

Facts about Cyanobacterial Blooms for Poison Center Professionals



<https://www.cdc.gov/habs/materials/factsheet-cyanobacterial-habs.html>

Cyanobacterial blooms can make people and animals ill. Learn more about exposures, signs and symptoms, laboratory testing, and illness management.

Cyanobacterial blooms can harm people and animals

Cyanobacteria, also referred to as blue-green algae, are microscopic organisms that live primarily in fresh water but can also be found in brackish or salt water.

An overgrowth of cyanobacteria is referred to as a “cyanobacterial bloom.” Cyanobacterial blooms are usually blue-green in color, but can be other colors, including red or brown. When a bloom occurs, scum might float on the water surface. As it decays, it can smell like rotting plants. Cyanobacterial blooms more often occur during the summer or early fall but can occur anytime during the year. Cyanobacteria usually multiply and bloom when the water is warm, stagnant, and rich in nutrients (phosphorus and nitrogen) from sources such as fertilizer runoff or septic tank overflows.

Not all cyanobacterial blooms are harmful. A bloom can be harmful to people, animals, or the environment if it

- uses up the oxygen in the water
- releases harmful gases
- produces toxins
- becomes too dense

Common cyanotoxins

- Microcystins
- Saxitoxins
- Cylindrospermopsins
- Nodularins
- Anatoxin-a
- Lyngbyatoxins
- Guanitoxin, formerly known as anatoxin-a(S)

Human exposure to cyanobacterial blooms and cyanobacterial toxins

Routes of exposure

- **Ingestion:** swallowing contaminated water or eating food contaminated with toxins (including taking contaminated nutritional supplements)
- **Inhalation:** breathing in aerosolized toxins
- **Skin contact:** direct contact with contaminated water during activities like swimming or boating
- **Eye contact:** direct contact with contaminated water or aerosols



People are most often exposed to cyanobacterial blooms and toxins through recreational water. However, in a limited number of cases toxins have been detected in tap water systems and have prompted [drinking water advisories](#). When tap water is contaminated, additional exposures to toxins can occur through activities like showering or household use.

Signs and symptoms

Many factors determine whether exposure to cyanobacterial blooms will cause adverse health effects. These factors include, but are not limited to:

- toxin type and concentration,
- duration and route of exposure, and
- any comorbid conditions of the patient (more than one disease or condition is present in the same person at the same time).

Determining the type of cyanotoxin that caused illness, based on self-reported symptoms, can be difficult. Some of the reported symptoms following specific toxin exposures are listed below.

- **Microcystins:** abdominal pain, nausea, vomiting, headache, diarrhea, sore throat, blistering around the mouth, and pneumonia.
- **Cylindrospermopsis:** gastrointestinal symptoms, including vomiting and bloody diarrhea, as well as fever and headache.
- **Anatoxin-a:** neurologic symptoms, including numbness, tingling, burning sensation, drowsiness, salivation, and speech disturbances.



Laboratory tests

No diagnostic tests for cyanotoxins are clinically available. However, the following tests can be used by healthcare providers to evaluate illnesses related to cyanotoxins:

- Electrolytes and liver enzymes
- Renal function tests, serum glucose, and urine tests to check for proteinuria and glycosuria (in severe toxicity)
- Chest radiograph, if respiratory symptoms are present

Specialized laboratories can perform testing to identify cyanobacteria or cyanotoxins in feces, urine, stomach contents (if available), tissues, serum, or water specimens. The [Environmental Protection Agency \(EPA\) website](#) lists laboratories that can analyze water samples for cyanobacteria and cyanotoxins.

Treatment

Treatment is mainly supportive and symptom directed. There are no specific antidotes for cyanotoxins or specific treatments for illnesses caused by cyanobacteria and their toxins in humans.

- **For ingestion of contaminated water or food:** Stop the exposure by avoiding contaminated food or water. If needed, replenish fluids and electrolytes. Activated charcoal can be considered if the patient arrives within 1–2 hours after a toxic ingestion, assuming no contraindications. Provide other supportive and symptom-directed care, as needed.
- **For inhalation of aerosolized toxins:** Stop the exposure by moving to a noncontaminated environment and treat respiratory symptoms accordingly.
- **For skin contact with contaminated water:** Remove contaminated clothing and jewelry, and wash skin with soap and water for 10–15 minutes. Antihistamines and steroids can be used.
- **For eye exposure to contaminated water:** Remove contact lenses. Irrigate the eyes with normal saline for at least 15 minutes. Refer the patient to an ophthalmologist if eye symptoms persist after copious irrigation.

Similar illnesses

Other illnesses, medical conditions, and exposures to chemicals can cause signs and symptoms like those caused by cyanobacterial blooms and should be ruled out. These can include organophosphate poisoning, mushroom poisoning, drug overdose, chemical burns, exposure to irritants, and acetaminophen poisoning.

Preventing illness

People can take [steps to avoid getting sick](#) from cyanobacteria and the toxins they make. For example, people can avoid drinking the water and playing, swimming, water skiing, boating, or doing other activities in areas where the water is discolored or has a bad odor, or where there is visible foam, scum, or mats on the water's surface. People should check for swimming and fishing advisories before visiting lakes and rivers and follow advisories to reduce their chances of getting sick.

If drinking-water advisories are issued, people should follow local or state guidance to reduce their chances of getting sick.

People taking, or considering taking, [supplements containing blue-green algae](#) (cyanobacteria) should consult with a healthcare provider before taking supplements or giving them to a child.



Animal exposure to cyanobacterial blooms

Routes of exposure

Animals can be exposed to cyanobacterial blooms in the same ways that humans are exposed. These routes include ingestion, inhalation, skin contact, and eye contact. Exposure can occur while swimming, by licking cyanobacteria or cyanotoxins off their fur or hair, or by eating cyanobacterial mats found in or near the water.

Domestic animals, especially dogs, may be early victims of toxin-producing blooms. Animals are often the first to be affected because they are more likely than humans to swim in or drink water contaminated by cyanobacterial blooms, even if it looks or smells bad.

Signs of illness

Health effects seem to be more serious in animals than in humans. This might be the result of higher ingested doses or a difference in their reaction to toxins. Exposures to cyanotoxins have killed fish, dogs, cattle, birds, and other wildlife.

The most frequently reported symptoms in dogs exposed to cyanobacterial blooms are gastrointestinal, such as vomiting and foaming at the mouth. Exposure can also cause lethargy and neurologic symptoms, including stumbling, behavior changes, spastic twitching, loss of coordination, ataxia, violent tremors, partial paralysis, and respiratory paralysis.

Liver injury, including hepatoenteritis and necrotic hepatic lesions, and petechial hemorrhage of the heart have been reported in animals exposed to cyanotoxins.

Protecting pets and livestock

People should keep their pets or livestock from grazing near, drinking, or swimming in water with a cyanobacterial bloom. If pets or livestock do go in water that might have a bloom, they should be immediately rinsed with clean, fresh water from a sink, shower, hose, or outdoor spigot. Pets should not be allowed to lick their fur until they have been rinsed.

People should contact a veterinarian promptly if the animal shows any signs of illness after suspected or known exposure to cyanobacterial blooms or potentially contaminated water.

If there is a cyanobacterial bloom, do not let pets or livestock do any of the following:



Drink the water



Swim or play
in the water



Eat near the water



Lick their fur after
being in the water

Laboratory tests

Currently, no tests for cyanotoxins are clinically available. The following diagnostic tests might be helpful for evaluating animals exposed to cyanotoxins:

- Electrolytes and liver function tests
- Renal function tests, serum glucose, urine to check for proteinuria and glycosuria (in severe toxicity)
- Chest radiograph if respiratory symptoms present

Treatment

There are currently no established treatments.

- Medical care is supportive. There are no known antidotes to cyanotoxins.
- Activated charcoal might be useful within the first hour, and atropine has efficacy with saxitoxin exposure.
- Treatment with cholestyramine might be helpful for dogs exposed to microcystins.

Reporting

The primary responsibility for the control of cyanobacterial blooms rests with agencies such as [state and local health departments](#). People should report any cyanobacteria-related illnesses to those agencies.

If people have concerns about the appearance, smell, or taste of their tap water, they should contact their water utility or health department and consider using bottled water for drinking and cooking until the problem is resolved.

More Information from CDC, EPA, and FDA

- [Harmful Algal Bloom-Associated Illnesses](#)
- [Cyanobacterial Blooms: Information for Healthcare Providers](#)
- [Cyanobacterial Blooms: Information for Veterinarians](#)
- [One Health Harmful Algal Bloom System](#)
- [Health Department Directories](#)
- EPA: [Health Effects from Cyanotoxins](#)
- FDA: [Blue-Green Algae Products and Microcystins](#)



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