LABSTRACT – November 2019

Respiratory Virus Testing Update

Audience
Healthcare providers who order respiratory virus testing for their patients from Public Health Ontario (PHO) Laboratory.

Overview
This Labstract provides clinicians with an update on respiratory virus testing changes, and details of PHO Laboratory’s respiratory virus testing algorithm.

What has changed?

On November 4, 2019 PHO Laboratory will implement an expanded laboratory-developed multiplex respiratory virus PCR (MRVP) assay across four testing sites (PHO Toronto, Ottawa, London and Timmins laboratory sites). All respiratory virus specimens that meet acceptance criteria will be tested using this assay.

The MRVP assay detects 11 respiratory virus targets. These include influenza A, influenza A H3 subtype, influenza A H1 (pdm09) subtype, influenza B, respiratory syncytial virus, parainfluenza, adenovirus, enterovirus, seasonal human coronaviruses, rhinovirus and human metapneumovirus.

Note: The assay detects the different types/subtypes of respiratory syncytial virus (A/B), parainfluenza (1 – 4) and seasonal human coronavirus (OC43, 229E, NL63, HKU1) but does not differentiate between them.
# Respiratory virus testing available at PHO Laboratory

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<th>Patient Setting 1</th>
<th>Testing</th>
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### Table footnotes:

1. Patient setting must be provided on the requisition to help triaging of specimens. If patient setting is not provided, the specimen will not be tested.
2. ICU - Intensive Care Unit; CCU - Critical Care Units.
3. MRVP detects: influenza A, influenza A H3 subtype, influenza A H1 (pdm09) subtype, influenza B, respiratory syncytial virus (RSV A/B), parainfluenza (1 – 4), adenovirus, enterovirus, seasonal human coronavirus (OC43, 229E, NL63, HKU1), rhinovirus and human metapneumovirus. **Note:** The assay detects the different RSV, parainfluenza and seasonal human coronaviruses named above but does not differentiate between them.
4. A separate cytomegalovirus (CMV) PCR is available upon request (indicate on the requisition) for bronchoalveolar lavage (BAL)/bronchial wash/pleural fluid.
5. A limit of four outbreak specimens are routinely accepted for testing. For requests for additional testing in outbreak settings, contact PHO Laboratory’s Customer Service Centre.
6. Respiratory virus swab collection kits will not be supplied for these patient settings.
7. To assist with patient management when respiratory virus testing is not available, healthcare providers are encouraged to refer to PHO’s respiratory surveillance reports for information on respiratory pathogen activity in Ontario (see 5 below).
When influenza is circulating, laboratory confirmation of influenza is not needed before initiating treatment, as waiting until influenza is confirmed will delay initiation of therapy. Current clinical guidelines recommend that during influenza season, influenza antiviral therapy (e.g., oseltamivir or zanamivir) be started empirically for patients with:

- moderate, progressive, severe or complicated influenza, such as individuals who are hospitalized with influenza-like illness.
- high risk of influenza complications/severe disease.

For more information, please see the references provided with this document.

To understand the circulating respiratory pathogens and to assist with influenza antiviral treatment decisions, health care providers are reminded to regularly review PHO’s Ontario Respiratory Pathogen Bulletin (ORPB). The ORPB is updated weekly and provides an overview of influenza and other respiratory viruses. Data on influenza positivity is also presented at the local public health unit level to provide jurisdiction-specific information.

Specimen Collection and Handling

Please check the expiry date of both the collection swabs and transport media (tube), as specimens collected using expired swabs or tubes will be rejected. Specimen containers and supplies are provided by PHO Laboratory to submitters for the exclusive purpose of testing performed at PHO Laboratory (http://www.publichealthontario.ca/test_directory).

NOTE: To maintain optimum viability, specimens should be stored and transported to PHO Laboratory at 2-8°C within 72 hours of collection. If longer storage or transit time is anticipated, specimens should be frozen at -70°C or lower.

Additional respiratory viral services available at PHO Laboratory

1. Influenza Antiviral Susceptibility Testing

Currently circulating influenza A subtypes (H1N1pdm09 and H3N2) are universally amantadine resistant and almost all currently circulating influenza A and B viruses are oseltamivir susceptible. Resistance has been documented on rare occasions. Pre-pandemic seasonal influenza A (H1N1) was known to be amantadine susceptible, and almost universally oseltamivir resistant, but it has not been detected in Ontario since mid-2009.

Routine susceptibility testing is not required for clinical care, however a proportion of influenza-positive samples will be forwarded to the National Microbiology Laboratory for strain typing and antiviral susceptibility testing and limited susceptibility testing is also available at PHO Laboratory.

Recommended indications for antiviral susceptibility testing in Ontario are:

- Influenza developing during or soon after influenza antiviral prophylaxis (e.g., oseltamivir or zanamivir)
o Severely ill patients such as those admitted to an intensive care unit with laboratory-confirmed influenza not responding to influenza antiviral therapy

o Fatalities in patients with laboratory-confirmed influenza being treated with influenza antiviral therapy

o Persistent influenza viral shedding, defined as a repeat PCR test positive after seven days or more of treatment. Repeat PCR testing could be undertaken for patients who are not responding to antiviral therapy. Immunocompromised patients are at greater risk for more severe disease, persistent viral shedding and development of antiviral resistance.

o Positive test for influenza A in a traveller returning from an area where resistance is endemic

To request influenza susceptibility testing for a patient who meets any of the above criteria, please provide the relevant information on the laboratory requisition. To make a request on a sample already submitted to PHO Laboratory, please contact our Customer Service Centre at 1-877-604-4567 or 416-235-6556 or your local PHO laboratory.

2. Testing for Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

MERS-CoV is a novel coronavirus that emerged in the Middle East in 2012. Patients with relevant clinical presentation and epidemiological risk factors for MERS-CoV infection, such as travel to certain countries in the Middle East or contact with a confirmed or probable MERS-CoV case, should be considered for MERS-CoV testing. For further information, please see the PHO Laboratory MERS-CoV Test Information Sheet available at: publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Middle-Eastern-Respiratory-Syndrome-Coronavirus-(MERS-CoV).aspx

Note: MRVP detects seasonal human coronavirus but does not detect MERS-CoV.

3. Testing for Novel Influenza Viruses

a) Avian influenza viruses

PHO Laboratory conducts testing for avian influenza (e.g., H5N1, H5N2, and H7N9) as required based on the information provided on the test requisition. Samples indicating travel to affected areas, or exposure to known cases, will be tested by real-time influenza A PCR (US CDC protocol) and if positive will be tested first for seasonal subtypes (H3N2, H1N1pdm09). If no seasonal subtype is detected, further testing for avian influenza subtypes will be conducted.

If you suspect avian Influenza contact your local health unit, and also contact PHO Laboratory Customer Service Centre at 1-877-604-4567 prior to submitting specimens.

In April 2013, the World Health Organization (WHO) confirmed emergence of a novel avian influenza A (H7N9) virus in China. Ontario Ministry of Health and Long-Term Care guidance, including laboratory testing information, is available at: health.gov.on.ca/en/pro/programs/emb/avian/workers.aspx

Influenza A (H5N1) infections in humans have been infrequently reported since 2003 with cases occurring in Asia, and later in Africa, Europe, and the Middle East, mostly due to exposure to infected

b) Surveillance and testing for variant (swine origin) influenza viruses in humans

PHO conducts surveillance for variant influenza viruses, such as H3N2v, which have caused several hundred infections in the United States in recent years, with a peak in 2012, among persons with swine contact (e.g., children exposed at agricultural fairs, swine workers). Only limited human-to-human transmission has been documented. Screening will be done by real-time PCR for the swine nucleoprotein (NP) gene on all early and late season influenza A viruses of subtype H3 and a proportion of all other H3 subtype influenza A-positive samples once the influenza season is established. This testing is also available on request in person(s) who develop acute respiratory illness following direct contact with swine or their environment.

**NOTE:** Samples that do not subtype for seasonal influenza will be tested for a panel of avian and/or swine influenza viruses.

4. Testing for Enterovirus (including EV-D68 and other serotypes)

EV-D68 circulated in Ontario in the summer/fall of 2014, and to a lesser extent in 2016. More recently several cases of EV-D68 were detected in Ontario up to November 2018. Information about non-polio enterovirus, including D68, is available at: [publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Pages/Enterovirus-D68.aspx](http://publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Pages/Enterovirus-D68.aspx).

Information on specimen collection and testing for enterovirus can be found at: [publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Enterovirus.aspx](http://publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Enterovirus.aspx)

5. PHO Surveillance Reports and Network:

PHO routine surveillance reports are available on the PHO website at

- [Ontario Respiratory Pathogen Bulletin](http://www.publichealthontario.ca/ORPB)
- [Laboratory-Based Respiratory Pathogen Surveillance Report](http://www.publichealthontario.ca/LabPathogenReports) summarizes all respiratory viral testing done at PHO Laboratory

**Sentinel Practitioner Surveillance Network (SPSN)**

- The SPSN performs molecular respiratory viral testing on patients with influenza-like-illness visiting community-based sentinel health care providers across Ontario, as well as in other provinces. SPSN sentinels are the only community practitioners who are exempt from laboratory testing restrictions. Specimens collected by SPSN sentinels will be tested for influenza and other respiratory viruses (by molecular methods or culture). General information on Ontario’s SPSN, and information for practitioners interested in contributing to the network, can be found at: [publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Studies/Pages/VE-study.aspx](http://publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Studies/Pages/VE-study.aspx)
References


2. AMMI Canada Guidelines. Available at: https://www.ammi.ca/?ID=122


For further information

- Specimen collection, submission, testing, and reporting information is available in detail on the Respiratory Viruses (including influenza) Test Information Sheet (TIS), located on our website at: Respiratory Viruses Virus Detection TIS

- Contact the PHO Laboratory Customer Service Centre at 416-235-6556 or 1-877-604-4567 (toll-free), or by email at customerservicecentre@oahpp.ca

- For PHO Laboratory specimen collection information and previous Labstracts, refer to publichealthontario.ca/test directory

- The current version of the PHO Laboratory General Test Requisition and other forms are available at publichealthontario.ca/Requisitions

- To subscribe to future Labstracts, register on our website

- To register for Autofax and receive laboratory reports by fax directly from our laboratory information system as soon as they are released, contact the PHO Laboratory Customer Service Centre.