

# **NOROVIRUS (Viral Gastroenteritis):** ***Information Packet for*** ***Nursing Facilities***

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# **Norovirus in Healthcare Facilities**

May 16, 2006

## **General Information**

### **Virology**

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Noroviruses (genus *Norovirus*, family *Caliciviridae*) are a group of related, single-stranded RNA, non-enveloped viruses that cause acute gastroenteritis in humans. *Norovirus* was recently approved as the official genus name for the group of viruses provisionally described as “Norwalk-like viruses” (NLV). Currently, human noroviruses belong to one of three norovirus genogroups (GI, GII, or GIV), each of which is further divided into >25 genetic clusters.

### **Clinical manifestations**

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The average incubation period for norovirus-associated gastroenteritis is 12 to 48 hours, with a median of approximately 33 hours. Illness is characterized by acute-onset vomiting; watery, non-bloody diarrhea with abdominal cramps, and nausea. In addition, myalgia, malaise, and headache are commonly reported. Low-grade fever is present in about half of cases. Dehydration is the most common complication and may require intravenous replacement fluids. Symptoms usually last 24 to 60 hours. Volunteer studies suggest that up to 30% of infections may be asymptomatic.

### **Epidemiology of transmission**

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Noroviruses are highly contagious, with as few as 100 virus particles thought to be sufficient to cause infection. Noroviruses are transmitted primarily through the fecal-oral route, either by direct person-to-person spread or fecally contaminated food or water. Noroviruses can also spread by via a droplet route from vomitus. These viruses are relatively stable in the environment and can survive freezing and heating to 60°C (140°F). In healthcare facilities, transmission can additionally occur through hand transfer of the virus to the oral mucosa via contact with materials, fomites, and environmental surfaces that have been contaminated with either feces or vomitus.<sup>1</sup>

### **Diagnosis of norovirus infection**

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Diagnosis of norovirus infection relies on the detection of viral RNA in the stools of affected persons, by use of reverse transcription-polymerase chain reaction (RT-PCR) assays. This technology is available at CDC and most state public health laboratories and should be considered in the event of outbreaks of gastroenteritis in healthcare facilities. Identification of the virus can be best made from stool specimens taken within 48 to 72 hours after onset of symptoms, although good results can be obtained by using RT-PCR on samples taken as long as 7 days after symptom onset. Other methods of diagnosis, usually only available in research settings, include electron microscopy and serologic assays for a rise in titer in paired sera collected at least three weeks apart. Commercial enzyme-linked immunoassays are available but are of relatively low sensitivity, so their use is limited to diagnosis of the etiology of outbreaks. Because of the limited availability of timely and routine laboratory diagnostic methods, a clinical diagnosis of norovirus infection is often used, especially when other agents of gastroenteritis have been ruled out.

## **Measures to Limit Transmission**

### **Isolation precautions**

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Patients with suspected norovirus infection should be managed with Standard Precautions ([www.cdc.gov/ncidod/hip/isolat/std\\_prec\\_excerpt.htm](http://www.cdc.gov/ncidod/hip/isolat/std_prec_excerpt.htm)) with careful attention to hand hygiene practices. However, Contact Precautions ([www.cdc.gov/ncidod/hip/isolat/contact\\_prec\\_excerpt.htm](http://www.cdc.gov/ncidod/hip/isolat/contact_prec_excerpt.htm)) should be used when caring for diapered or incontinent persons, during outbreaks in a facility, and when there is the possibility of splashes that might lead to contamination of clothing. Persons cleaning areas heavily contaminated with vomitus or feces should wear surgical masks as well. In an outbreak setting, it may be prudent to place patients with suspected norovirus in private rooms or to cohort such patients.

### **Environmental disinfection**

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There are no hospital disinfectants registered by the U.S. Environmental Protection Agency (EPA) that have specific claims for activity against noroviruses. In the absence of such products, CDC recommends that chlorine bleach be applied to hard, non-porous, environmental surfaces in the event of a norovirus outbreak. A minimum concentration of 1000 ppm (generally a dilution 1 part household bleach solution to 50 parts water) has been demonstrated in the laboratory to be effective against surrogate viruses with properties similar to those of norovirus. , Healthcare facility staff should use appropriate PPE (e.g. gloves and goggles) when working with bleach.

Quaternary ammonium compounds are often used for sanitizing food preparation surfaces or disinfecting large surfaces (e.g., countertops and floors). However, because noroviruses are non-enveloped, most quaternary ammonium compounds (which act by disrupting viral envelopes) do not have significant activity against them. ,

Phenolic-based disinfectants have been shown to be active against noroviruses in the laboratory. However, this activity may require concentrations 2- to 4-fold higher than manufacturer recommendations for routine use.<sup>1</sup>

Previous studies of disinfectants have used feline calicivirus (FCV) as a surrogate for norovirus; the use of FCV as an acceptable surrogate for noroviruses is under review by the EPA. The only product with an EPA-approved claim against FCV is the peroxygen compound Virkon-S® (EPA registration number 62432-1)\*. If selected for disinfection of environmental surfaces, this product should be used in accordance with the manufacturer's instruction. Proprietary disinfectant products should be used on pre-cleaned surfaces to ensure maximum performance.

There are available disinfectants that have activity against other non-enveloped RNA viruses that cause enteric disease (e.g., hepatitis A virus and poliovirus). However, it is not known if these disinfectants would be equally effective against norovirus.

Heat disinfection (i.e., pasteurization) has been suggested for items that cannot be subjected to chemical disinfectants. A temperature equal to or greater than 60°C (140°F) has been used successfully under laboratory conditions.<sup>2</sup>

\*Note: The use of trade names and commercial sources is for information purposes only and does not constitute endorsement by CDC, the U.S. Public Health Service (PHS), or the Department of Health and Human Services (DHHS).  
References

# Viral Gastroenteritis

## General Fact Sheet

### What is viral gastroenteritis?

Gastroenteritis means inflammation of the stomach and small and large intestines. Viral gastroenteritis is an infection caused by a variety of viruses that results in vomiting or diarrhea. It is often called the "stomach flu," although it is not caused by the influenza viruses.

### What causes viral gastroenteritis?

Many different viruses can cause gastroenteritis, including rotaviruses, adenoviruses, caliciviruses, astroviruses, Norwalk virus, and a group of Noroviruses. Viral gastroenteritis is not caused by bacteria (such as *Salmonella* or *Escherichia coli*) or parasites (such as *Giardia*), or by medications or other medical conditions, although the symptoms may be similar. Your doctor can determine if the diarrhea is caused by a virus or by something else.

### What are the symptoms of viral gastroenteritis?

The main symptoms of viral gastroenteritis are watery diarrhea and vomiting. The affected person may also have headache, fever, and abdominal cramps ("stomach ache"). In general, the symptoms begin 1 to 2 days following infection with a virus that causes gastroenteritis and may last for 1 to 10 days, depending on which virus causes the illness.

### Is viral gastroenteritis a serious illness?

For most people, it is not. People who get viral gastroenteritis almost always recover completely without any long-term problems. Gastroenteritis is a serious illness, however, for persons who are unable to drink enough fluids to replace what they lose through vomiting or diarrhea. Infants, young children, and persons who are unable to care for themselves, such as the disabled or elderly, are at risk for dehydration from loss of fluids. Immune compromised persons are at risk for dehydration because they may get a more serious illness, with greater vomiting or diarrhea. They may need to be hospitalized for treatment to correct or prevent dehydration.

### Is the illness contagious? How are these viruses spread?

Yes, viral gastroenteritis is contagious. The viruses that cause gastroenteritis are spread through close contact with infected persons (for example, by sharing food, water, or eating utensils). Individuals may also become infected by eating or drinking contaminated foods or beverages.

### How does food get contaminated by gastroenteritis viruses?

Food may be contaminated by food preparers or handlers who have viral gastroenteritis, especially if they do not wash their hands regularly after using the bathroom. Shellfish may be contaminated by sewage, and persons who eat raw or undercooked shellfish harvested from contaminated waters may get diarrhea. Drinking water can also be contaminated by sewage and be a source of spread of these viruses.

### Where and when does viral gastroenteritis occur?

Viral gastroenteritis affects people in all parts of the world. Each virus has its own seasonal activity. For example, in the United States, rotavirus and astrovirus infections occur during the cooler months of the year (October to April), whereas adenovirus infections occur throughout the year. Viral gastroenteritis outbreaks can occur in institutional settings, such as schools, child care facilities, and nursing homes, and can occur in other group settings, such as banquet halls, cruise ships, dormitories, and campgrounds.

## **Who gets viral gastroenteritis?**

Anyone can get it. Viral gastroenteritis occurs in people of all ages and backgrounds. However, some viruses tend to cause diarrheal disease primarily among people in specific age groups. Rotavirus infection is the most common cause of diarrhea in infants and young children under 5 years old. Adenoviruses and astroviruses cause diarrhea mostly in young children, but older children and adults can also be affected. Norwalk and Noroviruses are more likely to cause diarrhea in older children and adults.

## **How is viral gastroenteritis diagnosed?**

Generally, viral gastroenteritis is diagnosed by a physician on the basis of the symptoms and medical examination of the patient. Rotavirus infection can be diagnosed by laboratory testing of a stool specimen. Tests to detect other viruses that cause gastroenteritis are not in routine use.

## **How is viral gastroenteritis treated?**

The most important of treating viral gastroenteritis in children and adults is to prevent severe loss of fluids (dehydration). This treatment should begin at home. Your physician may give you specific instructions about what kinds of fluid to give. CDC recommends that families with infants and young children keep a supply of oral rehydration solution (ORS) at home at all times and use the solution when diarrhea first occurs in the child. ORS is available at pharmacies without a prescription. Follow the written directions on the ORS package, and use clean or boiled water. Medications, including antibiotics (which have no effect on viruses) and other treatments, should be avoided unless specifically recommended by a physician.

## **Can viral gastroenteritis be prevented?**

Yes. Persons can reduce their chance of getting infected by frequent handwashing, prompt disinfection of contaminated surfaces with household chlorine bleach-based cleaners, and prompt washing of soiled articles of clothing. If food or water is thought to be contaminated, it should be avoided.

## **Is there a vaccine for viral gastroenteritis?**

There is no vaccine or medicine currently available that prevents viral gastroenteritis. A vaccine is being developed, however, that protects against severe diarrhea from rotavirus infection in infants and young children.

## **BLEACH SOLUTION: Recommendations for norovirus disinfection using bleach solution**



- Bleach is cheap and easy to get. The solution of bleach and water is easy to mix, is nontoxic, is safe if handled properly, and kills most infectious agents. (*Be aware that some infectious agents are not killed by bleach. For example, cryptosporidia is only killed ammonia or hydrogen peroxide.*)
- A solution of bleach and water loses its strength very quickly and easily. It is weakened by organic material, evaporation, heat, and sunlight. **Therefore, bleach solutions should be mixed fresh each day to make sure it is effective.** Any leftover solution should be discarded at the end of the day.
- NEVER mix bleach with anything but fresh tap water! Other chemicals may react with bleach and create and release a toxic chlorine gas.
- Keep the bleach solution you mix each day in a cool place out of direct sunlight and out of the reach of children.
- Label all bleach solution as 'BLEACH SOLUTION' and mark the date and time that it was mixed on the label.

### **NOROVIRUS DISINFECTION STEPS WITH HOUSEHOLD BLEACH ON HARD, NONPOROUS SURFACES (i.e., floors, counters, toilets)**

1. Put on rubber, latex, vinyl, or nitrile gloves. If cleaning vomit or feces, don a mask.
2. Thoroughly wet contaminated surface with water.
3. With a sponge or rag, apply 10% bleach solution on contaminated surface.

**Hypochlorite (bleach) solution:** Mix 1 ½ cups of household bleach in 1 gallon of water to make a 10% bleach solution.



4. Allow the bleach solution to set on the surface for 10 minutes
5. Rinse surface with water
6. Allow surface to air dry
7. Dispose of gloves.
8. After taking off gloves, thoroughly wash hands with soap and warm water.

Adapted from Clorox, Inc. [http://www.cloroxlaundry.com/usage\\_household.shtml](http://www.cloroxlaundry.com/usage_household.shtml) and the Centers for Disease Control and Prevention <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5203a1.htm>

**GASTROENTERITIS CASE LOG FOR XXXX FACILITY NAME**

**MASON COUNTY**

Location within the facility \_\_\_\_\_

Total residents ill: \_\_\_\_\_

Total residents (ill and well): \_\_\_\_\_

Date log started \_\_\_\_\_

Total staff ill: \_\_\_\_\_

Total staff (ill and well): \_\_\_\_\_

Identification		Res location Staff duties					Onset	Signs and Symptoms										Illness Outcome					
		Age	Sex	Resident (R) or Staff (S)	Resident's Room #	Staff Duties (use code below)		Vomiting or diarrhea Onset Date	Nausea (N)	Vomiting (V)	Diarrhea (D)	Cramps (C)	Passing excess Gas (G)	Headache (H)	Myalgia/muscle aches (M)	Unusual fatigue (T)	Fever (F)	Chills (L)	Blood/Blood in stools (B)	V or D duration in hours	Seen a clinician (Y/N)	Visited ER (Y/N)	Days hospitalized (Y/N)
RESIDENT OR STAFF NAME		Yrs	M/F	R/S	Rm#	▼	mm/dd/yy	(Y = Yes, N = No, DK = Don't know)										Hrs	Y/N	Y/N	Y/N	Y/N	
Last	First																						
							TOTALS																

▶▶▶ DUTY CODES: R — Food Service      S — Housekeeping      T — Patient Care      U — Administrative/clerical      V — Maintenance

Adapted from: Oregon Department of Health and Human Services (2004), <http://oregon.gov/DHS/ph/acd/outbreak/ltcflog.doc>

