

# epiTRENDS

A Monthly Bulletin on Epidemiology and Public Health Practice in Washington

**May 2023 Volume 28, Number 5**

## Waterborne Disease Update

According to a 2021 report by Centers for Disease Control and Prevention (CDC), an estimated 7.15 million illnesses and 6,630 deaths due to waterborne diseases occur each year in the United States. Exposures to waterborne disease agents can occur via ingestion, inhalation, and intranasal or skin contact.

## Waterborne Disease Pathogens

Certain pathogens causing waterborne disease are reportable by health care providers and laboratories when individual illnesses occur. Cases are reportable to the local health jurisdiction where the patient resides.

Selected Notifiable Disease Pathogens that are Sometimes or Primarily Waterborne		
Type	Specific Agent and Reporting Timeframe	What is Reportable?
Bacteria	<ul style="list-style-type: none"><li>• <i>Shigella</i> spp. (within 24 hours)</li><li>• Shiga toxin-producing <i>Escherichia coli</i> or STEC (immediately)</li><li>• <i>Legionella</i> spp. (within 24 hours)</li><li>• <i>Vibrio</i> spp. (within 24 hours)</li></ul>	All individual cases
Free-living Amebae	<ul style="list-style-type: none"><li>• <i>Naegleria fowleri</i> (Immediately)</li><li>• <i>Acanthamoeba</i> (Immediately)</li><li>• <i>Balamuthia mandrillaris</i> (immediately)</li></ul>	Suspected and confirmed invasive neurologic disease (as "Amebic Meningitis")
Parasites	<ul style="list-style-type: none"><li>• <i>Cryptosporidium</i> (within 3 business days)</li><li>• <i>Giardia</i> (within 24 hours)</li></ul>	All individual cases

Some waterborne illnesses are reportable only when they are part of a suspected or confirmed waterborne outbreak, defined as:

- Two or more epidemiologically linked persons who experience a similar illness after exposure to the same water source, where epidemiological evidence implicates the water as the likely source of the illness.



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Agents that cause waterborne outbreaks include the reportable pathogens above as well as non-reportable pathogens including as norovirus and other viruses, *Pseudomonas aeruginosa* (“hot tub rash”) and other bacteria, other parasites, toxins (such as cyanotoxins produced by harmful algal blooms), pool chemicals, etc.

### **Free Living Ameba Infections are Now Reportable in Washington State**

As of January 2023, invasive neurologic free living ameba infections, including granulomatous amebic encephalitis (GAE) and primary meningoencephalitis (PAM) are reportable as “amebic meningitis”. Suspected and confirmed infections are immediately reportable. Three types of free-living amebae, *Acanthamoeba*, *Balamuthia* and *Naegleria*, cause the majority of human diseases.

#### ***Acanthamoeba* spp.**

*Acanthamoeba* can be found worldwide in soil and water (freshwater, saltwater, swimming pools and tap water.) Infection can result in multiple disease syndromes.

*Acanthamoeba* keratitis is an infection of the cornea of the eye which may lead to permanent impairment of vision or even blindness. Most people who develop *Acanthamoeba* keratitis are contact lens wearers; improper storage, handling and wearing of lenses are risk factors. A multistate outbreak of *Acanthamoeba* keratitis occurred in 2007 and was associated with contaminated contact lens solution. Early diagnosis and treatment are essential to prevent vision damage. Suspected or confirmed outbreaks of *Acanthamoeba* keratitis are reportable in Washington State but individual cases are not.

In extremely rare cases, immunocompromised persons may develop granulomatous amebic encephalitis (GAE) or disseminated infections when *Acanthamoeba* enter through the skin or lungs and spread through the blood stream. Signs of GAE include mental status changes, loss of coordination, fever, muscular weakness, partial unilateral paralysis, double vision and photophobia. Signs of disseminated infection include reddish nodules, skin ulcers or abscesses and inflammation of the lungs or sinuses. GAE and disseminated infection are more difficult to diagnose than keratitis and are often at advanced stages when they are diagnosed. Most cases of *Acanthamoeba* GAE are fatal.

#### ***Balamuthia mandrillaris***

*Balamuthia mandrillaris* can be found in dust and soil throughout the world and may also live in water. Identified infections are very rare (approximately 200 ever reported globally) and the incubation period may be long (weeks to months) so exposure routes are not always clear. Individuals may become exposed via dust inhalation, through damaged skin contact with *Balamuthia*-contaminated dust/soil or by receiving organ transplants from an infected donor.

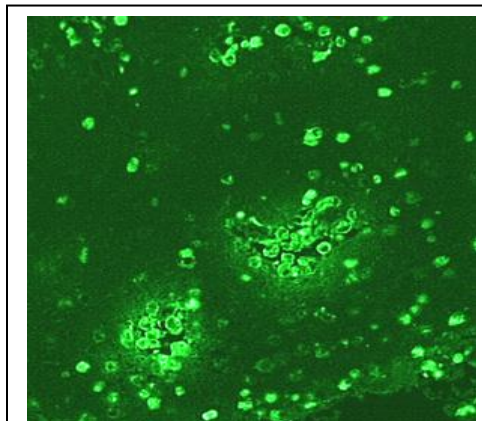
*Balamuthia* can cause infections of the skin, sinuses, brain, or other organs. Infection can begin with a non-healing skin lesion and then progress to GAE. More than 89 percent of infections are fatal, however early identification of the disease and treatment increase survival. Both immunocompromised and immunocompetent people are at risk for infection and for progression to GAE.



Trophozoite of *B. mandrillaris* in culture (CDC)

## *Naegleria fowleri*

*Naegleria fowleri* is found throughout the world in warm fresh water such as lakes, rivers, and hot springs. Infection with *Naegleria fowleri* causes primary meningoencephalitis (PAM), which is almost universally fatal. Symptoms begin one to nine days after nasal exposure to contaminated



Indirect immunofluorescence (IIF) assay of *N. fowleri* in brain tissue (CDC).

water and are similar to those of bacterial meningitis, including headache, fever, nausea, and vomiting followed by stiff neck, photophobia, seizures and cranial nerve abnormalities. In contrast to GAE, PAM is a rapidly progressing illness which usually leads to coma and death within weeks. This short incubation period and rapid progression makes pinpointing likely exposure sources much easier for *Naegleria* than the other types of amoebae. Because the illness progresses so quickly, early suspicion and diagnosis are key. Risks for exposure include freshwater recreation such as playing, swimming, diving, or using a backyard plastic water slide. Nasal rinsing and using a neti pot are also risk factors. According to the CDC, 157 cases of PAM were reported in the US between 1962 and 2022 with only four survivors.

## Washington State Harmful Algal Blooms Toolkit Now Available

A Harmful Algal Blooms Toolkit is available on the Washington State Department of Health Website: <https://doh.wa.gov/community-and-environment/contaminants/blue-green-algae/resources>. The Animal Safety Alert Poster and Veterinary Reference Card in the toolkit have both been updated.

### Animal Safety Alert Poster

The updated Animal Safety Alert Poster is designed for posting or distribution wherever pet owners might see it. It includes details about when to keep your pet out of the water as well as what symptoms to watch for if your pet was potentially exposed. There is a space on the poster to add the phone number of the local health jurisdiction as well as a QR code that takes people to the main DOH Blue-Green Algae page.



### Veterinary Reference Card

Harmful algal blooms can affect pets, livestock, and wildlife. The updated veterinary reference card includes details about harmful algal blooms along with clinical information outlining exposure routes, likely signs, incubation periods, differential diagnosis, and laboratory and other findings. The veterinary reference card also directs veterinarians to report suspected illnesses to their local health jurisdiction and includes a QR code that links to a PDF version of the card that can be saved to a mobile device.



## Other HABs Toolkit Resources

Other resources that can be found on the HABs Toolkit website are images used to develop signs that are posted as bodies of water where a HAB is confirmed or suspected; Recreational Guidance for Microcystins, Anatoxin-a, Cylindrospermopsin and Saxitoxin; and links to county state and federal HABs websites. Office of Communicable Disease Epidemiology is also available for consultation.

Animal and single human illnesses associated with harmful algal blooms (HABs) are not reportable in Washington but citizens and health care providers (especially veterinarians who are more likely to see cases) are strongly encouraged to report suspected human and animal HAB-associated illnesses to their local health jurisdiction. Two or more suspect human HAB-associated illnesses are immediately notifiable as a waterborne outbreak. LHJs should notify Communicable Disease Epidemiology (206-418-5500) of reported HABs illnesses.

## Resources

### Waterborne Disease

CDC estimates of waterborne disease in the United States:

[https://wwwnc.cdc.gov/eid/article/27/1/19-0676\\_article](https://wwwnc.cdc.gov/eid/article/27/1/19-0676_article)

Detecting and investigating waterborne disease cases and outbreaks:

<https://www.cdc.gov/healthywater/surveillance/detecting-investigating.html>

### Free Living Amebae

Free living amebic infections: <https://www.cdc.gov/dpdx/freelivingamebic/index.html>

*Acanthamoeba*: <https://www.cdc.gov/parasites/acanthamoeba/>

*Balamuthia mandrillaris*: <https://www.cdc.gov/parasites/balamuthia/>

*Naegleria fowleri*: <https://www.cdc.gov/parasites/naegleria/>

### Harmful Algal Blooms

Department of Health Harmful Algal Blooms Toolkit: <https://doh.wa.gov/community-and-environment/contaminants/blue-green-algae/resources>

Animal safety alert poster (NEW!):

<https://doh.wa.gov/sites/default/files/legacy/Documents/4300/332-117-HABAnimalSafetyAlertPoster.pdf?uid=6425e5b73ea25>

Veterinarian reference card (NEW!):

[https://doh.wa.gov/sites/default/files/legacy/Documents/4300/332-115\\_EPH\\_VetReferenceCard.pdf?uid=6425e5b74052d](https://doh.wa.gov/sites/default/files/legacy/Documents/4300/332-115_EPH_VetReferenceCard.pdf?uid=6425e5b74052d)

Freshwater algae control program: <https://ecology.wa.gov/Water-Shorelines/Water-quality/Freshwater/Freshwater-algae-control>