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## Guidelines For Environmental Cleaning And Disinfection of Norovirus

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**Noroviruses** are a group of viruses that cause acute gastroenteritis in humans. The symptoms of norovirus infection include nausea, vomiting, diarrhea, cramping, and low-grade fever. Noroviruses are transmitted through the fecal-oral route, either by consumption of fecally contaminated food or water, direct person-to-person spread, or environmental and fomite (inanimate object or substance that is capable of transmitting infectious organisms) contamination.

### Materials Needed:

Disposable gloves, masks, eye protection or face shields, and gown or protective clothing

*Please don all materials before beginning cleaning procedure.*

For questions about the above mentioned personal protective equipment, please see

[http://www.cdc.gov/ncidod/dhqp/gl\\_isolation.html](http://www.cdc.gov/ncidod/dhqp/gl_isolation.html) (Part II.E)

### General Warning:

Chlorine bleach may damage fabrics and other surfaces. Please spot test area before applying to visible surface.

### This document contains information for:

- Disinfection
- Specific Clean-up Procedures
- Food Service Establishments
- Healthcare/Hospital/Nursing Home Facilities
- Schools/Daycares

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# Disinfection

(For non-visibly soiled areas - please refer to specific procedures for large spills)

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## Examples of items to disinfect:

Doorknobs, faucets, sinks, toilets, commodes, bath rails, phones, counters, chairs (including backs), tables, hand rails, elevator buttons, light switches, keyboards, mattress covers, aprons, uniforms, linens, bedding and ice machines.

**What works best: Chlorine bleach (sodium hypochlorite -NaOCl).**

**Regular liquid chlorine bleach (5.25%–6.15% sodium hypochlorite) should be used for disinfection (e.g., not gentle, splash-less). Using alternative formulations of bleach may alter the dilution concentration.**

## Chlorine bleach concentrations and mixing instructions:

- **200ppm** (parts per million) - 1:250 dilution
- **Use for stainless steel, food/mouth contact items, toys**
- **1 Tablespoon of bleach in 1-gallon water**

- 1000ppm** (parts per million) - 1:50 dilution
- **Use for non-porous surfaces, tile floors, counter-tops, sinks, toilets**
  - **1/3-cup bleach in 1-gallon water**

- 5000ppm** (parts per million) - 1:10 dilution
- **Use for porous surfaces, wooden floors**
  - **1 and ½ cup bleach in 1-gallon water**

## Stability of Chlorine Bleach

- Open bottles of liquid chlorine bleach will lose effectiveness after 30 days. Change bottles of bleach every 30 days for accurate concentrations. For disinfecting, use an unopened bottle of chlorine bleach. Prepare a dilution of fresh bleach every day of use and discard unused portions.

### Bleach dilutions clarified with household measurement terms

Bleach Solution	Dilution Exact	Chlorine (ppm)	Dilution approximate	Household (ppm) Approximate	Application
5.25% - 6.15%	Concentrate	52,500 - 61,500	Concentrate	52,500 - 61,500	* Patient Care
5.25% - 6.15%	1:10	5,250 - 6,150	1.5 cups / 1 gallon	~6000	* Patient Care
5.25% - 6.15%	1:100	525-615	0.25 cup / 1 gallon	~600	* Patient Care
5.25%	1:200	263	1 tablespoon / 1 gallon	<200	Dietary
5.25% - 6.15%	1:1000	53-62	1 teaspoon / 1 gallon	~50	Dietary

The glossary in the CDC guidelines provides bleach dilutions using household measurement terms and equivalent parts per million (ppm) that can be used to translate recommendations for use in the patient care setting for environmental decontamination after cleaning, e.g., for *Clostridium difficile*. Premier's Safety Institute has expanded the information to include the use of chlorine bleach as a sanitizing agent in dietary settings consistent with EPA U.S Gov't regulations (21 CFR Part 178). **Please see references on page 10.**

#### Other effective disinfectants

- A phenolic environmental disinfectant (Lysol® or Pinesol®) may be effective, but may require a concentration of **2-4X** the manufacturer's recommendation. The use of this product at the higher concentration may pose a significant health risk to children, workers, pets or yourself. Use extreme caution when using these products. Please read the manufacturer's warning.
- Environmental Protection Agency (EPA) -registered disinfectants

**Note: Some of these products now include quaternary ammonia-based disinfectants but in combination with alcohols. These claims of effectiveness are based on in-vitro studies usually using feline calicivirus; field effectiveness in the context of outbreaks has not been evaluated.**

EPA's Registered Antimicrobial Products Effective Against Norovirus:  
[http://www.epa.gov/oppad001/list\\_g\\_norovirus.pdf](http://www.epa.gov/oppad001/list_g_norovirus.pdf)

NOT ALL DISINFECTANTS SHOWN ON EPA LIST ARE APPROVED FOR USE IN FOOD FACILITIES. **\*\* Please see Food Service Establishments Section beginning on page 5.**

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## Health Concerns with using Chlorine Bleach

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### Mixing hazards

- USE ONLY IN WELL-VENTILATED AREAS. Adverse effects of inappropriate mixtures of household cleaners usually are caused by prolonged exposure to an irritant gas in a poorly ventilated area. The most common inappropriate mixtures of cleaning agents are bleach with acids (like vinegar) or ammonia (Windex®). Potential irritants released from such mixtures are chlorine gas, chloramines, and ammonia gas.

### Health hazards

- Chlorine bleach is corrosive and irritating to all mucosal tissue, skin, eyes and upper and lower respiratory tract. Avoid spray bottle application with any disinfectant. However, "pour" or "pump" bottles that do not produce aerosols are highly recommended.

### Personal protective equipment

- Disposable gloves, masks, eye protection or face shields, and gown or protective clothing
- Environmental cleaning using a more concentrated disinfectant will require a heavier duty glove than a simple non-sterile latex/vinyl glove.

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## Specific Clean-up Procedures

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For cleaning large spills of vomitus or stool, a two-step process should be used. Put on personal protective equipment before cleanup as specified in the CDC document: [http://www.cdc.gov/ncidod/dhgp/gl\\_isolation.html](http://www.cdc.gov/ncidod/dhgp/gl_isolation.html)

1. Pre-cleaning of visible/organic debris with absorbent material (double layer and placed in a plastic bag to minimize exposure to aerosols) should precede the disinfection process.
2. Liberally disinfect area and objects surrounding the contamination with an appropriate environmental disinfectant (multiple applications may be required).

\*Ensure appropriate dilution and contact times for the appropriate environmental disinfectant.

### Hard surfaces

- Disinfect with bleach, rinse with water if food preparation area.

### Carpet / Upholstered Furniture

- Visible debris should be cleaned with absorbent material (double layer) and placed in a plastic bag to minimize exposure to aerosols - disinfecting with bleach may discolor carpet – steam clean (heat inactivation) 158°F for 5 minutes or 212°F for 1 minute for complete inactivation.

### Linens / clothing / textiles

- If soiled, vomit or stool should be carefully removed to minimize aerosols. Keep contaminated and uncontaminated clothes separated. Minimize disruption of soiled linens and laundry. Aerosols created may pose a risk for transmission. Wash items in a pre-wash cycle, then use a regular wash cycle using detergent and dried separately from uncontaminated clothing at high temperature greater than 170°F. Ensure segregation of clean and soiled linens/clothing/textiles.

### Surfaces Corrodible/damageable by bleach

- EPA-registered phenolic solutions (concentrated Lysol® or concentrated Pinesol®) mixed at **2-4X** the manufacturer's recommended concentration.

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# Food Service Establishments

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## III Employees

- Food handlers who are ill with gastrointestinal symptoms **MUST NOT** prepare or serve food for others under any circumstances (**2005 Food Code 2-201.12**). Any employee with vomiting or diarrhea must be sent home immediately, unless their symptoms are the result of a non-infectious condition (e.g., pregnancy or Crohn's Disease).
- It is required that employees that have been ill with *suspected* Norovirus **MUST** not return to work for a period of 24 hours after symptoms have ended or provides medical documentation that the symptom is from a non-infectious condition, as mentioned above. However, It is **highly recommended** that employees that have been ill with suspected Norovirus should not return to work for a period of 48 to 72 hours after symptoms have ended
- Serving a Non-Highly Susceptible Population (2005 Food Code 2-201.13 (A)(2)(a))  
Food handlers who have been *diagnosed* as having Norovirus may return on a *restricted* basis (i.e. restricted from working with exposed food; clean equipment, utensils, and linens; and unwrapped single-service and single use articles) in the food establishment no sooner than 24 hours after symptoms resolve. They remain restricted until they do meet the following conditions:
  - Approval is obtained from the Regulatory Authority (**2005 Food Code 2-201-13 (D)**), AND
  - They have been medically cleared (**2005 Food Code 2-201-13 (D)(1)**), OR
  - More than 48 hours have passed since the employee's symptoms have resolved. (**2005 Food Code 2-201-13 (D)(2)**).
- Serving a Highly Susceptible Population (2005 Food Code 2-201.13 (A)(2)(b))  
An employee who serves a highly susceptible population and who has been diagnosed with Norovirus is excluded from work until meeting the following requirements:
  - Approval is obtained from the Regulatory Authority (**2005 Food Code 2-201-13 (D)**), AND

- They have been medically cleared (**2005 Food Code 2-201-13 (D)(1)**),  
OR
- More than 48 hours have passed since the employee's symptoms have resolved. (**2005 Food Code 2-201-13 (D)(2)**).
- Diligent hand washing practices should be followed.

### **Hand washing**

- After using the restroom, sneezing, coughing, before and after food preparation, all employees should wash hands with warm running water and soap, using friction for 20 seconds. Hands should be dried with a single-service paper towel or air dryer.
- It is recommended that persons involved in bussing tables, handling of used utensils; cups or any dishes exercise regular thorough hand washing, particularly before eating or handling food or clean utensils.

### **Disinfection Precautions**

- NOT ALL DISINFECTANTS SHOWN ON EPA LIST (page 3) ARE APPROVED FOR USE IN FOOD FACILITIES
- **Product label must contain language stating approval for use in (FDA or USDA) food facilities AND provide appropriate directions for use/application rates in these settings. Consult the manufacturer for further information on approval for use on food contact surfaces and/or in food service facilities.**
- Any pesticide product intended for sanitizing inanimate food contact surfaces must be approved by FDA under 21CFR178.1010. See link below for approved chemicals.  
[http://www.access.gpo.gov/nara/cfr/waisidx\\_99/21cfr178\\_99.html](http://www.access.gpo.gov/nara/cfr/waisidx_99/21cfr178_99.html)

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# Healthcare/Hospital/Nursing Home Facilities

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## Occupational Health Policies

- Refer to Occupational Health for employee health policies for work restrictions and return to work policies  
[http://www.cdc.gov/ncidod/dhqp/gl\\_hcpersonnel.html](http://www.cdc.gov/ncidod/dhqp/gl_hcpersonnel.html)

## EPA-Registered Hospital-Use disinfectant

- Ensure appropriate use EPA-registered Hospital-Use disinfectant – (see Disinfection section).

## Medical Equipment Cleaning Precautions

- Medical equipment used for care of norovirus infected patients, should be either dedicated to that room for the duration of isolation or be thoroughly disinfected upon removal from the room. Please consult terminal cleaning recommendations for your facility. Selection of appropriate cleaning agent should be consistent with the equipment manufacturer's recommendation for compatibility.

## Cleaning Procedures

- Routine environmental cleaning measures, at proper time intervals, and proper disinfection order, with the recommended concentration and contact time should be used.
- For cleaning procedures (i.e. changing water / wash cloths, sequence of cleaning) refer to HICPAC Environmental Infection Control for Healthcare Facilities, 2003 [http://www.cdc.gov/ncidod/dhqp/gl\\_enviroinfection.html](http://www.cdc.gov/ncidod/dhqp/gl_enviroinfection.html) Pgs.71-88.

## Laundry Concerns

- Do not shake soiled linens and laundry. Aerosols created may pose a risk for transmission. Soiled linens should be placed directly into a bag at the point of removal.
- Ensure proper separation of clean and soiled laundry.
- For additional laundry information go to <http://www.cdc.gov/ncidod/hip/enviro/guide.htm> pgs98-103.

## Ice Machines

- Contaminated ice machines must be disinfected.
- For protocols see <http://www.cdc.gov/ncidod/hip/enviro/guide.htm> pgs



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## Schools/Daycare

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### Hand washing

- All employees should wash hands with warm running water and soap, using friction for 20 seconds, paying special attention to under fingernails. Dry hands with a single-service paper towel or air dryer.
- Hands should be washed after using the restroom, sneezing, coughing, changing diapers, before any food preparation or service.

### Toy cleaning

- Toys should be cleaned and disinfected daily.
- Any toy that enter a child's mouth (rubber or plastic blocks, balls, etc.) must be disinfected with 200ppm bleach, rinsed thoroughly and air dried or run through dishwasher with high temperature (170°F).
- Remove visible debris on softer toys that have been soiled by vomit – (see Disinfection section). Launder toy as directed or discard if necessary.

### Keeping Diaper Changing Surfaces Clean

- Surfaces should have a plastic covered pad without cracks.
- Use disposable material to cover the pad on changing tables such as shelf paper, wax paper, scrap computer paper, cut up paper bags. Discard after each diaper change.
- Clean the surface after every diaper change by washing with detergent, water and friction, bleach dilution (see **Disinfection** section for appropriate concentration), and rinsing with clean water.
- Caregivers must wash their hands immediately.
- After changing a diaper, the diapered child's hands should be washed also.

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