

WHAT IS NOROVIRUS?

Norovirus is widely known for causing outbreaks of illness among large numbers of people on cruise ships. Since the original virus was identified in 1968, there has been increasing recognition of norovirus as an agent of viral gastroenteritis traced to restaurants and catered meals, nursing homes, schools and camps. In 2006, the Centers for Disease Control and Prevention (CDC) estimated that at least 50 percent of foodborne outbreaks in the United States were attributed to norovirus¹ with 60 percent in restaurants and banquet facilities, 9 percent in private homes, 8 percent in the workplace, 4 percent in schools, and 2 percent in healthcare. Other cases occurred in camps, churches/temples, fairs, festivals, picnics, and in prisons/jails.² While the source of many cases is unknown, foodborne (source of 57 percent of cases), water (3 percent of cases) and person-to-person spread (16 percent of cases) may be involved.³ Norovirus is also an increasingly common cause of gastroenteritis outbreaks in Europe⁴ and other countries.

WHAT ARE THE SYMPTOMS?

Noroviruses cause acute gastroenteritis: nausea, frequent and violent vomiting, and/or diarrhea. Other symptoms include low-grade fevers, chills, headaches, muscle aches and fatigue. Onset occurs in as little as 12 hours from exposure, but commonly takes 24 to 48 hours after ingesting the virus. The illness usually lasts one to two days, and in most cases recovery occurs without problems unless the person becomes dehydrated from the illness. This is a higher risk in very young, elderly or immunocompromised persons.

Noroviruses are extremely contagious due to the low infectious dose of as few as 10 to 100 viral particles. This means that low-level contamination of food and water can lead to outbreaks. People may infect others by shedding the virus from the time they start feeling ill until at least three days - and possibly up to 2 weeks - after recovery. There are presently no vaccines to prevent infections and no antiviral medicines available that treat norovirus infection. The Center for Infectious Disease Research and Policy provides additional information of clinical interest on symptoms and disease.⁵

HOW IS IT TRANSMITTED?

Noroviruses are present in feces or vomit of infected people at very high levels (millions per gram), which is why it is essential that ill people are prohibited from handling food. Most foodborne outbreaks of norovirus illness are likely caused by direct contamination of a ready to eat food by a food handler before its consumption. Norovirus particles can be carried by aerosols over distances longer than three feet to land on surfaces.⁶ Others may become ill by touching these contaminated surfaces and then touching their mouths, or having direct contact with an infected person.

Outbreaks have frequently been associated with consumption of ready-to-eat foods, including various salads, sandwiches and bakery products. Liquid items (e.g., salad dressing or cake icing) that allow the virus to mix evenly have also been implicated as a cause of outbreaks. Additionally, food can be contaminated at its source, as oysters from contaminated waters have been associated with widespread outbreaks of gastroenteritis. Other foods, including raspberries and salads, have been contaminated before widespread distribution and subsequently caused extensive outbreaks.⁷ A large norovirus outbreak, likely involving person-to-person spread, impacted more than 1,000 people in the Houston Astrodome when it housed Hurricane Katrina evacuees. Inadequate sanitary conditions, the lack of adequate hand-washing facilities, delays in cleaning and decontaminating soiled areas and bedding, and close proximity of people contributed to the spread.⁸

Norovirus cannot be detected by standard culture methods, but only by more complex techniques such as microscopic examination or by polymerase chain reaction, so researchers have used surrogate strains in studies that examine inactivation techniques.

NOROVIRUS

MICROBIAL RISKS

HOW IS IT CONTROLLED?

The primary control of norovirus relies on the exclusion of ill individuals from food and hospitality settings. Food handlers who have recently recovered from norovirus illness should be given non-food handling tasks. The US CDC has just released updated information about preventing norovirus, emphasizing the important role that food service operators can play in its control.⁹

Normal cleaning and sanitizing procedures are typically not sufficient to inactivate the virus; rather, aggressive disinfection protocols are needed. Prompt attention to disinfection is needed to reduce the magnitude of norovirus outbreaks. Recently, the Food Marketing Institute published guidance to help the retail food industry prepare for and respond to a norovirus outbreak.¹⁰ For cleanup of vomitus or other body excretions, personal protection equipment and a biohazard clean-up kit is very useful to minimize further spread of the virus.

IN GENERAL:

- Cover material with tissue or paper toweling until clean-up detail arrives.
- Wear disposable gloves and face mask when cleaning the spill.
- Follow Biohazard Clean-up Kit instructions:
 - o Sprinkle adsorbent material on body fluids.
 - o Pick up with scoop and place in disposal bag.
 - o Apply a properly registered disinfectant per label instructions.
- Wash hands thoroughly after removing protective equipment.

Hand hygiene is critical to help prevent and control virus outbreaks. This is a primary transmission mode and must be judiciously implemented. Washing well and often is the best control. The efficacy of alcohol based hand sanitizers remains controversial. Although they may be useful in between hand washing. They should not be considered as a substitute for hand washing.¹¹

THE CDC RECOMMENDS HAND WASHING USING THE FOLLOWING PROCEDURE¹²:

1. Wet your hands with warm water.
2. Apply a generous amount of soap.
3. Rub hands together for 20 seconds.
4. Rinse hands.
5. Dry hands with a paper towel.
6. Use the paper towel to turn off the faucet and open the door.

Due to the persistence of the virus, bare hand contact with ready to eat food is not recommended. Food items that may have become contaminated with norovirus should be immediately discarded. The virus does not multiply in foods or in the environment, but can persist on contaminated surfaces and survives freezing. Norovirus is also relatively heat stable, though cooking foods to 70°C (158°F) for five minutes or boiling for one minute was shown to destroy feline calicivirus,¹³ the surrogate for norovirus currently recognized by EPA for products that have disinfection claims against norovirus. However, researchers¹⁴ have increasingly suggested that Murine (mouse) Norovirus (MNV-1), the first norovirus to be laboratory propagated, may be a more relevant surrogate for studying environmental survival of human norovirus than FCV, but EPA's position has not changed.

For assistance with this topic or other food safety questions for your operation, please Contact Us.

REFERENCES AND FURTHER INFORMATION

- *Facts About Norovirus | <http://www.ecolab.com/innovation/microbial-risks/-/media/0BB01E6F345748FE9B22217AA601C098.ashx>
- *Tips for Reducing Norovirus Risk | <http://www.ecolab.com/innovation/microbial-risks/-/media/81BB682ECDEF44FF99F76436919ABB5.ashx>
- *Fankhauser et al., J. Infect. Dis. 1998;178:157-8
- *CDC | <http://www.cdc.gov/norovirus/index.html>
- *CDC Information for Food Handlers | <http://www.cdc.gov/norovirus/food-handlers/work-with-food.html>
- *FDA | <http://www.ecolab.com/innovation/microbial-risks/-/media/4CBA379D4277470B9D122D43878C70C.ashx>

1CSC 2009. Surveillance for Foodborne Disease Outbreaks --- United States, 2006. *MMWR* 58(22):609-615 <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5822a1.htm>

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5Center for Infectious Disease Research and Policy (CIDRAP) information of clinical interest

6Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007. *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, June 2007.* <http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf>

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10FMI Norovirus Guide

11CDC-Updated Norovirus Outbreak Management and Disease Prevention Guidelines

12CDC - Hand washing

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14Cannon et al 2006. *J Food Prot.* 69: 2761-5.