

special feature



# A Norwalk NIGHTMARE



**I**n the midst of Operation Desert Storm in Iraq, hundreds of American soldiers became violently ill with what was first thought to be a biological warfare agent. It wasn't. It was the same bug that takes a regular run at hospitals, nursing homes, schools, hotels and cruise ships – anywhere that people gather. It is the same bug that sidelines trains, airplanes and busses for decontamination. It's a very tiny little microbe, but it leaves a long and disgusting legacy of vomit and diarrhea . . . and it is particularly active this year.

#### **VIROLOGY 101**

All this damage and turmoil is caused by Norwalk virus, and by its first cousin, Norwalk-like virus (NLV). Norwalk is a common cause of food poisoning - it rates fifth in the top 10 causes of food poisoning. And, of all cases of viral gastroenteritis (vomiting, diarrhea, etc.), Norwalk/NLV is found to be the villain more than 65 per cent of the time. Eight out of 10 Canadians have had it at one time or another, but unlike many other viruses, you don't get a lengthy immunity to Norwalk/NLV, and are possibly even more vulnerable to re-infection later. It causes profuse vomiting and watery diarrhea, and is not usually a fatal infection except, potentially, in the very young and the very old.

Norwalk is called an “emerging pathogen.” It was iden-

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tified and labeled as recently as 1972 from a fecal sample taken during a 1963 outbreak of gastro-intestinal illness in Norwalk, Ohio. When viruses are named, they are given a family name, then a genus name, then a species name, then a strain name. Norwalk and NLV are in a family of viruses called Caliciviridae (Calici means cup-like). Their genus name is Norovirus. There are several species of Norwalk-like viruses and each species can have multiple strains.

These are non-enveloped viruses. Virus classification depends on four factors: size, shape, type of genetic material and the presence of an envelope - a coating of fatty lipid tissue. It would seem logical that an enveloped virus (HIV, Hepatitis B and C, influenza) would be more resistant to disinfectants. Actually, it's quite the opposite. Drying, or heat, or exposure to a disinfectant, or even exposure to a detergent can damage the lipid envelope. Once punctured, the guts of the virus leak out and the virus dies. Non-enveloped viruses like Noroviruses (Norwalk and Norwalk-like viruses), pose a much greater challenge to housekeepers because they don't have an envelope and are harder to kill.

## DISINFECTION

For healthcare facilities, Noroviruses are a real pain in the budget because they are so difficult to kill and so easily transmitted from other people, objects and from the air. For Norwalk/NLV, once they're in the building, it's "party time."

To disinfect Norwalk and NLV from surfaces, the Centre for Disease Control in Atlanta, GA, recommends three types of disinfectants - bleach, phenolics and Accelerated Hydrogen Peroxide™. Not



recommended are quaternary ammonium chloride disinfectants.

The inclusion of phenolics in this list of disinfectants is controversial. Most textbooks don't include phenolic compounds for reliable disinfection of non-enveloped viruses. The CDC recommendation is based upon a study claiming that a double-strength phenolic solution would be sufficient to kill the viruses. If a phenolic disinfectant is used, it should not be used on food contact surfaces or around children.

The recommended concentration of bleach varies depending on which study you read, although a 10-minute contact time is universal. The CDC recommends a 1,000 parts-per-million dilution - approximately 1:50 of household bleach with water. Other studies recommend a dilution of 1:9. Neither of these dilutions would be safe for use on fabrics, and could cause damage to floor coatings and other hard surfaces.

Accelerated Hydrogen Peroxide shows a lot of promise. Dr. Syed Sattar of the Centre for Research on Environmental Microbiology at the University of Ottawa is the lead

researcher into applications for Accelerated Hydrogen Peroxide. He has determined that the Canadian-made disinfectants are effective against non-enveloped viruses like Norwalk in their regular dilution and at a five-minute contact time. These chemicals, once diluted, are safe for use on all surfaces including fabrics, although prolonged contact with soft metals like brass and copper might cause mild corrosion.

The problem is none of these disinfectants has ever been tested directly against Norwalk or NLV. Human Caliciviruses won't grow in the lab so researchers use Feline Calicivirus as a surrogate. It is for this reason that chemical manufacturers can't make claims on their product labels that they can kill Norwalk.

## NORWALK MANAGEMENT

This virus is so infectious that even if just one infected person carries Norwalk into a hospital emergency room or goes to visit their Aunt Mabel at the senior's residence, the result (12 to 24 hours

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later) could be the start of a Norwalk outbreak. In hospitals, the virus will often affect the staff more than it will affect patients. If enough nurses and doctors pick up a Norwalk infection, entire emergency rooms and hospital wards have to close because there are not enough people to run them. The vomiting and diarrhea will last just a day or two, but the sick staff will remain very infectious and will have to stay home for at least another two days. Recent studies show that they might remain infectious for as long as two weeks after symptoms have disappeared.

The management of a Norwalk outbreak requires particular attention to two things: hand hygiene and proper disinfection. Healthcare facilities with good handwashing practices and well-run, well-financed housekeeping departments have a head start.

Hand washing is critical. The use of alcohol hand sanitizers is recommended for day-to-day use, and during any outbreak, although for non-enveloped viruses alcohol is no more effective than hand washing with soap and water. The use of antiseptic hand soap provides no added benefit over regular hand soap and could even be detrimental. Importantly, “nose-pickers” and “eye-rubbers” should beware that they are vastly more likely to infect themselves even if they wash their hands regularly.

During the normal course of cleaning a hospital, ordinary detergents are satisfactory for most surfaces and disinfection is necessary only in special areas. During a suspected or confirmed Norwalk/NLV outbreak, hard surfaces should be cleaned well and then disinfected with diluted bleach or an Accelerated Hydrogen Peroxide



product. This is particularly important in washrooms that are used by more than one person. Non-launderable fabrics (chairs, carpet) should be treated with Accelerated Hydrogen Peroxide and/or steam cleaned with water at a temperature of at least 71 degrees Celsius (160 degrees Fahrenheit). Typically, only steam cleaners with in-line heaters, such as truck-mounted extractors, can reliably maintain that temperature.

For housekeepers, it usually comes down to the speed of the response. If a spill of vomit is allowed to sit on a hallway floor, countertop or sink, exposed and untreated for even a short period of time, many others in the area can be infected. It has to be cleaned up and disinfected as soon as possible, but not with a vacuum. The Norovirus is very small and will easily pass through even a HEPA vacuum filter to come to rest on other surfaces. Housekeeping staff, themselves are prime targets for Norwalk/NLV. If they don't wash their hands often, especially after

removing their work gloves, they are very vulnerable.

### THE BEST WEAPON

Lastly, the best weapon that healthcare facilities have in their arsenal for the war against infectious diseases is education. For general information on Norwalk and NLV, Health Canada regularly publishes the Canada Communicable Disease Report ([www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc](http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc)). The CDC puts out Morbidity and Mortality Weekly ([www.cdc.gov](http://www.cdc.gov)). Interesting information on hand hygiene promotion can be found at [www.sexyhands.com](http://www.sexyhands.com) and at Health Canada's [www.hc-sc.gc.ca/hpb/lcdc](http://www.hc-sc.gc.ca/hpb/lcdc). Also, the infectious disease nurse in your local health unit will be able to help with information, advice and education.

Remember the simple, three-part trick for staying ahead of Norwalk in healthcare facilities and elsewhere: Wash your hands - clean your space - cross your fingers.

Stay healthy.