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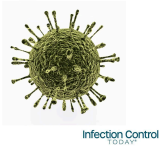
Infection Control TODAY®

Alcohol-Based Hand Sanitizers Ineffective Against Norovirus: Effective Alternatives and Infection Control Strategies

May 30, 2024
Neal Wieselman

News *Article*

Alcohol-based hand sanitizers do not protect against norovirus, a highly contagious virus. Effective alternatives like hypochlorous acid-based sanitizers are crucial for better infection control.



An illustration of the Norovirus. The viruses are transmitted by fecally contaminated food or water, or through person-to-person contact. Noroviruses are the most common cause of viral gastroenteritis.

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As most health care professionals know, norovirus, or the stomach flu, consists of viruses that irritate and inflame the stomach and intestine linings. Highly contagious, norovirus can cause days of nausea, vomiting, diarrhea, and fever, resulting in severe dehydration, reduced nutrient absorption, and even death.

Norovirus causes an estimated 685 million cases of acute gastroenteritis worldwide each year, according to the CDC. This includes 200 million cases of children, resulting in 50,000 deaths. The virus is responsible for at least 50% of all gastroenteritis outbreaks and is estimated to total $60 billion in health care costs and lost productivity worldwide. And while respiratory virus season is slowing down, norovirus numbers remain in the wrong direction. Statistics from 15 states participating in the CDC's NoroSTAT surveillance program reported 1,208 outbreaks from August 1, 2023, to April 9, 2024, compared with 986 during the same period last year.

Unlike enveloped respiratory viruses such as influenza, respiratory syncytial virus, and SARS-CoV-2, which are transmitted by airborne particles, Norovirus usually spreads from direct contact with infected fecal matter, vomit, or person

or surface. Also, unlike most respiratory viruses, norovirus can live on surfaces, still infecting people, for up to 4 weeks.

Many people, including those in health care, believe alcohol-based hand rub (ABHR) is the answer. Yet scientific research proved long ago it is not. Having worked for 25-plus years developing ABHR formulas, I can attest that ABHR has its place in health care settings, especially in fighting many respiratory viruses such as SARS-CoV-2. However, ABHR is useless against norovirus, making health care professionals more likely to contract the virus. This raises the question: If ABHR is ineffective against norovirus, why do so many health care facilities continue to use it for that purpose?

The Q&A below closely examines why ABHR doesn't work against norovirus and why remaining dependent on ABHR facilitates the spread of the virus and lowers hand hygiene compliance rates.

Q. We have heard from many sources—including the CDC—that ABHR is ineffective against norovirus and can exacerbate its spread. Why?

A. Norovirus is a nonenveloped virus, making it hardy and more resistant to pH and temperature changes and some disinfectants—including alcohol. ABHR cannot kill norovirus because the alcohol, regardless of percentage, cannot penetrate the capsid, the protein shell of a virus particle surrounding its nucleic acid. In contrast, SARS-CoV-2 is an enveloped virus with a fragile covering easily penetrated by alcohol sanitizers. The confusion comes in because the average person often does not know the difference between nonenveloped and enveloped viruses. The emphasis on ABHR during the COVID-19 pandemic further advanced the misinformation that ABHR works against all viruses.

Q. Is the finding that ABHR does not work against Norovirus new?

A. No. As early as 2011, studies showed that ABHR is ineffective against norovirus and could potentially increase the risk of an outbreak of highly contagious diseases—including norovirus—in health care settings. Two years later, the CDC stated that ABHR is "useless" against norovirus.

Lee-Ann Jaykus, PhD, a respected researcher and professor at North Carolina State University, definitively told Time that hand sanitizers will not inactivate norovirus. Aron Hall, DVM, MSPH, Dipl ACVPM, the CDC's Norovirus expert, told NBC News that ABHR is "ineffective against the virus" and that "soap and water can wash it away, but it takes really hot water to kill it." This

means the virus is not killed by warm water. Last year, senior Forbes contributor Bruce Y. Lee quoted Hall: "Alcohol gels won't kill the virus. Even if you were to use so much hand sanitizer on your hands that you felt like you were wearing hand sanitizer mittens, the live virus could still remain on your hands." Further, while proper handwashing removes norovirus, studies show most health care workers wash their hands properly less than 50% of the time.

Q. Since ABHR is ineffective against norovirus, what infection prevention protocols must health care facilities follow when a patient is discovered to have norovirus, and are there any complications with the protocol that must be considered?

A. Any individual showing norovirus symptoms needs to be immediately isolated, and health care workers must switch from ABHR to hand washing with soap and water. Unfortunately, however, there are significant drawbacks to this protocol. For one, it is too little too late since by the time a patient is diagnosed with Norovirus, it has already spread to the entire ward and even the whole facility by staff still using ABHR. Further, handwashing does not kill the virus and only removes it if handwashing is done correctly. To kill the virus requires a water temperature of 140 °F (60 °C), which is far too hot for human hands. In addition, the absence of a nearby water source and time constraints can make handwashing between interactions difficult in a busy health care environment and lead to lower hand hygiene adherence.

Q. Does ABHR cause other health concerns directly related to the spread of norovirus?

A. Yes. ABHR can dissolve the lipid level, damaging the lipid barrier that protects the skin and causing dermal damage to hands and even eczema; the same is true of too much handwashing. This skin damage makes people more vulnerable to norovirus.

Q. How can ABHR misuse negatively impact health care hand hygiene compliance?

A. Dermal damage makes skin sensitive, so those with dermal issues wash their hands less frequently, linked to decreased hand hygiene adherence. In May 2023, the World Health Organization (WHO) conducted its first study on hand hygiene in health care settings and found, "Average hand hygiene [adherence] without specific improvement interventions remains around 40%. In critical care areas, such as intensive care units, average [adherence] levels are around

60%." These low scores have spawned a new industry that measures and reports on hand hygiene adherence.

Q. If ABHR is ineffective against norovirus and causes dermal damage to the skin, why do health care facilities and workers continue to use it?

A. In many cases, even health care personnel do not understand the difference between enveloped and nonenveloped viruses. Add to this that the CDC, WHO, other respected health agencies, and powerful ABHR manufacturers have spent years and millions of dollars promoting ABHR. Understandably, this promotion skyrocketed during the COVID-19 pandemic, leaving many people convinced ABHR is the answer for preventing all types of viruses, although this is not the case. The only way to rectify this is to help spread the word that ABHR fights respiratory viruses but does *not* work against norovirus; ABHR encourages the spread of norovirus through a false sense of security and dermal damage that discourages proper hand hygiene.

Q. Are there any solutions other than thorough handwashing that can be used against norovirus?

A. Yes. Hypochlorous acid (HOCl). The human immune system produces HOCl to kill invasive organisms and fight infection. White blood cells create HOCl in humans to defend against infection, bacteria, and general illness. It works by breaking down the cell walls of pathogens and killing them. Outside the body, HOCl is made using electrolysis to break down a simple saltwater solution.

HOCl is an approved hand and surface sanitizer in the United Kingdom and Europe. US studies show that HOCl inactivates both enveloped and nonenveloped viruses, like norovirus. HOCl contains no alcohol, benzalkonium chloride, hydrogen peroxide, or other chemicals. It is so safe that it is used in products such as wound care and eyecare formulas and is approved by the FDA as a nonrinse sanitizer for meat, poultry, fish, vegetables, and fruits.

Q. Are all HOCl products the same in terms of effectiveness against norovirus?

A. No, not all HOCl-based products are equal. They differ in their percentage of HOCl and free available chlorine, shelf lives that can vary from days to years, and pH ranges from acidic to alkaline, making some inadvisable for use on the skin. In a recent interview, Cleveland Clinic dermatologist Shilpi Khetarpal, MD, advised verifying that a product with HOCl is billed for skin care before use.

The best HOCl antimicrobial spray for hand hygiene use on the skin contains stabilized HOCl (S-HOCl). This stabilized formulation has all the attributes of HOCl plus additional benefits that make it exceptionally well-suited for hand hygiene.

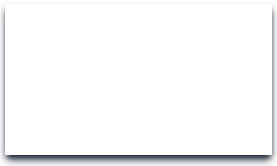
S-HOCl is hypoallergenic with a neutral pH, making it safe for use on skin, a feature few HOCl solutions can match. The best S-HOCl formulas have a 2-year shelf life compared to HOCl's average 30-day shelf life. It is also advisable to look for an S-HOCl hand hygiene spray that:

- Has an antimicrobial designation that has a 510(k) registration
- Is FDA-cleared
- Is accepted by the National Eczema Association
- Carries designations from other reputable organizations, verifying it is safe for use on skin.

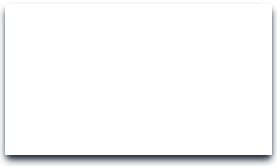
I am a huge proponent of using ABHR to eliminate bacteria and enveloped viral pathogens, and our company still manufactures it for this reason. However, ABHR will not kill nonenveloped viruses like norovirus, no matter how much you use it. This puts health care staff, patients, and visitors at risk for norovirus every day.

It is time to adjust and adapt to improve hand hygiene protocol to best protect everyone at your health care facility. It's time to exchange ABHR for an antimicrobial S-HOCl hand hygiene spray with efficacy against norovirus and all enveloped and nonenveloped viruses that will increase hand hygiene adherence.

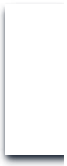
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