NOROVIRUS PREVENTION TOOL KIT
WHAT IS NOROVIRUS?
Norovirus is a single-stranded, nonenveloped RNA virus that causes inflammation of the stomach and/or intestines and it is the most common cause of acute infectious gastroenteritis in the United States. Norovirus causes an estimated 23 million cases of gastroenteritis and 800 deaths per year in the U.S. alone.¹

The virus is highly contagious – it takes as few as 18 virus particles to cause an infection, and one person is capable of infecting many others. As a result, norovirus outbreaks are quite common, and not just on cruise ships. According to a 2010 study in the American Journal of Infection Control (AJIC), hospitals and long-term care facilities account for more than 25% of U.S. outbreaks.¹

SYMPTOMS
Norovirus causes the abrupt onset of nausea, vomiting and diarrhea that usually lasts for one to two days. Other symptoms can include stomach pain, fever, headache and body aches. Symptoms appear 12 to 48 hours after exposure to the virus. Symptom severity and duration can be increased among the elderly or the immune compromised.

There is no specific cure for norovirus, but the replacement of fluids to avoid dehydration is extremely important.² Most people recover within one to three days.

TRANSMISSION
Norovirus is highly contagious and can infect anyone. Since there are many different types of the virus, a person can contract it multiple times. The most incidences of norovirus illness in the United States occur between November and April.³

Norovirus is transmitted by accidentally getting infected stool or vomit particles in the mouth. This usually occurs through one of the following ways: ³

- Ingesting contaminated food or drinks
- Touching contaminated surfaces and then touching the mouth
- Having direct contact with an infected person

People are most contagious when they are sick with norovirus illness and during the first three days after recovering from the symptoms.

THE RISK OF HEALTHCARE FACILITY NOROVIRUS OUTBREAKS IS PROBABLY UNDERAPPRECIATED AND IS BEST ADDRESSED BY ADVANCED PLANNING AND HAVING A WELL THOUGHT-OUT INSTITUTIONAL CONTROL PLAN THAT CAN BE RAPIDLY MOBILIZED AND DEPLOYED WHEN THE NEED ARISES.

Brian Currie, MD, MPH, Vice President and Medical Director for Research at Montefiore Medical Center
Patients carrying the pathogen can easily contaminate objects or shared surfaces that they touch, so healthcare facilities may want to group suspected infected patients together or place them in private rooms. Given the prevalence of the virus, surface disinfection and hand hygiene are important parts of a prevention regimen.

The Centers for Disease Control and Prevention (CDC) recommends the following prevention measures for healthcare facilities:

- **WASH HANDS** with soap and water after contact with norovirus patients and follow all hand-hygiene guidelines.
- **REMOVE AND WASH** contaminated clothing or linens and wear disposable gloves while handling.
- Follow the proper **PERSONAL PROTECTIVE EQUIPMENT** guidelines and use gowns and gloves when in contact with symptomatic patients.
- Routinely **CLEAN AND DISINFECT** high touch patient surfaces and equipment with bleach (sodium hypochlorite) or another U.S. Environmental Protection Agency (EPA) registered product with a label claim to kill norovirus.
- Ensure that **STAFF WHO SHOW SYMPTOMS OF GASTROENTERITIS** are excused from work.
NOROVIRUS IMPACT ON FACILITIES
What makes norovirus relevant to healthcare facilities is the risk of outbreaks among patients and the risk of contamination to staff members.

Transmission to Patients
Norovirus can be introduced into healthcare facilities through infected patients, staff or visitors. The virus is easily transmitted through direct or indirect contact with particles from vomitus or diarrhea. A study in the American Journal of Infection Control (AJIC) reports that each norovirus outbreak affects an average of more than 12 patients. Patients infected with norovirus may experience increased hospital stays and could suffer other medical complications. According to the CDC, nearly two-thirds of all norovirus outbreaks in the U.S. occur in long-term care facilities. Outbreaks in these settings can last months and symptoms can be more severe in elderly patients. Thus limiting the virus’ spread to patients is extremely important, especially in healthcare environments.

Transmission to Staff
The American Journal of Infection Control notes that “norovirus outbreaks in healthcare workers can cause substantial economic losses to hospitals because of absenteeism.” In many cases, high levels of illness among staff result in closure of the affected ward, further increasing norovirus related expenses. A review of closed medical departments found that more than 44% were directly attributed to norovirus outbreaks. To prevent the spread of illness to staff, the proper contact precautions and environmental cleaning protocols should be followed.

THE FINANCIAL BURDEN OF NOROVIRUS TO FACILITIES
A matched case study found that the financial burden of a norovirus outbreak to a facility was $65,190

Increased expenses resulted from:
- Bed closures
- Additional lab testing
- Infected workers
- Increased nursing care for infected patients
- Infection control team expenses

Due to the highly contagious nature of the disease, costs increase rapidly based on the number of infected patients and staff members, making it imperative for facilities to mitigate further spread of the disease in order to curb rising costs.
PREVENTION IS THE KEY TO REDUCING THE FINANCIAL BURDEN OF NOROVIRUS

A recent study found that increased hand hygiene and surface disinfecting measures can greatly reduce the financial burden norovirus has on a facility.

Increasing surface disinfection following the detection of a single case of norovirus was found to offset costs by as much as $40,040. When five cases of norovirus were detected, cost reduction increased to as much as $99,363.8

Similarly, increasing hand hygiene after the detection of a single case of norovirus was found to offset costs by up to $21,394. Implementing similar procedures following the detection of five norovirus cases reduced costs by upwards of $104,273.8

These measures are based on the highly contagious nature of the virus and the ability of both surface disinfection and hand hygiene to aid in the reduction of the disease transmission to both patients and staff within a facility.8

SURFACE DISINFECTION AND HAND HYGIENE are key in reducing transmission of the disease to both patients and staff within a facility.

THE LABEL OF ANY DISINFECTING PRODUCT SHOULD BE READ TO CONFIRM THAT THE PRODUCT IS EPA-REGISTERED TO KILL NOROVIRUS.

Lillian A. Burns, MT, MPH, CIC, Director of Infection Control and Epidemiology at Lenox Hill Hospital, North Shore LIJ

References:
2. CDC. Norovirus Q&A. National Center for Infectious Diseases, Respiratory and Enteric Viruses Brand. 2005.
3. Center for Disease Control and Prevention (CDC).
It is no surprise for those working in the infection control field that norovirus is a growing concern for healthcare facilities. A recent article in the *American Journal of Infection Control* noted that norovirus is the leading cause of healthcare-associated infection outbreaks in U.S. hospitals, accounting for 65% of ward closures and 18.2% of all infection outbreaks.

When it comes to dealing with and preventing norovirus outbreaks in your facility, Clorox Healthcare wants to help. As a trusted partner of those working in infection control, Clorox Healthcare is committed to providing valuable solutions to the healthcare community.

This Norovirus Prevention Tool Kit contains information and tools to help your facility prevent and manage norovirus outbreaks. The Tool Kit is meant to help educate infection control and environmental services teams and demonstrate the value and cost savings that a well thought out prevention plan can have. With the right tools such as environmental cleaning and disinfection protocols and checklists, your facility will be ready to deal with norovirus when necessary.

We hope this Tool Kit will be of value to your facility and we look forward to hearing your feedback and success stories.

Best Regards,

Craig Stevenson  
Vice President & General Manager  
Clorox Professional Products Company
NOROVIRUS PREVENTION ADVICE
FROM THE EXPERTS

Brian Currie, MD, MPH
Vice President and Medical Director for Research at Montefiore Medical Center

Healthcare facilities with norovirus outbreaks can experience increased costs related to isolation precautions and personal protective equipment. Control efforts may require patient care unit closures, supplemental environmental cleaning, staff cohorting or replacement and dealing with increased sick time and staffing shortfalls.

The risk of healthcare facility norovirus outbreaks is probably underappreciated and is best addressed by advanced planning and having a well thought out institutional control plan that can be rapidly mobilized and deployed when the need arises.

Lillian A. Burns, MT, MPH, CIC
Director of Infection Control and Epidemiology at Lenox Hill Hospital, North Shore LIJ

Trying to contain a norovirus outbreak can be very difficult, because not only must healthcare facilities have the cooperation from the staff on prevention measures, but also from the patients and visitors.

Getting the cooperation from the patients and visitors may be difficult because they are not fully aware of the impact of norovirus and will often forget to follow infection prevention policies and procedures, such as washing hands. Education is a critical step in any norovirus prevention plan.

Frequent cleaning and disinfecting of the environment is necessary to curtail outbreaks of norovirus. All patient care equipment and medical devices should be disinfected as appropriate with a bleach solution or a product that contains bleach such as bleach-based wipes. The label of any disinfecting product should be read to confirm that the product is registered to kill norovirus.

Ruth Carrico, PhD, RN, FSHEA, CIC
Associate Professor, Division of Infectious Diseases, Department of Medicine at the University of Louisville School of Medicine

It only takes one experience with norovirus to recognize that the time and effort spent in prevention is infinitely better than trying to respond and react to the outbreak. Preparation and training are critical, especially when considering the role the environment plays in transmission. Ensuring that healthcare personnel are competent and well-equipped to address this challenge requires strong partnerships and active collaboration among the healthcare disciplines. Maintaining a clean and safe environment is everyone’s job.
THE FINANCIAL BURDEN OF NOROVIRUS

THE FINANCIAL BURDEN OF NOROVIRUS TO FACILITIES

A matched case study found that the financial burden of a norovirus outbreak to a facility was $65,190\(^1\).

Increased expenses resulted from:
- Bed closures
- Additional lab testing
- Infected workers
- Increased nursing care for infected patients
- Infection control team expenses

PREVENTION IS THE KEY TO REDUCING THE FINANCIAL BURDEN OF NOROVIRUS

Increasing **surface disinfection** following the detection of a single case of norovirus was found to offset costs by as much as $40,040\(^2\).

- When five cases of norovirus were detected, cost reduction increased to as much as $99,363\(^2\).

Similarly, increasing **hand hygiene** after the detection of a single case of norovirus was found to offset costs by up to $21,394\(^2\).

- Implementing similar procedures following the detection of five norovirus cases reduced costs by upwards of $104,273\(^2\).

**References:**
1. Impact of an outbreak of norovirus infection on hospital resources. Walter Zingg, MD; Carlo Colombo, RN, MPH; Thomas Jucker, RN; Walter Bossart, PhD; Christian Ruef, MD. *Infection Control and Hospital Epidemiology*, vol. 26, No. 3, March 2005; pp. 263-267.
PREVENTING THE SPREAD OF NOROVIRUS

ENVIRONMENTAL SURFACE DISINFECTION PROTOCOLS

To help prevent the spread of norovirus in healthcare environments, implement the following surface cleaning and disinfecting protocol regularly and even more diligently during an outbreak.

PREVENT OUTBREAKS
- Emphasize thorough cleaning and disinfection of environmental surfaces.
- Pay close attention to frequently touched surfaces and use appropriate disinfectants for the intended surface.

CONTAIN OUTBREAKS
- Separate or cohort sick patients, ideally in private rooms with attached bathrooms.
- For suspected clusters of viral gastroenteritis, clean and then disinfect with a dilute bleach solution (minimum 5.25% per gallon of water) or an appropriately labeled EPA-registered disinfectant with a norovirus claim.
- Increase the amount of cleanings for wards or unit levels, as well as frequently touched surfaces, to three times daily.

REMEMBER:
- Wear disposable gloves and disposable gowns.
- Perform hand hygiene with soap and water (not alcohol-based hand rub).
- Use disposable cleaning materials and discard any sponges or cleaning cloths/rags. Consider using ready-to-use EPA-registered wipes to minimize reuse of cloths that can aid in disease transmission.
- Use a ready-to-use EPA-registered disinfecting product or a bleach solution. Follow the manufacturer’s instructions when using EPA-registered disinfectants like bleach or hydrogen peroxide-based products. If using a bleach solution, prepare a fresh solution each day and be sure containers are properly labeled.

DISINFECTING SURFACES:
- Clean visibly soiled surfaces with a detergent prior to disinfection with bleach or another disinfectant that is EPA-registered to kill norovirus.
- Apply the EPA-registered disinfectant to the surfaces and wait the recommended contact time.
- If using a bleach-based product, use clean gloves and cloths/rags to wipe down surfaces after the appropriate time has elapsed. After cleaning, dispose of or properly disinfect rags and cloths.

DON’T FORGET TO DISINFECT THESE HOT SPOTS:
- As well as: “Frequently touched” surfaces like handles and hand rails, larger surfaces like floors, countertops and general areas in the bathroom and kitchen.
PREVENTING THE SPREAD OF NOROVIRUS

HAND HYGIENE PROTOCOLS
To help prevent the spread of norovirus in the healthcare environment, implement the following healthy hands protocols everyday and even more diligently during an outbreak.

PREVENT & CONTAIN OUTBREAKS
• The U.S. Centers for Disease Control and Prevention (CDC) recommends always washing hands before preparing food, eating, touching your mouth or face and after going to the bathroom.

![Food, Person, Toilet, Water Tap]

• If gloves are worn and become contaminated, remove the gloves and wash your hands.
• During outbreaks or clusters of cases, pay particular attention to good hand hygiene and use an alcohol-based hand sanitizer along with hand washing.¹

HAND WASHING – HOW TO DO IT:
• Wash hands using soap and warm, running water.
• Rub hands vigorously during washing for at least 20 seconds (as long as it takes to sing “Happy Birthday” twice).
• Pay special attention to the backs of the hands, wrists, between the fingers and under the fingernails.
• Rinse hands well while leaving the water running.
• With the water running, dry hands with a single-use towel.
• Turn off the water using a paper towel, covering washed hands to prevent re-contamination.²

HAND HYGIENE WITH HAND RUB OR SANITIZING SPRAY – HOW TO DO IT:
• Apply one to two pumps on palm-side of each hand while holding hand in a “claw” position.
• Shuffle fingertips in palm of wet hand (repeat with other hand).
• Interlock fingers on both hands and move in and out.
• Rub hands vigorously to cover remainder of hands and wrists.
• Allow hands to air dry – make sure enough product is applied to thoroughly cover all surfaces and fingernail beds and for hands to remain wet for at least 30 seconds.
• When using a hand sanitizer, make sure you reach all surfaces of the hand. Germ hot spots include: fingertips, cuticles and nailbeds, underneath the fingernails, between fingers, knuckles, wrists and any furrows or wrinkles in the skin.

WHAT TO WATCH FOR:
• The CDC recommends using an alcohol-based hand sanitizer that contains 60-95% ethanol or isopropanol.³ The alcohol contained in a hand sanitizer denatures or destroys the virus’s proteins, rendering it unable to cause infection.⁴

References
PREVENTING THE SPREAD OF NOROVIRUS

FOOD AND WATER PROTOCOLS

The U.S. Centers for Disease Control and Prevention (CDC) states that about 50% of all outbreaks of food-related illness are caused by norovirus.\(^1\) There are an estimated 9.2 million cases of foodborne norovirus infection in the United States each year.\(^2\)

According to the CDC, food and drinks (including water) can easily become contaminated with norovirus because it only takes very few (10-100) norovirus particles to make a person sick.\(^3\)

Follow the below protocols to help prevent and contain outbreaks when handling food and water in healthcare settings.

PREVENT OUTBREAKS

- Always wash and sanitize hands before eating, preparing or serving food.
- People who are sick with symptoms of gastroenteritis (vomiting and/or diarrhea) should never prepare or serve food until at least 48-72 hours after symptoms resolve.
- Environmental surfaces, including bathroom surfaces, surfaces frequently touched by hands (door knobs, faucet handles, light switches, remote controls, etc.) and all food preparation surfaces should be disinfected regularly.

CONTAIN OUTBREAKS

- Identify and eliminate sources of contamination in the water supply. Fecal contamination from untreated sewage is a common cause of water supply contamination.
- Prohibit sick persons from preparing or serving food for at least 48-72 hours after the last symptoms have cleared; this is because people will continue to shed norovirus in their fecal matter for several days after recovery from norovirus symptoms.
- Dispose of any potentially contaminated food/beverage items.
- Intensify hand washing with soap and water and sanitization efforts. CDC recommends the use of an alcohol-based hand sanitizer along with hand washing.\(^4\)
- Remember to disinfect environmental surfaces and objects that may be contaminated with norovirus with bleach or a ready-to-use EPA-registered disinfectant that is labeled with kill claims against norovirus.

For environmental disinfection of norovirus on hard surfaces, CDC recommends chlorine bleach at a minimum concentration of 1000 ppm.

For surfaces that have high levels of soil and resistant surfaces, CDC recommends up to a 5000 ppm chlorine bleach solution.\(^4\)

Disinfect these frequently touched surfaces

PREVENTING THE SPREAD OF NOROVIRUS

LAUNDRY PROTOCOLS

Laundry can come in direct contact with infected individuals or become contaminated with norovirus during collection of heavily soiled laundry. According to the U.S. Centers for Disease Control and Prevention (CDC), chlorine bleach provides an extra margin of safety in addition to detergents. During a norovirus outbreak, be extra diligent in disinfecting contaminated laundry. Evidence from outbreak investigations and laboratory-based research has shown that only strong disinfectants, such as bleach, are effective against norovirus. Bleach is effective at concentrations that are safe for routine use.

PREVENT & CONTAIN OUTBREAKS

• Carefully contain soiled linens. Facility-based laundering services should routinely use either bleach or other disinfectants when washing sheets, towels, bedding, etc.
• In addition to disinfecting contaminated laundry with bleach, be sure to disinfect the machine and laundry room surfaces to prevent cross-contamination of clean laundry.

WHAT TO DO WITH NOROVIRUS-CONTAMINATED LAUNDRY:

• Minimize contact by donning appropriate personal protective equipment (PPE) (e.g. gown and gloves) when handling soiled laundry, including sheets, towels, clothing, and any other fabrics that came in contact with the virus.
• Use gloves and contain contaminated laundry in bags until it can be washed. Be careful not to shake the laundry during the bagging process, as that can generate aerosols.
• For residential facility settings (e.g. long-term care facilities, hospices, etc.), wash norovirus-contaminated laundry separately. At facility-based or commercial laundries, chemical disinfection is routinely accomplished, so separation of soiled laundry is not necessary.
• After washing contaminated laundry, don’t forget to disinfect the washing machine:
  • Start the wash cycle and let the machine fill with hot water
  • Stop the cycle, add one cup bleach, let the mixture sit for 10 minutes
  • Continue the wash cycle without adding any laundry
• Disinfect the hard surfaces that may come in contact with norovirus-contaminated laundry, including:
  • The lid of the machine
  • The top of the inside of the machine
  • The outside of the bleach bottle

TO DISINFECT LAUNDRY, USE LIQUID DISINFECTING BLEACH AND HOT WATER

• To disinfect laundry, add ¾ cup to 1¼ cups bleach – depending on washer size and per label instructions – and use hot water. To improve the efficacy of disinfecting, visibly soiled surfaces should be cleaned with detergent before disinfection to remove excess organic matter.
• A temperature of at least 160° F (71° C) for a minimum of 25 minutes is recommended for hot-water washing.
• If washing in low temperatures (less than 160° F/71° C), choose suitable chemicals at the proper concentration. Review instructions for compatibility of fabrics with bleach prior to laundering.

References
**ENVIRONMENTAL CLEANING CHECKLIST FOR NOROVIRUS**

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Component</th>
<th>Yes</th>
<th>No</th>
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<tr>
<td>PERFORM HAND HYGIENE.</td>
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<td>PUT ON PPE.</td>
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<td>DISINFECT WITH A HYPOCHLORITE SOLUTION, BLEACH-BASED PRODUCT OR OTHER PRODUCT EPA-REGISTERED TO KILL NOROVIRUS:</td>
<td>Door knobs/handles</td>
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<td>Door surface</td>
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<td>Bed rails</td>
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<td>Call button</td>
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<td>Phone</td>
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<td>Overbed table &amp; drawer</td>
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<td>Countertop</td>
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<td>Light switches</td>
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<td>Furniture (ensure product compatibility with surfaces)</td>
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<td>Arms of patient chair</td>
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<td>Seat of patient chair</td>
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<td></td>
<td>All other miscellaneous horizontal surfaces</td>
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<td>Window sills</td>
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<td>Bedside commode</td>
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<td></td>
<td>Medical equipment (e.g., IV controls)</td>
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<tr>
<td>DISINFECT WITH A HYPOCHLORITE SOLUTION, BLEACH-BASED PRODUCT OR OTHER PRODUCT EPA-REGISTERED TO KILL NOROVIRUS:</td>
<td>Spot clean walls with a disinfectant wipe or cloth</td>
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<td><strong>BATHROOM</strong>, including:</td>
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<td>Bathroom door knob</td>
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<td>Toilet horizontal surface/seat</td>
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<td>Toilet lever/flush</td>
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<td>Faucets (at sink)</td>
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<td></td>
<td>Bathroom handrails</td>
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<td>Sink</td>
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<td>Tub/shower</td>
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<td>Mirror</td>
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<td>DAMP DUST:</td>
<td>Overhead light (if bed is empty)</td>
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<td>CLEAN:</td>
<td>TV &amp; stand</td>
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<td>CLEAN FLOOR:</td>
<td>Dust mop tile</td>
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<td></td>
<td>Wet mop tile</td>
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<td>REPLACE AS NEEDED:</td>
<td>Hand sanitizer</td>
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<td></td>
<td>Paper towels</td>
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<td>Soiled curtains</td>
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<td>FOR TERMINAL CLEANING, DAMP DUST:</td>
<td>Bed frame</td>
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<td>Mattress</td>
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<td>Remake bed with clean linens</td>
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<td></td>
<td>Replace as needed: Pillows, mattresses, pillow covers, mattress covers</td>
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<tr>
<td>OTHER:</td>
<td>Empty trash and replace liner</td>
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<tr>
<td>DISCARD DUST CLOTHS.</td>
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<td>CHANGE MOP HEADS AFTER EACH ISOLATION ROOM.</td>
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<tr>
<td>REMOVE PPE BEFORE EXIT.</td>
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<tr>
<td>PERFORM HAND HYGIENE.</td>
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</table>

*In addition to the surfaces listed above, be sure to clean all surfaces in the room since pathogens can live anywhere.*

Adapted from APIC’s 2008 “Guide to the Elimination of Clostridium difficile in Healthcare Settings.”

Retrieved from: [http://www.apic.org/Resource_/EliminationGuideForm/5de5d1c1-316a-4b5e-b9b4-c37beac1b53e/File/APIC-Cdiff-Elimination-Guide.pdf](http://www.apic.org/Resource_/EliminationGuideForm/5de5d1c1-316a-4b5e-b9b4-c37beac1b53e/File/APIC-Cdiff-Elimination-Guide.pdf)
Be ready.

A portfolio of solutions EPA registered to kill Norovirus.

**Clorox® Healthcare™ Hydrogen Peroxide Cleaner Disinfectants**
- Wipes and sprays EPA registered to kill Norovirus in 3 minutes (wipes) and 1 minute (sprays)
- No harsh chemical odors or fumes
- Kills 41 pathogens, including Norovirus, TB and 13 antibiotic resistant organisms

**Clorox® Healthcare™ Bleach Cleaner Disinfectants**
- Wipes and sprays EPA registered to kill Norovirus in 1 minute
- Trusted by more hospitals than any other ready-to-use bleach products
- Kills 51 pathogens, including *C. difficile* Spores, TB and 12 antibiotic resistant organisms

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Email: healthcare@clorox.com
Visit us: cloroxhealthcare.com