

## **Guidelines for the Management of Calicivirus (Norwalk-Like Virus or Norovirus) Gastrointestinal Outbreaks**

Managing outbreaks of calicivirus infection is a challenge to all health care workers. Norwalk-like Virus (NLV), recently renamed Norovirus, is a significant cause of diarrheal outbreaks in British Columbia.

From January to June 2002, 64 outbreaks of gastroenteritis were reported. Over 30 (50%) of these were found to be caused by Norwalk-like Virus by Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) testing.

The source of the virus can be food (or food-contact surface), water, a food handler, person-to-person spread, or a caregiver. This efficiency of spread is compounded by the fact that the virus has a low infectious dose (reported to be as low as 10 viral particles). The virus is excreted in the stool of infected patients for a period of up to 2 weeks. Levels of the virus in the stool become very low after the patient becomes asymptomatic. In very immunocompromised patients, the virus can be shed for a prolonged periods of time. NLV has also been detected in relatively high concentrations in vomitus. There is therefore the risk of spread of the virus through aerosolization when a patient vomits. The virus is resistant to low concentrations of chlorine and, in fact, may be resistant to some commonly used disinfectants at working concentrations.

When managing a calicivirus outbreak, a number of practical suggestions can be made based on the above observations. If the source of the virus is a food handler, then restricting such personnel from working with food for at least 48 hrs after the symptoms have cleared is recommended. A definitive diagnosis (RT-PCR) is warranted before allowing the employee to return to work.

If the source of infection is food, consideration should be given to discarding all food other than dry stock in unopened containers. To date common food sources have been fresh salad or fruits or vegetables as well as shellfish. However if any food has been exposed, even indirectly, to vomitus (as in the case of a food handler vomiting into a kitchen sink), it is potentially infectious from aerosol contamination and should be discarded.

If the source is drinking water or ice cubes, their use should be discontinued. This includes containers for water or ice cubes until they have been properly disinfected. The temporary substitution of commercially bottled water for domestic water may be one consideration. Likewise, food can be contaminated if washed with contaminated water.

Of significant concern, (not fully appreciated to date) is the role of the environment in spread of this infection. Since vomiting is known to generate virus-containing aerosols, the environment can be readily contaminated. Food placed on an aerosol-contaminated surface

could become a source of infection, or aerosols could contaminate the food itself. Contamination of the taps of a wash sink could serve as a source for individuals when washing their hands.

Hand washing is key to control the person-to-person spread of NLV and hands can be adequately cleansed by thorough washing with soap and water. Waterless hand rinses containing at least 60% alcohol can be used as a substitute for handwashing if no sink is readily available and hands are not visibly soiled.

Disinfection of contaminated surfaces may be difficult. Cleaning of environmental surfaces may be suboptimal because of the difficulty of assessing values of specific disinfectants on the human caliciviruses (can not be grown in cell culture). Limited studies on the infectivity of Norwalk virus in volunteers indicates that a solution of 0.1% hypochlorite (1000 ppm chlorine) is an effective disinfectant while 1 to 10 ppm chlorine (amounts used to disinfect drinking water) is not. In a recent study it was shown that most commonly used disinfectants are not effective at eliminating the virus when used at their recommended dilutions. Only when used in concentrations 4-fold greater than recommended, were phenolic compounds and quaternary ammonium compounds effective disinfectants for caliciviruses.

The outbreaks affect our susceptible seniors. They also affect many others. One restaurant even occurred at a High School Grad celebration (700 very ill grads and parents). Considering both the patient morbidity as well as the loss of work time and revenue associated with each outbreak, an effect rapid testing system is essential. BCCDC Laboratory Services has recently developed (in conjunction with CDC, Atlanta) an RT-PCR molecular test for NLV detection. We found in 64 recent outbreaks, 32 were shown to be NLV positive by RT-PCR (compared to 3 positive detects by traditional (with slow Turn-Around-Time) electron microscopy methods. DNA sequencing of outbreak NLVs can be used to produce a map of how these highly infectious, diarrheal agents are spread throughout the province. Variations in the DNA sequence will allow us to investigate the molecular epidemiology of these outbreaks.

We trust this update of a significant problem (that appears to be under-recognized) is helpful. Ms. Lorraine McIntyre, Labs Services Outbreak Coordinator would be glad to talk with you (604-660-6079). The new lab tests (Nucleic Acid Detection and DNA Sequencing) are now real-time. It should help the folks in the trenches provide early detection and interventions.

**Source:**

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