



Controlling the Spread of Norovirus in an Institutional Setting – Recommendations from the Philadelphia Department of Public Health 2016-2017

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Outbreaks of norovirus infection are common during winter months within institutions such as residential facilities, hospitals, long-term care facilities, schools, and childcare settings. The virus is easily spread from person-to-person through direct contact, contact with contaminated surfaces, and eating contaminated food. Norovirus is also known as the “stomach flu,” although this virus is not related to the influenza virus. This information is provided by the Philadelphia Department of Public Health (PDPH) to assist with the recognition and control of norovirus infections in residential institutional settings. Additional information, educational materials, and posters can be found on the internet at hip.phila.gov.

Norovirus Characteristics

Norovirus is easily spread in the environment and person-to-person. The typical symptoms are nausea, vomiting, fever, abdominal cramps, and watery non-bloody diarrhea. The usual incubation period is 1-2 days, but can be as short as 12 hours. Illness typically lasts 12-60 hours and is self-limiting (will resolve on its own). The virus is present in vomitus and stool, and can be shed in stool for up to two weeks after the symptoms resolve. Asymptomatic persons can also spread the virus.

Norovirus can be a formidable problem for facilities because the infectious dose is very low: very few virus particles are necessary to cause illness. The virus can live on surfaces and water for long periods of time, and is resistant to many standard cleaning and disinfection products. As a result, contamination of the environment plays a key role in norovirus transmission and person-to-person transmission is commonly seen in institutional settings. Also, when an individual with norovirus handles or prepares food and drinks improperly (without proper hand washing and gloves), it may cause infection in people who consume those products. Reinfection may occur multiple times during a lifetime. There is no specific therapy for norovirus infection; treatment is supportive and centered on fluid replacement. Anti-emetics may be useful for residents/patients with severe vomiting.

An outbreak of norovirus infection is likely when there are at least 3 patients/residents, students, and/or staff in a facility who are experiencing symptoms of this virus in a 48-hour period. Any outbreak should be promptly reported to PDPH by calling 215-685-6740 during business hours or 215-686-4514 during evenings, weekends and holidays and asking for the Division of Disease Control on-call staff.

Preparing for Norovirus Season

It is important for institutions to have certain measures in place before the norovirus season arrives, which will better equip the staff, residents and visitors in case of an outbreak. The following recommendations are made to help facilities prepare for norovirus season:

- Provide in-services to staff on norovirus transmission, signs, and prevention. PDPH provides a template for in-service presentations.
- Provide in-services to staff and residents on proper hand hygiene.
- Hang signage throughout the facility on proper hand hygiene.
- Prepare literature for families and residents about the upcoming norovirus season. Include that ill family and friends should not visit until their symptoms have

resolved for 72 hours and even longer for infants and those with complex medical conditions. PDPH can assist with literature or guidance.

- Develop a surveillance system for monitoring gastrointestinal (GI) illness in staff and residents. This should also include a communication plan for notifying nurse managers or supervisors of single and multiple cases. PDPH has generic spreadsheets for use in tracking GI illness in staff and residents/patients.
- Create a communication plan for nurse managers to notify facility administration of any possible outbreaks and who is to communicate this information to PDPH.
- Ensure the sick policy is fair for staff that may become ill with norovirus or have dependents with norovirus. All staff that have symptoms of norovirus should be excluded from work, regardless of position or duties for at least 72 hours after the resolution of symptoms.
- Discuss with facilities management/environmental health management the routine cleaning schedule along with an enhanced cleaning schedule. Ensure that the proper cleaning products are in place.
- Ensure the building has a proper supply of soap and paper towels. In addition, alcohol-based hand sanitizers may be used in conjunction with handwashing, but should NOT be used as a substitute. Ensure these supplies are adequately stocked to cover the entire season.
- Ensure there is proper supply of gloves and other PPE equipment such as gowns and masks.
- Ensure there are adequately placed hand-sanitizer dispensers throughout the facility, particularly in common areas and at least on each unit.

Diagnosis

The Pennsylvania Department of Health Bureau of Laboratories (BOL) can identify norovirus in stool and vomitus using a PCR-based assay. This assay is not yet approved for clinical use. PDPH must be consulted before clinical specimens are submitted to BOL for testing. Several private laboratories in the region may also offer this test; please check with your laboratory to see if they offer this lab test.

- Stool or vomit should be collected during the acute phase of illness (within 48-72 hours of symptom onset), and put into a dry, clean container. The container must be placed in a leak proof bag. Liquid stool obtained during the acute phase of illness will have a higher yield than vomit or semi-formed stool obtained later in the illness.
- Each specimen container should be clearly labeled with patient's name, date of collection, date of birth, and name of the facility from which the specimen is obtained. A separate list of names, including date of specimen collection and date of birth, should also be provided to ensure PDPH staff is able to fill out lab slips for each specimen submitted.
- Specimens can be stored in a working refrigerator (4°C) until ready for pick-up. Specimens should not be frozen.
- Ideally, specimens from at least 5 individuals should be obtained during outbreaks.
- PDPH can assist with specimen transport to the laboratory.

When specimens are not available for viral testing, Kaplan Criteria (see reference #9) can be used to diagnosis an outbreak due to norovirus. These criteria are 1) vomiting in more than half of symptomatic patients, 2) mean/median incubation period of 24 to 48

hours, 3) mean/median duration of illness of 12 to 60 hours, 4) no bacterial pathogen isolated in stool cultures.

Infection Control Measures

Strict hand hygiene and other infection control practices are necessary to control norovirus spread.

- Hands should be washed frequently and vigorously with soap and water for ≥ 20 seconds especially:

<p>AFTER:</p> <ul style="list-style-type: none"> • Using the bathroom • Cleaning up vomitus or diarrhea • Changing diapers • Handling soiled clothing or linens • Contact with a symptomatic person • Sneezing or coughing • Removing personal protective equipment • Busing tables or handling used utensils 	<p>BEFORE:</p> <ul style="list-style-type: none"> • Eating • Food preparation • Serving food • Providing healthcare services • Assisting patients/residents with activities of daily living • Administering medication to patients/residents
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- If water and soap are not available, use an alcohol-based hand sanitizer with 60-95% ethanol.
- Contact precautions should be used when caring for or visiting patients with symptoms of norovirus or exposed to the virus. Personal protective equipment (PPE) such as gloves and gowns should be available outside of all rooms with a sick resident. PPE should be worn at all times in the room of a sick resident by all that enter the room (e.g. nursing staff, facilities management staff, etc). All persons should remove and dispose of PPE when leaving the room and wash their hands.
- Contact precaution advisory signs should be hung on doors of patients/residents with symptoms of norovirus infection. All persons, including staff, residents, and visitors, should adhere to these advisories. Additional signage may be placed in areas where cohorting and isolation are taking place of both ill and exposed residents.
- Persons cleaning areas that are heavily contaminated with vomitus or feces should wear gowns, gloves, eye protection or face shields and surgical masks. Aerosolization of vomitus can infect environmental surfaces or another person’s oral mucosa. Proper techniques for cleaning and disinfection are described in detail below.
- Staff must clean up vomit and fecal spillages promptly and carefully so that virus aerosolization is minimized. After clean up, disinfect the surrounding area with a bleach-based cleaner or with heat disinfection (as detailed below).
- Immediately wash clothing or linens that may be contaminated with the virus, especially after an episode of vomiting or diarrhea. Staff should handle soiled linens as little as possible, with gloves, and with minimal agitation so that aerosols are prevented. Linens can also be placed immediately into a laundry bag to minimize cross-contamination. Contaminated linens should be laundered separately in hot water and detergent on the maximum cycle length and machine dried.

- Items in the residents' rooms should not be shared or they should be single-use.
- Medical equipment used for care of a norovirus infected resident should be dedicated to the room (e.g. I.V. pump) or thoroughly disinfected between use (e.g. glucometer).

Recommendations for Administrators

- Any staff member, including kitchen staff, with symptoms of norovirus infection should be sent home. Symptomatic staff must not return to work for 72 hours after symptoms resolve; symptomatic food handlers must not prepare or serve food for others under any circumstances. If transmission continues in the facility, screen employees who have been exposed and potentially incubating infection, to ensure rapid exclusion if symptoms develop.
- Limit staff from moving between affected and unaffected units and assign staff to work on the same wards or units as consistently as possible, until the outbreak has resolved. If feasible, maintain the same staff-to-resident assignments.
- Exclude any nonessential personnel including volunteers from affected units.
- Limit new admissions and readmissions to the facility and primarily affected units until the outbreak is over.
- Cancel group activities including dining events until there are no new cases for 72 hours.
- Educate all staff, patients/residents and visitors about norovirus and the risk of infection. During community-wide outbreaks, instruct staff with diarrhea or vomiting not to come to work until they have recovered.
- Create a line list of both staff and patients/residents affected by the outbreak; PDPH has developed a form for this purpose. This list will provide information about the extent of the outbreak and assist with assessing the impact of control measures.
- Provide regular updates on the outbreak situation to staff and to PDPH.
- PDPH should be informed when residents with norovirus are transferred to a hospital or other healthcare facility during the outbreak. LTC facilities should also inform all facilities that receive residents from the LTC institution for any reason, that there is an active norovirus outbreak in the facility.

Recommendations for Staff

- Any staff member, including kitchen staff, with symptoms of norovirus infection should be sent home immediately or not come into work. Symptomatic staff must not return to work for 72 hours after symptoms resolve; symptomatic food handlers must not prepare or serve food for others under any circumstances.
- Staff who must interact with sick and well patients/residents must wash hands thoroughly between each interaction. Well rooms should be visited first. Emphasis should be placed on cleaning hands before each medication administration.
- Staff recently returning from a period of absence due to suspected norovirus infection may be better suited to care for exposed and symptomatic patients.
- All staff caring for patients with norovirus symptoms should use contact precautions and wear appropriate personal protective equipment (PPE). PPE may also be worn when in specific units where ill residents have been identified.
- Notify administrator(s) of any patient with symptoms consistent of norovirus.

Recommendations for Residents

- Educate residents and visitors about norovirus and the risk of infection.
- If possible, place residents with norovirus in private rooms, or cohort residents with the same illness. At a minimum, patients with norovirus should be placed on contact precautions during the duration of their illness and at least 72 hours after the resolution of symptoms. Roommates of residents with norovirus infection are at very high risk for infection, particularly if there is a shared bathroom. If no private rooms are available for ill residents, shared bathroom facilities should be cleaned frequently (after each use at a minimum) with a chlorine-based or other appropriate disinfectant.
- Closely monitor contacts (e.g., roommates) of cases to ensure quick recognition of illness and prompt exclusion from group activities and common-use facilities.
- Residents with norovirus infection should be confined to their rooms, and should not use common bathroom facilities or participate in group activities until 72 hours after their symptoms have resolved.
- Discontinue self-service in the cafeteria or dining facilities to minimize food handling by residents, until the outbreak is over (e.g., 72 hours with no new cases). Meals should be brought to ill residents by dedicated staff. Pantry access on the individual units should also be restricted from all residents.
- Residents should be restricted from using the ice machines unless it is one that dispenses the ice automatically. Ice machines may play a key role in transmission and may need to be disinfected.

Recommendations for Visitors

- Signs should be posted throughout the facility to alert visitors of the outbreak, and the methods of transmission. It is also prudent to warn visitors with gastrointestinal or other contagious illness to delay visiting the facility until their own symptoms have resolved.
- Facilities may wish to restrict visitors from entering the facility until the outbreak is over.

Recommendations for Facility Management

During an outbreak, routine ward, bathroom and toilet cleaning should occur with increased frequency, especially common-use bathrooms. “High touch” surfaces such as faucets, sinks, toilets, commodes, bath rails, toilet rails, counters, phones, keyboards, tables, mattress covers, chairs, handrails, doorknobs, elevator buttons, light switches and ice machines require frequent cleaning. Ensure that shared bathrooms on affected units and rooms are cleaned frequently (after each use at a minimum) with a chlorine-based or other appropriate disinfectant. Unit level cleaning may be increased up to twice daily with frequently touched surfaces being cleaned up to three times daily using EPA-approved products effective against norovirus in healthcare settings.

When cleaning an area that has been contaminated with stool or vomit, carpets should not be dry-vacuumed and hard surfaces should not be buffed since these processes can increase the risk or aerosolization of norovirus particles. A suggested procedure for cleaning these areas should include applying detergent and hot water, then an appropriate disinfectant, followed by steam cleaning. If mops are used, the heads should be laundered frequently and reusable towels should be disinfected regularly.

Before the disinfection process:

- Spot test disinfectant solutions: some disinfectants can discolor or corrode surfaces.
- Protect yourself from norovirus aerosols and disinfectant by wearing personal protective equipment (PPE): disposable gloves, facemask, eye protection, and disposable gown.

A summary of cleaning and disinfection recommendations is provided below along with a summary table at the end of these guidelines.

- Disinfection with either chlorine bleach or a U.S. Environmental Protection Agency (EPA) approved disinfectant can be used to control norovirus outbreaks. A list of approved EPA disinfectants can be found on the web at: www.epa.gov/oppad001/list_g_norovirus.pdf
- Chlorine bleach should be applied to hard, non-porous, environmental surfaces at a minimum concentration of 1000 ppm (generally a dilution of 1 part household bleach solution to 50 parts water – e.g., 1/3 cup bleach mixed in 1 gallon of water). In areas of high levels of soiling and resistant surfaces, a concentration of 5000 ppm may be used (a dilution of 1 part bleach to 10 parts water, or 1 2/3 cup (25 tablespoons) of bleach mixed with 1 gallon water). Chlorine-based solutions should be freshly prepared to disinfect.
- Phenolic-based disinfectants (e.g., Pinesol® or Lysol®) are effective but may require concentrations of 2-4 times the manufacturer's recommendations for routine use.
- Heat disinfection (to 60°C or 140°F) has been suggested for items (carpet and upholstery) that cannot be subjected to chemical disinfectants such as bleach.
- Quaternary ammonium compounds, often used for sanitizing food preparation surfaces and disinfecting large surfaces such as countertops or floors, may not be effective against noroviruses. Consult the EPA list of registered disinfectants to ensure that the product is effective against norovirus; if not, temporarily switch to a disinfectant that is effective against norovirus.
- If a patient ill with norovirus is transferred or discharged, discard disposable patient-care items from their room and launder all linens including privacy curtains.
- Remove potential sources of transmission such as candy bowls, fruit bowls, etc. throughout the facility.

Resources:

Refer to our website for updates, forms, and additional information:

<https://hip.phila.gov/DiseaseControlGuidance/DiseasesConditions/Norovirus>

1. Michigan Department of Community Health: Local Health Department Guidelines for Environmental Cleaning and Disinfection of Noroviruses. May 2005
2. Centers for Disease Control and Prevention, "Norwalk-like viruses: public health consequences and outbreak management. MMWR 2001; 50 (No. RR-9).
3. CDC. Norovirus in Healthcare Facilities – Fact Sheet, available at http://www.cdc.gov/ncidod/dhqp/id_norovirusFS.html.
4. Pennsylvania Department of Health, "Recommendations for the control of norovirus outbreaks in long term care, healthcare, and daycare facilities," February 27, 2006.
5. Norovirus Control Measures for Skilled Nursing Facilities. Los Angeles County Department of Public Health, Acute Communicable Disease Control Program, Revised 12-1-06, available at www.lapublichealth.org

6. Said MA, Perl TM, Sears CL. Gastrointestinal Flu: Norovirus in Health Care and Long-Term Care Facilities. *Clin Infect Dis.* 2008; 4:1202-8
7. Virginia Department of Health, "Norovirus Prevention Guidance for Institutions/Facilities," Revised January 31, 2009, available at http://www.vdh.state.va.us/Epidemiology/documents/pdf/Attachment_H_Norovirus_Prevention_Guidance_For_Facilities_01_31_09.pdf
8. MacCannell T, Umscheid CA, Agarwal RK, et al. Guideline for the Prevention and Control of Norovirus Gastroenteritis Outbreaks in Healthcare Settings. Draft document available at: www.cdc.gov/hicpac/pdf/norovirus/HICPAC_Norovirus_FR_Ver_05_20_10_clean.pdf
9. Kaplan JE, Feldman R, Campbell DS, Lookabaugh C, Gary GW. The frequency of a Norwalk-like pattern of illness in outbreaks of acute gastroenteritis. *Am J Public Health.* 1982;72(12):1329-1332.

Summary Table: Disinfection of Norovirus on Different Surfaces

SURFACES	BLEACH SOLUTION*	DILUTION	CONTACT TIME
Non-porous surfaces: Porcelain or ceramic surfaces, tile floors, counter tops, toilets, sinks.	1/3 cup (5 tbsps) bleach mixed in 1 gallon water	1:50 Use 1:10 dilution if high levels of soiling.	A contact time of up to 10 minutes may be required for maximal effect.
Porous surfaces: wood floors, cement	1 2/3 cup (25 tablespoons) bleach mixed in 1 gallon water	1:10	
CARPETS, TEXTILES, UPHOLSTERY	HANDLING PRECAUTIONS AND DISINFECTION PROCESS		
Carpets, upholstery	<ul style="list-style-type: none"> • Carefully remove vomitus and feces to minimize aerosols; wipe with absorbent material. • Clean with hot water and detergent or steam clean at 158° F for 5 minutes or 212° F for 1 minute. • Dry vacuuming is not recommended, since virus may become airborne. 		
Linens and textiles Clothing	<ul style="list-style-type: none"> • Immediately wash linens and clothing that may be contaminated with the virus, especially after an episode of illness. Minimize aerosols by gently handling or bundling soiled materials. • Remove excess vomit or stool carefully from material. • Separate norovirus-contaminated and uncontaminated laundry. • Launder with hot water and detergent on the maximum cycle length and machine dry. 		

*Presume use of standard (5.25%) bleach solution