VERMONT
DEPARTMENT OF HEALTH

THO Manual: THOs and Recreational Water

July 2024

Rivers, ponds, lakes and streams may contain disease-causing microorganisms or drowning hazards. Swimming in contaminated waters can cause illness, including minor skin rash, sore throat, diarrhea or gastroenteritis. Although people of any age are susceptible, children are more likely to become sick from swimming in contaminated water, as they generally spend more time in the water and often swallow water while swimming. Infants, older adults and people with compromised immune systems have the greatest chance of becoming seriously ill from swimming in contaminated water.

KEY POINTS

- **The Health Department recommends that public beaches and other publicly used natural recreational areas (such as lakes, ponds, and rivers) be tested for *E. coli* at least once a week during the swimming season.**
- **THOs should be able to visually identify cyanobacteria so that they can investigate and respond to a cyanobacteria report.**
- **THOs can help decrease the risk of injury and illness by encouraging people to stay out of rivers and lakes following heavy rains or flooding.**

Swim Water Testing Overview

Escherichia coli (commonly known as *E. coli*) are bacteria associated with human and animal feces. It is natural for there to be some fecal material in lakes, ponds and rivers. As long as the level of *E. coli* is low, swimming is relatively safe. However, when *E. coli* levels are high, other disease-containing microorganisms may be present, and THOs should close these swimming areas until the levels decrease.

The Health Department recommends that public beaches and other publicly used natural recreational areas (such as lakes, ponds, and rivers) be tested for *E. coli* at least once a week during the swimming season. Although statewide regulations do not require weekly testing, the THO may be responsible for routine testing. THOs should work with their select boards to ensure that public swimming areas are being tested weekly and that the town budget is adjusted to support testing.

Beaches within Vermont State Parks fall under the jurisdiction of the Vermont Department of Forests, Parks and Recreation and are tested weekly by staff during the summer. Therefore, there is no need for towns to test swimming areas within State Parks. Some towns also have local recreational water testing requirements.

Additional bacterial testing may be warranted after floods or periods of heavy rain when swimming areas are more vulnerable to runoff contamination. In some instances, THOs may be asked to take samples at public swimming areas after a known sewage contamination event or during a public health investigation of recreational water. Sample kits and specific instructions will be provided for the investigation.

Escherichia Coli (*E. coli*) Water Testing Procedures

1. **Sampling Kits:** The Public Health Laboratory provides kits (for $15) for swimming water *E. coli* analyses (Kit SW). Purchase kits from the Laboratory by calling 802- 338-4724 or 800-660-9997 (toll-free) or ordering online at www.HealthVermont.gov/lab/forms. Some private laboratories or your town wastewater facility may also provide testing for swimming waters.
2. **When and where should samples be taken?** Take swimming water samples during times when the most people are using the swimming area. Sampling early in the week leaves time to take follow-up samples in the same week if results show contamination. Additional testing (beyond the weekly sample) may be warranted after floods, during periods of heavy rain, or after a known contamination event. Take samples in a representative section of the swimming area, in three feet of water and one foot below the surface of the water. The instructions included with the test kit will provide more details on sampling procedures. For larger swimming areas longer than 300 feet, taking samples in more than one location is recommended.
3. **Sample Handling:** Deliver or mail the sample to the laboratory as soon as possible since testing needs to begin no later than 30 hours after collection. Take care to prevent freezing or heating of the samples during shipment as this may compromise the results. If using the Public Health Laboratory, you can:
    - **Drop them off at the Laboratory:** The Lab's address is 359 South Park Drive, Colchester. Samples are accepted for drop-off at the Public Health Laboratory Monday through Thursday, between 7:45 a.m. and 4:00 p.m. and on Friday until 3:30 p.m. Samples are not accepted on State holidays.
    - **Drop them off at an Office of Local Health Location:** Find locations and timing for the sample drop-off program on our website. If using this option, be sure to take the samples the same day that you drop them off. Samples dropped off at Office of Local Health locations will not be analyzed at the lab until the next day, and samples cannot be dropped off at Office of Local Health locations on Fridays, state holidays, or the day before state holidays.
    - **Mail/Ship your samples to the Laboratory:** Samples sent through the mail should be delivered using either U.S. Postal Service express mail or overnight delivery through UPS or FedEx, to arrive at the laboratory within 30 hours of sample collection. Occasionally samples sent through the mail do not arrive in time for analysis, making this the least preferred delivery option.

      USPS: Mail samples to P.O. Box 1125, Burlington, VT 05402-1125

      FedEx or UPS: Mail samples to 359 South Park Drive, Colchester, VT 05446

4. **Results:** The results from a water sample analyzed by the Health Department Laboratory will be reported back as colony forming units (cfu) of *E. coli* per 100 mL (milliliters) of water. The Health Department has determined that the health protection level of *E. coli* in swimming water is 235 cfu per 100 mL. A test result greater than 235 cfu indicates that the water is not suitable for swimming. Results for samples received by 4 p.m. will be available by phone after 3 p.m. the following business day.

5. **When should the swimming area be closed?** THOs have the authority to close any public swimming area whenever they feel a threat to public health exists, regardless if sample results are available or not. However, before taking this step and depending on the situation, THOs should consult with their select board and the Health Department for advice. If a sample result greater than 235 cfu per 100 mL, close the swimming area immediately. When closing a swimming area, the THO should place a sign in the swimming area noting it is closed and notify the town offices and local media. If sewage or some other pollutant or safety hazard is impacting the water, the THO can close a swimming area without first obtaining contaminated sample results. Samples should be taken as soon as possible to assess the scope of the problem.
6. **Re-testing:** The swimming area should not re-open until a follow-up test shows results of 235 cfu per 100 mL or below. Follow-up testing should take place at the same location as the initial sample.
7. **What if a swimming area consistently has high *E. coli* results?** When high levels of *E. coli* are regularly found in a swimming area, the THO should investigate possible sources of contamination. Testing in different areas of the water source (such as upstream in a river) may help isolate the pollutant source. If, after some investigation, it appears that a water source is being contaminated by an outside source, it may be helpful for the THO to contact the Health Department and/or the Department of Environmental Conservation's Watershed Management Division at 802-828-1535 for support. If it appears that the contamination is due to poor agricultural practices, contact the Agency of Agriculture, Food and Markets at 800-828-2430 for assistance.

Closing a Swimming Area:

If a water sample tests greater than 235 *E. coli* per 100 mL of water, the swimming area should be closed immediately.

8. **What about testing swimming pools and spas?** The State does not have any statewide regulations concerning the maintenance and testing of public swimming pools. The Centers for Disease Control and Prevention has a voluntary guidance document, the Model Aquatic Health Code, based on science and best practices that can help local authorities and the aquatics sector make swimming and other water activities healthier and safer. Recommendations for designing, operating, and maintaining hot tubs to reduce *legionella* risk can be found here.

   Recreational water facilities—including swimming pools, hot tubs and water features—located in licensed lodging establishments are regulated separately by the Health Department. There also may be local regulations governing pools, spas or hot tubs. THOs should check with their town to determine if there is a local role. THOs can arrange for inspections if illness is reported or suspected as a result of using a public pool or spa.

Recreational Water and Storms/Flooding

While rivers and lakes can have hazards and contamination under normal conditions, severe storms and flooding can increase the risk of getting hurt, sick, or drowning at these bodies of water.

Swollen rivers and fast-moving currents can create dangerous conditions at swimming holes and rivers for days after a heavy rain event. Sharp objects, like glass or metal fragments, and spilled fuel or chemicals can also be carried into swimming areas by stormwater runoff and flooding. Severe rains may bring bacteria or microorganisms that can make people sick into the water from overwhelmed wastewater systems and runoff.

THOs can help decrease the risk of injury and illness by encouraging people to stay out of rivers and lakes until the water is clear and calm - at least 48 hours following heavy rains, and even longer if it has flooded. They can also test their town's swim areas for *E. coli* after heavy rain events. A factsheet on Recreation Water Safety after a flood can be found here.

Water Safety & Drowning Prevention

Uninintentional drowning can occur in lakes, rivers and swimming holes. Eight deaths on average occur each year in Vermont due to unintentional drowning. Swollen rivers and fast-moving currents can create dangerous conditions at swimming holes and rivers for days after a heavy rain event. THOs can help prevent these deaths by working with their towns to place permanent signs at swimming holes that are known to be dangerous, and close those areas after rain storms or when other dangerous conditions occur. Additionally, the THO can work with community and state partners to increase safety in their communities by implementing and supporting injury prevention programs in their communities such as "life jacket loaner programs." Tips for safely enjoying water activities and swimming holes can be found here.

Cyanobacteria (Blue-green Algae)

Cyanobacteria, also known as blue-green algae, are naturally found in freshwater in the U.S. including Lake Champlain and other Vermont waters. They grow well in water that has high amounts of nutrients like phosphorous and nitrogen. Cyanobacteria can multiply quickly to form surface scums and dense populations known as blooms.

Cyanobacteria blooms generally occur in lakes and ponds in the late summer and fall, but can happen earlier in a hot, dry year. Cyanobacteria may appear thick like 'pea soup' or look like a paint spill. They are generally green in color although they can also be blue, white, brown or purple. Generally, cooler weather, rainfall and reduced sunshine will lead to the breakdown of a bloom. Some blooms die off after a few days or weeks, while others persist for a few months, depending on environmental conditions. Because the cells break open when a bloom dies and release toxins, more toxins may be in the water after a bloom than during it.

Health Effects of Cyanobacteria

Sometimes cyanobacteria can release natural toxins or poisons (called cyanotoxins) into the water, especially when they die and break down. After exposure to cyanobacteria, people could experience health effects, but this depends on the amount someone is exposed to, how they are exposed, whether toxins are being produced, and the type of toxin.

People may get rashes or other skin irritations from coming into contact with blooms. Usually, these skin irritations are not associated with toxins, but from other compounds in cyanobacteria cells. Breathing in water droplets with cyanobacteria or toxins may cause allergic-like reactions, runny noses or sore throats. Swallowing water with high levels of cyanobacteria toxins may cause severe stomach problems like abdominal pain, diarrhea and vomiting, liver damage, dizziness or numb lips, and tingling fingers and toes. These symptoms may take hours or days to show up in people or animals.

Animals can also get sick or die after exposure to cyanobacteria. Symptoms include weakness or staggering, difficulty breathing, convulsions, vomiting or diarrhea, foaming at the mouth, dark urine or blood in the urine, or cyanobacteria in the vomitus or stool. Their symptoms tend to be worse than symptoms in humans because dogs may intentionally drink lake water and lick scum off of their fur.

Because of the health effects associated with exposure to cyanobacteria, it is important to keep dogs and people from swimming or playing in waters contaminated by cyanobacteria.

Cyanobacteria and Drinking Water

Cyanobacteria are not usually found in groundwater. If there is reason to believe that surface water is getting into a private groundwater well, the well owner should talk with a water treatment specialist and test their water for contaminants, including bacteria and nitrates.

Avoid swallowing untreated lake or pond water in any way — including drinking, teeth brushing or food preparation. Untreated water may contain cyanobacteria or cyanotoxins, as well as other microorganisms and chemicals that can make people sick. The Health Department does not recommend showering or bathing in water that may contain cyanobacteria, which can cause rashes and skin irritation.

If someone's private drinking water comes from surface water, they should work with a water treatment specialist and the DEC Regional Engineer to make sure that their system can treat for cyanotoxins and other pathogens. Once treated, they may wish to re-test your water for toxins to make sure the treatment system is working.

The Health Department works with the Department of Environmental Conservation and public drinking water suppliers that use surface water to test for cyanotoxins in drinking water during the spring and fall. See results here. People with questions on their public water system should call the number on their water bill.

When contacted by homeowners concerned about the safety of their private water supplies, THOs can refer individuals to the Environmental Health Division (Private Drinking Water Program) for technical assistance at 800-439-8550.

Investigating Cyanobacteria Reports

The Departments of Health and Environmental Conservation work together every summer to monitor for cyanobacteria on Lake Champlain. The Health Department also works with a network of volunteers trained and coordinated by the Lake Champlain Committee. The public can also submit reports through an online form found on the tracker website. All confirmed cyanobacteria blooms reported to the Health Department are displayed on the Cyanobacteria Tracker. We encourage all communities to develop cyanobacteria monitoring programs on their lakes. More information on what these programs would look like can be found in the Cyanobacteria Guidance for Communities.

The Health Department will reach out to the appropriate THO when a cyanobacteria bloom is reported. When the Health Department is closed, such as on the weekend, we encourage residents to contact THOs directly about potential blooms and water quality concerns.

The first thing to do when investigating a cyanobacteria report is to visit the location of the reported bloom. It is important to visit the site between the hours of about 11 a.m. to 5 p.m. when cyanobacteria are most likely to rise to the surface and be visible.

THOs should be able to visually identify cyanobacteria. A video and pictures are available on the Health Department website to help: HealthVermont.gov/cyanobacteria. A short training course on cyanobacteria was developed by the University of Vermont.

If cyanobacteria are present at a recreational site, it is most important to keep people and their pets out of the water. To do this, THOs can post signs at the location where people are likely to see and read them. This may mean posting multiple signs along a beach. It may also be appropriate to post cyanobacteria bloom information on the town's website or social media.

THOs can post a "Swim Area Closed" sign when there is a large cyanobacteria bloom covering most of the swim area. The swim area should remain closed until the bloom has been gone for 24 hours OR the results for any toxin testing that was done come back below the Health Department's advisory levels. THOs can post a "Health Alert" sign when cyanobacteria are present at less than bloom levels or at areas that are not used for swimming (e.g. boat launches). These signs (including translated versions) are available online to download and print on the THO Forms and Resources page.

More information on beach closure and re-opening recommendations are available in the Cyanobacteria Guidance for Vermont.

The Department of Environmental Conservation may be able to coordinate toxin testing for select blooms. You can email Peter.Isles@vermont.gov to request testing.

Other Contaminants

When the presence of other pollutants is suspected, the THO should consult with the Health Department for direction (and to ensure that they are aware of the problem) by calling 800-439-8550. If necessary, the THO may need to assist with the collection of water samples as well as post the swimming area(s).

Contact

Environmental Health Division: 802-863-7200