Viral Gastroenteritis

NOROVIRUS

Michigan Guidelines for Environmental Cleaning and Disinfection of Norovirus

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 fecal-contaminated food or water, direct person-to-person spread, or environmental and fomite (inanimate object or substance that can transmit infectious organisms) contamination.

Personal Protective Equipment Needed for Cleaning
Disposable gloves, masks, eye protection or face shields, and gown or protective clothing. *Put on (don) all materials before the start of cleaning procedure.*

For questions about the above mentioned personal protective equipment, please see **Preventing Norovirus | CDC**.

General Warning
Chlorine bleach may damage fabrics and other surfaces. Spot test the area before applying to visible surfaces.

This document contains information for:

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

General Disinfection

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

Examples of Items to Disinfect

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

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

Regular liquid chlorine bleach (5.25%–6.15% sodium hypochlorite) should be used for disinfection. Using alternative formulations (e.g., non-scented or splash-less bleach) of bleach may alter the dilution concentration needed to clean materials. Do not combine bleach with any other disinfectants or cleaning products.

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, countertops, 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 disinfection, use an unopened bottle of chlorine bleach. Prepare a dilution of fresh bleach every day of use and appropriately discard unused portions.

Preparation of bleach dilutions using household measurements:

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).

Other Effective Disinfectants

- A phenolic disinfectant (Lysol® or Pinesol®) may require a concentration of **2-4X** the manufacturer's recommendation to be effective. The use of this product at the higher concentration may pose a significant health risk to children, workers, and pets. Use extreme caution when using these products. Consult the manufacturer's warning.

- Environmental Protection Agency (EPA) registered disinfectants can be located here: (List G: EPA's Registered Antimicrobial Products Effective Against Norovirus (Norwalk-like virus): **List G: Antimicrobial Products Registered with EPA for Claims Against Norovirus (Feline calicivirus) | US EPA**

Health Concerns Associated with Chlorine Bleach

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 include chlorine gas, chloramines, and ammonia gas. Do not combine bleach with any other disinfectant or cleaning product.**

Health Hazards

- Chlorine bleach is corrosive and irritating to all mucosal tissue, skin, eyes, and the upper and lower respiratory tract. Avoid spray bottle application with any disinfectant. "Pour" or "pump" bottles that do not produce aerosols are highly recommended.
- All chemicals, if removed from original bulk container, and placed into a working container (i.e., pour or pump bottles) should bear a label with a common name and concentration of the chemical inside.
- **Never place a chemical into another container that previously held a different type of chemical.**

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.

Specific Clean-up Procedures

For cleaning large spills of vomit or stool, a two-step process should be used. Put on personal protective equipment *before* cleanup, as specified in the CDC document: Preventing Norovirus | CDC.

1. Pre-cleaning of visible/organic debris with absorbent material (double layer and placed in a plastic bag to minimize exposure to aerosols) should be used before the disinfection process.

2. Liberally disinfect area and objects surrounding the contamination with an appropriate disinfectant (multiple applications may be required). Ensure that the appropriate dilution and contact times for the disinfectant are used.

Hard Surfaces

- Disinfect area with bleach and rinse with water if food is prepared on the surface.

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 of the virus.

Linens / Clothing / Textiles

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

Disinfectants that Cause Surface Corrosion/ Damage

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

Food Service Establishments

Ill Employees

- Food handlers who are ill with gastrointestinal symptoms MUST NOT prepare or serve food for others under any circumstance **(FDA Food Code 2-201.12)**. Any employee with vomiting and/or diarrhea must be *excluded* (i.e., preventing a person from working as an employee in a food establishment or entering a food establishment as an employee) from work unless their symptoms are the result of a non-infectious condition (e.g., pregnancy or Crohn's Disease).

- It is required that employees who have been ill with vomiting and/or diarrhea 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 who have been ill with suspected Norovirus, should not return to work for a period of 48 to 72 hours after symptoms have resolved.

Serving a Non-Highly Susceptible Population (FDA 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. Employees must remain restricted until the following conditions are met:

- Approval is obtained from the Regulatory Authority (**FDA Food Code 2-201-13 (D),** AND
- They have been medically cleared (**FDA Food Code 2-201-13 (D)(1),** OR
- More than 48 hours have passed since the employee's symptoms have resolved. (**FDA Food Code 2-201-13 (D)(2).**
  OR
- The food employee was excluded or restricted and did not develop symptoms and more than 48 hours have passed since the FOOD EMPLOYEE was diagnosed.

Serving a Highly Susceptible Population (FDA Food Code 2-201.13 (A)(2)(b)

A highly susceptible population means persons who are more likely than other people in the general population to experience foodborne disease because they are immunocompromised; preschool aged children; or older adults AND obtain food at a facility that provides services such as custodial care, health care, or

assisted living, such as a child or adult day care center, kidney dialysis center, hospital, or nursing home, or nutritional or socialization services such as a senior center. Persons who are part of a highly susceptible population are at greater health risks if exposed to Norovirus. An employee who serves food at a highly susceptible population food service establishment, and who has been *diagnosed* with Norovirus is *excluded* from work until meeting the following requirements:

- Approval is obtained from the Regulatory Authority (**FDA Food Code 2-201-13 (D),** AND
- They have been medically cleared (**FDA Food Code 2-201-13 (D)(1),** OR
- More than 48 hours have passed since the employee's symptoms have resolved. (**FDA Food Code 2-201-13 (D)(2).** OR
- The food employee was excluded or restricted and did not develop symptoms and more than 48 hours have passed since the FOOD EMPLOYEE was diagnosed.

- Diligent hand washing practices should be followed.

Hand Washing

- After using the restroom, before and after food preparation, sneezing, or coughing, all employees should use a designated handwashing sink to wash hands and exposed portions of arms. Wash with warm running water and soap using friction for 20 seconds and rinse under clean, running warm water. Hands should be dried with a single-use paper towel or air dryer. To avoid recontaminating hands, it is recommended that employees use single-use paper towel or similar clean barriers when touching surfaces such as faucet handles on handwashing sink or handle of restroom door.
- It is recommended that persons involved in busing tables, handling of used utensils, cups, or any dishes exercise frequent and thorough hand washing, particularly before eating or handling food or clean utensils.
- **Hand sanitizer does not work well against Norovirus and should not be used as a substitute for hand washing**.

Disinfection Precautions

A common difference between surface sanitizers and disinfectants is that the active ingredient concentration is often higher and sometimes different in disinfectants than in most surface sanitizers. This higher concentration is one of the reasons disinfectants can achieve a higher level of antimicrobial efficacy compared to surface sanitizers. In most cases this higher level of active ingredient exceeds the level that can be safely applied to a food contact surface (FCS) without a follow-up rinse. Furthermore, some inert ingredients that do not meet the statutory limit outlined in 40 CFR 180 might be used in a disinfectant, making the disinfectant inappropriate for a no-rinse FCS

application**. It is critical to carefully review product labels for all registered surface sanitizers and disinfectants to ensure their safe and proper use.**

The U.S. EPA is the regulatory authority for antimicrobials like surface sanitizers and disinfectants used in food establishments. Only EPA-registered surface sanitizers and disinfectants can be used in food establishments.

Disinfectants can be used on an FCS; however, most disinfectants require rinsing after being applied to an FCS. Regular food preparation and cooking would follow the rinse step (if required) after a disinfection step.

Most disinfectants used in food establishments are intended for targeted interventions or specific areas. Typically, they are reserved for restrooms, high touch points, blood and bodily fluid clean up, pathogen remediation, outbreak control, or biofilm control. It is important to use disinfectants only when needed and not as a substitute for a surface sanitizer.

- See link for **approved** chemicals: **List G: Antimicrobial Products Registered with EPA for Claims Against Norovirus (Feline calicivirus) | US EPA**.

Responding to Vomit or Fecal Contamination Events in Food Establishments:

- It is recommended that a food establishment have written procedures for employees to follow when responding to vomiting or diarrheal contamination events that involve the discharge of vomit or fecal matter onto surfaces in a food establishment. The procedures should address the specific actions employees take to minimize the spread of contamination and the exposure of employees, consumers, food, and surfaces to vomit or fecal matter. When developing a written procedure, it should take into consideration:

    - The procedures for containment and removal of any discharges, including airborne particulates;
    - The procedure for cleaning, sanitizing, and, as necessary, the disinfection of any surfaces that may have become contaminated;
    - The procedures for the evaluation and disposal of any food that may have been exposed to discharges;
    - The availability of effective disinfectants, such as EPA registered disinfection products sufficient to inactivate Norovirus, personal protective equipment, and other cleaning and disinfecting equipment and appurtenances intended for response and their proper use;
    - Procedures for the disposal and/or cleaning and disinfection of tools and equipment used to clean up vomit or fecal matter;
    - The circumstances under which a food employee is to wear personal protective equipment for cleaning and disinfecting of a contaminated area;

- Notification to food employees on the proper use of personal protective equipment and procedures to follow in containing, cleaning, and disinfecting a contaminated area;
- The segregation of areas that may have been contaminated so as to minimize the unnecessary exposure of employees, customers, and others in the facility to the discharges or to surfaces or food that may have become contaminated;
- Minimizing risk of disease transmission through the exclusion and restriction of ill employees as specified in 2-201.12 of the FDA Food Code;
- Minimizing risk of disease transmission through the prompt removal of ill customers and others from areas of food preparation, service, and storage; and
- The conditions under which the plan will be implemented.

Healthcare/Hospital/Nursing Home Facilities

Occupational Health Policies

- Refer to Occupational Health for employee health policies for work restrictions and return to work policies. See **Noroviruses (osha.gov)** for more information.

Medical Equipment Cleaning Precautions

- Medical equipment used for care of Norovirus infected patients should either be 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 and Norovirus Guidelines for Healthcare Settings, 2011 **Norovirus | Guidelines Library | Infection Control | CDC**.

Laundry Concerns

- Do not shake soiled linens and laundry. Creating aerosols 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: 2011 **Norovirus | Guidelines Library | Infection Control | CDC.**

Ice Machines

- Contaminated ice machines must be disinfected.
- For protocols see **Resources and References | CDC.**

Schools/Daycare

Hand Washing

- All employees should wash hands with warm running water and soap, using friction for 20 seconds, paying special attention to under the fingernails. Dry hands with a single-use paper towel or air dryer.
- Hands should be washed after using the restroom, sneezing, coughing, changing diapers, and before any food preparation or service.
- **Hand sanitizer does not work well against Norovirus and should not be used as a substitute for hand washing.**

Toy Cleaning

- Toys should be cleaned and disinfected daily.
- Any toy that enters 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 *General 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 *General Disinfection* section for appropriate concentration) and rinsing with clean water.
- Caregivers must wash their hands immediately after changing a diaper.
- After changing a diaper, the diapered child's hands should be washed as well.

References

1. CDC. Norovirus Guidelines for Healthcare Settings. Norovirus | Guidelines Library | Infection Control | CDC. (Accessed 3/16/23).

2. CDC. Preventing Norvirus. Preventing Norovirus | CDC. (Accessed 3/16/23).

3. CDC. Resource and References. Resources and References | CDC. (Accessed 3/16/23).

4. EPA. List G: EPA's Registered Antimicrobial Products Effective Against Norovirus (Norwalk-like virus). List G: Antimicrobial Products Registered with EPA for Claims Against Norovirus (Feline calicivirus) | US EPA. (Accessed 3/16/23).

5. OSHA. Norovirus Fact Sheet. Noroviruses. (Accessed 3/16/23).

This document has been updated from the 2014 document, *Guidance for Environmental Cleaning and Disinfection of Norovirus*.

Michigan Department of Health and Human Services
Bureau of Infectious Disease Prevention
Division of Communicable Disease (517) 335-8165
For questions, contact Jennifer Beggs beggsj@michigan.gov or Cole Burkholder burkholderc1@michigan.gov.