

Norovirus Outbreaks rev Apr 2015

Norovirus is the most common cause of gastrointestinal illness, estimated to cause more than half of all cases and outbreaks recorded annually. Outbreaks of norovirus are common as viral particles are readily transmitted person-to-person due to a low infectious dose required to cause illness. While sporadic cases are not reportable, norovirus outbreaks are reported to DSHS and to the CDC.

BASIC EPIDEMIOLOGY

Infectious Agent

Noroviruses are small, structured RNA viruses that belong to the Caliciviridae family. There are six genogroups (G) of norovirus, of which GI, GII, and GIV infect humans. Due to its genetic diversity, infection with one genogroup does not provide immunity against any other norovirus genogroup. GII norovirus strains account for the majority of norovirus outbreaks in long term care facilities, and the GII.4 Sydney strain has been predominant in recent years.

Transmission

Transmission occurs through the fecal-oral route, including direct person-to-person contact and indirect transmission through contaminated food, water, or environmental surfaces. Vomitus-oral transmission, via aerosolization, is possible.

Incubation Period

Norovirus symptoms typically present 12–48 hours after exposure to the virus.

Communicability

Norovirus is most communicable during acute stage of disease, but the virus may be shed in stool for 2-3 weeks after symptom resolution.

Clinical Illness

Norovirus illness is generally self-limited and lasts 1-3 days in healthy individuals, and 4-6 days in the very young, elderly, and hospitalized. Primary symptoms include: vomiting and diarrhea (typically watery and without blood). Additional symptoms include: nausea, low-grade fever, abdominal cramps, and malaise. Deaths can occur, especially in the elderly in long-term care facilities.

DEFINITIONS

Outbreak Definition

An outbreak is defined as two or more cases with symptoms clustered in time and space.

Confirmed: An outbreak is confirmed as being caused by norovirus if ≥ 2 ill persons in the outbreak have norovirus DNA identified in a stool specimen submitted to the DSHS laboratory or another acceptable laboratory.

Probable: Norovirus can be established as the probable cause of an outbreak if:

- The mean (or median) illness duration is 12 to 60 hours, AND
- The mean (or median) incubation period is 24 to 48 hours, AND
- More than 50% of people have vomiting, AND
- No bacterial or parasitic agent is found.

OUTBREAK INVESTIGATION

Outbreak Investigation

Suspect norovirus outbreaks should be investigated in order to determine the agent, characterize the scope, and prevent additional cases.

Outbreak Investigation Checklist

- Prepare a linelist of all cases. Minimal information needed for the line list might include patient name or other identifier; age and sex; category or group (e.g. patient, preschooler, resident, staff, or student), room number, if applicable; onset of symptoms (date & time), signs & symptoms, duration of illness; lab specimen collected, lab results; treatments and outcome of case; and foods eaten leading up to illness, or other risky exposures reported by the case or surrogate.

Line list example:

ID	Name	Age	Sex	Category	Room #	Onset	Symptoms	Hospitalized	Lab specimen
1	NT	34	F	resident	4c	12/4/14	Bl. D, F	Yes	stool
2	PR	2	M	staff	Wing A	11/30/14	V, D, F	None	none

- Systematically collect information from cases to characterize the outbreak.
 - Interview ill persons (as many as possible).
 - Use a questionnaire based on the Hypothesis Generating Questionnaire (http://www.dshs.state.tx.us/idcu/health/foodborne_illness/investigation/) that includes information specific to the outbreak, such as a calendar and building floor plans.
- Characterize the outbreak: Compile all of the available information on all cases in the outbreak. See Characterize the Outbreak below.
- Arrange for appropriate laboratory testing.
 - Attempt to collect stool specimens from at least 3 but not more than 12 ill persons, and coordinate specimen submission and testing with EAIDB and DSHS or local laboratory. See Laboratory Procedures.
 - Ensure that specimens negative for norovirus are tested for bacterial pathogens.
- Conduct environmental field investigation, if indicated.
 - Facility assessment:
 - Collect information on facility operations.
 - Identify and correct items that may have contributed to the outbreak.
 - Obtain names and contact information of those present at facility during outbreak timeframe, e.g., employees, food workers, customers, residents, students, etc.
- Implement facility control measures. See Control Measures Section.
- Communicate regularly with all parties involved in outbreak investigation
 - Provide Situation Reports through email.
 - Hold conference calls to discuss the outbreak investigation.
- Monitor the outbreak until the last case has been symptom-free for 48 hours

- Report findings at conclusion of investigation.
 - Create Outbreak Summary Report.
 - Submit a completed **National Outbreak Reporting System (NORS)** outbreak form at the conclusion of the outbreak investigation.

Characterize the outbreak

- Provide descriptive information, in narrative, tabular, and graphic form, for the outbreak
 - Calculate or estimate the number of persons at risk.
 - Calculate or estimate the number of ill persons.
 - Calculate or estimate the attack rate.
 - Calculate or estimate the mean, median, and range for the illness incubation period.
 - Calculate the number and frequency of symptoms expressed by ill persons.
 - Calculate the number and percentage of ill persons who sought medical care.
 - Calculate the number and percentage of ill persons hospitalized overnight.
 - Calculate the number and percentage of ill persons who died.
 - Calculate the percentage of total cases in the age groups <1y, 1-4y, 5-19y, 20-24y, ≥50y.
 - Calculate the gender distribution of illness (% female, % male).
 - Document the number of persons who provided stool specimens and the number of these that tested positive for norovirus.
 - Document the strain of norovirus, if determined.
- Characterize the outbreak setting
 - Document any ill health care, food, or other workers at the facility or other setting.
 - Document the percentage of ill staff who had illness onset >24 hours before residents/others.
 - Document any suspected source of the outbreak (*Note: More than one suspect source can be entered into the National Outbreak Reporting System or NORS*).
 - Document characteristics of the setting that might have contributed to the outbreak (Crowding, construction, water issues, recent movement of people into setting, etc.).
 - Document any food or environmental specimens that tested positive for noroviruses and the viral strain identified, if known.
- Characterize the time frame of the outbreak.
 - Document the illness onset dates for the first and last ill persons in the outbreak, and the peak date of illness.
 - Prepare an epi-curve for the outbreak.

CONTROL MEASURES

Control measures should be implemented as soon as a potential outbreak is recognized. Specific recommendations for the prevention of additional cases should be based on the findings of the epidemiologic investigation.

General Control Measures include:

- **Hand hygiene**
 - Hands should be washed with warm water and soap for 15-20 seconds especially:
 - Before preparing, handling or eating any food.

- After going to the bathroom.
- After changing a diaper.
- After caring for someone with diarrhea.
- No bare-hand contact with ready-to-eat foods also helpful.
- Alcohol-based and other sanitizers are of questionable efficacy; and therefore, should not be a substitute for hand washing when soap and water are available.

- **Environmental Disinfection**

- If the facility does not have an Environmental Protection Agency-registered commercial virucide, use bleach. The CDC recommends the use of a chlorine bleach solution with a concentration of 1000–5000 ppm (5–25 tablespoons of household bleach (5.25%) per gallon of water) on all surfaces. Leave the surface wet for ≥ 5 minutes or follow the directions on the commercial cleaner to allow sufficient time for the bleach to kill the pathogen.
- Bathrooms and “high-touch” surfaces (door knobs, hand rails, etc.) should be targeted.
- Refer to bleach cleaning recommendations: http://www.disinfect-for-health.org/wp-content/themes/disinfect/pdfs/NorovirusIncident_8.5x11_Eng_Color.pdf

- **Exclusion and Isolation**

- Recommend segregation of ill persons, perhaps also with exposed persons, if appropriate.
- Recommend restriction of movement and visitors, if a group setting and if appropriate.
- Restrict individuals from handling food, engaging in child-care, healthcare work, or attending child-care until they are free from symptoms for at least 24 hours without the use of symptom suppressing medications.

For more information on norovirus prevention, please see:

<http://www.cdc.gov/norovirus/preventing-infection.html>

Recommended Control Measures for Schools and Child-Care Centers:

- **Hand Washing**

- Encourage children and adults to wash their hands frequently, especially before handling or preparing foods and after wiping noses, diapering, using toilets, or handling animals.
- Wash hands with soap and water long enough to sing the “Happy Birthday” song twice.
- Sinks, soap, and disposable towels should be easy for children to use.
- If soap and water are not available, clean hands with gels or wipes with alcohol in them.

- **Diapering**

- Keep diapering areas near hand washing areas.
- Keep diapering and food preparation areas physically separate. Keep both areas clean, uncluttered, and dry.
- The same staff member should not change diapers and prepare food.
- Cover diapering surfaces with intact (not cracked or torn) plastic pads.
- If the diapering surface cannot be easily cleaned after each use, use a disposable material such as paper on the changing area and discard the paper after each diaper change.

- Sanitize the diapering surface after each use and at the end of the day.
- Wash hands with soap and water or clean with alcohol-based hand cleaner after diapering.
- **Environmental Surfaces and Personal Items**
 - Regularly clean and sanitize all food service utensils, toys, and other items used by children.
 - Discourage the use of stuffed toys or other toys that cannot be easily sanitized.
 - Discourage children and adults from sharing items such as combs, brushes, jackets, and hats.
 - Maintain a separate container to store clothing and other personal items.
 - Keep changes of clothing on hand and store soiled items in a nonabsorbent container that can be sanitized or discarded after use.
 - Provide a separate sleeping area and bedding for each child, and wash bedding frequently.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School, Child-Care Facility, and General Public Reporting Requirements

Cases or suspected cases of illness considered being **public health emergencies, outbreaks, exotic diseases**, and unusual group expressions of disease must be reported to the local health department or DSHS **immediately**. Other diseases for which there must be a quick public health response must be reported **within one working day**.

Local and Regional Reporting and Follow-up Responsibilities

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDB at **512-776-7676**
- Submit a completed **National Outbreak Reporting System (NORS)** outbreak form at the conclusion of the outbreak investigation.
 - Enter into NORS online reporting system at <https://wwwn.cdc.gov/nors/login.aspx>
 - Forms, training materials, and other resources are available at <http://www.cdc.gov/nors/>
- To request a NORS account, please email FoodborneTexas@dshs.state.tx.us
 - Please put in Subject Line: NORS User Account Request
 - Information needed from requestor: name, e-mail address, and agency name
 - After an account has been created a reply e-mail will be sent with a username, password, and instructions for logging in.

LABORATORY PROCEDURES

Real time RT-PCR for norovirus is available at the DSHS laboratory for clinical specimen testing. Coordinate shipping, specimen submission, and testing of specimens with EAIDB and the DSHS laboratory staff. Specimens should not be submitted to the DSHS laboratory unless approved by EAIDB. Contact an EAIDB foodborne epidemiologist to discuss further.

CLINICAL SPECIMENS

Specimen Collection

- Only raw stool is accepted for norovirus testing.
- Transport temperature: 2-8°C (ice pack).
- Transport time: as soon as possible.

Submission Form

- Use the DSHS Laboratory G-2B form for specimen submission.
 - Select appropriate test:
 - Molecular Studies (Section 6):
 - Check “PCR” and “Norovirus”.
 - Check “Outbreak association” and write in name of outbreak, (bottom of Section 2).
 - Payor source (Section 6):
 - Check “IDEAS” to avoid bill for submitter.

Specimen Shipping

- Transport temperature: 2-8°C (ice pack)
- Transport time: as soon as possible.
- Ship specimens via overnight delivery.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

ENVIRONMENTAL AND FOOD SAMPLES

- Testing of food or other environmental specimens is generally NOT done for norovirus outbreaks, because appropriate laboratory protocols are not available.
 - Food testing is not routine, except for shellfish (by FDA).
 - Detection in water, other food items requires special protocols; if indicated, EAIDB will call CDC or FDA to discuss further.