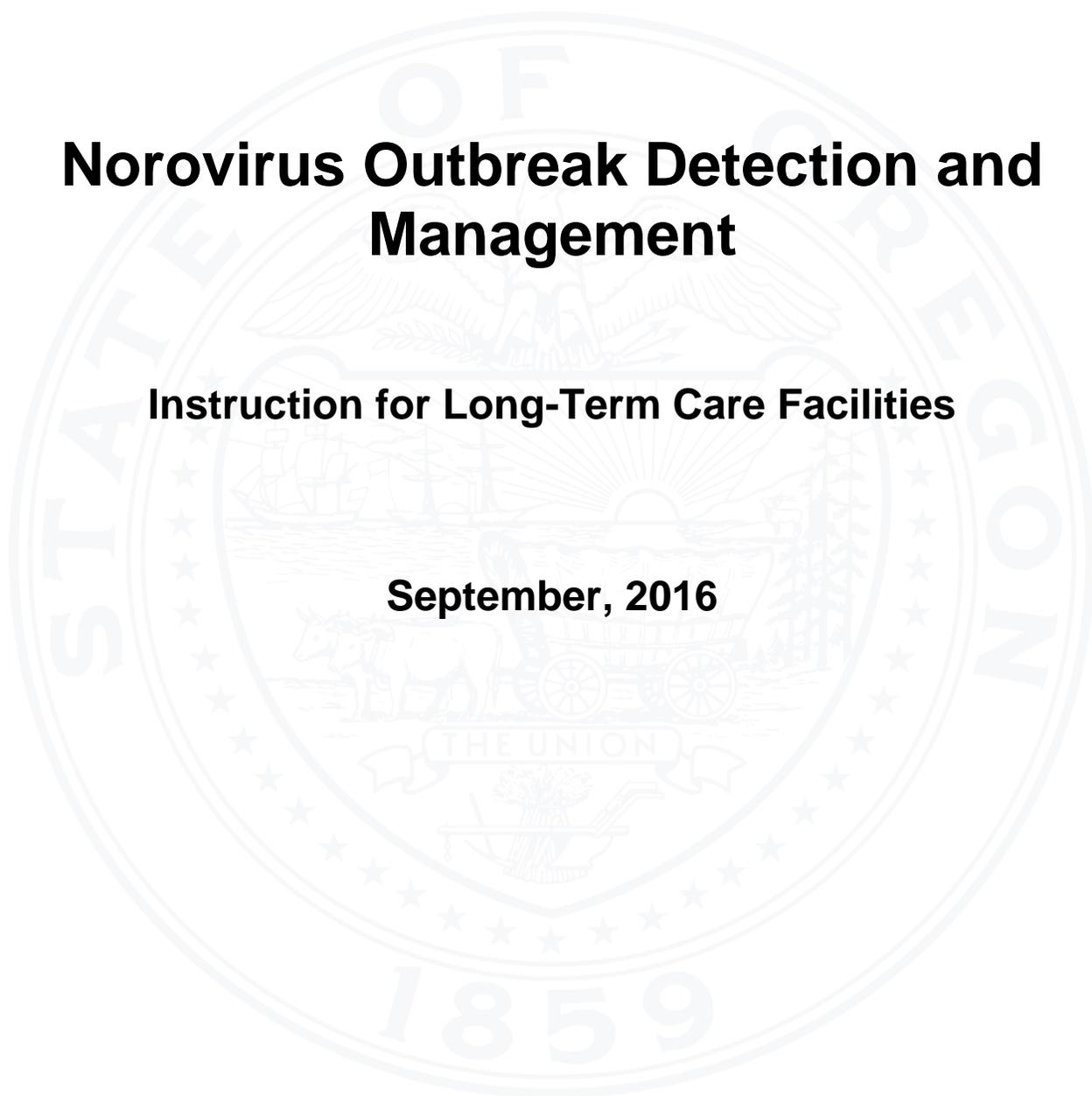


Norovirus Outbreak Detection and Management

Instruction for Long-Term Care Facilities

September, 2016



Norovirus Outbreak Detection and Management

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Norovirus Outbreak Detection and Management

Norovirus in Long Term Care Facilities

Acute Gastroenteritis (AGE) outbreaks in schools and day care centers (DCC) are common. In Oregon during 2009–2014, confirmed norovirus and norovirus-like outbreaks accounted for 50% of reported gastroenteritis outbreaks in schools and DCCs. Due to the highly infectious nature of norovirus, it is necessary to have an established outbreak response plan to combat a prolonged outbreak among facility students and staff. Norovirus outbreaks can be identified and contained early with understanding of the typical symptoms and with proper infection-control measures.

Clinical Description

Noroviruses, named for the first-recognized outbreak in Norwalk, Ohio in 1968, belong to the *Caliciviridae* family. Noroviruses are non-enveloped viruses, so they are not susceptible to alcohol-based disinfectants. There are six genogroups (G) of norovirus, of which GI, GII, and GIV afflict humans. Due to their genetic diversity, infection with one noroviral strain does not confer immunity against other strains. GII norovirus strains, and in particular, GII.4 strains, account for most norovirus outbreaks in long-term-care facilities (LTCFs).

Transmission

Norovirus is highly contagious due to its extremely low infectious dose (see Table 1). Transmission of norovirus is fecal-oral, primarily through person-to-person contact, but also through:

- contaminated surfaces (i.e., fomites)
- contaminated food
- contaminated water (including ice)
- swallowing of norovirus aerosolized in vomitus

An infected person will begin to shed norovirus particles a few hours before symptoms begin and can continue to shed for more than 2 weeks. Peak viral shedding occurs at 2 to 3 days after symptom onset, with a median amount of norovirus shed of 95×10^9 copies per gram of feces (1).

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TABLE 1. Characteristics of “Norwalk-like viruses” that facilitate their spread during epidemics

Characteristic	Observation	Consequences
Low infectious dose	<10 ² viral particles	Permits droplet or person-to-person spread, secondary spread, or spread by foodhandlers
Prolonged asymptomatic shedding	≤2 weeks	Increased risk for secondary spread or problems with control regarding foodhandlers
Environmental stability	Survives ≤10 ppm chlorine, freezing, and heating to 60 C	Difficult to eliminate from contaminated water; virus maintained in ice and steamed oysters
Substantial strain diversity	Multiple genetic and antigenic types	Requires composite diagnostics; repeat infections by multiple antigenic types; easy to underestimate prevalence
Lack of lasting immunity	Disease can occur with reinfection	Childhood infection does not protect from disease in adulthood; difficult to develop vaccine with lifelong protection

Characteristics of “Norwalk-like viruses” that facilitate their spread during epidemics. From MMWR 50 (RR-9):1–18. Available at www.cdc.gov/mmwr/preview/mmwrhtml/rr5009a1.htm.

Symptoms

Norovirus symptoms begin a median of 33 (range, 12–48) hours after exposure to the virus. Symptoms may include:

- vomiting
- diarrhea, typically watery and without blood
- nausea
- low-grade fever
- abdominal cramps
- malaise
- chills

Treatment

Although there is no specific treatment for norovirus infection. Because many patients have both vomiting and diarrhea, precautions should be taken to avoid dehydration, especially in the very young and very old.

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Outbreak Prevention and Detection

Norovirus infection is not reportable *per se* in Oregon, but Oregon Administrative Rule 333-018-0000 requires that all *outbreaks* of any disease be reported and investigated by the Local Health Department (LHD). An outbreak is defined as more cases than expected for a given population and time period. Therefore, if there are two or more persons showing symptoms of norovirus or other AGE in a LTCF within a short period of time, it must be reported to the LHD. The facility should encourage staff members to report AGE illnesses among residents immediately. Staff members should not come to work until they are asymptomatic for 48 hours since they are likely to still be shedding viral particles. Appropriate Personal Protective Equipment (PPE) and hand-hygiene practices are essential in preventing and limiting the transmission of norovirus.

Practice active AGE surveillance within the facility to detect outbreaks promptly:

- Keep accurate, daily health records of each resident to be able to identify early symptoms of norovirus or other illnesses. Review resident health data over time to identify trends that are signs of outbreaks.

- Alert the designated Infection Control Practitioner in the facility of staff or residents with AGE symptoms.

For a complete list of reportable diseases, go to

<http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/ReportingCommunicableDisease/Pages/index.aspx> .

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Outbreak Response and Reporting

When an outbreak of norovirus-like illness is recognized, swift implementation of aggressive infection control measures is necessary to prevent further spread of the virus. The affected school or DCC should take the following steps:

- Notify the Local Health Department (LHD) of the outbreak within 24 hours.
- Begin to track the cases' symptom profiles and personal information using the Case Log.
- Consult and coordinate with the LHD on stool collection and laboratory testing. A minimum of 2 positive stool samples is necessary to confirm an outbreak. At least 3 specimens should be collected in case one specimen yields a different result from the other two.
- Educate all staff of the outbreak and the suspected pathogen's symptoms and preventive measures.
- Implement facility-wide control measures:
 - Restrict sick students from school until asymptomatic for 48 hours.
 - Cancel group activities
 - Deep clean bathrooms and frequently touched surfaces.
 - Enforce strict hand washing
- Limit visitors, and post *Gastroenteritis Outbreak Notice* on all entrances to the facility.
- In consultation with the LHD, declare the outbreak over after the last case is symptom-free for 2 incubation periods (4 days).

Ending an Outbreak

Maintenance and regular review of the Gastroenteritis Case Log will enable public health officials to discern when the outbreak is over — generally when no new cases have surfaced over a period of 2 incubation periods (4 days).

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Control Measures

The quickest way to prevent new cases in an outbreak is by identifying and halting the mode of transmission. Norovirus is typically spread via a person-to-person transmission and can be stopped with effective control measures. Control measures should be implemented once the facility suspects an outbreak; do not wait for the LHD or state to declare an outbreak.

Suggested control measures are:

- **Cohorting:** If the facility has the capacity and resources, place all sick patients into the same room or wing and assign nursing staff to work with those patients and only those patients (nurse cohorting). There cannot be any mixing of sick residents and staff working with the sick to those who are well. Isolate cases until asymptomatic for 48 hours.
- **Stopping admissions and transfers:** Inform and limit the facility's visitors of the suspect illness to protect the facility residents and the visiting family members. Stop all transfers within and out of the facility; or provide a descriptive symptom profile to the receiving facility prior to any transfer. Do not accept new admissions into the infected facility until the outbreak is declared over by the LHD. Post notices on the entrance of the facility warning them of the outbreak and its highly communicable nature (refer to *Gastroenteritis Outbreak Notice*).
- **Stop group activities:** Stop group activities until the outbreak has been declared over. Communal meals and social and recreational groups should be stopped to prevent further person-to-person transmission.
- **Limit equipment usage:** If the facility has the resources, dedicate the usage of specific lifts, shower chairs, and other communal equipment to the ill residents. If not possible, it is imperative to clean and disinfect the shared equipment thoroughly before using it with another resident.
- **Clean:** Remove vomit or diarrhea right away! Wipe up at vomit or diarrhea and then use kitty litter, baking soda or other absorbent materials to absorb liquids. Use soapy water to wash all surfaces that had contact with vomit or diarrhea, as well as nearby high-touch surfaces (e.g., door knobs, toilet handles, hand rails). Rinse with plain water and wipe dry. However, germs can remain on surfaces even after cleaning so all surfaces must be then disinfected.
- **Disinfect:** The facility should use an Environmental Protection Agency-registered commercial virucide (http://www.epa.gov/sites/production/files/2015-10/documents/list_g_norovirus.pdf). If an EPA-registered virucide is not available then the facility should use bleach. CDC recommends the use of a chlorine bleach solution with a concentration of ~3500 ppm (this can be achieved by adding 1 cup of household bleach to a gallon of water) on all surfaces; refer to *Clean Up and Disinfection for Norovirus ("Stomach Bug")* on page 14. Leave the surface wet for ≥5 minutes or follow the directions on the commercial cleaner to allow sufficient time for the disinfectant to work. Disinfect frequently used surfaces such as:

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- chair handles and backs,
 - door handles,
 - counters,
 - hand railings,
 - Bed linens
 - Frequently used items (toothbrushes, combs, remote controls, etc.)
- **Personal Hygiene:** Encourage frequent hand washing among staff, food handlers, and residents in the facility. Staff members should use proper PPE to protect themselves from illness and to prevent further person-to-person transmission. The use of gloves, masks, and gowns should be highly encouraged for staff members working with ill patients and cleaning bodily fluids. Sick staff members should not be allowed to work until they are asymptomatic for 48 hours.
 - **For more information,** check *Preventing Norovirus Infection* found at www.cdc.gov/norovirus/preventing-infection.html

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Cleaning up vomit and other unpleasant tasks

Staff who clean up vomit or diarrhea should take these precautions to reduce their risk of infection.

General Principles

- Handle with care anything contaminated with vomit or diarrhea:
 - Wear protective gear (gloves, masks & gowns)
 - Soak up vomit & diarrhea with disposable cloths or absorbents like cat litter
- Clean first *then* disinfect
 - Cleaning is the removal of germs and foreign material from surfaces or objects. It is done by using water and detergent.
 - Disinfecting is the killing of germs on surfaces or objects. Chemicals, such as bleach, are used to kill germs
 - Disinfecting after cleaning kills germs that remain on surfaces after cleaning, which further decreases the risk of spreading infection.
 - Use a ~3500 ppm bleach solution by mixing 1 cup of household bleach to a gallon of water. If you are using concentrated bleach, then decrease the amount of bleach to $\frac{3}{4}$ cup of bleach to a gallon of water. **OR**
 - Use an EPA-registered norovirus disinfectant; see www.epa.gov/oppad001/list_g_norovirus.pdf. Be sure to read the label directions, as there may be separate directions for using the product as a disinfectant or a cleaner.
 - Prepare fresh bleach solution daily

Cleaning specific things

Carpets and upholstery: carefully remove vomit and diarrhea; clean contaminated carpet or upholstery with detergent and hot water; steam clean at $\geq 158^{\circ}$ F for 5 minutes or 212° F for 1 minute; *do not vacuum* (2)

Furniture, floors and other hard, non-porous surfaces: carefully remove vomit and diarrhea; clean contaminated furniture and other hard surfaces with detergent and hot water; disinfect with 0.5% bleach solution (see above).

Fixtures and fitting in toilet areas: carefully remove vomit and diarrhea; clean contaminated fixtures and fitting with detergent and hot water; disinfect with 1000–5000 ppm bleach solution (see above).

Cloth items (e.g., pillows, bedding, mattress covers,): carefully remove vomit and diarrhea; wash items in a pre-wash cycle, then use a regular wash cycle using detergent; dry items at a temperature greater than 170° F; *do not mix soiled and clean items in one load*; it is best to discard soiled cloth items than to risk exposure during cleaning (2).

Wash your hands (with soap and water) after any cleaning of vomit or diarrhea.

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Oregon State Public Health Laboratory Testing

The Oregon State Public Health Laboratory (OSPHL) will test stool and vomitus from ill persons in suspected norovirus outbreaks. Coordinate with the LHD to receive a Stool Collection Kit to prepare and send specimens to OSPHL. OSPHL analyzes stool samples once a week but twice a week during the October–May norovirus “season.”

Specimen Collection Guidelines

- Detailed stool collection instructions and an instructional video can be found at: <http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Outbreaks/Gastroenteritis/Pages/Outbreak-Investigation-Tools.aspx#itkit>
- Collect specimens as soon as possible after the onset of illness. Typically, viral shedding is highest during illness and up to 5 days after illness has resolved.
- Collect whole stool (optimal value is ~15 g, or about the size of a walnut) or 10 mL of watery stool from at least 3 ill persons.
- Refrigerate or store specimens on wet ice until ready to transfer. Do not freeze or leave stool at room temperature. Store stool in a tightly closed container, away from food and medication.
- Label each specimen with the date of collection and the name and date of birth of the ill person.
- Seal specimens in a bag and transfer them in an insulated, waterproof container with cold packs to ensure appropriate temperature during transfers. (Refer to the OSPHL Guidelines for Packaging and Shipping found at <http://public.health.oregon.gov/LaboratoryServices/SubmittingSamples/Pages/ShippingTransport.aspx>.)
- Contact the LHD to arrange for pick up and transfer of the specimens to OSPHL.

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Gastroenteritis Outbreak Notice

NOTICE!

We are currently experiencing many cases of gastroenteritis among our staff and residents.

We are working with the Local Health Department and State Public Health Division to contain and control this highly communicable disease.

Please, for the safety of our residents and their visiting friends and family, we ask that visiting your loved ones be limited as much as possible. Please refrain from bringing young children and elderly to visit; as they are most susceptible to intestinal infections.

If you do decide to visit, please check in at the front desk, and take an outbreak fact sheet for your reference.

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CDC Norovirus Fact Sheet

Norovirus Illness: Key Facts

Norovirus—the stomach bug

Norovirus is a highly contagious virus. Norovirus infection causes gastroenteritis (inflammation of the stomach and intestines). This leads to diarrhea, vomiting, and stomach pain.

Norovirus illness is often called by other names, such as food poisoning and stomach flu. It is true that noroviruses can cause food poisoning. But, other germs and chemicals can also cause food poisoning. Norovirus illness is not related to the flu (influenza), which is a respiratory illness caused by influenza virus.



Anyone can get norovirus illness

- Norovirus is the most common cause of acute gastroenteritis in the United States.
- Each year, norovirus causes about 21 million cases of acute gastroenteritis in this country.
- Many different types of norovirus exist, so you can get infected and sick many times in your life.

Norovirus illness can be serious

- Norovirus illness can make you feel extremely sick with diarrhea and vomiting many times a day.
- Some people may get severely dehydrated, especially young children, the elderly, and people with other illnesses.
- Each year, norovirus causes about 70,000 hospitalizations and 800 deaths, mostly in young children and the elderly.

Norovirus spreads very easily and quickly

- It only takes a very small amount of norovirus particles (fewer than 100) to make you sick.
- People with norovirus illness shed billions of virus particles in their stool and vomit and can easily infect others.
- You are most contagious when you are sick with norovirus illness and during the first 3 days after you recover.
- Norovirus can spread quickly in closed places like daycare centers, nursing homes, schools, and cruise ships.
- Norovirus can stay on objects and surfaces and still infect people after days or weeks.
- Norovirus can survive some disinfectants, making it hard to get rid of.

Norovirus can spread in many ways

Norovirus can spread to others by—

- eating food or drinking liquids that are contaminated with norovirus,
- touching surfaces or objects that have norovirus on them then putting your fingers in your mouth, and
- having close personal contact with an infected person, for example, caring for or sharing food, drinks, or eating utensils with an infected person.

There's no vaccine to prevent norovirus infection and no drug to treat it

- Antibiotics will not help with norovirus illness because antibiotics do not work on viruses.
- When you have norovirus illness, drink plenty of liquids to replace fluid loss and prevent dehydration.
- If you or someone you are caring for is dehydrated, call a doctor.

National Center for Immunization and Respiratory Diseases
Division of Viral Diseases



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CDC Recommendations for Norovirus Bleach Cleaning

Clean-up and Disinfection for Norovirus ("Stomach Bug")

THESE DIRECTIONS SHOULD BE USED TO RESPOND TO ANY VOMITING OR DIARRHEA ACCIDENT

Note: Anything that has been in contact with vomit and diarrhea should be discarded or disinfected.

1 Clean up

- Remove vomit or diarrhea right away!**
 - Wearing protective clothing, such as disposable gloves, apron and/or mask, wipe up vomit or diarrhea with paper towels
 - Use kitty litter, baking soda or other absorbent material on carpets and upholstery to absorb liquid; do not vacuum material: pick up using paper towels
 - Dispose of paper towel/waste in a plastic trash bag or biohazard bag
- Use soapy water to wash surfaces that contacted vomit or diarrhea and all nearby high-touch surfaces, such as door knobs and toilet handles**
- Rinse thoroughly with plain water**
- Wipe dry with paper towels**

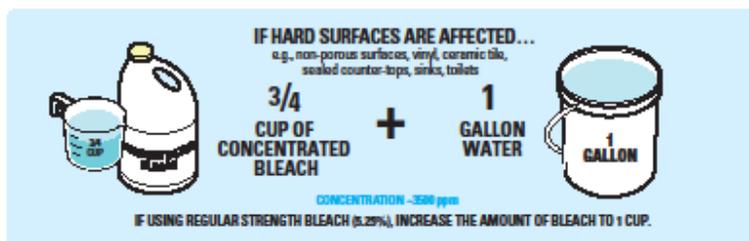
DONT STOP HERE: GERMS CAN REMAIN ON SURFACES EVEN AFTER CLEANING!

2 Disinfect surfaces by applying a chlorine bleach solution

Steam cleaning may be preferable for carpets and upholstery. Chlorine bleach could permanently stain these. Mixing directions are based on EPA-registered bleach product directions to be effective against norovirus. For best results, consult label directions on the bleach product you are using.

a. Prepare a chlorine bleach solution

Make bleach solutions fresh daily; keep out of reach of children; never mix bleach solution with other cleaners.



IF HARD SURFACES ARE AFFECTED...
e.g., non-porous surfaces, vinyl, ceramic tile,
sealed counter-tops, sinks, toilets

3/4 CUP OF CONCENTRATED BLEACH + 1 GALLON WATER

CONCENTRATION ~350 ppm

IF USING REGULAR STRENGTH BLEACH (5.25%), INCREASE THE AMOUNT OF BLEACH TO 1 CUP.

- Leave surface wet for at least 5 minutes
- Rinse all surfaces intended for food or mouth contact with plain water before use

3 Wash your hands thoroughly with soap and water

Hand sanitizers may not be effective against norovirus.

Facts about Norovirus



Norovirus is the leading cause of outbreaks of diarrhea and vomiting in the US, and it spreads quickly.

Norovirus spreads by contact with an infected person or by touching a contaminated surface or eating contaminated food or drinking contaminated water. Norovirus particles can even float through the air and then settle on surfaces, spreading contamination.

Norovirus particles are extremely small and billions of them are in the stool and vomit of infected people.

Any vomit or diarrhea may contain norovirus and should be treated as though it does.

People can transfer norovirus to others for at least three days after being sick.

IF CLOTHING OR OTHER FABRICS ARE AFFECTED...

- Remove and wash all clothing or fabric that may have touched vomit or diarrhea
- Machine wash these items with detergent, hot water and **bleach** if recommended, choosing the longest wash cycle
- Machine dry



Scientific experts from the U.S. Centers for Disease Control and Prevention (CDC) helped to develop this poster. For more information on norovirus prevention, please see <http://www.cdc.gov/norovirus/preventing-infection.html>.



co.somerset.nj.us/health



neha.org



waterandhealth.org



americanchemistry.com



cfour.org

disinfect-for-health.org

Updated March, 2015

Norovirus Outbreak Detection and Management

Oregon Gastroenteritis Control Measures Report



PUBLIC HEALTH DIVISION
Acute and Communicable Disease Prevention
Kate Brown, JD, Governor



GASTROENTERITIS CONTROL MEASURES REPORT

OUTBREAK # _____ FACILITY NAME _____

CORPORATION NAME _____

Completed by: _____ Date: ___/___/_____ County: _____

FACILITY POPULATION INFORMATION

_____ Total number of residents in the facility during the outbreak.
 _____ Total number of employees (not including staff from "temp" agencies) during the outbreak.
 _____ Total number of temporary staff hired during this outbreak (enter 0 if temporary staff were not used).
 _____ Total number of patient care staff during the outbreak.

FACILITY QUESTIONS (please include dates)

	Y	?	N	NA	
A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the facility Medicare certified?
B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the facility Medicaid certified?
C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the facility owned by a corporation?
D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the facility have written procedures for contact isolation of patients?
E					When were facility control measures first implemented? ___/___/_____
F					When were control measures lifted and typical procedures resumed? ___/___/_____
G					What type of facility is it? (check all that apply) <input type="checkbox"/> Skilled Nursing <input type="checkbox"/> Residential Care <input type="checkbox"/> Assisted Living <input type="checkbox"/> Adult Foster Care <input type="checkbox"/> Memory Care

CONTROL MEASURES FOR RESIDENTS & PATIENTS (please include Start and End dates)

	Y	?	N	NA	
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were admissions discontinued until the outbreak was over? If yes, what date were admissions discontinued? ___/___/_____ and resumed? ___/___/_____
I	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were sick patients confined to their rooms until they were symptom free for 48 hours or more? If yes, when were patients confined? ___/___/_____ through ___/___/_____
J	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were group activities discontinued until the outbreak was over? ___/___/_____ through ___/___/_____
K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were ward transfers discontinued during the outbreak? ___/___/_____ through ___/___/_____
L	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were visitors restricted during the outbreak? ___/___/_____ through ___/___/_____
M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Was patient care equipment dedicated to a single sick patient, or shared among similarly sick patients?
N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were patients with vomiting or diarrhea put on contact precautions? ___/___/_____ through ___/___/_____
O	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were patients with vomiting or diarrhea moved to private rooms or to rooms with other patients with vomiting or diarrhea (cohorting)? ___/___/_____ through ___/___/_____

CONTROL MEASURES FOR STAFF (please include Start and End dates)

	Y	?	N	NA	
P	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are sinks, soap and paper towels within or just outside each resident's room?
Q	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were the same staff-to-resident assignments maintained throughout the outbreak (cohort nursing)?
R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do employees have paid sick leave? If yes (check only one box): <input type="checkbox"/> all permanent staff or <input type="checkbox"/> some permanent staff
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were there any employees with vomiting or diarrhea restricted from work until symptom-free for 48 hours? Number of restricted employees _____
T					What did patient caregivers use while caring for a patient with vomiting or diarrhea (choose one)? <input type="checkbox"/> gloves only <input type="checkbox"/> gloves & gown both <input type="checkbox"/> gloves, gown & mask <input type="checkbox"/> no equipment
U					What preparation(s) were used to clean up fecal and vomit accidents (choose all that apply)? Bleach & water _____ Other: _____
V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Were non-essential personnel excluded from outbreak units? ___/___/_____ through ___/___/_____
W	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Was staff educated on the cause of the outbreak and control measures? When? ___/___/_____

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References

- (1) Atmar, RL., Apekun, AR., Gilger, MA., Estes, MK., Crawford, SE., Neill, FH., Grahamn, D.Y., (2008) Norwalk virus shedding after experimental human infection. *Emerg Infect Dis* 14(10): 1553-1557
- (2) OSHA Fact Sheet: Noroviruses: <https://www.osha.gov/Publications/norovirus-factsheet.pdf>