

## Norovirus

Norovirus (NV) is a highly communicable virus that leads to widespread community outbreaks every winter, from November to March. It causes vomiting and diarrhea that last 1-3 days and can lead to dehydration in the very young, the elderly and other vulnerable individuals. The vast majority of cases are transmitted from person-to-person, often in facilities such as hospitals, long-term care and schools. In some situations, an ill foodhandler can contaminate food which can lead to foodborne NV outbreaks. Contamination of food at its source is highly unusual.

In the winter of 2016-17, BC experienced a prolonged NV outbreak associated with the consumption of raw and insufficiently cooked oysters sourced from geographically disparate harvest areas.

The outbreak started with an initial NV outbreak (N=118 cases in 19 separate clusters<sup>1</sup>) in Tofino with cases becoming ill from Nov 17 to 28 2016. Six cases were lab-confirmed as NV genotype I (GI). The majority of cases consumed raw oysters at a local oyster festival; the rest of the cases consumed raw oysters at local restaurants in the same time period. Oysters from one BC farm harvested on Nov 13 and 14 explained the majority of cases. Leftover oysters and oysters harvested from this farm tested positive for NV GI.

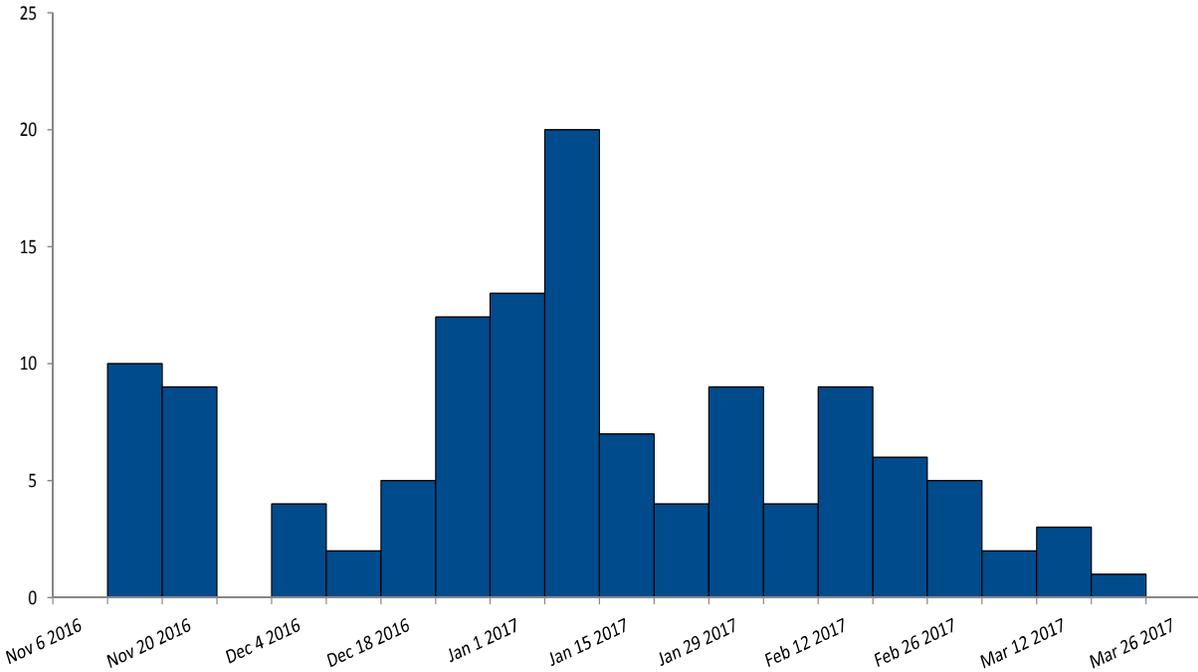
Between Dec 6 2016 and Mar 26 2017, an additional 331 NV cases (145 separate clusters) were reported in BC (N=229), Alberta and Ontario following the consumption of oysters from BC. Eighteen clusters were lab-confirmed as NV GI or GII. Farms from various BC harvest areas were implicated. Testing of leftover oysters and/or oysters from 14 farms identified 6 positive for NV GI or GII.

A series of communications and control measures were taken to minimise the public health risk. These included a public health alert, and the education of BC restaurant staff. The Canadian Food and Inspection Agency and the Department of Fisheries and Oceans closed 12 oyster farms between Dec and Apr 2017. The incidence of NV decreased in March and the outbreak was declared over on Apr 18 2017.

It is hypothesised that human sewage led to the contamination of the marine environment. It is likely that environmental conditions such as prior heavy rainfalls, followed by cold temperatures and low UV light played a role in allowing NV to persist and contaminate shellfish beds. Efforts are underway to improve early detection of NV in oysters, more rapidly control outbreaks and identify the source of environmental contamination.

1. A cluster is defined as illness in one or more individuals all exposed together to the same shellfish at the same time in the same location.

**4.1 Number of clusters of norovirus infection or norovirus-like illness associated with oysters reported by week of onset of first case, BC, Nov 6 2016-April 1 2017**



**4.2 Shellfish farm closures associated with a norovirus outbreak, BC, Dec 2016-April 2017**

