The following is taken from the United States Environmental Protection Agency's Document "Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water," June 2015

Key Questions and Answers

Where in the country are harmful algal blooms a problem? Harmful algal blooms (HABs) are a national concern. HABs have impacted waters across many regions of the U.S. EPA recommends that drinking water systems in all areas of the country that use surface water sources, such as lakes and reservoirs, assess their water source's vulnerability to HABs. EPA estimates that lakes and reservoirs that serve as sources of drinking water for between 30 and 48 million people may be periodically contaminated by algal toxins.

How do cyanotoxins produced by some harmful algal blooms affect drinking water quality? HABs can occur in source waters used for drinking water. Winds and water currents can potentially transport HABs within proximity to drinking water intakes at treatment plants. If not removed during drinking water treatment, exposure to cyanotoxins in tap water could potentially affect human health. Algal blooms may also cause aesthetic problems (earthy and musty smell) and affect the taste of treated drinking water.

What are the health effects from exposure to cyanotoxins in drinking water? Effects including gastroenteritis, and liver and kidney damage have been reported in humans following acute or short-term exposure to cyanotoxins in drinking water. Recreational exposure to cyanobacterial blooms has been reported to lead to allergic reactions, including hay fever-like symptoms; skin rashes; and gastrointestinal distress. However, more research is needed to quantify these effects.

What about using water with elevated algal toxins for showering and other uses? The Health Advisory values for two key algal toxins (microcystins and cylindrospermopsin) are specifically for consumption of drinking water. Exposure to cyanobacteria and their toxins may also occur by ingestion of toxin-contaminated food, including consumption of fish, and by inhalation and dermal contact during bathing or showering. While these types of exposures cannot be quantified at this time, they are assumed to contribute less to the total cyanotoxin exposures than ingestion of drinking water. While information is not currently available to determine safe concentrations for showering, bathing, or other uses, EPA expects that it is unlikely that showering or bathing in water with cyanotoxin levels near or below the Health Advisory will present a health risk. As our understanding of algal toxin health effects continue to develop, EPA will continue to evaluate their health effects for other uses.

Are immunocompromised individuals or infants fed by nursing mothers at risk? Populations such as nursing mothers and pregnant women, the elderly, and immune-compromised individuals or those receiving dialysis treatment may be more susceptible than the general population to the health effects of microcystins. As a precautionary measure, immunocompromised individuals and nursing mothers may want to consider following the recommendations for bottle-fed infants and young children of pre-school age.

Are the Health Advisory values safe for all children (regardless of age)? The microcystins and cylindrospermopsin Health Advisory values are set at levels at which adverse health effects are not

expected to occur. EPA would not expect adverse health effects for children who are school-aged when microcystins concentrations in drinking water are at or below 1.6 μg/L and cylindrospermopsin concentrations are at or below 3 μg/L. EPA would not expect adverse health effects for bottle-fed infants and young children of pre-school age (less than six years old) when microcystins concentrations in drinking water are at or below 0.3 μg/L and cylindrospermopsin concentrations are at or below 0.7 μg/L.

Why is EPA's value different from the World Health Organization's (WHO) value? In 1998, the World Health Organization (WHO) released a provisional guideline of 1 μg/L for microcystin-LR in drinking water. The derivation of this value differs from EPA's Health Advisory guideline derivation in two ways: the duration of exposure and exposure parameters (body weight and drinking water consumption) used for the calculation of the values.

WHO's guideline is based on risk from a lifetime of consumption and was calculated using data from a study of longer duration (13 weeks). EPA based the Health Advisory value on a more recent study of shorter duration (28 days). EPA believes that this shorter exposure duration is more representative of how people may be exposed to cyanotoxins in their drinking water, from sporadic blooms rather than exposure over a lifetime of consumption.

The exposure parameters used for the WHO guideline for body weight (60 kg) and average water intake (2 L/day) are different from the parameters EPA used (adult average body weight of 80 kg consuming 2.4 L/day). EPA's exposure values are based on statistics of the U.S. population, and are routinely used for risk assessment purposes.

Why has EPA developed Health Advisories for two cyanotoxins: microcystins and cylindrospermopsin? Cyanobacteria and their toxins have been found in drinking water systems and recreational waters in the U.S. Many states have expressed concerns regarding the presence of cyanotoxins in tap water and in surface waters, causing use impairments due to near-shore algae buildup. Currently, there are no U.S. federal water quality criteria or standards, or regulations concerning the management of HABs in drinking water under the Safe Drinking Water Act (SDWA) or in ambient waters under the Clean Water Act (CWA).

Based on the toxicology and epidemiology data, EPA found there are adequate data to develop Health Advisory values for microcystins and cylindrospermopsin. EPA issued these Health Advisories to assist state and local authorities in their efforts to address cyanotoxin risks.

What happens if you exceed the Health Advisory level? If it is a Ten-day value, what happens if you exceed for a smaller number of days? The Health Advisory levels for microcystins and cylindrospermopsin are non-regulatory concentrations of drinking water contaminants at which adverse health effects are not anticipated to occur over a Ten-day exposure period. Because it is difficult to determine in advance the duration of elevated algal toxin levels, EPA recommends that water systems begin to take actions once the elevated levels have been confirmed by additional samples. Additionally, because of time needed to process sequential analytical tests, it can take several days following the detection of a bloom and/or cyanotoxins before concentrations above the Health Advisory values are confirmed in finished water. Therefore, EPA recommends initiating the response activities as soon as practicable.

What about pets exposed to cyanotoxins through drinking water?
Pets are at greatest risk from exposure to cyanotoxins from consuming scum and mats, licking their fur after swimming in contaminated water, and drinking water from a water body contaminated by cyanobacteria. However, pets could also get sick if they drink tap water contaminated with high concentrations of cyanotoxins.

What is EPA doing to address problem of cyanotoxins in drinking water sources and other waters?
EPA has developed Health Advisories that will provide states, drinking water utilities and the public with information on health effects of cyanotoxins, and methods to sample and treat cyanotoxins in drinking water. EPA will continue to work with states, local communities and stakeholders to provide technical support on key steps that can be taken to protect the public from exposure to algal toxins.

EPA is planning to develop ambient water quality criteria for the protection of human health for recreational uses for microcystins, cylindrospermopsin, and anatoxin-a, if adequate data are available.
EPA is working diligently with its partners to address nitrogen and phosphorus pollution (known to create environmental conditions favorable to HABs) including:

• Providing states with technical guidance and resources to help them develop water quality criteria for nitrogen and phosphorus as part of their water quality standards for surface waters.
• Working with states to identify waters with nitrogen and phosphorus pollution and to develop Total Maximum Daily Loads (TMDLs) to restore the waters by limiting allowable nutrient inputs.
• Awarding grants to states for operating nonpoint source management programs.
• Administering a permit program that restricts the amount of nitrogen and phosphorus released to the environment from point sources, such as wastewater treatment plants.
• Providing funding for the construction and upgrading of municipal wastewater facilities and the implementation of nonpoint source pollution control and estuary protection projects.
• Working with state and federal partners on the Mississippi River and Gulf of Mexico Watershed Nutrient Taskforce to reduce hypoxia.
• Conducting and supporting research on nitrogen and phosphorus pollution-related topics.

EPA has worked closely with the U.S. Department of Agriculture (USDA) to focus investment in priority watersheds across the country through the National Water Quality Initiative. In addition, USDA funds are available through a variety of programs to control agricultural sources of runoff through suites of conservation practices, and many states are partnering with USDA to do so.
EPA is working to help educate the public and stakeholders about nutrients and HABs, leading a HABs public awareness campaign, including expert webinars and publications.

Are there point-of-use treatment devices consumers can use at their home or workplace to protect themselves from cyanotoxins in drinking water?
EPA is unaware of point-of-use devices that have been demonstrated to be effective for removal of cyanotoxins from drinking water. Third-party organizations are currently developing certification standards to test point-of-use devices and evaluate how reliably they can remove cyanotoxins from drinking water.

Can algal blooms and their toxins affect ground water wells?
Typically no, unless they are "Ground Water Under the Direct Influence of Surface Water" wells. Cyanobacteria require sunlight to survive. Most groundwater wells are not expected to be impacted by cyanotoxins.

What research is EPA doing on harmful algal blooms?
EPA researchers are conducting HAB research on water quality, human and ecological health effects, monitoring and analytical methods for rapid detection, and drinking water treatment research related to HABs.

Specifically for drinking water treatment, EPA researchers are conducting a Lake Erie field study that monitors cyanobacteria at numerous treatment plants to define the start and end of bloom events, and the water quality changes that take place through the treatment plant. In addition, the researchers are working on science to improve the ability of existing treatment processes to remove cyanobacterial toxins and to improve the performance of existing operations by modifying the locations where treatment chemicals are applied, and the types and concentrations of chemicals applied.