

Outbreaks of norovirus infection are more likely to occur during winter months within institutions such as residential facilities, hospitals, long-term care facilities, schools, and child care 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 Oklahoma State Department Health (OSDH) to assist with the recognition and control of norovirus infections in schools and child care facilities.

Norovirus Characteristics

The typical symptoms of norovirus are nausea, vomiting, low-grade fever, abdominal cramps, and watery, non-bloody diarrhea. Vomiting is more common in children. Symptoms usually develop within 24 to 48 hours after exposure, but can appear as early as 12 hours. Illness typically lasts 12 to 60 hours and usually will resolve on its own. The virus can be shed in stool for up to 14 days after illness has resolved.

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 eating or placing their hand in their mouth.
- Having direct contact with another person who has norovirus. Examples include, 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 not destroyed by many disinfecting products. When an individual with norovirus handles or prepares food and drinks improperly, they can contaminate those items and can cause infections in people who consume those products; therefore, food workers with diarrhea or vomiting should not work until at least 72 hours after their symptoms have stopped.

Re-infection can occur multiple times during a lifetime. An outbreak of norovirus infection is suspected when more than two students and/or staff in a facility or classroom have symptoms of this virus, starting within a 48 hour period. Report any suspected outbreaks to the OSDH Acute Disease Service at 405-271-4060. After business hours or on weekends or holidays, you will be asked to leave a message, and the epidemiologist-on-call will return your call shortly.

Diagnosis and Treatment

Individuals with diarrhea and vomiting should drink plenty of fluids and follow the control measures on the next page to prevent spread in their households. There is no vaccine or specific therapy for norovirus infection; treatment is supportive and focuses on preventing dehydration. If symptoms do not improve, individuals should contact their primary care physician. Confirmatory laboratory testing for norovirus during an outbreak can be arranged through the OSDH Public Health Laboratory by contacting the OSDH Acute Disease Service. During community-wide outbreaks or periods of high norovirus transmission, laboratory diagnosis may not be necessary.

Control Measures

Strict infection control practices are necessary to control norovirus spread. These are:

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

AFTER: <ul style="list-style-type: none">• Toilet visits• Cleaning up vomit 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 entire hands including beneath fingernails,
 - * Rinse hands well with warm running water, and
 - * Dry hands with disposable paper towel or under air dryer.
- Adults should observe younger children washing hands after using the toilet and before eating.
- Each sink should be supplied with soap and access to paper towels.
- Educate students and staff about good hand washing techniques.
- If water and soap are not available, use an alcohol-based hand sanitizer with at least 60% alcohol, although this is not as effective as soap and water.
- Post signage to remind all persons in the facility to practice frequent hand washing.
- Persons cleaning areas that are heavily contaminated with vomit 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 next page for cleaning and disinfecting).
- If it is possible, immediately remove and wash clothing or linens that may be contaminated with vomit or feces. Handle soiled items as little as possible, without agitating them. Launder with an approved detergent in hot water $\geq 160^{\circ}\text{F}$ for ≥ 25 minutes. Dry in hot dryer if fabric allows. If laundry is not done at your facility, place soiled linens 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 and must not return until they are no longer symptomatic for 72 hours.
- 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. OSDH Acute Disease Service 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. Floating staff should be assigned exclusively to either well or sick classrooms until the outbreak is over.
- 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 72 hours.
- Students must wash their hands thoroughly after using the bathroom and before eating.

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Cleaning and Disinfecting 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.
- After cleaning, disinfect with diluted chlorine bleach or a U.S. Environmental Protection Agency (EPA)-approved disinfectant.
- Diluted 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 and 2/3 cup [25 tablespoons] of bleach mixed with 1 gallon water). Fresh bleach solutions should be prepared daily, as potency is quickly lost.
- 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 bleach-based cleaning solution or placed in a dishwasher with a washing cycle of greater than 170 °F. Throw away toys that are grossly contaminated.
- Thoroughly disinfect diaper changing surfaces:
 - * 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 hands of the diapered child after each diaper change.

Resources:

1. CDC. Norovirus in Healthcare Facilities – Fact Sheet, available at <http://www.cdc.gov/HAI/organisms/norovirus.html>, (accessed 16 August 2011).
2. CDC. Division of Viral Disease, Norovirus, available at <http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm> (accessed 16 August 2011).
3. Philadelphia Department of Public Health, “Controlling the Spread of Norovirus in Schools and Childcare Settings – Interim Recommendations from the Philadelphia Department of Public Health, February 10, 2011”, available at https://hip.phila.gov/xv/Portals/0/HIP/Disease_Info/Norovirus/PDPHGuidelines_ControllingSpreadNorovirus_SchoolsChildcareSettings_021011.pdf (accessed 16 August 2011).

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