Shellfish-Associated Conditions

Molluscan shellfish such as clams, mussels, oysters and geoducks are plentiful along the coast of the Pacific Northwest. Historically, shellfish consumption has carried health risks such as typhoid fever and hepatitis A, reflecting contamination of ocean water due to inadequate sewage disposal. Although water quality protection and shellfish monitoring have increased the safety, shellfish consumption can still present health risks due to certain infectious agents and toxins.

With improvement of ocean water quality through control of land-based pollution sources, shellfish-associated illnesses currently result primarily from natural marine organisms. As molluscan shellfish filter large volumes of ocean water to feed, their intestines can temporarily concentrate organisms or toxins pathogenic to humans, resulting in illnesses including vibriosis and shellfish poisoning.

Vibriosis

In this region of the country, infections with naturally occurring marine species of the bacterial genus *Vibrio* remain the illnesses most commonly associated with molluscan shellfish consumption. Most cases are due to *V. parahaemolyticus* but other non-cholera *Vibrio* species are also occasionally identified. Annual case counts are variable. In each of the last ten years, 9 to 80 confirmed cases of vibriosis have been reported in Washington residents, primarily in late summer and early autumn. Most vibriosis cases experience mild to moderate gastrointestinal illnesses, although severe infections can occur. Persons taking antacids or medications to reduce stomach acid may be at higher risk of developing vibriosis when consuming shellfish.
The majority of cases follow consumption of raw or undercooked oysters from local sources, either commercially grown or recreationally harvested. Fewer cases are associated with out-of-state travel or other varieties of seafood. Some *Vibrio* species cause tissue infections after ocean water contacts damaged skin. Each year Washington shellfish regulators also receive reports of vibriosis in residents of other states associated with consumption of exported Washington oysters.

Since *Vibrio* are normally found in the ocean, these bacteria may be present in shellfish at low levels. *Vibrio* can multiply within shellfish under warm conditions, either in the ocean during hot summer days or after harvest if there is inadequate cooling. To reduce *Vibrio* contamination, recreational shellfish harvesters should collect shellfish as soon as possible with the receding tide, avoid harvesting shellfish exposed to the sun, and keep shellfish cold. Thorough cooking of the shellfish to 145°F will eliminate *Vibrio*. Cooked shellfish should not be rinsed with seawater, which can recontaminate the food.

Toxic Shellfish Poisoning

As filter feeders, molluscan shellfish can concentrate toxins from microscopic marine organisms. In addition to shellfish, marine species such as crabs which feed on molluscan shellfish may also accumulate the...
Toxins and present a risk to people consuming these other species. If harvesting crabs, discard the crab gut and crab butter (the white-yellow fat inside the back of the shell) because these may concentrate marine toxins.

Paralytic shellfish poisoning (PSP) is due to saxitoxin produced by dinoflagellates which are endemic to the ocean but increase in numbers during periodic blooms. The toxin causes tingling of the mouth and extremities, and at high concentrations can result in loss of coordination, difficulty breathing or respiratory paralysis. Symptoms occur within minutes to hours of consumption. Since the toxin is heat and cold stable, freezing or cooking does not prevent illness. Most years there are no PSP cases identified in Washington State, although in 2000 there were seven cases among recreational harvesters.

Another toxin from marine organisms, domoic acid, can also concentrate in shellfish during plankton blooms and is the cause of amnesic shellfish poisoning. In addition to gastrointestinal symptoms there can be neurologic symptoms including confusion, seizures, and temporary or permanent memory loss. Symptoms occur from 15 minutes to 1.5 days after consumption. In 1991 high domoic acid levels were found in shellfish in Washington State, and 29 illnesses were retrospectively associated with razor clams. No subsequent cases have been identified. The toxin is not destroyed by heating or freezing.

This summer high levels of a biotoxin not previously associated with illnesses in the United States was detected in shellfish from the Sequim Bay area in Washington State. Okadaic acid is produced by dinoflagellates and is the likely toxin that results in diarrhetic shellfish poisoning (DSP) characterized by diarrhea, nausea, vomiting, abdominal cramps and chills. Symptoms begin within a few hours and last one to three days after eating DSP-tainted shellfish.

A family in Washington became ill after consuming mussels they collected from a public area of the bay. Testing of mussel samples from the same site confirmed presence of the DSP toxin. Following identification of the DSP cases, commercial and recreational harvests were closed in that area for several weeks until toxin levels diminished. An ongoing plan to monitor shellfish was established. DSP has been known from several European countries and Japan, and the toxin was recently found in shellfish from British Columbia waters. Like other toxins, the toxin causing DSP is not destroyed by freezing or cooking.

The Pacific Northwest has many natural resources available to its citizens and visitors including marine resources. Routine shellfish monitoring in Washington State identifies and closes harvest areas with increased toxin levels in shellfish. Recreational shellfishing should be done only in safe areas. Closures based on routine monitoring are posted at www.doh.wa.gov/shellfishsafety.htm or can be accessed by calling the Department of Health biotoxin hotline at 1-800-562-5632.