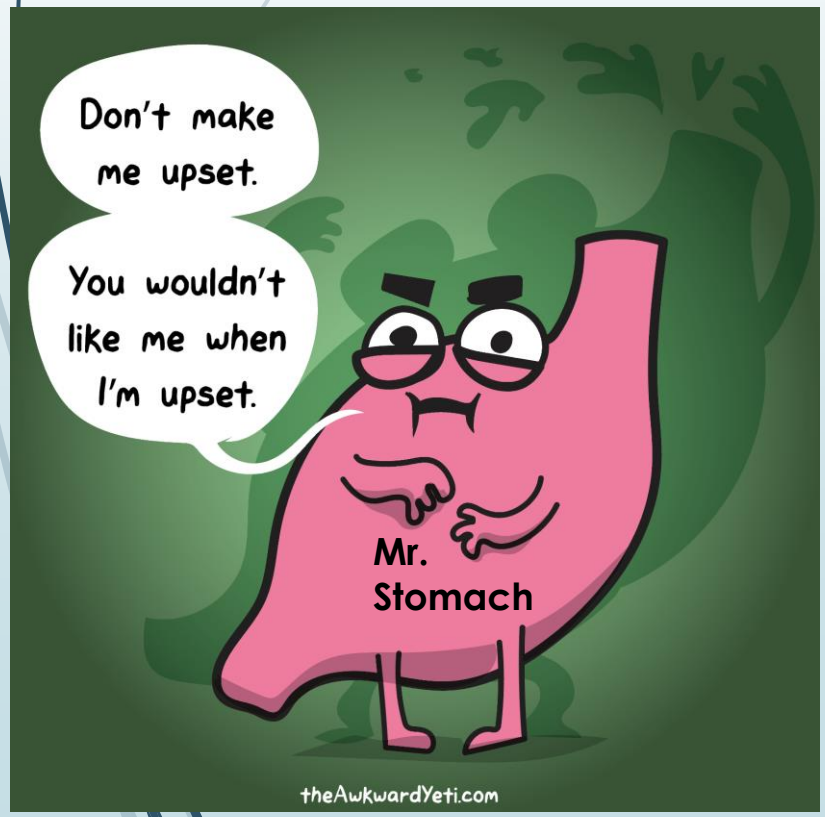
Common Causes of Groundwater Contamination

- Improper use of fertilizers and manure
- Improperly built or failing sewage systems
- Leaking storage tanks (rusted fuel oil tanks)
- Improperly abandoned wells
- Naturally occurring contaminants (Arsenic)



Common Problems Fall into Two Categories

- Two Types: **Health Based Concerns** and **Nuisances**



Most Common Problems

1. Coliform Bacteria

2. Nitrate

3. Lead and Copper

4. Arsenic (naturally occurring)

5. Turbidity

6. Iron

7. Hardness

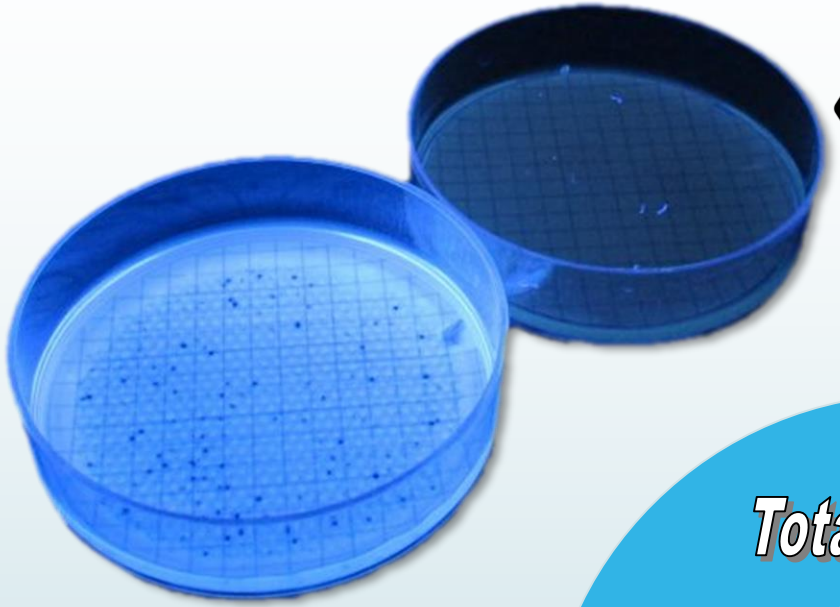
8. Sulfur

Common Nuisance Problems

- Undesirable aesthetic, odor, or taste
- Fairly common for private wells
- Can cause clogging or breaking of appliances, staining of fixtures, or rotten egg smell

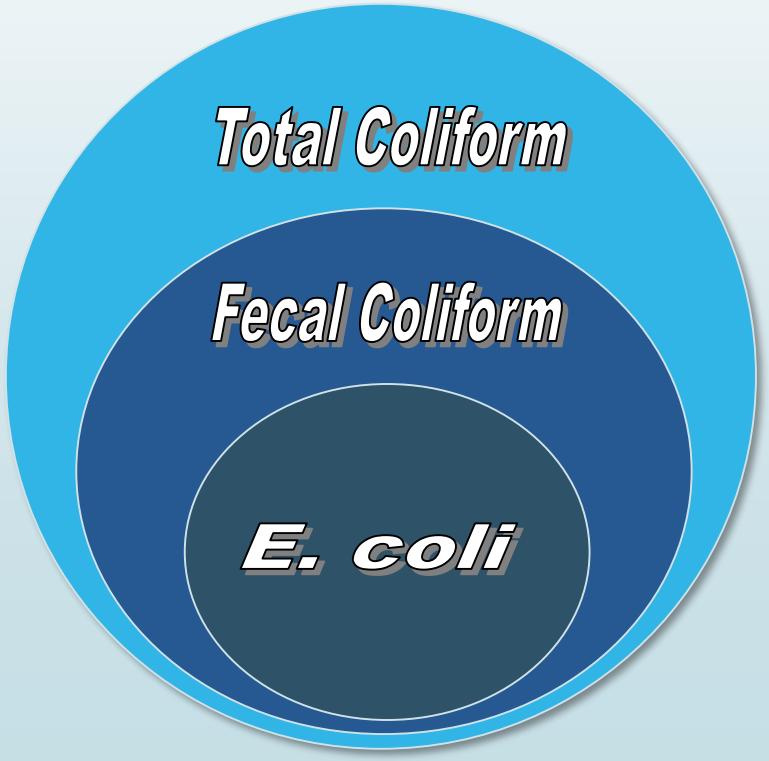
Potential Contaminant - **Coliform Bacteria and E. coli**

- Total coliform
  - Derive from organic material (soil, animals, plants)
  - Presence is an indication of contamination from external sources
- E. coli
  - The major species of fecal coliform
  - Indicator of fecal pollution and the possible presence of other pathogens



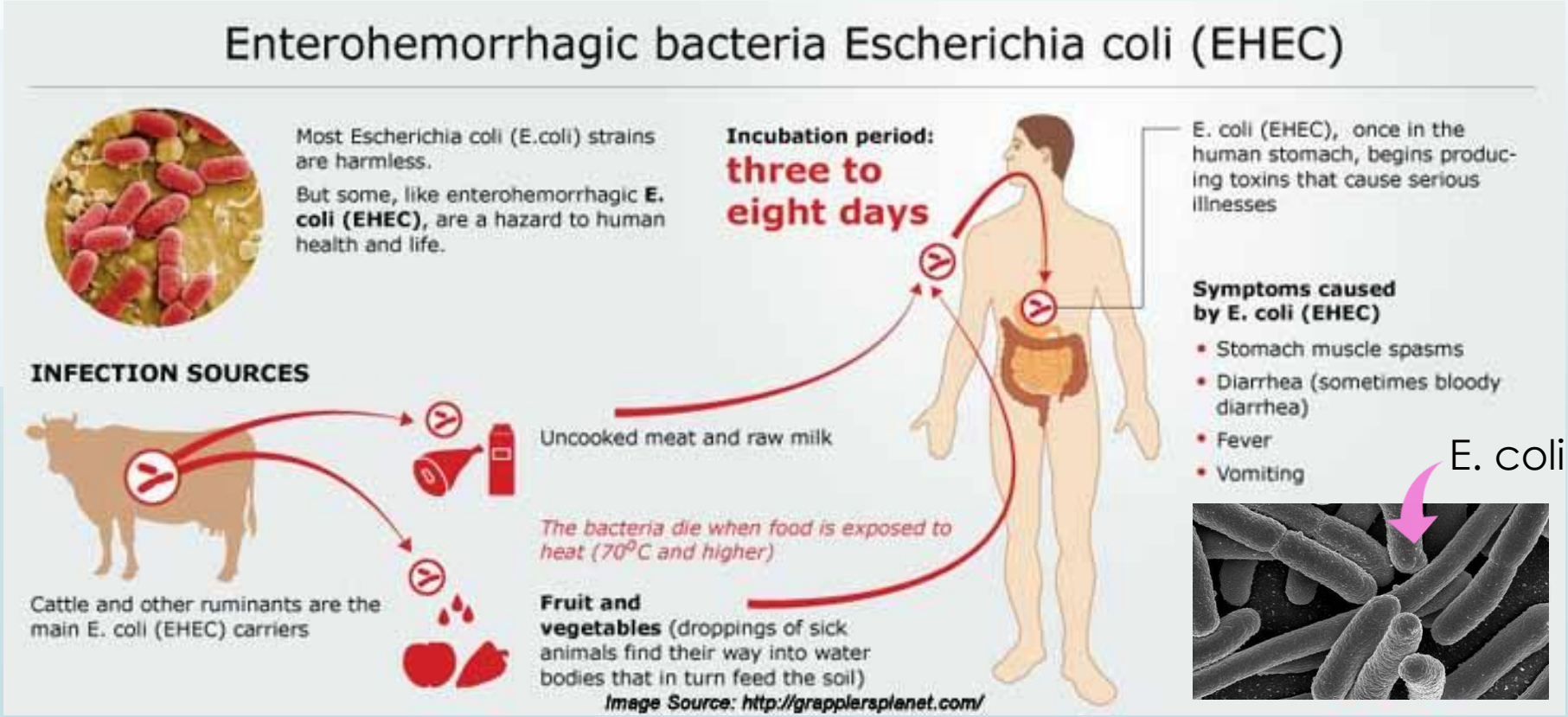
Petri dish with no bacteria colonies

Petri dish holding colonies of total coliform and E. coli



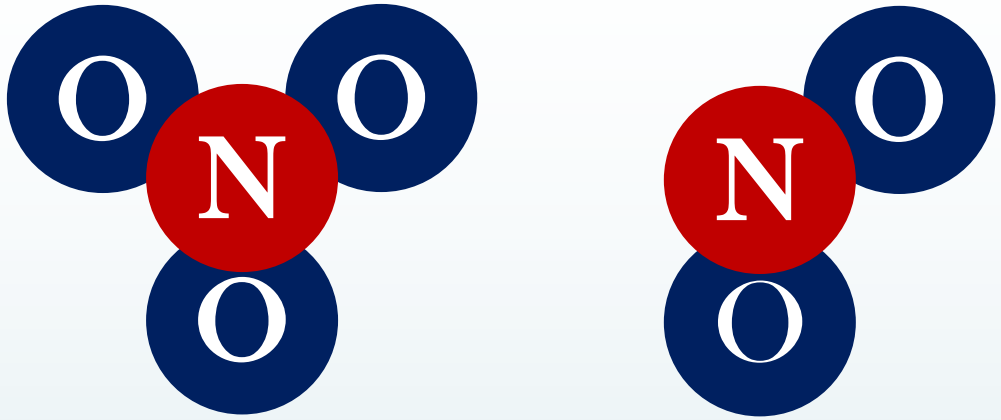
Potential Contaminant - **Coliform Bacteria and E. coli**

- The acceptable concentration of coliform is set at less than one colony per 100 ml of water.
- E. coli and coliform are used as "red flag" markers for the presence of pathogenic microorganisms in drinking water.
- The gut of warm blooded animals is a rich source of pathogenic microorganisms such as E. coli.
- Some strains of E. coli can cause intestinal distress that can include nausea, diarrhea, and vomiting.



Potential Contaminants – **Nitrate and Nitrite**

- **Common Sources:**
  - **Fertilizers**



- During digestion nitrate becomes nitrite and, at high enough concentrations, reduces the blood's ability to transport oxygen through the body.
  - **Nitrate** Maximum Contaminant Level = **10mg/L**
  - **Nitrite** Maximum Contaminant Level = **1mg/L**
  - Young children are the most at risk
  - Elevated levels of nitrate and/or nitrite can cause "Blue Baby Syndrome," also know as methemoglobinemia

Potential Contaminant - **Lead**

Free Lead testing pilot program sponsored by the New York State Department of Health

www.health.ny.gov/environmental/water/drinking/lead/free_lead_testing_pilot_program.htm

- What is it?
  - Lead is a semi-soft, malleable, corrosion-resistant metal.
- What is it used for and where can it be found?
  - Historically used in paints, plumbing, and as an additive to gasoline.
  - Today lead is still used in batteries, ammunition, and other things.
  - **Remaining lead paint, lead plumbing and fixtures** is the major concern, not lead in the ground.

- Lead Toxicity
  - No 'safe' level of exposure to lead has been found (Flora *et al.*, 2012)
- Why is lead poisoning a topic of concern?
  - Bioaccumulation in bone
    - Once it's ingested lead does not easily leave the body.
  - Lead affects the nervous system and can lead to brain damage.
  - Children are particularly at risk

Potential Contaminant - **Arsenic**

- Where is arsenic found?
  - Naturally occurring arsenic is only found in certain regions of the United States.
    - Naturally occurring arsenic has been found in well water samples from Tompkins county.†
  - Historically arsenic based pesticides were also used in orchards.
- Why is arsenic a concern?
  - Arsenic is a known carcinogen and causes increased risk of cardiovascular disease.

†Map and information curtesy of the Water Resources Council of Tompkins County http://www.tompkinscountyny.gov/files/planning/water-resources/Documents/Arsenic_Fact_Sheet_WRC_2014-01_final.pdf

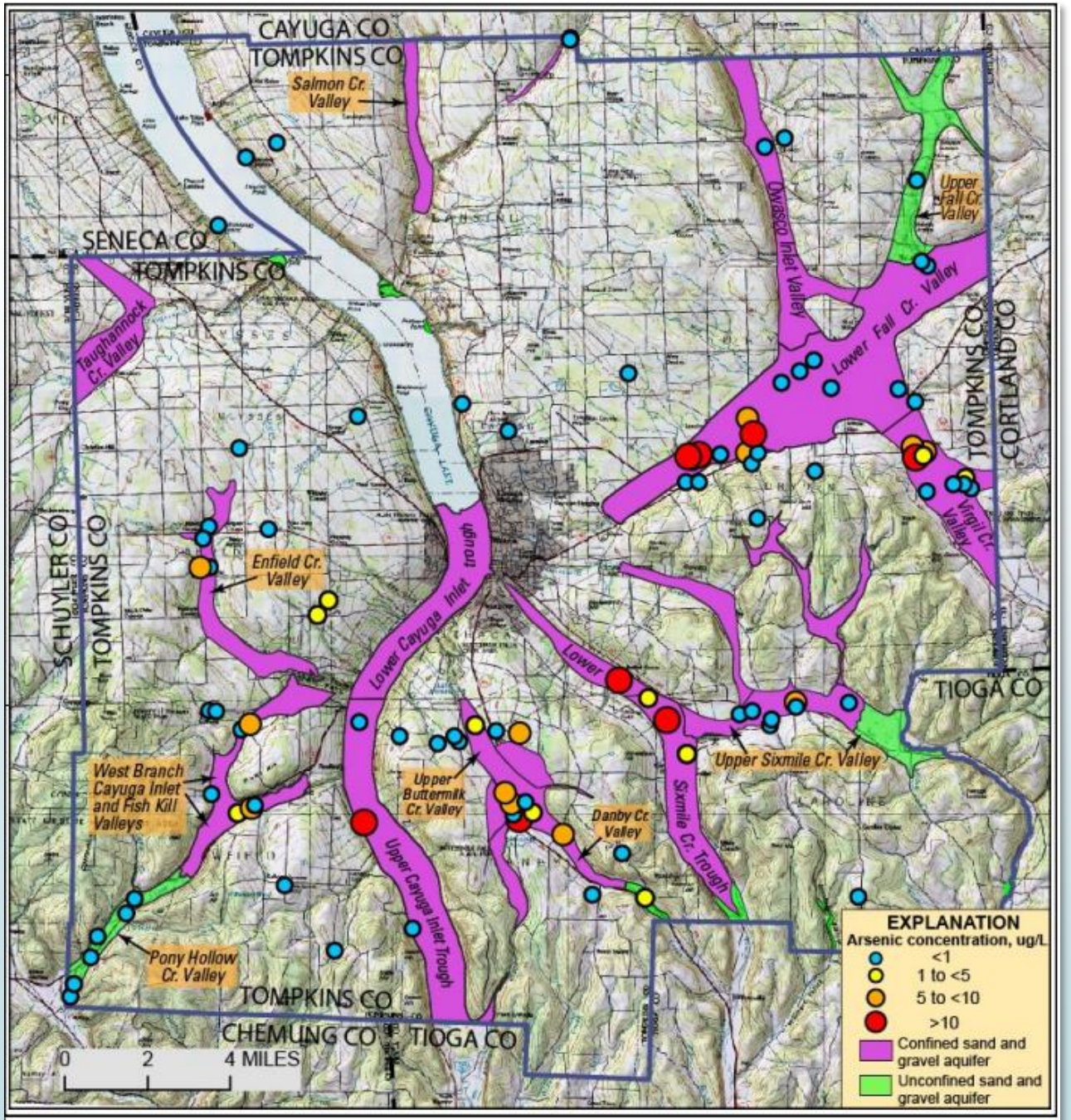


Figure 1.– Map showing groundwater sample sites in Tompkins County where arsenic was analyzed.

Other Contaminants - Metals, organic solvents, petroleum products, pesticides

- It is essential to consider the history of your property when determining what to test for.
- Questions to ask yourself:
  - Is there now, or was there at some point, an industrial plant, disposal site, or mine near my property?
  - Are pesticides and/or herbicides being used in the vicinity?
  - Was there a recent contaminant spill or leakage nearby?

Water Testing – Certified vs. Non-certified Labs

- Certified Labs
  - Regulated by the NY State Department of Health
  - Regulatory and legal purposes
  - Reliable test results
- Non-certified labs
  - Academic labs, home improvement stores, water treatment companies
  - Not regulated
  - Less reliable and maybe less expensive
  - May be more appropriate for exploring problems
  - Due diligence when a company is both testing water and selling treatment systems!

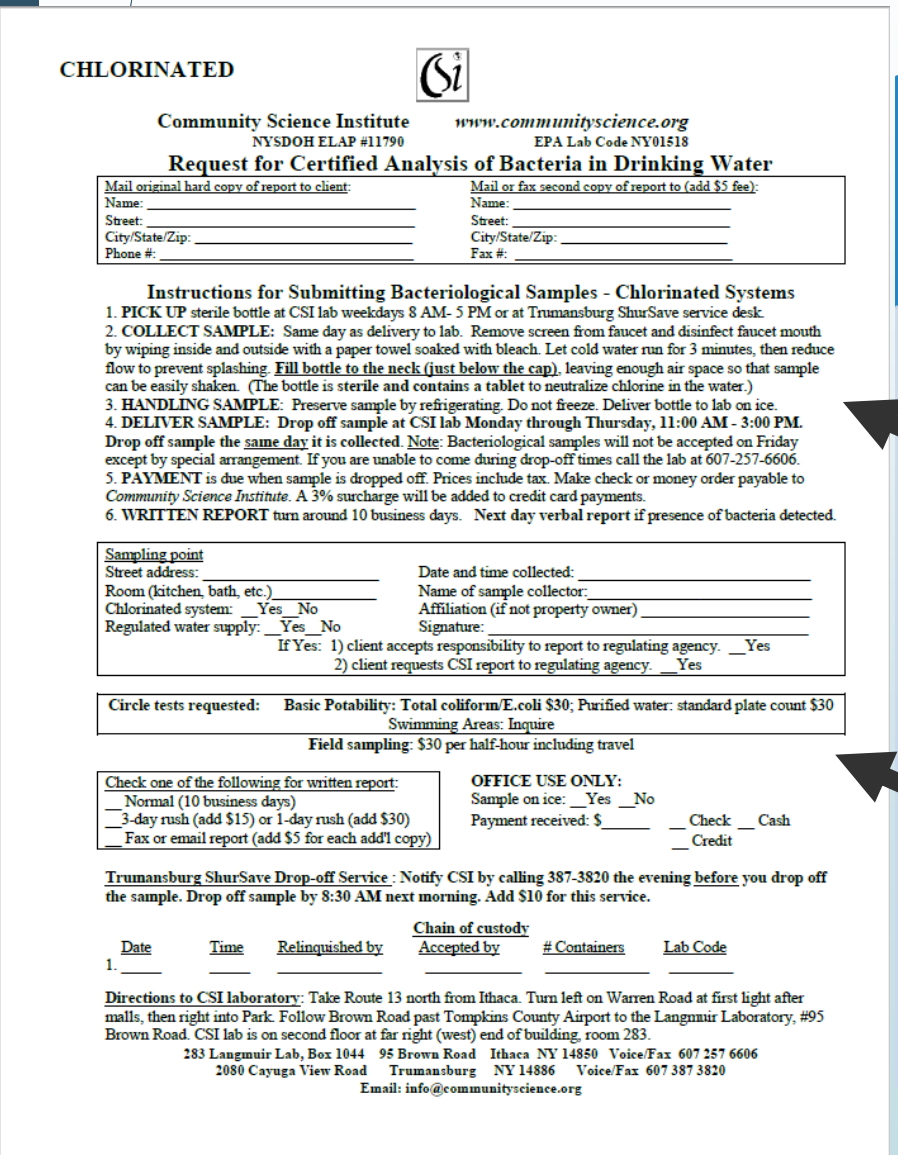
Test!

Why not just drink bottled water?

- Not necessarily better/safer than well water
- No uniform testing standards
- Municipal water systems held to state and federal standards
- Produces unnecessary waste
- Temporary solution to household water quality problems
- Buying all that bottled water is expensive!

Americans throw away 35 billion plastic water bottles each year!

Sample Collection



CHLORINATED

Community Science Institute *www.communityscience.org*
NYSDOH ELAP #11790 EPA Lab Code NY01518

Request for Certified Analysis of Bacteria in Drinking Water

Mail original hard copy of report to client:	Mail or fax second copy of report to (add $5 fee):
Name:	Name:
Street:	Street:
City/State/Zip:	City/State/Zip:
Phone #:	Fax #:

Instructions for Submitting Bacteriological Samples - Chlorinated Systems

1. **PICK UP** sterile bottle at CSI lab weekdays 8 AM- 5 PM or at Trumansburg ShurSave service desk.
2. **COLLECT SAMPLE:** Same day as delivery to lab. Remove screen from faucet and disinfect faucet mouth by wiping inside and outside with a paper towel soaked with bleach. Let cold water run for 3 minutes, then reduce flow to prevent splashing. **Fill bottle to the neck (just below the cap)**, leaving enough air space so that sample can be easily shaken. (The bottle is **sterile and contains a tablet** to neutralize chlorine in the water.)
3. **HANDLING SAMPLE:** Preserve sample by refrigerating. Do not freeze. Deliver bottle to lab on ice.
4. **DELIVER SAMPLE: Drop off sample at CSI lab Monday through Thursday, 11:00 AM - 3:00 PM. Drop off sample the same day it is collected.** Note: Bacteriological samples will not be accepted on Friday except by special arrangement. If you are unable to come during drop-off times call the lab at 607-257-6606.
5. **PAYMENT** is due when sample is dropped off. Prices include tax. Make check or money order payable to *Community Science Institute*. A 3% surcharge will be added to credit card payments.
6. **WRITTEN REPORT** turn around 10 business days. **Next day verbal report** if presence of bacteria detected.

Sampling point
Street address: _____ Date and time collected: _____
Room (kitchen, bath, etc.)_____ Name of sample collector:_____
Chlorinated system: __Yes__No Affiliation (if not property owner) _____
Regulated water supply: __Yes__No Signature: _____
If Yes: 1) client accepts responsibility to report to regulating agency. __Yes
2) client requests CSI report to regulating agency. __Yes

Circle tests requested: **Basic Potability: Total coliform/E.coli $30**; Purified water: standard plate count $30
Swimming Areas: Inquire
Field sampling: $30 per half-hour including travel

Check one of the following for written report:
__Normal (10 business days)
__3-day rush (add $15) or 1-day rush (add $30)
__Fax or email report (add $5 for each add'l copy)

OFFICE USE ONLY:
Sample on ice: __Yes __No
Payment received: $_____ __ Check __ Cash
__ Credit

Trumansburg ShurSave Drop-off Service : Notify CSI by calling 387-3820 the evening before you drop off the sample. Drop off sample by 8:30 AM next morning. Add $10 for this service.

Chain of custody

	Date	Time	Relinquished by	Accepted by	# Containers	Lab Code
1.						

Directions to CSI laboratory: Take Route 13 north from Ithaca. Turn left on Warren Road at first light after malls, then right into Park. Follow Brown Road past Tompkins County Airport to the Langmuir Laboratory, #95 Brown Road. CSI lab is on second floor at far right (west) end of building, room 283.

283 Langmuir Lab, Box 1044 95 Brown Road Ithaca NY 14850 Voice/Fax 607 257 6606
2080 Cayuga View Road Trumansburg NY 14886 Voice/Fax 607 387 3820
Email: info@communityscience.org

Collect Samples

Follow sample collection instructions attached to each bottle.

Fill out form attached to bottle

Return Samples

Return samples to the lab on ice the same day the sample is collected.

Sample Processing

Is your system chlorinated or non-chlorinated?

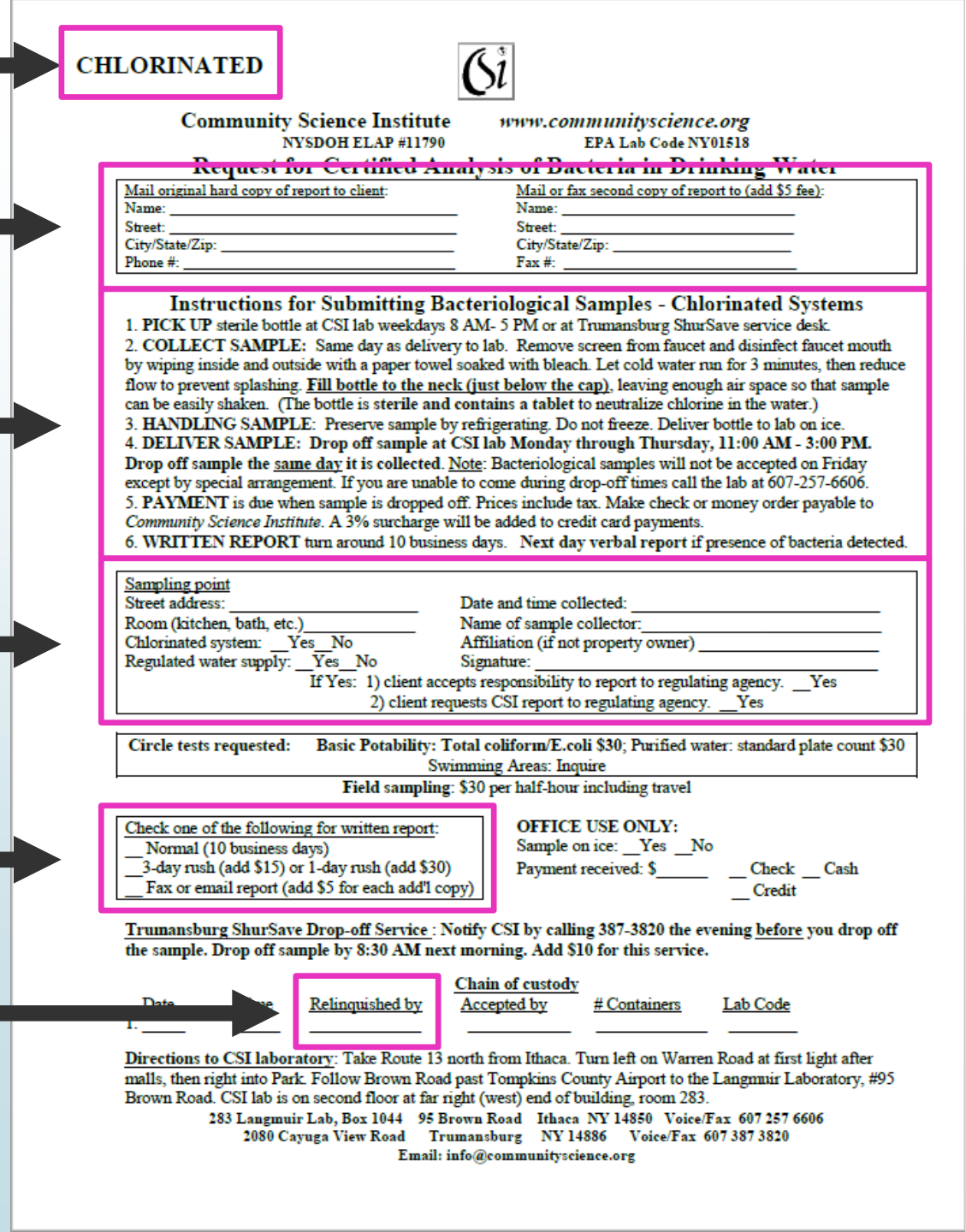
Where do you want the results mailed?

How do you collect the sample?

When, how, and where was the sample collected?

When do you need the results?

Chain of custody



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Phone #: _____

Mail or fax second copy of report to (add $5 fee):
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City/State/Zip: _____
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5. **PAYMENT** is due when sample is dropped off. Prices include tax. Make check or money order payable to *Community Science Institute*. A 3% surcharge will be added to credit card payments.
6. **WRITTEN REPORT** turn around 10 business days. **Next day verbal report** if presence of bacteria detected.

Sampling point
Street address: _____
Room (kitchen, bath, etc.)_____
Chlorinated system: __Yes__No
Regulated water supply: __Yes__No

Date and time collected: _____
Name of sample collector:_____
Affiliation (if not property owner) _____
Signature: _____
If Yes: 1) client accepts responsibility to report to regulating agency. __Yes
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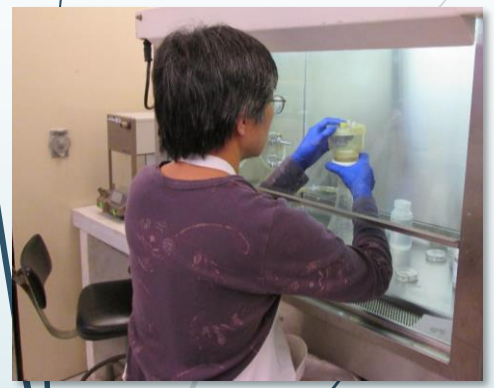
Test Results



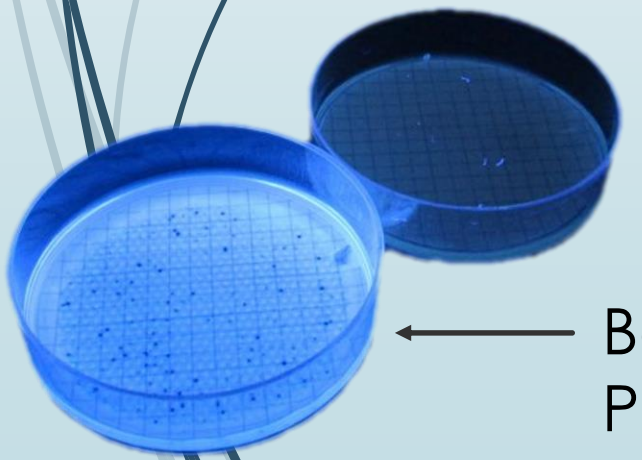
Bacteria Assay

Client and sample information

Sample information provided by lab

Testing results

Allowed Level*	Result
Absent	Present
Absent	Absent
10	0.95
1	<0.01
0.015	0.0032



← Bacteria Colonies on Petri Dishes

The Report

Community Science Institute, Inc.
NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Test Report

Client:	Sample matrix: Drinking Water
Jane Doe 123 Puddleduck St Ithaca, NY 14850	Date & time sampled: 5/8/2017, 8:30 AM Sampled by: Jane Doe Sampling location: 123 Puddleduck St, kitchen Date and time received: 5/8/2017, 2:25 PM

Client Code: Gen Pub
Project Code: Lab
Sample Lab ID: NF-240
Report ID: Gen Pub-5806, NF-240
Test Methods: <TC/E.coli>40 CFR 141.21 (f) 6v, MI Agar-1604, <Nitrate/Nitrite> SM 4500-NO3 E, <Lead> EPA 200.8

Test For	Allowed Level*	Result	Units	Test Date, Time	Additional Information
Total coliform	Absent	Present	Present/Absent	5/8/2017, 4:25 PM	25 colonies/100 mL
E.coli	Absent	Absent	Present/Absent	" "	
Nitrate	10	0.95	mg N/L	5/10/2017	
Nitrite	1	<0.01	mg N/L	5/9/2017, 3:45 PM	
Lead	0.015[1]	0.0032	mg/L	5/13/2017	

*Upper limit allowed for public water supplies regulated by NYS Dept. of Health
[1]The Action Limit for Lead is 0.015 mg/L. This health-based guideline is non-enforceable.

Sample received on ice: Yes

Result applies only to sample listed above and not to any other samples.

Additional information:

Subcontract: Lead was analyzed by subcontract with Microbac Laboratories, Inc. Certificate of analysis is attached.

Report prepared by: _____ Date: _____
Stephen M. Penningroth, Technical Director

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2080 Cayuga View Road Trumansburg NY 14886 Voice/Fax 607 387 3820
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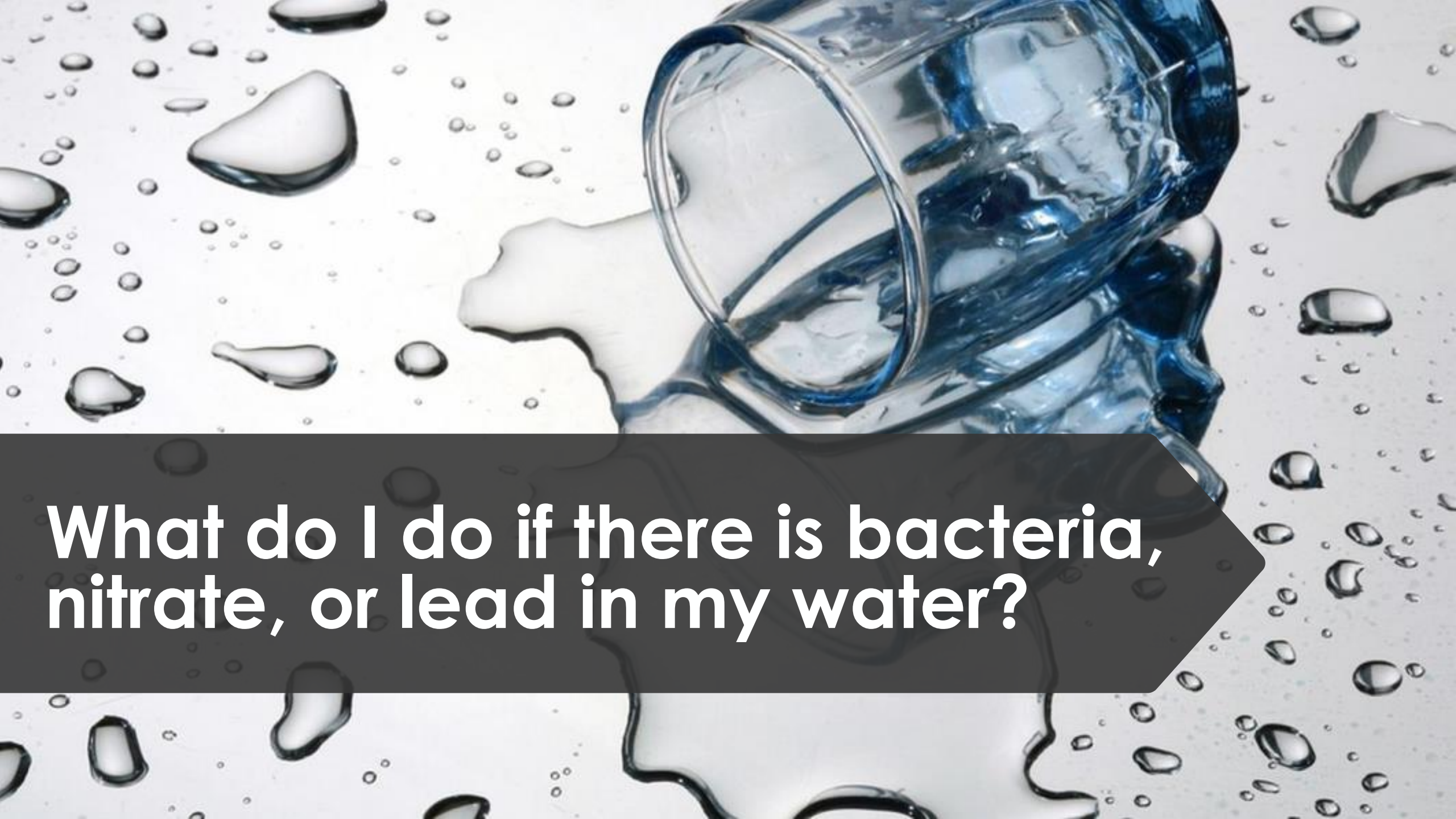
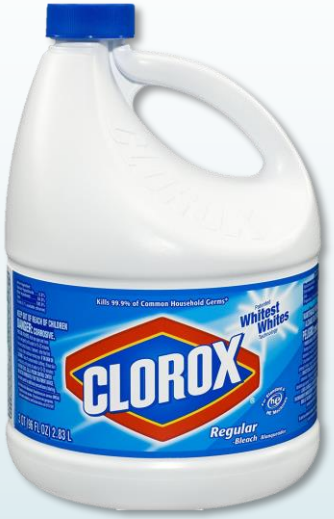


What do I do if there is bacteria, nitrate, or lead in my water?

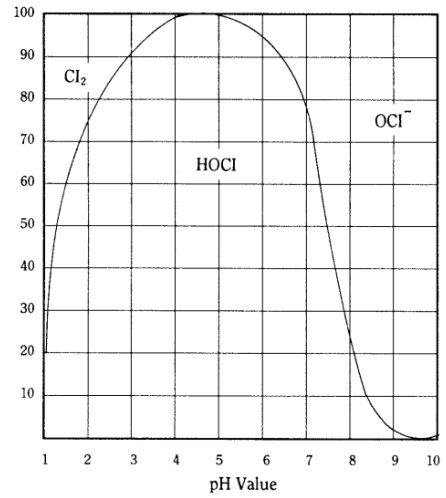
If you have **bacteria** you can shock your well

- Before disinfecting the water supply system, all sources of pollution should be eliminated and proper repairs should be made to the well/water system.
- Well shocking procedure
  - Pour correct volume of bleach into your well and circulate chlorinated water through your system.
  - Allow contact time to elapse.
  - Flush chlorinated water from the lines.
  - Reconnect water treatment equipment.
  - Use the water, but do not ingest.
  - Test for coliform after all chlorine has been removed.
  - If problem is not corrected, contact the Health Dept.



Feet of Water in Well	Well Diameter (inches)				
	3	4	5	6	8
30	½C	¾C	1C	1¼C	2½C
40	½C	¾C	1¼C	2C	3¼C
60	¾C	1¼C	2C	2¾C	1¼Q
80	1C	1¾C	2½C	3¾C	1½Q
100	1¼C	2C	3C	1Q	2Q
150	1¾C	3C	1¼Q	1¾ Q	3Q
200	2¼C	1Q	1½Q	2¼Q	1G
250	2¾C	1¼Q	2Q	2¾Q	1¼G
300	3½C	1½Q	2¼Q	3½Q	1½G

Using more than the recommended quantity of bleach is **NOT** more effective!



What do you do if you have **lead** and/or **nitrate** in your water?

- Some potential treatment solutions
  - Address the probable source of contamination.
    - This could involve repairing or replacing your well or replacing the plumbing in your house.
  - Reverse osmosis can remove lead and nitrates.
  - Ion exchange resins can remove lead ions and replace them with harmless ions.
- Contact a water treatment center for more information.

We're here to answer your questions!

Contact Information

Community Science Institute
283 Langmuir Lab/Box 1044
95 Brown Rd.
Ithaca, NY 14850

607-257-6606

info@communityscience.org

communityscience.org

Tompkins County Health Department
55 Brown Rd
Ithaca, NY 14850

607-274-6600

www.tompkinscountyny.gov/health

Coupons worth discounts of 20% (all attendees) and 50% (financial hardship) off water testing are available!

Resources

- Flora G, Gupta D, Tiwari A. (2012). Toxicity of Lead: A review with recent updates. *Interdisciplinary Toxicology*. ***5***(2): 47-58
- Water Resources Council of Tompkins County. Arsenic in Your well Water? (2014) http://www.tompkinscountyny.gov/files/planning/water-resources/Documents/Arsenic_Fact_Sheet_WRC_2014-01_final.pdf
- B&B Chlorination. Shock Chlorination for Private Well Owners. http://www.bbchlor.com/PDF%20Files/Shock%20Chlorination%20For%20Private%20Well%20Owners.pdf