

norovirus safety

Noroviruses

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Noroviruses cause about half of all food borne (23 million) cases of acute gastroenteritis in the U.S. each year. Noroviruses are the probable cause of illness among cruise ship passengers that have been in the news over the past several years. Noroviruses are also called Norwalk viruses.

The symptoms of Norovirus are acute-onset vomiting, watery non-bloody diarrhea with abdominal cramps, nausea, and occasionally low grade fever. Vomiting is more common in children. Symptoms usually start 24 to 48 hours after exposure. Dehydration is the

most common complication, especially among children and the elderly. Symptoms usually last 24 to 60 hours, and there are no long term consequences.

Noroviruses, like all other viruses, do not reproduce outside of living cells. Noroviruses are spread through food and water that has been contaminated with traces of fecal matter. Noroviruses are highly contagious and may also be spread person-to-person during outbreaks. During illness, each gram of feces contains hundreds of millions of viral particles. There may be less viral particles in vomit, but there still may be millions per milliliter. To protect the health of non-infected bathers it is vital that persons with diarrhea not enter pools or spas. Even after the infected person has apparently fully recovered, they can continue to shed viral particles for up to two weeks. NSPF and the CDC recommend that persons should not swim for 14 days after they have fully recovered from diarrhea.

Operators should have an action plan for treating all vomit and fecal accidents. While it is more likely that vomit is caused by swallowing excess water than by Norovirus, the operator must assume the worst and apply appropriate treatment.

In case of vomit or a formed fecal accident:

1. Close the facility at once.
2. Scoop or net the vomit/feces and flush it down a toilet.
3. Adjust the free chlorine to at least 2.0 ppm and pH to 7.2-7.5. Hold the chlorine at >2.0 ppm for 30 minutes.
4. While the pool is closed, soak the scoop or net in a 10% bleach solution.
5. After 30 minutes, the pool can be re-opened.

Diarrhea may be caused by a number of microbes including Norovirus, *Cryptosporidium*, and *E. coli*. The operator must assume the worst case and treat for *Cryptosporidium*. Because this parasite is highly resistant to chlorine, hyperchlorination is suggested by the CDC.

In case of diarrheal accident:

1. Close the facility at once.
2. Scoop or net the diarrhea and flush it down a toilet.
3. Adjust the free chlorine to at least 20.0 ppm and pH to 7.2-7.5. Hold the chlorine at or above 20 ppm for 8 hours.
4. Soak the scoop or net in a 10% bleach solution for at least 30 minutes.

After 8 hours the chlorine level should be adjusted to 1.0 to 4.0 ppm; the pool can be re-opened.

Norovirus Info Online

Detailed vomit and fecal accident treatment procedures are available from the CDC at www.cdc.gov/healthyswimming or by contacting NSPF.

The CDC has additional information on Noroviruses at www.cdc.gov/ncidod/diseases/submenus/sub_norwalk.htm

The World Health Organization has a draft manual on swimming pools that includes background on Noroviruses and microbial health threats at www.who.int/water_sanitation_health/bathing/bathing2/en/