

Norwalk-like Viruses

(a.k.a. Norovirus, a.k.a. NLV)

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

Not reportable as individual cases. Possible common-source outbreaks are reportable. Prompt follow-up is essential to block ongoing transmission. Commercial products are occasionally implicated.

B. Laboratory And Physician Reporting Requirements

Viral gastroenteritis is not reportable per se. These infections are never specifically diagnosed in the clinical setting. In general, you will only hear about Norwalk infections in the context of outbreaks of acute gastroenteritis. Physicians are required to report suspect outbreaks immediately after they become aware of them.

C. Local Health Department Reporting and Follow-Up Responsibilities

1. Individual cases should not be reported. Don't worry, you won't hear of them.
2. Complaints of possible common-source outbreaks of gastroenteritis (i.e., vomiting, diarrhea, and other symptoms) must be investigated immediately. Outbreaks of gastroenteritis in nursing homes and similar settings (which are most often caused by NLV) must likewise be investigated.
3. Notify OHS immediately about possible common-source outbreaks.
4. Outbreak investigation summary forms (www.oshd.org/odpe/guidelin/forms/) should be submitted when an investigation is completed. These are often completed by the coordinating OHS epidemiologist, however; check before you start on one of these.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agents

The "Norwalk-like" viruses (NLV), now classified as "noroviruses," are probably the most common cause of outbreaks of acute gastroenteritis in Oregon and the United States. There are many viruses in this group, but the taxonomic relationships between them are not well settled. Originally, many were named after the location of the first recognized outbreak: Norwalk (Ohio), Sapporo (Japan), Marin (California), Hawaii (guess), Snow Mountain, Ditchling, Paramatta, Taunton, etc. The Norwalk outbreak in 1968 was the first of this class, so the whole group is often called "Norwalk" or (better) "Norwalk-like." These agents are also collectively referred to as SRSV's (for Small Round Structured Viruses). More recently, most of these have been classified into the Calicivirus family, so "caliciviruses" is becoming another shorthand name for this group. There are many caliciviruses, however, many of which don't cause human illness.

It is very rare for these outbreaks to be ascribed to a specific NLV. Hence, it is not really possible to tell if there are significant epidemiological or clinical differences among the NLV. With our currently crude understanding, we basically lump these viruses together for epi purposes.

Norwalk-like Viral Infections

B. Description of Illness

NLV outbreaks are characterized by high rates of vomiting, diarrhea, nausea, and stomach cramps. Vomiting is sometimes more commonly reported than diarrhea; this may be particularly true for children. In addition to the usual gamut of other GI symptoms (nausea, abdominal cramps, etc.), Norwalk cases typically report headache and myalgias to a degree not seen with other common agents. Be sure to ask about these symptoms.

Although sometimes intense, this is generally a mild, brief, and self-limited illness that rarely lasts more than a day or two. Some people may feel “wrung out” for a few days after acute symptoms have resolved. In most outbreaks, few if any affected persons seek medical attention. Fewer than 1% are hospitalized. Deaths are very rarely reported—almost all among elderly and debilitated patients in nursing homes.

C. Reservoirs

Humans are the only known source of the NLV that cause human disease.

D. Sources and Routes of Transmission

NLV are shed in stool and vomit. Most transmission is fecal-oral or “vomit-oral” (yuck). Unlike other common agents of gastroenteritis, however, there is compelling evidence that NLV can be spread by the airborne route. Sources of transmission include: food that's uncooked before serving, shellfish, and environmental surfaces contaminated with feces or vomitus. Data on how common this is or under what circumstances it may occur are lacking, however.

E. Incubation Period

Given enough individuals in a group, the median incubation period is almost always 32–36 hours. Individual incubations typically range between 24–48 hours, though volunteers studied had onsets ranging from 10–50 hours.

F. Period of Communicability

Communicability has been inferred from outbreak investigations to last at least 2–3 days post-recovery for some individuals. It is likely that persons are most infectious during the period of acute disease. Viral antigens or RNA are detectable in stool for as long as a week after symptoms resolve, although it is uncertain that this necessarily implies communicability. Remember that norovirus has a low infectious dose.

G. Treatment

There is no specific therapy. Rehydration may be indicated when vomiting and/or diarrhea is severe.

H. Susceptibility and Immunity

Little is known about what may be considerable variation in susceptibility to these viruses. Exposure to these agents is very common; >40% of U.S. adults may have antibodies that react with NLV antigens—close to 100% of children in less developed countries. Paradoxically, antibodies may be markers for susceptibility rather than protective immunity. For some [presumably genetic] reasons, some individuals may be resistant to clinical illness. Long-term immunity does not develop after exposure, although there may be some resistance to reinfection that lasts for several months or so.

3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES

A. Case Definitions

There is no fixed case definition, as individual cases are not reportable. During outbreak investigations, a case definition must be developed. For most Norwalk outbreaks, “vomiting or diarrhea” is a reasonable case definition, qualified by some time/exposure element (e.g., within 2–3 days of an implicated meal).

D. Public Health Lab Services

Norwalk-like viral infections are never identified by private labs. Testing in public health and academic labs became feasible on a significant scale only in the mid-1990s, with the development of recombinant antigens and molecular probes.

Since 1999, stool samples can be screened at the OSPHL for several of the most common subtypes of NLVs (but not all). Consult with OHS epidemiologists before specimens are collected. Food and water testing is generally not practicable.

Try to get 4 but no more than 6 stool specimens from every significant cluster where NLVs are a potential cause. Specimens should be collected as soon as possible, but, because of the duration of excretion, if necessary specimens collected several days after symptoms resolve may be worth testing (if better stuff isn't available). Fresh (and ideally loose) stool is best; use a clean container with a tight-fitting screw top (the lab staff get *really annoyed* when stool samples leak). It doesn't have to be sterile. Urine specimen cups or 50 ml centrifuge tubes make ideal containers. Distribution of over-the-toilet collection pans (the "hats") may increase the yield. Try to send specimens to OSPHL within 48 hours of collection. Refrigerate (but don't freeze) them prior to transport.

Serologic tests for antibody levels are available only under special circumstances through the CDC; consult with the Communicable Disease Section for more details. Paired sera are ideal, with acute specimens collected <3 days after onset and convalescent sera ~3–4 weeks later.

4. ROUTINE CASE INVESTIGATION

There are no routine investigations. Almost by definition you will be dealing with a "special situation"—i.e., an outbreak. See §6.

5. CONTROLLING FURTHER SPREAD

A. Education

Advise individuals on measures to avoid further or future exposures.

1. Stress the importance of hand washing to minimize the risk of secondary transmission.
2. Stress the importance of environmental sanitation. Severe vomiting is a hallmark of norovirus infection and, with its low infectious dose, a little aerosolized vomitus goes a long way to infecting innocents unlucky enough to come in contact with contaminated surfaces. Information about cleaning up vomitus and feces and other unpleasant tasks can be found at <http://www.dhs.state.or.us/publichealth/acd/outbreak/cleanup.pdf>.
3. Persons who have been ill should not work as patient care providers or food handlers—either at work or at home—for (ideally) 3 days after symptoms resolve. (Note, however, that there is little legal way to insist on this, once symptoms resolve.)

B. Isolation and Work or Day Care Restrictions

1. Hospitalized patients and residents of nursing homes and similar settings

The Hospital Infection Control Practices Advisory Committee recommends contact precautions for incontinent or diapered patients with acute diarrhea when the diarrhea has an infectious cause. Because aerosolized vomitus contains a lot of infectious virus, gowns, gloves, masks, hair and shoe covers should be worn when a patient is vomiting; bed linens should be handled as infectious waste.

2. Work Restrictions

By law, persons may not work as food handlers, day care workers, and health care workers as long as they are symptomatic. Although we have no legal authority to compel it, we strongly recommend that food handlers and health care workers refrain from food handling and caring for patients for at least 3 days after diarrhea stops if at all possible. In any event, workers should be cautioned about the need for scrupulous hand washing. Be aware that viral excretion may continue for 4–5 days after symptoms resolve.

Norwalk-like Viral Infections

3. Case is a Day-Care Worker or Attendee

Symptomatic children should be excluded. Ideally, kids would stay home for a day or two after they get better too, but good luck trying to convince parents of that.

C. Follow-up of Cases

None indicated.

D. Protection of Contacts

None needed, except hand washing after changing diapers of infected children or other contact with excreta.

E. Environmental Measures

Advice on improving food-handling or day-care environments may be indicated.

6. MANAGING SPECIAL SITUATIONS, E.G., POSSIBLE OUTBREAKS

A. Common-source Outbreaks

Notify OHS epidemiologists ASAP within 24 hours when you get wind of any possible common-source outbreaks (503/731-4024). They can help develop questionnaires as necessary and provide other assistance in data collection and analysis. In addition, they will take care of notifying neighboring counties and states as appropriate. Many outbreaks that seem to have a limited and local focus may be connected to events elsewhere (e.g., multi-state distribution of a contaminated commercial product).

Likely sources include raw oysters, salads and other cold foods, or other food that gets hands-on contact. Contaminated water and ice are other possibilities. Infected food handlers are very often behind the problem. Inquire about recent illness among food handlers; check work/attendance records. Focus on implicating specific food items [or water, etc.], using epidemiological comparisons of cases and control, and evaluating their method of preparation. Ask about recent illness among food handlers going back at least 5 days before the implicated event.

B. Nursing Homes and Similar Settings

Most outbreaks of NLV in nursing homes are spread rapidly from person to person by the fecal-oral or vomit-oral route. Attack rates often exceed 50% and usually at least a few residents need rehydration in an emergency room, even hospitalization. Typically, one or two residents become ill, followed 1½ days later by an explosion of gastroenteritis among residents, then staff. Staff absenteeism is often so high that patient care and safety is extremely compromised. Patient caregivers from temporary staffing agencies are often used, but may become ill themselves after filling in during a norovirus outbreak and carry the agent (unwittingly, of course) to another facility. NLV spreads rapidly in nursing homes once it gets started. Sick patients should be cohorted if at all possible and staff should not work on other patient care units (or in other facilities in the case of caregivers who work for outside agencies that provide fill-in staff). We recommend waiting seven days after the last case occurs before new admissions are permitted. As with hospitalized patients, diapered or incontinent nursing home residents should be placed on contact precautions, and gowns, gloves and masks should be used when caring for any patients who are vomiting.