Norovirus Infection

If you have emetophobia (a severe fear of vomit), winter can be a tough season as norovirus (also known as ‘winter vomiting disease’) activity typically peaks between December and March. This article provides background on norovirus, addresses the most common routes of transmission, and provides resources for outbreak investigation and response.

Background

Symptoms of norovirus infection usually begin within 12 to 48 hours of being exposed and typical symptoms include acute onset of vomiting, watery, non-bloody diarrhea with abdominal cramps, and nausea. Some also complain of headache, low-grade fever and body aches. Most people fully recover within 24 to 72 hours, but those who are elderly, very young and/or immunocompromised may develop severe dehydration and require medical care.

Norovirus is a highly contagious virus. Infection does not provide lasting immunity because there are many different types of noroviruses. An infection with one type of norovirus may not protect against other types. Norovirus is extremely contagious, with an estimated infectious dose as low as 18 viral particles. However, not everyone who is exposed to norovirus develops infection (susceptibility may be partly genetic) and not all people with a norovirus infection have symptoms. Norovirus can be transmitted through multiple routes including foodborne, waterborne, and person-to-person.

Norovirus is the leading cause of foodborne illness and foodborne outbreaks in the United States. Infected food workers are frequently the source of norovirus outbreaks, often because they touch ready-to-eat foods, such as raw fruits and vegetables, with their bare hands. However, any food served raw or handled after being cooked can be contaminated with norovirus.
Bivalve shellfish such as oysters, clams and mussels can be an important source of foodborne norovirus. Bivalves are able to concentrate norovirus in their tissues if the water they are grown in is contaminated by any of the following sources: faulty wastewater treatment plants, failing septic systems, storm water runoff, dumping of boat sewage waste, and vomiting overboard near shellfish beds. Because they are often eaten raw or lightly cooked, oysters are the most common bivalve associated with foodborne norovirus in Washington State. To reduce the risk of shellfish-related norovirus people should harvest shellfish only from open and approved areas. Cooking can reduce the risk of norovirus illness, but the virus can survive at temperatures up to 140°F. Quick steaming or cooking until the shells just open is not sufficient heating to protect against norovirus illness.

Norovirus may be transmitted through fecally contaminated drinking water or recreational water. Drinking water outbreaks have occurred from multiple sources including well water, untreated surface water and bottled water. Recreational water also poses a risk for norovirus transmission, particularly in natural untreated waters such as lakes. Chlorination is effective against norovirus at typical concentrations used in treated waters such as pools and spas. A concentration of 1.0 mg/L chlorine will inactivate norovirus in less than a minute.

Norovirus can spread quickly in crowded spaces like daycare centers, nursing homes, schools, and cruise ships. Transmission may occur through direct contact with an infected person, by swallowing virus particles that become aerosolized when an infected person vomits, and by touching objects and surfaces that an infected person has touched with unwashed
hands. Norovirus can continue to be shed in stool for two weeks or more after the resolution of symptoms, so continued vigilance on hand hygiene is important for preventing further spread of illness. Norovirus can also stay in the environment for days and weeks so thorough cleaning of objects or surfaces that might have become contaminated by an ill person is also an important control method.

**Outbreak Response**

An individual case of norovirus is not a notifiable condition in Washington, but health care providers should report outbreaks of norovirus-like illness to their local health jurisdiction (LHJ). LHJs should report suspected and confirmed norovirus outbreaks to Department of Health (DOH) Office of Communicable Disease Epidemiology (CDE) using the Enteric Disease Outbreak Reporting Form. CDE reports suspected and confirmed outbreaks through the National Outbreak Reporting System (NORS), and CaliciNet, a national norovirus laboratory surveillance network.

Local health jurisdictions should report norovirus-like illness outbreaks that are suspected to be foodborne to CDE and to the DOH Food Safety Program. If the possible source of exposure is shellfish, norovirus outbreaks or individual cases of norovirus should be reported to CDE and to the DOH Shellfish Illness monitoring program at sf.illness@doh.wa.gov.

CDE recently published a norovirus outbreak response toolkit website (see resources section for link) which provides many resources collected from local health jurisdictions, the Centers for Disease Control and Prevention (CDC), and DOH for outbreak investigation and response. Check out the toolkit for specific guidance on topics such as norovirus epidemiology background, education, outbreak response, environmental cleaning, and specimen submission.

**Laboratory Testing**

If a local health jurisdiction would like to request laboratory testing to confirm a norovirus outbreak, they should contact CDE and report the possible number of cases from whom stool samples could be collected. If there are at least three stool samples, CDE will coordinate testing with the Washington State Public Health Laboratories (PHL). Specimens will be tested for both norovirus genogroup I (GI) and genogroup II (GII). Specimens from outbreaks tested at the PHL may be forwarded to a CaliciNet laboratory for genotyping.

Conventional RT-PCR followed by sequence analysis of the RT-PCR products is used for norovirus genotyping. A new method of dual typing for norovirus is being implemented this year by laboratories participating in CaliciNet. This consist of RT-PCR amplification of a partial region of both the polymerase gene and the capsid gene. Previously only the capsid gene was used for genotyping. An example of a genotype result based on the old capsid only sequencing would be “GII.4 Sydney.” If the same virus was typed using the newer dual typing method, the result would be listed as
“GII.P16-GII.4 Sydney,” with the P16 indicating the polymerase type.

Although norovirus illness is a brief although unpleasant illness, the high number of infections leads to a large burden of disease in absences, medical care, and occasional complications. Prompt identification and reporting of suspected norovirus outbreaks can lead to public health responses that prevent additional cases.

**Resources**

Washington State Department of Health Enteric Outbreak Reporting Form:  

Washington State Department of Health Norovirus Outbreak Response Toolkit:  

**CDC**  
Norovirus Website:  
[https://www.cdc.gov/norovirus/index.html](https://www.cdc.gov/norovirus/index.html)

NORS:  
[https://www.cdc.gov/nors/index.html](https://www.cdc.gov/nors/index.html)

CaliciNet:  

**NoroCORE**  
Norovirus Collaborative for Outreach, Research, and Education:  
[https://norocore.ncsu.edu/about/overview/](https://norocore.ncsu.edu/about/overview/)