Great Lakes HABs Collaborative

Linking Science and Management to Reduce Harmful Algal Blooms

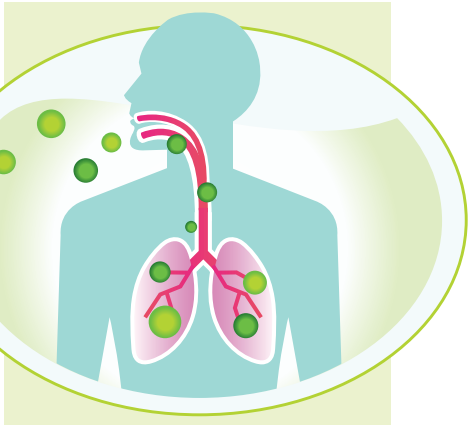
Harmful Algal Bloom Toxins in the Air

Freshwater harmful algal blooms (HABs) are an annual occurrence during the summer and fall in the nearshore areas of the Great Lakes, as well as in inland waterbodies. These HABs are largely made up of one or more species of cyanobacteria, also known as blue-green algae (e.g., *Microcystis* and *Dolichospermum*). HABs have the potential to disrupt ecosystems, impact water and air quality, and deter recreation. They can also produce toxins (e.g., microcystin, anatoxin – collectively referred to as HAB toxins) that can be harmful to human health. A series of fact sheets, including this one, are designed to **share emerging science with water managers** and assist elected officials and the public in **understanding the impacts of HABs on human health.**

Harmful Algal Blooms are found across the Great Lakes and inland waters within the Great Lakes basin. In addition to **exposure through skin contact and consumption,** humans can also **risk exposure to toxic blooms through the inhalation of aerosols** generated from freshwater HABs (1).

Many people first learned about aerosols during the COVID-19 pandemic. **Aerosols are very small particles or droplets that can become suspended in the air.** When a HAB is agitated (by waves, wind, or boat traffic), it may release these particles into the air (1). The presence of HAB toxins in aerosols is the focus of emerging science on how HABs may affect people.

To fully understand the risk of HAB aerosols to people, we need **additional testing in the natural environment and laboratory.** This fact sheet summarizes existing science and future implications as the science tackles these issues (2).



The best way to avoid exposure to the toxins created by HABs is to **not recreate in water with an algal scum or opaque green appearance.** It is particularly important to not engage in activities that agitate the water surface like boating, jet-skiing, and even swimming when local or state agencies have closed beaches due to HABs (3). **When in doubt, stay out** (that includes pets)! The potential effects on human health are linked to the amount and duration of exposure, frequency of exposure, and personal health conditions (4).

Supporting Evidence and Future Implications

HAB toxins can be aerosolized

Aerosols are produced by wave breaking, bubble-bursting, and recreational activities

Aerosols generated from water with HABs were found to contain HAB toxins (1)

Toxin inhalation may lead to airway inflammation

Some animal studies have demonstrated negative health consequences such as inflammation from the inhalation of aerosols containing HAB toxins (5)

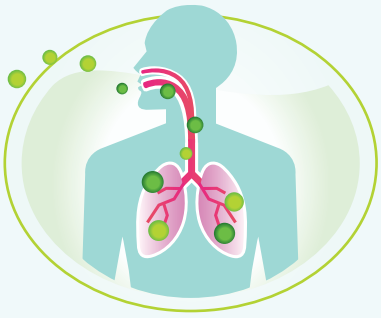
Some water users reported respiratory irritation

An epidemiology study measured the relationship between HAB exposure and respiratory symptoms

Respiratory symptoms were more likely in humans exposed to high levels of HAB aerosols (4)

Aerosols are generated that may contain HAB toxins

Inhalation of aerosols may occur at source or at a distance



Exposure to aerosolized HAB toxins may lead to airway inflammation

NORMAL AIRWAY | INFLAMED AIRWAY

Glossary

Aerosol – very small particles or droplets that are suspended in the air.

Harmful Algal Blooms (HAB) – rapidly growing algae or cyanobacteria that may produce toxins, which are dangerous for humans and animals.

Cyanobacteria – blue-green algae, microscopic organisms that can be found in water.

HAB toxins – toxic substance produced by algae or cyanobacteria within water bodies that negatively impact human and animal health.

Inflammation – a physical condition in which an area of the body becomes swollen and red. It is the body's response to an injury or infection. Airway inflammation is persistent in asthma and other respiratory diseases.

Respiratory symptoms – common signs of lung conditions. Examples include difficulty breathing, dry cough, wheezing, productive cough, nasal congestion, and sore throat.

Epidemiology – the branch of medicine which deals with the incidence, distribution, and possible control of diseases and other factors relating to health.

Go to the United States Centers for Disease Control and Prevention for more information on human health and HABs: www.cdc.gov/habs. | **MAY 2022**

References

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Contact us at www.glc.org/work/habs

Go to the United States Centers for Disease Control and Prevention for more information on human health and HABs: www.cdc.gov/habs. | **MAY 2022**