

# NORWALK-LIKE VIRUSES (NOROVIRUSES)

## OVERVIEW

Norwalk-like viruses (NLV) are the most important cause of nonbacterial gastroenteritis outbreaks in schools, nursing homes, institutions, cruise ships and families. The virus is food borne and highly contagious. Norovirus outbreaks occur throughout the year with a seasonal peak during the cooler months. These viruses were first recognized in 1972 during an outbreak of gastroenteritis in Norwalk, Ohio.

## CLINICAL FEATURES

Symptoms usually appear 1 to 2 days after exposure and include; abrupt onset of nausea, vomiting, diarrhoea and abdominal cramps. Headache, muscle pain and low-grade fever sometimes occur. Severe illness is rare.

The disease is usually brief and self-limiting, typically resolving within three days without long-term health consequences.

Immunity appears to be short-term and serotype specific.

## DIAGNOSTIC TESTING

Public health laboratories test for Noroviruses to diagnose individual cases and to track outbreaks. Noroviruses are detected directly from samples. Testing approaches vary; BC uses a PCR assay and Ontario uses electron microscopy.

Collect emesis and/or stool in sterile dry specimen containers and forward to the local public health laboratories. Refrigeration of specimens is preferred.

Report all suspected food poisoning incidents to the public health inspector for further investigation.

contaminated food or drinks and by direct contact with an infected person. The key to reducing the spread of NLV is rigorous general hygiene including frequent hand washing, thorough disinfection of contaminated items and careful preparation of food.

**AUTHOR:** Susan Roman MD, FRCP(C) is a medical microbiologist located at MDS Metro in British Columbia. Her main interest is in molecular diagnostics.

## References:

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2. CDC. Norwalk-Like Viruses: Public Health Consequences and Outbreak Management. MMWR 2001; 50(No.RR09)1-18.
3. Allison, C. Norwalk-like viruses: when the runs can slow you down. CMAJ 2003; 168(1): 64-65
4. www.cdc.gov



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## TREATMENT & PREVENTION

No specific treatment is available. There is no vaccine or medication that can prevent or treat Norovirus infection. Supportive care is directed toward preventing dehydration.

The virus is very contagious. Humans are the only known reservoir for Noroviruses. The virus continues in the stool for as long as 2 weeks after the person recovers. People get infected by consuming

# HEPATITIS C VIRUS: Laboratory Evaluations

## OVERVIEW

Hepatitis C virus (HCV) is a major worldwide health problem and is a leading cause of hepatitis, cirrhosis and hepatocellular carcinoma.

In North America approximately 0.2-1.0% of the population is chronically infected with HCV.<sup>1-3</sup> Transmission occurs primarily through percutaneous exposure to infected blood, commonly related to injection drug use or needle-stick injury. Other routes include perinatal and sexual.<sup>4</sup> Transmission from blood products and organ transplant was virtually eliminated with the introduction of a sensitive test for antibody to HCV in 1992.

Most infected patients are asymptomatic. However, if symptoms are evident patients will comment on poor appetite, fatigue or abdominal pain. Jaundice is present in 20-30% of patients. Approximately 85% of infected patients develop chronic hepatitis, and of these, 20% will develop cirrhosis of the liver and may require transplantation.<sup>4</sup>

## DIAGNOSTIC TESTING

Three types of tests are available for diagnosis of hepatitis C virus; serological, nucleic acid based detection and HCV genotyping.<sup>5-7</sup>

### 1. Serological Testing

Serologic tests include immunoassays and recombinant immunoblot assays (RIBA). Immunoassays can detect HCV antibodies within 4-10 weeks of infection.

These are screening tests and are not 100% sensitive or specific. The positive predictive value of the result varies with the prevalence of HCV infection in the population screened. In low risk populations these assays miss only 0.5 to 1.0% of cases, but false positives may be as high as 20%.

Both immunoassays and RIBA confirm the presence of antibody in a patient's serum but cannot differentiate ongoing infection from resolved infection. Initial positive results are confirmed with supplemental serologic tests. Patients who repeatedly screen positive by immunoassay and indeterminate using supplemental tests should be referred for further evaluation.

Also noteworthy;

- False positive results may occur due to non-specific binding of the antibody to rheumatoid factor or unrelated cross-reacting antibodies.
- Indeterminate or false negative results may occur in patients who have been recently infected, patients with immune deficiencies or patients on hemodialysis.

### 2. HCV RNA: Nucleic Acid Detection

HCV RNA tests detect infection within 1-3 weeks of viral exposure.<sup>7</sup> Persistent HCV infection is diagnosed by the persistence of HCV RNA in the blood for at least 6 months. Both qualitative and quantitative methods are available.

**Qualitative HCV-RNA** analysis is a sensitive and specific indicator of current infection status and is useful in the confirmation of a positive or ambiguous serological result. A qualitative test is also used in the assessment of seronegative hepatitis patients in whom infection is suspected, i.e. patients on hemodialysis or immune deficiency etc. As infants can carry maternal antibody up to 15

months of age, HCV-RNA analysis may also be helpful in diagnosing infection in infants of HCV antibody positive mothers.

**Quantitative HCV-RNA** analysis provides information on HCV viral levels and is useful in monitoring response to antiviral therapy, but does not predict the likelihood of disease progression. It should be noted that;

- False negative HCV-RNA results may be due to: intermittent viremia, viral levels below the detection limit of the analytical method or specimen instability.
- False positive HCV-RNA results may be due to specimen contamination.
- HCV-RNA is NOT a reliable indicator of either disease activity or infectiousness.

### 3. HCV Genotyping

Six Hepatitis C virus genotypes and more than 50 subtypes have been identified. The genotype does not appear to affect the rate of disease progression, but is important as a predictor of patient response to therapy.<sup>5</sup> Genotypes 1a and 1b, which account for 75% of HCV infections in the United States, are associated with a lower rate of response to treatment.

### Requesting Hepatitis C Analysis

In Ontario, to order Hepatitis C serological testing write "chronic hepatitis" or "Hepatitis C" on the OHIP requisition. For qualitative or quantitative HCV-RNA or HCV genotyping complete the PHL requisition and clearly indicate the specific test required. For quantitative HCV-RNA requests, indicate the stage of therapy (baseline, 12 weeks, post-treatment). Genotyping is performed only once on a patient being considered for treatment.

In British Columbia, to order Hepatitis C serological testing write "Hepatitis C" in the additional tests section of the requisition. HCV serology testing is included in the testing performed when you check off the previous/chronic hepatitis box on the requisition. When ordering HCV-RNA PCR testing, please specify clearly whether HCV-RNA qualitative testing, HCV-RNA quantitative testing or HCV genotyping is required. For HCV-RNA quantitative testing and HCV genotyping please fill out a BCCDC Hepatitis requisition.

**AUTHOR:** Sheila Boss is a clinical biochemist and Laboratory Director at the MDS International Reference Laboratory, Toronto, Ontario.

Susan Roman MD, FRCP(C) is a medical microbiologist located at MDS Metro in British Columbia.

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# Lipidemia Review

A summary of recommended changes in the management of dyslipidemia recommended by the Canadian working group on hypercholesterolemia, was recently reported in CMAJ.<sup>1</sup> A simplified approach to risk assessment is proposed along with revised lipid target values. The 2003 Canadian lipid update includes three levels of risk (low, moderate and high) and two target lipid values (one for LDL-cholesterol and one for the ratio of total cholesterol to HDL-cholesterol). The revised target levels based upon 10-year cardiovascular risk categories are presented in Table 1.

Modifications to the current MDS laboratory report will be completed over the next few months to reflect the 2003 lipid guidelines.

**Table 1 Risk categories and target lipid levels.<sup>1</sup>**

Risk Category	LDL-C mmol/L	Target Level Total Cholesterol / HDL-C ratio
<b>High</b> (10-year risk of coronary artery disease $\geq$ 20%, or history of diabetes mellitus or any atherosclerotic disease)	<2.5 <b>and</b>	<4.0
<b>Moderate</b> (10-year risk 10-20%)	<3.5 <b>and</b>	<5.0
<b>Low</b> (10-year risk $\leq$ 10%)	<4.5 <b>and</b>	<6.0

**AUTHOR:** Sheila Boss is a clinical biochemist and Laboratory Director at the MDS International Reference Laboratory, Toronto, Ontario

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- 1) Genest, et al. Recommendations for the management and the prevention of cardiovascular disease: summary of the 2003 update. CMAJ, 2003; 169(9): 921-924.
- 2) www.cma.ca/cmaj

# Infection Control

The recent Canadian SARS experience has highlighted for clinicians and laboratorians the importance of careful infection control practices. In order to protect our patients and staff, MDS has specific policies and procedures to reduce the transmission of communicable diseases within its Specimen Collection Centres (SCC) and laboratories. We would like to remind physicians of their important role when determining which patients should undergo specimen collection in their own homes or in the office, rather than in a SCC. The following information may be of value to you when considering patient investigation.

Most clinicians are familiar with the infection control strategy of Universal Precautions, which calls for precautions for all patients regardless of clinical suspicion of infection. Two subsequent strategies, Standard Precautions and Transmission Precautions, were developed to manage patients according to: 1) degree of patient contact (calling upon good hand washing practice and use of personal protective equipment) and 2) the mode of transmission of the suspected infectious agent, respectively. While MDS staff are trained to use Standard Precautions when dealing with all patients, **physician communication (written or verbal) with the laboratory is required to enable staff to employ transmission-based precautions, which will depend on the suspected or proven diagnosis.**

**Table 1. Precautions are specific to the infectious disease.<sup>1</sup>**

Type and Transmission Mode	Examples
<b>Airborne:</b> Dissemination of small droplet nuclei which remain suspended for long periods of time	- <i>Mycobacterium tuberculosis</i> - Measles virus (Rubeola) - Varicella zoster virus (Chickenpox)
<b>Droplet:</b> Propulsion of large organism-containing droplets within 1m of source	- <i>Neisseria meningitidis</i> - <i>Bordetella pertussis</i> - Respiratory viruses ie Influenza, SARS CoV, RSV
<b>Contact:</b> Direct or indirect physical transfer of organism	- Methicillin resistant <i>Staphylococcus aureus</i> - Vancomycin resistant enterococcus - Some respiratory viruses ie Influenza, RSV

For patients suspected of harboring an infection that is transmitted by the airborne route, clinicians should arrange for specimen collection in the patient's home or in the office. This would apply to patients with suspected tuberculosis, measles and chickenpox,. The type of suspected infection should be indicated, so that MDS staff are appropriately prepared. MDS Medical staff are available to consult with you to assist in the investigation of such patients when required.

During community outbreak situations, clinicians are asked to confer with MDS Medical staff or Public Health authorities regarding laboratory investigation of affected patients requiring specimen collection. Otherwise, patients with suspected viral respiratory tract infections should be identified on the requisition so that SCC staff can adopt appropriate precautions. In Ontario, for example, staff will comply with the most recent provincial SARS Directives until notified to do otherwise.<sup>2</sup>

**AUTHOR:** Alicia Sarabia, MD, FRCPC, is a Medical Microbiologist with MDS.

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2. SARS Directive HCP 03-01(R), June 16, 2003 to Ontario Health Care Providers in Community Settings and Community Health Care Agencies (Excluding Community Care Access Centres).

