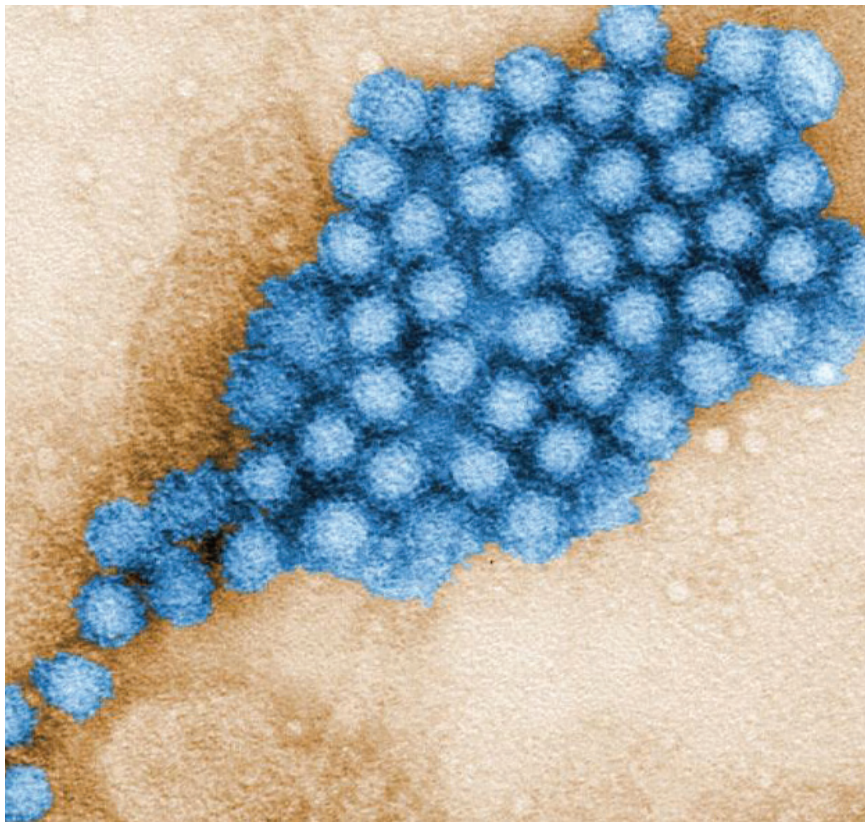


# NOROVIRUS

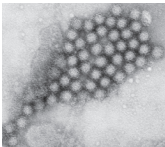


## A Toolkit for Schools

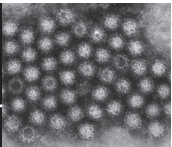


**Public Health**  
Prevent. Promote. Protect.





# NOROVIRUS



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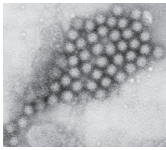
# NOROVIRUS



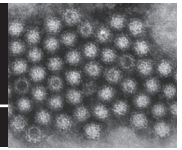
## Foreword

Multnomah County Environmental Health Services developed this toolkit to provide schools a quick and easy reference for understanding Norovirus. We include fast and simple ways to prevent and reduce exposures in the school setting. An emphasis is placed on prevention and solution options. Our goal is to inform school administrators and staff about why Norovirus is a problem, and encourage self-assessment of current sanitation practices that pose an increased threat to human health. While this toolkit is geared toward schools, it can also be a vital tool for any other high risk areas including assisted living facilities, cruise ships, restaurants, and homes. We hope the resources included in this toolkit will provide an easy transition to a cleaner and safer environment. We understand that disinfecting all areas and items in a school setting can be a great challenge. When cleaning and sanitizing, try to focus on the most active and affected areas. These are places that experience a high amount of traffic, such as cafeterias, and areas soiled by vomit, feces, or other bodily fluids.





# NOROVIRUS



## NOROVIRUS

### What is Norovirus?

Norovirus is a RNA virus that is the most common cause of gastroenteritis, or inflammation of the stomach and intestines, in humans. RNA viruses have very high mutation rates, which means that it is very difficult to produce effective vaccines for pathogens such as Norovirus. Its name is derived from the original strain, Norwalk-virus, which caused an outbreak on Halloween in Norwalk, Ohio in 1968. More commonly known as the stomach flu, Norovirus infections are most common during winter months. Like all viruses, Norovirus cannot be treated with antibiotics or grow outside the human body, but can survive up to a week on inanimate objects such as surfaces, doorknobs and toys.

### Why it's a problem

Norovirus is a problem today because it is HIGHLY CONTAGIOUS. If not dealt with correctly, a single case could spread to hundreds of people within hours. Norovirus is very contagious because it has a low infectious dose, high environmental stability, high strain diversity, and lack of lasting immunity. The lowest infectious dose is around 10 viral particles. To put this in perspective, a single vomiting incident contains close to 30,000,000 viral particles. Norovirus can withstand freezing temperatures and heating up to 140°F (60°C). It is also resistant in 10ppm chlorine, an average amount found in tap water.

### High Risk Areas

- Schools
- Long term care facilities
- Restaurants/dining areas
- Cruise ships
- Any enclosed, populated place



# NOROVIRUS



## Local Outbreaks

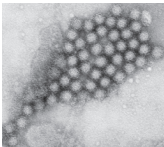
In Oregon, Norovirus outbreaks have increased from 20 reported in 2000 to 119 in 2006. While numbers have steadied the last couple of years, we have yet to see a significant decrease.

In May 2006, 120 students and 15 staff members became ill due to Norovirus at an Elementary School in Vancouver, Washington. This accounts for one quarter of the students and one third of the staff.

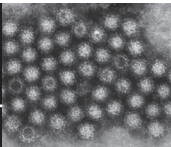
In January 2008, fraternity and sorority students at Oregon State University in Corvallis had to be quarantined after some of their members became ill. Those affected were confined to the first floor of the homes to discourage transmission to the other members.

In March 2007, an outbreak of viral gastroenteritis hit a large High School in SE Portland. The illness first appeared on Wednesday and quickly spread, infecting 50-100 students and staff members in 24 hours.





# NOROVIRUS



## SYMPTOMS and SPREAD

### Symptoms

Once the virus enters the body, symptoms usually present between 24 and 48 hours. However there have been cases that arise within 12 hours. Symptoms usually last 1-2 days, but can sometimes lasted up to a week or more.

#### Common Symptoms:

Nausea	Vomiting
Diarrhea	Abdominal cramps

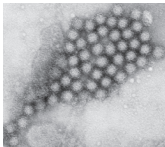
#### Other Symptoms:

Headache	Fever
Chills	Muscle aches

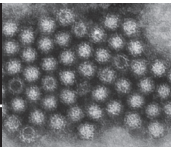
### Risks

A Norovirus infection will usually pass naturally in 1-2 days. As long as precautionary measures are taken to keep sick people at an optimum health level, major health issues are usually avoided. Excessive vomiting and diarrhea can create dehydration from rapid water loss throughout the body. It is important for those infected to drink lots of water and non-acidic juice that will replenish essential salts, electrolytes, and sugars without further upsetting the stomach.

Most people do not have long-term ailments due to the illness. However, an infection can become a serious health hazard for high-risk populations such as the elderly, young children, and people with already weakened immune systems. It is vital to keep at-risk environments clean to prevent infections that lead to hospitalizations and even death.



# NOROVIRUS



## Transmission

Norovirus is spread through the fecal-oral route. Ingestion is the most common way of contracting the virus, though research shows that airborne transmission is possible. In airborne transmission, a person contracts the virus from contaminated vapor released into the air by vomit or diarrhea.

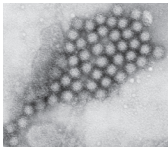
The most common ways to contract the virus are:

- Eating contaminated foods.
- Drinking contaminated water.
- Touching a contaminated surface or object and then putting your hands in your mouth, nose, or on your face.
- Direct contact with another person infected, such as sharing food or utensils, or by being in close proximity to an infected person.

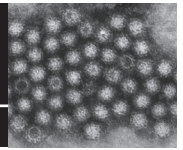
### Characteristics that facilitate spread

Characteristic	Observation	Consequences
Low infectious dose	< 10 viral particles	Permits droplet or person to person spread, secondary spread, or spread by food handlers
Prolonged asymptomatic shedding	> 2 weeks	Increased risk for secondary spread or problems with control regarding food handlers
Environmental stability	Survives >10 ppm chlorine, freezing, and heating up to 60°C (140°F)	Difficult to eliminate from contaminated water; virus maintained in ice and steamed oysters
Substantial strain diversity	Multiple genetic and antigenic types	Requires extensive diagnostic testing; repeat infections by multiple antigen types; easy to underestimate prevalence
Lack of lasting immunity	Disease can occur with re-infection	Childhood infection does not protect from disease in adulthood





# NOROVIRUS



## Immunity

Like the common cold, Norovirus has a number of different strains, allowing individuals to contract the illness multiple times throughout their lifetime. Currently, there are five known genogroups, divided into separate genotypes. These genotypes account for over 1,000 known strains of Norovirus. Any immunity an individual builds up against one strain will not be effective against any other strain.





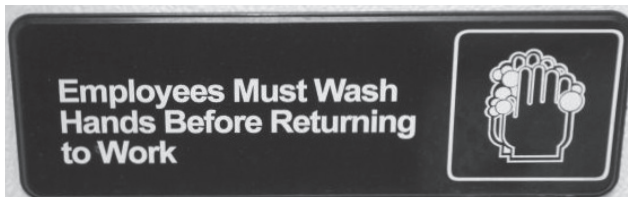
# NOROVIRUS



## Prevention

As with any health hazard, it is best to prevent a Norovirus outbreak before it spreads and becomes a problem for the entire community. Here are five simple ways you can prevent exposures:

- Wash your hands! Wash frequently with soap and warm water, especially after using the restroom, sneezing, or coughing.
- Wash fresh produce and prepare foods safely. Keep food out of the danger zone (41-140°F) and always make sure meat and fish are cooked thoroughly.
- Disinfect surfaces and keep the bathroom and kitchen areas clean.
- Disinfect children's toys frequently.
- Communicate with students and staff about the importance of prevention methods.
- Keep sick people home, especially if they are foodhandlers.





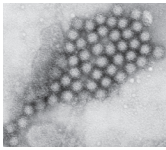
# NOROVIRUS



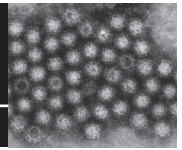
## REPORTING

Reports of individual cases are not required. Norovirus becomes dangerous when it spreads throughout the community. If two or more people become ill and Norovirus is suspected, teachers should inform school administrators and isolate the cases. School officials should contact the Multnomah County Health Department Communicable Disease Program at 503-988-3406.





# NOROVIRUS



## CLEANUP

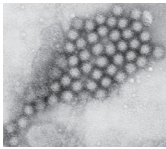
### Worker Safety

Chlorine bleach can be hazardous to human health and should be handled with care. NEVER mix bleach with ammonia or other chemicals. Certain mixtures allow for dangerous chemical reactions that could result in hospitalizations. Always use fresh solutions, as older mixtures will lose effectiveness. Cleaning products should be sealed properly and stored in safe areas.

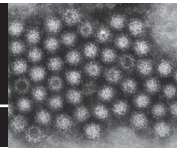
It is preferable that the custodial staff uses the following protective equipment: disposable gloves, masks, eye protection, and protective clothing. Ensure safe disposal of protective equipment to promote a healthy work environment by following these steps:

1. Remove gloves by rolling back from the wrist; do not touch skin.
2. Remove goggles if worn.
3. Remove gown and fold so the contaminated side is inward.
4. Remove mask by touching tape only.
5. Immediately wash hands with an effective antimicrobial cleaner.
6. All should be disposed of in a sealed garbage bag.





# NOROVIRUS



## Case Management

If a Norovirus case occurs at your school, follow this step-by-step process to prevent spread.

### Step 1: Identify

Identify contaminated areas. Detect who is infected, what rooms they have been in, and who they have been around. Use the illness tracking form to log all illnesses.

### Step 2: Report

Report the outbreak to Multnomah County Health Department at 503-988-3406.

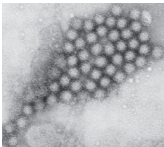
### Step 3: Isolate

Isolate sick students or faculty members and send them home immediately. Advise them to take precautionary measures to keep their families from getting sick. Ideally, little or no direct contact with people should be made. Ill people should not return to school until 24 hours after symptoms pass.

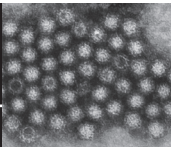
- Ill people should not prepare food for anyone for at least 1 day following the passing of symptoms.

### Step 4: Clean up

Clean up all vomit or diarrhea. When cleaning up, make sure to use double layer, absorbent material that is quickly discarded into a sealed plastic bag to reduce aerosols. If possible, open windows and doors to increase air circulation.



# NOROVIRUS



## Step 5: Disinfect

Disinfect the school.

- Disinfect all bathroom and kitchen areas, as well as targeted classrooms.
  - Items to disinfect: doorknobs, faucets, sinks, toilets, railing, phones, counters, chairs, tables, and light switches.
  - Wash all contaminated linens and tablecloths separately.
  - Remove all wall decorations for decontamination. If this isn't possible, they may need to be discarded.
  - Remember to wear **masks, gloves, and protective clothing.**

### Solutions

Since Norovirus is relatively resistant in the environment, it is important to use cleaning solutions that are effective. Softer household disinfectants will only spread the virus around, making transmission easier. When cleaning up after a Norovirus episode, it is crucial to use CHLORINE BLEACH BASED PRODUCTS.

Solid surfaces not contaminated by vomit or diarrhea	1/2 cup of chlorine bleach per gallon of water
Solid surfaces contaminated by vomit or diarrhea	2 cups of chlorine bleach per gallon of water
Non-solid surfaces (carpet, fabric, or any other material that could be damaged by chlorine bleach) contaminated by vomit or diarrhea	Must be steam/water treated to 140°F (60°C) or above



# NOROVIRUS



Please refer to the Norovirus Disinfection Guidelines handout in the Resources section for more extensive calculations and concentrations.

- \* A solution must be changed every 30 minutes with a new cloth towel used to prevent contamination.
- \*\* Quaternary Ammonium (Quat) based sanitizers that are often found in schools are NOT effective against Noroviruses. Chlorine-based sanitizers are the most effective solutions.

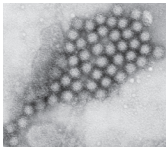
## Step 6: Communicate

Communicate with parents.

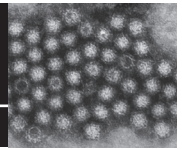
- Schools should send letters to staff and parents informing them of the outbreak.

## Step 7: Help Health Officials

For more information call Multnomah County Health Department Communicable Disease Program at 503-988-3406.



# NOROVIRUS



## ---Handouts---

### Prevent Norovirus Outbreaks

#### Description

Norovirus belongs to a group of viruses called calciviruses that spread very quickly. Previously named Norwalk-like viruses, it causes inflammation of the stomach and large intestines, known as gastroenteritis. It is important to drink lots of fluids to prevent dehydration.

#### Transmission

Norovirus is found in the stool or vomit of infected people. It is HIGHLY contagious. People become infected by:

- Eating contaminated food.
- Drinking contaminated water.
- Touching surfaces or objects and putting hand in mouth or nose.
- Direct contact with an infected person (i.e. sharing food or eating utensils).

#### Common symptoms

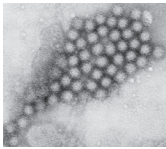
- Nausea
- Vomiting
- Diarrhea
- Abdominal cramps

#### Other symptoms

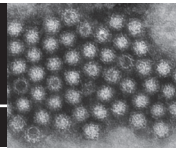
- Headache
- Fever/chills
- Muscle aches

Symptoms occur 12-48 hours after ingestion, usually lasting 1-2 days.





# NOROVIRUS



## **Prevention**

The virus has many strains, allowing people to get sick multiple times from an exposure. To prevent infections:

- Wash hands frequently, especially after using the bathroom and before preparing food.
- Carefully wash fruits, vegetables.
- Stay away from infected people until 1 day after their recovery .

## **Clean up**

- Clean and disinfect contaminated surfaces with a bleach-based cleaner.
  - For a list of EPA registered cleaning products effective against norovirus, visit [www.epa.gov/oppad001/list\\_g\\_norovirus.pdf](http://www.epa.gov/oppad001/list_g_norovirus.pdf)
- Immediately remove and wash contaminated clothing or linens.
- Flush vomit or stool and keep surrounding areas clean.
- Do not prepare food until 1 day after the infection.

## **Contact numbers:**

MCHD Communicable Disease Program: 503-988-3406

Oregon Public Health Division: 971-673-1111

Oregon Health Services: 503-731-4024



# NOROVIRUS



## **Dehydration: How to Recognize and Prevent It!**

### **Don't Wait! Prevent Dehydration!**

Your body needs water (fluids) to work properly. When your body loses substantially more fluids than you are drinking, you become dehydrated. Along with fluids, your body loses electrolytes, which are salts found in blood, body cells and other body fluids.

### **You lose body fluids in these ways:**

- Significant vomiting or diarrhea
- Urinating
- Sweating
- Fever

### **What are the symptoms of dehydration?**

- Flushed face, dry warm skin.
- Extreme thirst, dry mouth with thick saliva.
- Weakness, dizziness when standing, fainting.
- Headache, fast breathing.
- Small amounts of dark yellow urine.

### **How you can prevent dehydration:**

- Don't wait until you are thirsty.  
Drink fluids frequently.
- If you are vomiting or having diarrhea, drink a quarter cup of fluids every fifteen minutes.
- If you don't have an appetite, try to eat small amounts of foods and fluids five to seven times a day.

### **You can become dehydrated easily by not drinking enough fluids . . .**

- When you are ill.
- During hot weather.
- During extremely cold and dry winter weather.
- While you are taking medications to control excess body fluid.



# NOROVIRUS



Do not wait until dehydration becomes severe.  
When these symptoms are present, see your doctor.

## Stomach Flu Myths

**Myth:** Gastroenteritis, or “stomach flu,” is related to the flu (influenza).

- Influenza is a respiratory tract infection caused by the influenza virus. Viral gastroenteritis is most commonly caused by norovirus, but can also be caused by rotavirus, adenovirus, sapovirus, or astrovirus.

**Myth:** Stomach flu is something people just catch that cannot be avoided.

- By taking the correct precautionary measures, a norovirus infection can be prevented. Remember to always wash your hands!

**Myth:** Any common disinfectant will kill norovirus.

- Norovirus is very environmentally stable and can survive when in contact with some disinfectants. To clean up during a norovirus outbreak, chlorine bleach based solutions are recommended.

**Myth:** Antibiotics help shorten the course of the stomach flu.

- Antibiotics are often used for bacterial infections but are not effective against viral infections like gastroenteritis.



# NOROVIRUS

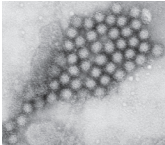


## Norovirus Disinfection Guidelines

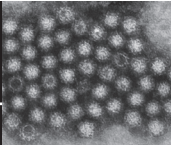
Solid surfaces not contaminated by vomit or diarrhea	1/2 cup of chlorine bleach per gallon of water
Solid surfaces contaminated by vomit or diarrhea	2 cups of chlorine bleach per gallon of water
Non-solid surfaces (carpet, fabric, or any other material that could be damaged by chlorine bleach) contaminated by vomit or diarrhea	Must be steam/water treated to 140°F (60°C) or above
Electronic white-boards and other multi-media equipment in classroom	Consult equipment instructions on cleaning methods

### Things to Consider

- Disinfection solution must be changed every 30 minutes or as needed with a new cloth towel use each change. Any contamination of the sanitizing solution will reduce its effectiveness.
- Wear non-latex disposable gloves when using strong sanitizing solutions.
- Chlorine percentages in commercial available bleaches may range from 3.5% to 12.5%.
- Containers of chlorine bleach being used may have been opened for an unknown amount of time – chlorine loses effectiveness the longer it has been opened.
- Some bleach products are not formulated for disinfectant purposes- always read the label carefully before using.
- Quaternary ammonium (Quat) based sanitizers (often found in school cafeteria kitchens) are typically not effective against noroviruses.
- For a list of cleaners EPA-registered to disinfect Norovirus visit: [www.epa.gov/oppad001/list\\_g\\_norovirus.pdf](http://www.epa.gov/oppad001/list_g_norovirus.pdf)

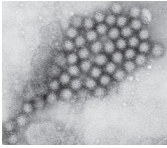


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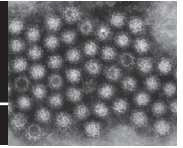


Gastrointestinal Illness Tracking Form

Name	Age	Sex	Student or Staff	Room # (student) or Job (staff)	Onset time/ date of 1 <sup>st</sup> symptoms	Vomiting (Y/N)	Diarrhea (Y/N)	Bloody diarrhea (Y/N)	Fever (Y/N) If yes, note temperature	Time/Date of last vomit/ diarrhea	Contact info

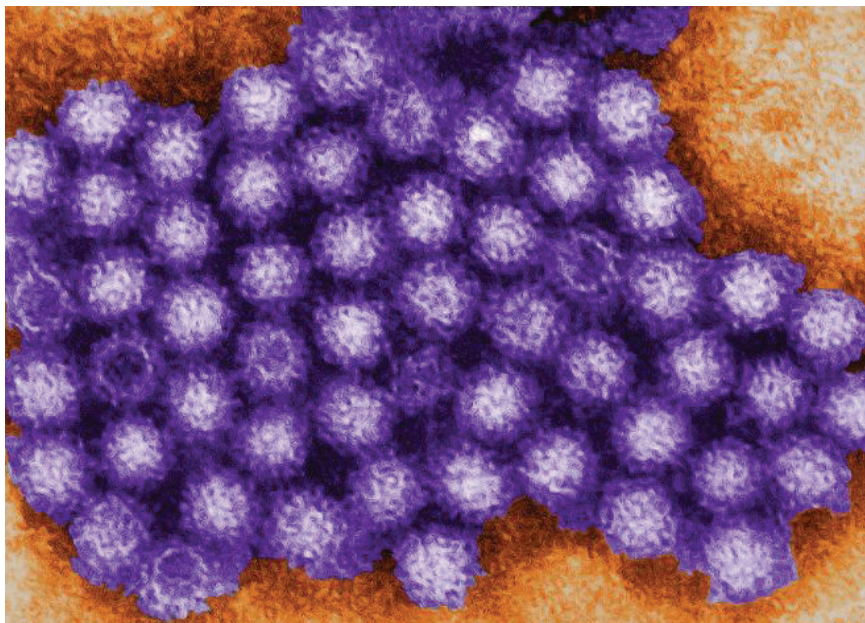


# NOROVIRUS



## NOTES





Health Department



Public Health

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## Health Department Environmental Health

847 NE 19th Ave., Suite 350

Portland, OR 97232

503-988-3400

[www.multco.us](http://www.multco.us)

**Employees Must Wash  
Hands Before Returning  
to Work**



revised 10/22/2013