Vibriosis

Included among Vibrio organisms are species that occur in marine waters and can result in illnesses associated with seafood. Understanding the epidemiology of these species has increased, improving public health interventions.

Non-cholera Vibriosis

The genus Vibrio includes V. cholerae, the causative agent for the disease cholera, as well as pathogenic non-cholera species. The non-cholera vibrios occur naturally in low numbers in marine coastal and brackish waters. The most common species reported in Washington under notifiable conditions surveillance for vibriosis is V. parahaemolyticus. This organism is strongly associated with seafood or with skin exposure to marine waters. Grimontia hollisae, reclassified in 2003 from Vibrio hollisae, is a closely related genus included in the vibriosis category of notifiable conditions.

Infections with Vibrio species may be intestinal, soft tissue, or rarely systemic. Symptoms of intestinal vibriosis include diarrhea, abdominal cramps, vomiting, and fever. Illnesses usually are mild to moderate and last several days, but symptoms can be more severe in persons who are immunocompromised or using stomach acid suppressors. V. vulnificus infection can cause more severe cholera-like gastrointestinal symptoms and sepsis, and is more likely to result in hospitalization or death. Severe V. vulnificus infections are more likely in persons with pre-existing liver disease including alcoholism, with diabetes, or with a pre-existing immunocompromising condition. Less commonly, if injured skin is immersed in seawater, a soft skin infection with vibrios can result. These infections are usually mild but can progress to sepsis. Vibrio species can also cause ear infections, particularly with V. alginolyticus.

Vibriosis is not common in this country, accounting for only 1% of reports to the Foodborne Disease Active Surveillance System (FoodNet) from
1996-2012. However, cases accounted for 1.2% of hospitalizations and 8.8% of deaths among the reports. Incidence of vibriosis increased with age, reaching 0.78/100,000 for persons age 65 and older.

In Washington, vibriosis notifiable conditions reports vary considerably from year to year, in the past two decades ranging from 18 to 80 cases annually. There were 493 confirmed vibriosis cases reported during 2004-2012, none fatal, but 35 (7.1%) requiring hospitalization. With shellfish consumption and marine water exposure as the major risks for vibriosis, it is expected that the rate for a coastal state such as Washington would exceed the national rate (Figure 1).

Of the 493 vibriosis cases reported in Washington since 2006, 471 had a species reported including 418 *V. parahaemolyticus*, 20 *V. alginolyticus*, 12 non-toxigenic *V. cholerae*, eight *V. fluvialis*, eight *G. hollisae*, four *V. mimicus*, and one *V. vulnificus*. Three of the cases with *V. mimicus* shared crayfish imported from Florida. The case with *V. vulnificus* involved an infected wound following ocean activities in Florida. Only nine other vibriosis cases presented as cellulitis or cutaneous ulcer, of which four were due to *V. alginolyticus* and four were due to *V. parahaemolyticus* with one unknown species.

**V. vulnificus in the United States**

*V. vulnificus* is closely associated with consumption of shellfish from the Gulf Coast region. Both the frequency and the levels of the organism are higher in Gulf Coast shellfish, increasing the risk for *V. vulnificus* infections for products from that area. Of 1,519 vibriosis cases reported through FoodNet during 1996-2010, there were 193 due to *V. vulnificus*. About a third of these cases were fatal, compared with about 1% of reported cases with other foodborne pathogens. Hospitalization rates were also higher for cases that were infections...
with *V. vulnificus*. From 1996 to 2010 there were significant increases nationally in reports for the three most common species, *V. parahaemolyticus*, *V. vulnificus*, and *V. alginolyticus*; it could not be determined if this represented increased levels of contamination, increased exposure of the population to shellfish and seawater, or improved detection and reporting of cases.

![Figure 2. U.S. Vibriosis Incidence per 100,000 Population, 1996–2010.](image)

### Preventing Vibriosis

Vibrios can multiply in sun-exposed shellfish beds or in harvested shellfish that are warm, so risks for vibriosis increase during the summer. Control measures involve harvesting shellfish from beds that are not at low tide (i.e., not sun-exposed) and keeping shellfish cold from harvest through consumption. All species of *Vibrio* are killed by adequate heating but re-contamination can occur after cooking if shellfish are rinsed in seawater or returned to a contaminated container.

In Washington, *V. vulnificus* is quite rare but was isolated from sediment from Willapa Bay in 1984, from oyster samples at the retail level in 2007, and from oyster samples collected for routine monitoring in 2013. Based on characterization by the Food and Drug Administration Gulf Coast Laboratory, the organisms isolated in 2013 were present at low levels and were of a less virulent genotype. At present, *V. vulnificus* associated with Washington marine waters has not been identified as a cause of any human illness.
A Vibrio Control Plan is laid out in Washington Administrative Code chapter 246-282 WAC with a goal of preventing illnesses from vibrios. The plan establishes harvest, temperature control, and transportation requirements for commercially-harvested oysters intended for raw consumption during the months of May through September. These measures are designed to minimize growth of vibrios in shellfish and to increase controls when shellfish-related vibriosis is reported. Monitoring efforts involve weekly environmental monitoring and oyster tissue sampling at 18 sites in Puget Sound and bi-weekly sampling in July and August at three coastal sites. There is also ongoing cooperative work with Centers for Disease Control and Prevention and with the Food and Drug Administration.

Recreational shellfish harvesting should be done only in open areas, which can be determined from the Department of Health shellfish safety hotline at (1-800-562-5632) or online (below). Shellfish should not be harvested at low tide, when the beds may have been heated by the sun, and shellfish should be kept cold after harvesting. Shellfish should be consumed well-cooked during the summer months. Shells may open before the meat reaches the recommended cooking temperature of 145°F. Avoid contaminating cooked shellfish with jar juices or unheated seawater. Persons with risk factors such as liver disease, diabetes, or immunocompromising illness should be especially careful to consume only safe shellfish.

Both safe seafood handling and ongoing public health activities will contribute to the control of these organisms. Healthcare providers should consider the diagnosis of vibriosis in persons at risk, contact the local health jurisdiction about suspected cases, and confirm those isolates at Washington State Public Health Laboratories. Any suspected infections should be reported promptly to Office of Communicable Disease Epidemiology.

Resources

Shellfish hotline: http://ww4.doh.wa.gov/scripts/esrimap.dll?Name=bioview&Step=1


National foodborne disease surveillance: http://www.cdc.gov/mmwr/pdf/wk/mm6215.pdf

Vibriosis in the United States: http://www.cdc.gov/media/dpk/2013/docs/dpk_foodnet-2013_Newton_2012_Vibriosis%20in%20the%20United%20States%201996-2010_CID.PDF