

*epi*TRENDS

Epidemiology and Public Health Practice in WA

A Monthly Bulletin on Epidemiology and Public Health Practice in Washington June 2025 Volume 30. Number 6

Shellfish Poisoning

The Pacific Northwest offers many coastal resources. However, Washington residents (especially recreational shellfish harvesters) should be aware of shellfish poisoning and how to avoid it.

Causes of Shellfish Poisoning

Shellfish poisoning is caused by consuming shellfish contaminated with marine biotoxins produced by naturally occurring microscopic organisms. These biotoxins are heat stable, are not removed by cleaning, and are not destroyed by cooking or freezing. The three types of shellfish poisoning of concern in



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Washington are paralytic shellfish poisoning, amnesic shellfish poisoning, and diarrhetic shellfish poisoning.

Paralytic Shellfish Poisoning is caused by paralytic shellfish poison (also known as saxitoxin) produced by Alexandrium spp., which are dinoflagellates. Bivalve molluscan shellfish, moon snails, and other carnivorous gastropods can accumulate PSP and other marine species, such as sea cucumbers, might be affected. Crabs can become toxic by feeding on shellfish, concentrating paralytic shellfish toxin in their gut

or "butter"—cleaning crabs thoroughly and not eating crab butter can reduce the risk of poisoning.

Amnesic Shellfish Poisoning is due to domoic acid produced by diatoms in the genus *Pseudo*nitzschia. Domoic acid is primarily an issue in razor clams on the coast, but has also been detected in mussels, clams, and oysters in Puget Sound. Dungeness crabs that feed on razor clams and other shellfish can also accumulate toxic levels of domoic acid. Cleaning crabs thoroughly and not consuming crab butter can reduce the risk of illness.

Diarrhetic Shellfish Poisoning is caused by diarrhetic shellfish toxins (also called okadaic acid) produced by the dinoflagellates Dinophysis and Phalacroma. Bivalve shellfish can accumulate diarrhetic shellfish toxin.



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Biotoxin-producing Harmful Algal Blooms

It is normal for low numbers of toxin-producing algae to be present in marine water. However, toxin-producing algae sometimes rapidly reproduce and form "harmful algal blooms" that become a greater food source for shellfish. Shellfish are filter feeders, pumping water through their systems and filtering out and eating algae and other food particles. During harmful algal blooms, toxins can accumulate until the shellfish themselves become toxic.

Once the number of toxin-producing algae in the water returns to normal, low levels, shellfish will flush the toxins from their bodies; however, it can be several days to several months or longer before the shellfish are safe to eat again. Some shellfish, like butter and varnish clams, are known to hold on to paralytic shellfish toxin for up to a few years after toxin-producing algae have stopped blooming, and other shellfish are safe to eat.

Researchers don't yet know the exact combination of conditions that cause harmful algal blooms. Biotoxin levels can rise quickly and unpredictably. They might rise quickly, remaining high for a long time then drop just as quickly to safe levels. The National Oceanic and Atmospheric Administration (NOAA) has more information about harmful algal blooms (NOAA Resources).

While the term "red tide" is commonly used to describe harmful algal blooms in marine waters, the blooms that produce paralytic shellfish poison, domoic acid (amnesic shellfish poison), and diarrhetic shellfish poison are rarely associated with a red tinge in the water. There are some algal blooms in Washington which turn water different colors, including red, but most of these blooms are not biotoxin-producing harmful algal blooms.

Illnesses due to Shellfish Poisoning

Currently, no clinical tests can detect these toxins in clinical specimens. However, epidemiologically implicated food can be tested. When there is a suspected human case, it is important to obtain full details about the shellfish, including specific type, collection site, and point of purchase.



Paralytic Shellfish Poisoning

Symptoms of paralytic shellfish poisoning include tingling and numbness of the mouth and extremities, difficult speaking and swallowing, and muscle paralysis causing respiratory arrent. Symptoms resolve without treatment in a few days.

Three clusters of paralytic shellfish poisoning were reported in Washington during the last 20 years (seven reports in 2012, seven reports in 2000, and five reports in 1998). One case was documented in 2022 due to butter clam consumption a year after a PSP-producing bloom occurred. Oregon experienced an outbreak over Memorial Day weekend of 2024, in which 42 cases were reported (including 2 Washington residents who had traveled to Oregon). Two mussel samples tested positive for saxitoxin levels 44 to 68 times above closure limits (CDC Resource).

Amnesic Shellfish Poisoning

Symptoms include vomiting, diarrhea, cramps, and neurological symptoms. Severe cases of amnesic shellfish poisoning can result in permanent short-term memory loss (the inability to form new memories), hence the term "amnesic" shellfish poisoning. No cases have been identified since risk areas in Washington were identified and closed in 1991.

Frequent marine mammal and bird mortalities have been linked to domoic acid. In early 2025, hundreds of sea lions and dolphins suffered from domoic acid toxicosis in California, with documented attacks on beachgoers by affected sea lions. Most sea lions suffering from domoic acid toxicosis typically exhibit seizures and tremoring, and aggressive behavior is rare.

Diarrhetic Shellfish Poisoning

Symptoms include diarrhea and/or vomiting, cramps, and chills. In 2011 three cases in one family were associated with mussels gathered in Puget Sound.

Biotoxin Monitoring in Washington

The Washington State Department of Health Shellfish Marine Biotoxin Program maintains a robust biotoxin monitoring system. Shellfish from both commercial and recreational harvest areas are regularly tested for the biotoxins that cause paralytic, amnesic and diarrhetic shellfish poisoning so that areas where dangerous levels of toxin have been detected can be closed. A harvest area is not allowed to re-open until lab tests confirm biotoxin concentrations have dropped to safe levels.

Staying Safe

Recreational shellfish collection is a popular activity in the Pacific Northwest with long traditions. Signs posted on a beach may indicate danger, warning, or closure for shellfish harvesting but such signs are often vandalized or stolen. Recreational shellfish collectors should check the <u>Shellfish Safety Map</u> (Resources) for real-time biotoxin and shellfish safety status information just before harvesting shellfish from Washington beaches. There is also a hotline (1-800-562-5632) to check for biotoxin closures.



Resources

Department of Health

Shellfish Safety Map for real time biotoxin closures and shellfish safety information: <u>https://fortress.wa.gov/doh/biotoxin/biotoxin.html</u>

Shellfish Safety Hotline - Biotoxin closures only (recorded): 1-800-562-5632

List of biotoxin closures by county: https://fortress.wa.gov/doh/eh/portal/odw/si/BiotoxinBulletin.aspx

Recreational shellfish information: https://doh.wa.gov/community-and-environment/shellfish/recreational-shellfish

Shellfish growing areas: https://doh.wa.gov/community-and-environment/shellfish/growing-areas

Department of Fish & Wildlife: https://wdfw.wa.gov/fishing/shellfishing-regulations

NOAA: What is a harmful algal bloom? | National Oceanic and Atmospheric Administration

Early Bloom of Toxic Algae off Southern California Sickens Hundreds of Sea Lions and Dolphins | NOAA Fisheries

CDC: Paralytic Shellfish Poisoning - Oregon, May-July 2024 | EIS Conference | CDC