



Controlling the Spread of Norovirus in Schools and Childcare Settings – Recommendations from the Philadelphia Department of Public Health 2019-2020

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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 ingestion of contaminated food. This information is provided by the Philadelphia Department of Public Health (PDPH) to assist with the recognition and control of norovirus infections in schools and childcare facilities.

Norovirus Characteristics

The typical symptoms of norovirus are nausea, vomiting, low-grade fever, abdominal cramps, and watery, non-bloody diarrhea. Symptoms usually develop in 1-2 days after ingestion of the virus, but can appear as early as 12 hours. Illness typically lasts 12-60 hours and is self-limiting (will resolve on its own). Virus can be shed in stool for up to 2 weeks. Norovirus is spread very easily from person to person and people can become infected with the virus in several ways, including:

- eating food or drinking liquids that are contaminated with norovirus;
- touching surfaces or objects contaminated with norovirus, and then placing their hand in their mouth;
- having direct contact with another person who has norovirus (for example, when caring for someone with illness, or sharing foods or eating utensils with someone who is ill).

The virus can persist on surfaces in the environment for weeks, and is relatively resistant to many disinfecting agents. When an individual with norovirus handles or prepares food and drinks improperly it can cause infections in people who consume those products; therefore symptomatic food workers should not handle food or drink. Re-infection may occur multiple times during a lifetime. There is no vaccine or specific therapy for norovirus infection, and treatment is supportive and centered on fluid replacement.

An outbreak of norovirus infection should be suspected when there are at least 3 students or staff in a facility or classroom who are experiencing gastrointestinal symptoms, with onset within a 48- hour period. Report all suspected norovirus outbreaks to PDPH, Division of Disease Control at 215-685-6742.

Diagnosis

Individuals with diarrhea and vomiting should see their primary healthcare provider. PDPH can assist in the diagnosis of norovirus in outbreak situations. Call PDPH immediately if an outbreak is suspected. Norovirus can be identified in vomitus or stool, and must be collected in a clean, re-sealable container. Testing is conducted at PDPH's Public Health Laboratory. During community-wide outbreaks or periods of high norovirus transmission, laboratory diagnosis may not be necessary.

Infection Control Measures

Strict infection control practices are necessary to control norovirus spread. Below are best practices to reduce spread of enteric pathogens. Hand washing is one of the best and easiest ways to reduce transmission of norovirus.

Hand should be washed:

AFTER: <ul style="list-style-type: none">• Toilet visits• Cleaning up vomitus or diarrhea• Changing diapers• Handling soiled clothing or linens• Contact with a symptomatic person• Sneezing, coughing	BEFORE: <ul style="list-style-type: none">• Eating or feeding children• Food preparation• Serving food• Providing healthcare services
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- Effective handwashing technique:
 - Lather hands with soap and warm water for 20 seconds, scrub under fingernails;
 - Dry hands with disposable paper towel or under an air dryer.
- Adults should observe younger children washing hands after using the toilet and before eating to ensure their hands are thoroughly cleaned.
- Each sink should be supplied with soap and access to paper towels.
- Educate students and staff about hand washing.
- If water and soap are not available, use an alcohol-based hand sanitizer with at least 60% ethanol.
- Post signage to remind all persons in the facility to practice frequent hand washing.
- Persons cleaning areas that are heavily contaminated with vomitus or feces should wear disposable gloves and face masks.
- Clean up vomit and fecal spillages promptly and carefully so that the release of virus into the air is minimized. Properly dispose of vomit or feces in a toilet and disinfect the surrounding area with a bleach-based cleaner (see below).
- If it is possible, immediately wash clothing or linens that may be contaminated with the virus, especially after an episode of vomiting or diarrhea. Staff should handle these as little as possible, with minimal agitation. Launder with hot water and detergent on the maximum cycle length and machine dry. If laundry is not done at your facility, place soiled items in a plastic bag and seal or tie the bag.

Recommendations for Administrators/Staff

- Any staff member, including kitchen staff, with symptoms of norovirus infection should be sent home immediately and must not return until they are no longer symptomatic for 3 days.
- Symptomatic food handlers must not prepare or serve food for others under any circumstances.
- Staff who interact with or assist sick students or clean up vomit or feces must wash hands thoroughly after each encounter.

- Administrative or student health staff at the school should track the number of ill students and staff. PDPH can provide you with a spreadsheet for this purpose.
- Post hand hygiene signage in the bathrooms for students and staff.
- Cancel or postpone group activities (i.e. outings, field trips, parties, etc.) until the outbreak is over.
- Maintain the same staff to assigned classrooms to limit the spread of infection.
- Non-essential staff and parents should not visit the school until the outbreak is over.

Recommendations for Students

- Any student with symptoms of norovirus infection should be sent home and must not return until they are no longer symptomatic for 48 hours. However, in instances of continued transmission, or if the child is not toilet-trained, a longer exclusion period of 72 hours is recommended.
- Students must wash their hands thoroughly after using the bathroom and before eating.

Cleaning and Disinfection of Environmental Surfaces

During an outbreak, routine classroom, bathroom and toilet cleaning should occur with increased frequency, especially common-use bathrooms.

- Before the disinfection process:
 - Spot test disinfectant solutions: 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 if available.
- Disinfection with either chlorine bleach or a U.S. Environmental Protection Agency (EPA) approved disinfectant can be used to clean contaminated surfaces. For a list of these products, see http://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) is suggested for items like upholstery and carpet that cannot be cleaned with chemical disinfectants such as chlorine bleach.
- Quaternary ammonium compounds, often used for sanitizing food preparation surfaces and disinfecting large surfaces such as countertops or floors, are *not* effective against noroviruses.
- “High touch” surfaces such as faucets, toilets, tables, toys, toilet rails, counters, phones, tables, chairs, sleeping mats, walls, hand rails, doorknobs, elevator buttons, light switches, and ice machines, require frequent cleaning.

- Toys should be disinfected daily with a 1:250 bleach solution (e.g. 1 tablespoon bleach diluted in 1 gallon water), or placed in a dishwasher with a washing cycle of greater than 170° F. Throw away toys that are grossly contaminated, especially ones that are not easily cleaned.
- Thoroughly disinfect diaper changing surfaces. The following measures will help reduce the chance of norovirus spreading to others:
 - Diaper changing pad should be free of cracks.
 - Line the pad with a disposable covering for one-time use for each diaper change
 - After a diaper change, dispose of lining and clean diaper changing surfaces with bleach (1:50 solution).
 - Caregivers should wash hands after each diaper change.
 - Wash the hands of the diapered child after each diaper change.

Resources:

Refer to the PDPH website for updates, forms, and additional information:

<https://hip.phila.gov/xv/DiseaseInformation/tabid/81/Default.aspx>

1. Centers for Disease Control and Prevention, "Norwalk-like viruses: public health consequences and outbreak management. MMWR 2001;50 (No. RR-9).
2. CDC. Norovirus in Healthcare Facilities – Fact Sheet, available at http://www.cdc.gov/ncidod/dhqp/id_norovirusFS.html.
3. CDC. Norovirus: Technical Fact Sheet, available at <http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus-factsheet.htm>
4. Michigan Department of Community Health: Local Health Department Guidelines for Environmental Cleaning and Disinfection of Noroviruses. May 2005
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. Pennsylvania Department of Health, "Recommendations for the control of norovirus outbreaks in long term care, healthcare, and daycare facilities," February 27, 2006.
7. Said M, Perl T, Sears C, Gastrointestinal Flu: Norovirus in Healthcare and Long-Term Care Facilities. CID, 2008; 47:1202-8.
8. Virginia Dept of Health

Summary Table: Disinfection of Norovirus on Different Surfaces

SURFACES	BLEACH SOLUTION*	DILUTION	CONTACT TIME
Items that will come into contact with food/mouth	1 tablespoon bleach mixed in 1 gallon water	1:250	A contact time of up to 10 minutes may be required for maximal effect
Non-porous surfaces, including porcelain and ceramic surfaces, tile floors, countertops, toilets, and sinks	1/3 cup (5 tablespoons) bleach mixed in 1 gallon water	1:50	
Porous surfaces, including wood floors and cement Heavily contaminated non-porous surfaces	1 and 2/3 cups bleach in 1 gallon water	1:10	

*Presume use of standard (5.25%) bleach solution

Summary Table: Disinfection of Non-Bleachable Surfaces

SURFACE	HANDLING PRECAUTIONS AND DISINFECTION PROCEDURES
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 because virus may become airborne.
Linens, 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.