Public Health Ontario | Santé publique Ontario

Labstract – September 2017

Respiratory Viral Testing Algorithm - Update for Fall and Winter 2017-2018

Audience

Healthcare providers who order respiratory virus testing for their patients

Overview

This Labstract provides clinicians with the details of the updated respiratory virus testing algorithm (see table on page 2)

Background

In November of 2016, Public Health Ontario (PHO) updated its respiratory viral testing algorithm, with expanded provision of multiplex respiratory viral PCR (MRVP). This was followed by an unexpected significant increase in submissions for respiratory viral testing. On June 19, 2017, PHO made further adjustments to the algorithm for the spring, summer and early fall.

The testing algorithm that was in effect beginning June 19th will change on September 20th, 2017 as outlined below:

Testing changes: effective September 20, 2017

Patient Setting[1]	Algorithm until September 19th 2017	Revised **Algorithm as of September 20th** 2017	Summary Comment
In-patient ICU/CCU[2]	MRVP[3]	Influenza A/B RT PCR (and subtype if flu A is positive). If flu A or B is positive then no further testing will be performed. If flu A/B is negative, samples will be further tested by Rapid Viral Culture[4,5]	Revised
Inpatient ward/Institutions	Rapid Viral Culture[4]	Influenza A/B RT PCR (and subtype on a selection of flu A-positive specimens). If flu A or B is positive then no further testing will be performed. If flu A/B is negative, samples will be further tested by Rapid Viral Culture[4]	Revised
Institutional Respiratory Infection Outbreaks	MRVP[3]/Influenza rapid testing will also be performed (up to 4 samples per outbreak)	Influenza Rapid Testing up to 4 outbreak samples. Influenza A/B RT PCR (1 sample from each flu A-positive outbreak will be subtyped). If flu A or B is positive then no further testing will be performed. If flu A/B is negative, samples will be further tested by Rapid Viral Culture[4]	Revised
Emergency Room patients[6]	Testing not available[7]	Testing not available[7]	Unchanged
Ambulatory – influenza high risk patients[6]	Testing not available[7]	Testing not available[7]	Unchanged
Ambulatory – patients NOT influenza high risk[6]	Testing not available[7]	Testing not available[7]	Unchanged

Table footnotes:

1. Patient setting must be provided to help triaging of specimens. If patient setting is not provided, sample will NOT be tested.
2. ICU - Intensive Care Unit; CCU - critical care units.
3. MRVP - multiplex respiratory viral PCR. The current MRVP assay detects influenza type (A and B), influenza A subtype (H1, H3 and (H1N1) pdm09), rhinovirus, enterovirus, RSV A and B, parainfluenza 1, 2, 3 and 4, adenovirus, bocavirus, human metapneumovirus and human coronaviruses 229E, NL63 and OC43.
4. The Rapid Viral Culture system (R-Mix Too) detects: adenovirus, influenza A, influenza B, respiratory syncytial virus (RSV), parainfluenza 1, 2 and 3, and human metapneumovirus.
5. CMV culture for bronchial alveolar lavage (BAL)/bronchial wash/pleural fluid will be done if requested on the requisition.
6. Respiratory swab collection kits will not be supplied for these patient settings.
7. To assist with patient management when respiratory viral 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).

Current clinical guidelines recommend, during influenza season, that influenza antiviral therapy (e.g., oseltamivir or zanamivir) be started empirically for patients with:

- severe acute respiratory illness (e.g., requiring hospitalization), or
- high risk of influenza complications/severe disease.

For more information, please refer to the Reference at the end of 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; an overview of select bacterial pathogens circulating in Ontario is included in the November to April publications. 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 specimen collection kit (http://www.publichealthontario.ca/test_directory) expiry dates before use. Expiry dates on collection swabs and transport media may not be identical – please check both dates. Specimens collected in kits that have expired dates will be rejected. Specimen containers and supplies are provided to submitters exclusively for samples that are to be tested by PHO.

NOTE: To maintain optimum viability, specimens should be stored and transported to PHO at 2-8°C within 48 hours of collection. If longer storage/transit time is anticipated, specimens should be frozen at -70°C or lower.

Additional respiratory viral services available at PHO

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.

Recommended criteria for antiviral susceptibility testing in Ontario are:

- Influenza developing during or soon after influenza antiviral prophylaxis (e.g., oseltamivir or zanamivir)
- Severely-ill patients (ICU) with laboratory-confirmed influenza not responding to influenza antiviral therapy
- Fatalities in patients with laboratory-confirmed influenza being treated with influenza antiviral therapy
- Persistent influenza viral shedding, defined as a repeat PCR test positive after 7 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.
- Influenza A(H1N1)pdm09-positive outbreak samples (will be routinely tested at PHO)

- 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, 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 early 2012. Patients with relevant clinical presentation and epidemiological risk factors for MERS-CoV infection, such as travel to 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 MERS-CoV Test Information Sheet available at: www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Middle-Eastern-Respiratory-Syndrome-Coronavirus-(MERS-CoV).aspx

3. Testing for Novel Influenza Viruses

a) Avian influenza viruses

PHO 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 for seasonal subtypes (H3N2, H1N1pdm09).

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: www.health.gov.on.ca/en/pro/programs/emb/avian/workers.aspx

Influenza A(H5N1) infections in humans have been infrequently reported since 2003 with case occurring in Asia, and later in Africa, Europe, and the Middle East, mostly due to exposure to infected birds or their environment. Information on influenza A(H5N1) is available at: www.health.gov.on.ca/en/news/bulletin/2014/hb_20140110_1.aspx

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 D68

EV-D68 circulated in Ontario in the summer/fall of 2014, and to a lesser extent in 2016. Information about testing for enterovirus D68 (EV-D68) testing, is available at: www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Pages/Enterovirus-D68.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** summarizes all respiratory viral testing done at PHOL (http://www.publichealthontario.ca/LabPathogenReports)

Sentinel Practitioner Surveillance Network (SPSN)

- **The SPSN** performs molecular 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 from SPSN sentinel health care providers will continue to be tested for influenza and other respiratory viruses (by molecular methods or culture). Ontario SPSN information as well as information for practitioners interested in contributing to the network can be found at: www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Studies/Pages/VE-study.aspx

Reference

Aoki FY, Allen UD, Stiver HG, et al. The use of antiviral drugs for influenza: A foundation document for practitioners. Can J Infect Dis Med Microbiol Suppl C Autumn 2013:24: 1C-15C

For further information

- Contact the PHOL Customer Service Centre at 416-235-6556 or 1-877-604-4567 (toll-free), or by email at CustomerServiceCentre@oahpp.ca
- For PHOL specimen collection information and previous Labstracts, refer to www.publichealthontario.ca/Labs
- The current version of the PHOL General Test Requisition and other forms are available at www.publichealthontario.ca/Requisitions
- To subscribe to future Labstracts, email labstracts@oahpp.ca
- To register for Autofax and receive laboratory reports by fax directly from our laboratory information system as soon as they are released, contact the PHOL Customer Service Centre.