

# Noroviruses

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## Section 1

### ABOUT THE DISEASE

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#### A. Etiologic Agent

Caliciviruses (*Caliciviridae*) are a family of non-enveloped, single-stranded RNA viruses divided into at least 5 genera; two of which- also referred to as Human Calicivirus (HuCVs)- are associated with acute gastroenteritis in humans: Norovirus, previously described as “Norwalk-like virus” (NLV); and Sapovirus, formerly described as “Sapporo-like virus” (SLV). Noroviruses are genetically diverse and are further divided into 6 geno-groups (I-VI), of which three (I, II, IV) cause human illness. Noroviruses are named after the original strain, “Norwalk virus,” that caused an outbreak of gastroenteritis in Norwalk, Ohio in 1968.

#### B. Clinical Description

Norovirus infection typically presents with acute onset, and the symptoms generally include some combination of nausea, vomiting, watery non-bloody diarrhea, and abdominal cramps and discomfort. Low-grade fever occasionally occurs. Other symptoms can include headache, malaise, chills, and muscle aches. Dehydration is the most common complication, especially among the young and elderly. Symptoms generally last 1-3 days, followed by complete recovery. However, more prolonged illness can occur, particularly among elderly people, young children, and hospitalized patients. There is no evidence of long-term sequelae following infection; although post-gastroenteritis arthritis has been described following norovirus infection, as it has with gastroenteritis due to other infectious agents.

#### C. Vectors and Reservoirs

Humans are the only known reservoir of calicivirus (norovirus and sapovirus) infection.

#### D. Modes of Transmission

Transmission of norovirus and sapovirus is primarily by person-to-person spread via the fecal-oral route or through contaminated food or water. Contaminated fomites can also potentially transmit these viruses and cause infection. Evidence also exists for transmission of norovirus through aerosolization of vomitus that may then contaminate fomites or enter the oral mucosa and be ingested.

#### E. Incubation Period

The incubation period for calicivirus (norovirus and sapovirus) infection is usually 12 to 48 hours.

#### F. Period of Communicability or Infectious Period

While some viral shedding may occur prior to the onset of symptoms, shedding typically begins with the onset of symptoms and can occur for several days after recovery. Noroviruses are highly contagious, and it is believed that a dose of as few as ten viral particles may be sufficient to cause infection.

#### G. Epidemiology

Human calicivirus infection has a worldwide distribution. It causes an estimated 1 in 15 US residents to become ill each year, as well as 56,000 to 71,000 hospitalizations, and 570 to 800 deaths- predominantly among young children and the elderly. Norovirus is also recognized as the most common cause of foodborne illness and foodborne outbreaks in the United States. The Centers for Disease Control and Prevention (CDC) estimates that at least 50% of all foodborne outbreaks of acute gastroenteritis are attributable to noroviruses. Most foodborne outbreaks of norovirus illness are likely caused by contamination of food by a food handler immediately before serving. Food items frequently associated with outbreaks include cold foods such as salads, sandwiches, and bakery products, as well as salad dressings and cake icing. Some food items, like oysters and berries, may be contaminated prior to arriving at a store or restaurant due to prior contact with contaminated water.

## H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.

## Section 2

### REPORTING CRITERIA AND LABORATORY TESTING

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#### A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report a case that meets any of the following criteria:

- Identification of infection in stool, vomitus, or serum specimen (laboratory confirmation by enzyme immunoassay [EIA], reverse transcriptase polymerase chain reaction [RT-PCR], or serology); or
- A clinically compatible case that is epidemiologically linked to a laboratory-confirmed case.

#### B. Laboratory Testing Services Available

The Massachusetts State Public Health Laboratory (MA SPHL) uses RT-PCR to test clinical specimens for the presence of norovirus. Testing is performed for outbreak investigations only and with prior approval from the MDPH Epidemiology Program at (617) 983-6800. A minimum of 3–5 specimens should be submitted per outbreak. Specimens will not be accepted for routine diagnostic purposes. Fresh stool is preferred, but vomitus is also acceptable. Stool specimens must be collected within 48-72 hours from symptom onset, either in a sterile container without transport medium or in a Meridian Para-Pak stool collection container. Vomitus must be submitted in a sterile container without transport medium. All specimens must be transported on ice and received cold within 48 hours of collection.

For more information on testing and specimen submission, call the MA SPHL at (617) 983-6609.

## Section 3:

### REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

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#### A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (e.g., a diapered child, daycare attendee, or food handler), and if so, to prevent further transmission.
- To identify transmission sources of public health concern (e.g., a contaminated public water supply), and to stop transmission from such a source.

## **B. Laboratory and Health Care Provider Reporting Requirements**

Cases of illness due to Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus are reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, shall report such evidence of infection directly to the MDPH within 24 hours.

All outbreaks of illness that are possibly foodborne are also reportable.

## **C. Local Board of Health (LBOH) Reporting and Follow-up Responsibilities**

### *Reporting Requirements*

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MDPH regulations (*105 CMR 300.000*) stipulate that Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection is reportable to the LBOH and that each LBOH must report any case or suspect case of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH

Bureau of Infectious Disease and Laboratory Sciences (BIDLS), Office of Integrated Surveillance and Informatics Services (ISIS) via MAVEN. Refer to the List of Diseases Reportable to Local Boards of Health for information on prioritization and timeliness requirements of reporting and case investigation <http://www.mass.gov/eohhs/docs/dph/cdc/reporting/rprtbdiseases-lboh.pdf>

### *Case Investigation*

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It is the responsibility of the LBOH to complete all questions in each of the MAVEN question packages by interviewing the case and others who may be able to provide information. Much of the information required can be obtained from the health care provider or from the medical record.

#### Calling the provider

If the case was hospitalized (i.e. reporting facility is a hospital), call infection control at the named hospital. A list of infection preventionists can be found in the help section of MAVEN. If the case was seen at a clinician's office, ask to speak to a nurse working with the ordering provider.

#### Calling the case or parent/guardian of the case

Before calling the case, review the disease fact sheet by clicking on the Help Button located in MAVEN and review all the information in this chapter. The call may take a few minutes, so in order to maximize the chance of getting the information needed, it might be good to note the potential length of the call with your contact, and offer the opportunity to call back when it is more convenient. Asking questions about how the case or child is feeling may get the case or parent talking. If you are unable to answer a question they have, don't hesitate to call the Division of Epidemiology and Immunization at 617-983-6800 for assistance, and call the case back with the answer later. People are often more than willing to talk about their illness, and they may be very happy to speak with someone who can answer their questions.

### *Using MAVEN*

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#### Administrative Question Package

Monitor your "Online LBOH Notification for non-Immediate Disease" workflow in MAVEN for any new cases of *Norovirus*. Once a new event appears in this workflow, open the Administrative Question Package (QP) and under the "Local Health and Investigation" section, answer the first question "**Step 1** - LBOH acknowledged" by selecting "Yes". The "LBOH acknowledged date" will then auto populate to the current day. Completing this first step will move the event out of this workflow and into your "Online LBOH notified but Case Report Forms (CRF) are pending" workflow. Note the date you started your investigation by answering "**Step 2** - Investigation started" as "Yes" and then note the date where shown. Record your name, agency, and phone numbers where shown in "**Step 3** - LBOH/Agency Investigator."

#### Demographic Question Package

Record all demographic and employment information. It is particularly important to complete the Race/Ethnicity and Occupation questions.

#### Clinical Question Package

Complete the "Diagnosis/Clinical Information" section, providing the diagnosis date, symptom information and date of symptom onset, hospitalizations, and other medical information

#### Risk Exposure/Control & Prevention Question Package

Accurately record all risk questions regarding travel and consumption of any high risk foods. As you enter data into MAVEN, additional questions will appear for you to answer regarding risk/exposure. When asking about exposure history (e.g., food, travel, activities), if possible, use the entire incubation period range of *Norovirus* (10-72 hours). Specifically, however, focus on 24-48 hours prior to the case's onset, which is the usual range.

### *Completing Your Investigation*

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1. If you were able to finish the case investigation and follow-up is complete, mark "**Step 4** - Case Report Form Completed" as "Yes" and then choose Local Board of Health (LBOH) -Ready for MDPH review for the Completed by variable.
2. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please complete "**Step 4** - Case Report Form Completed" as "No" and then choose a primary reason why the case investigation was not completed from the choices provided in the primary reason answer variable list.

3. If you are not online for MAVEN you may submit a paper case report form. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked “Confidential”) to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to obtain a copy of the case report form and to confirm receipt of your fax.

The mailing address is:

**MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)**  
**305 South Street, 5th Floor**  
**Jamaica Plain, MA 02130**  
**Fax: (617) 983-6813**

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

## **Section 4**

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### **CONTROLLING FURTHER SPREAD**

#### **A. Isolation and Quarantine Requirements (105 CMR 300.130)**

Food handling facility employees who test positive for Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus shall be excluded from food handling duties for either 72 hours past the resolution of symptoms or 72 hours past the date the positive specimen was provided, whichever occurs last. In outbreak circumstances consistent with Norwalk virus, Norwalk-like virus, norovirus, or other calicivirus infection affecting patrons or food handlers, food handling facility employees may be required to provide stool specimens for testing.

*Note: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider. See Glossary (at the end of this manual) for a more complete definition.*

#### **B. Protection of Contacts of a Case**

None.

#### **C. Managing Special Situations**

##### *Daycare*

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Since Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection may be transmitted from person to person through fecal-oral transmission, it is important to follow up on cases in a daycare setting carefully. General recommendations include:

- Children with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have diarrhea should be excluded until 72 hours after the resolution of symptoms.

- Children with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.
- Notifying parents/guardians of attendees should be considered when cases of norovirus infection occur in children or staff. Licensed daycare facilities must notify all parents in accordance with MDPH recommendations when any communicable disease or condition has been introduced into the program (606 CMR 7.11). MDPH epidemiologists are available to help determine whether notification is recommended and sample letters are available from the Division of Epidemiology and Immunization at (617) 983-6800.

### *School*

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Since Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection may be transmitted from person to person through fecal-oral transmission, it is important to follow up on cases in a school setting carefully. The MDPH [Comprehensive School Health Manual](#) provides detailed information on enteric disease case follow-up and control in a school setting. General recommendations include:

- Students or staff with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who have diarrhea should be excluded until 72 hours past the resolution of symptoms.
- Students or staff with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection, who do not handle food, have no diarrhea or have mild diarrhea, and are not otherwise sick, may remain in school if special precautions are taken.
- Students or staff who handle food and have Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection must not prepare food until 72 hours past the resolution of symptoms or 72 hours past the date a positive specimen was provided, whichever occurs last (per *105 CMR 300.130*).

Refer to Chapter 8 of the MDPH *Comprehensive School Health Manual* for complete guidelines on handling diseases spread through the intestinal tract.

### *Community Residential Programs*

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Actions taken in response to a case of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection in community residential programs will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection should be placed on standard plus contact precautions until 72 hours past the resolution of symptoms. (See the MDPH Division of Epidemiology and Immunization's Long Term Care Infection Control Guidelines

<http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/providers/infection->

[control.html](#) for further actions. A copy can be obtained by calling the MDPH Division of Epidemiology and Immunization at (617) 983-6800.) Staff members who provide direct patient care (e.g., feed patients, give mouth or denture care, give medications) are considered food handlers and are subject to food handler restrictions under *105 CMR 300.130*. In addition, staff members with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who are not food handlers should not return to work until their diarrhea is gone.

In residential facilities for the developmentally disabled, staff and clients with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection must refrain from handling or preparing food for either 72 hours past the resolution of symptoms or 72 hours past the date the positive specimen was provided, whichever occurs last (per *105 CMR 300.130*). In addition, staff members with Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection who are not food handlers should not return to work until their diarrhea is gone.

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#### *Reported Incidence Is Higher Than Usual/Outbreak Suspected*

If the number of reported cases of Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle (e.g., water or food, or association with a daycare center) should be sought, and applicable preventive or control measures should be instituted. Control of person-to-person transmission requires special emphasis on personal hygiene and sanitary disposal of feces and vomitus. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

*Note: Refer to the MDPH's Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. This manual can be located at <http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/food-safety/foodborne-illness/tools/foodborne-illness-investigations-and-control.html>. For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at [www.mass.gov/dph/fpp](http://www.mass.gov/dph/fpp).*

## **D. Preventive Measures**

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### *Personal Preventive Measures/Education*

To avoid exposure, recommend that individuals:

- Always wash their hands thoroughly with soap and warm water before eating or preparing food, after using the toilet, and after changing diapers.
- Wash own hands as well as the child's hands after changing a child's diaper.
- Dispose of feces and vomitus in a sanitary manner.

- Always wash their hands with plenty of soap and warm water if they are caring for someone who has vomited or has diarrhea, particularly after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes, or soiled sheets. Hands should be scrubbed for at least 15–20 seconds after cleaning the bathroom; after using the toilet or helping someone use the toilet; after changing diapers; before handling food; and before eating.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g. dental dam) may prevent the spread of norovirus to a case's sexual partners and may prevent exposure to and transmission of other fecal-oral pathogens.

## ADDITIONAL INFORMATION

There is no formal CDC surveillance case definition for Norwalk virus, Norwalk-like virus, norovirus, or any other calicivirus infection. For reporting to the MDPH, always use the criteria outlined in Section 2A.

## REFERENCES

American Academy of Pediatrics. [*Giardia intestinalis* Infections.] In: Pickering L.K., ed. *Red Book: 2015 Report of the Committee on Infectious Diseases, 30th Edition*. Elk Grove Village, IL, American Academy of Pediatrics; 2015: 353-355.

CSTE. Case Definitions for National Notifiable Disease Surveillance System; 2011

Heymann, D., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.