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Environmental Cleaning and Disinfection for Control of *Norovirus*

Tech Talk

Noroviruses (NVs) are a type of virus called non-enveloped and are a common cause of gastroenteritis in humans. Symptoms include sudden onset of nausea, vomiting, abdominal cramps and diarrhea 12-48 hours after exposure. It can also cause headache, fever, and muscle aches and occasionally, severe dehydration. Persons usually recover within 2-3 days without serious health effects.

Norovirus is highly contagious and as few as 10 viral particles may be enough to infect someone. NVs are spread through the fecal-oral route by contaminated hands, directly from person to person, through ingestion of contaminated food or water, or by contact with contaminated surfaces or fomites. Aerosolized vomitus also has been implicated as a transmission mode.

"The updated CDC Guideline calls for more frequent cleaning and disinfection, especially of high-touch surfaces, in recognition of the important role of surface contamination in the spread of Norovirus."

Several characteristics of NVs facilitate their spread during outbreaks. The low infectious dose (<100 viral particles) allows spread through multiple routes, e.g., by droplets, person-to-person and fomites. Vomiting, which may be projectile, and diarrhea, which may be explosive, increases the likelihood of environmental contamination. Hands may become contaminated with NV by touching contaminated surfaces resulting in hand-to-oral transmission.

In healthcare, the most likely and common modes of transmission are through direct contact with infected persons or contaminated equipment. The use of chemical cleaning and disinfecting agents are key in interrupting Norovirus spread from contaminated environmental surfaces.

What are the environmental cleaning recommendations that are effective against NV?

The recently revised CDC *Guideline for the Prevention and Control of Norovirus Gastroenteritis Outbreaks in Healthcare Settings* contains some key recommendations for environmental cleaning to control Norovirus outbreaks. One important change calls for more frequent cleaning and disinfection, especially of high-touch surfaces, in recognition of the important role of surface contamination in the spread of Norovirus. Currently, Feline Calicivirus (FCV) is considered the surrogate virus to assess efficacy of disinfectants and survival of NVs in the environment. There is however some debate on how well data on inactivation of FCV reflects efficacy against NVs, because FCV has different physiochemical properties to Norovirus.

The CDC recommends either chlorine bleach or U.S. Environmental Protection Agency (EPA)-registered disinfectants with label claims for use in healthcare and activity against Norovirus to control outbreaks. If using chlorine bleach, it should be applied to hard, non-porous, environmental surfaces at a minimum concentration of 1,000 ppm (1:50 dilution standard household bleach). In areas with high levels of soiling and resistant surfaces, up to 5000 ppm chlorine bleach may be used. Bleach can be a good disinfectant, but it is important that it be used properly – see the Disinfection with Bleach Tech Talk for more information on proper use of bleach. Always follow the manufacturers' instructions for use. If using an EPA-approved disinfectant, check the manufacturer's label claims for activity against Norovirus (or its surrogate FCV).

The following 3M™ products have been tested, and have received EPA approval, using the Feline Calicivirus surrogate for Norovirus:

3M™HB Quat Disinfectant Ready-to-Use

What are the environmental control measures?

Although person-to-person spread might extend NV outbreaks, the initial event is usually a common source, e.g., food or water. Efforts to prevent the initial contamination (e.g., food and water sanitation) and subsequent person-to-person transmission (e.g., restricting ill staff from work and sick persons to their room, hand hygiene) are necessary to prevent spread of NV. The high infectivity and persistence in the environment make NV difficult to control through routine sanitary measures. Control measures may vary depending on the setting (e.g., hospital vs. cruise ship) and the number of cases.

Some general measures are:

- Hand Hygiene: Wash hands with soap and water after using the toilet, vomiting or contact with contaminated objects or surfaces. Promote hand hygiene in areas affected by outbreaks of NV.
- PPE: Wear gloves when cleaning up feces or vomitus and for general cleaning in NV rooms. Wear a gown if contamination of clothing is possible. Use techniques that minimize aerosolization of potentially contaminated material. Use a mask and eye protection if there is anticipated risk of splashes to the face during the care of patients, especially among those who are vomiting. Clean the rooms of unaffected patients before moving to symptomatic patient areas.
- Minimize Cross-Contamination: Handle soiled linens and cloths as little as possible and with minimum agitation. Launder with detergent at the maximum cycle length and machine dry.
- Surface Cleaning and Disinfection: Increase the frequency of cleaning and disinfection of patient care areas at the ward/unit level to twice daily and frequently touched surfaces to three times daily during outbreaks. Use EPA-registered products with label claims for use in healthcare and follow the manufacturer's recommendations for application and contact times.
- Source Containment: Consider discarding all disposable patient-care items and laundering unused linens from patient rooms after NV patients are discharged or transferred.

References:

- L Jimenez, M Chaing, Virucidal Activity of Quaternary Ammonium Compound Formulations Against Feline Calicivirus, a Surrogate of Norovirus, American Journal of Infection Control 2006;34:269-73.
- CDC Guideline for the Prevention and Control of Norovirus Gastroenteritis Outbreaks in Healthcare Settings; 2011 http://www.cdc.gov/hicpac/pdf/Norovirus/Norovirus-Guideline-2011.pdf
- CDC Norovirus Prevention Toolkit; 2011 http://www.cdc.gov/hai/pdfs/norovirus/229110-ANorovirusIntroLetter508.pdf

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3M

Building and Commercial Services Division
St. Paul, MN 55144-1000
1-800-852-9722
www.3M.com/building