



LAB - LINK

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Health Network Laboratories is

pleased to keep you

connected to new and updated

laboratory testing information.

Influenza Testing

CPT (Current & Procedural Terminology) is a trademark of the AMA. Codes listed are guidelines and are for informational purposes only. Coding questions should be directed to the third party payor and/or the AMA. OIG guidelines recommend tests ordered should be reasonable and necessary for the patient, given their clinical condition. Physicians who order medically unnecessary tests for which Medicare reimbursement is claimed may be subject to penalties. Individual components of profiles or panels may be ordered individually at an additional charge. Physicians who consider Reflex testing unnecessary may order an initial test without the Reflexed test. Reflex or confirmation tests are performed at an additional charge.

Influenza Testing at Health Network Laboratories

A number of laboratory diagnostic tests can be used for detecting the presence of influenza and other viruses in respiratory specimens: Rapid antigen detection diagnostic tests (RIDTs), virus isolation in cell culture, or detection of specific viral RNA by real-time reverse transcriptase-polymerase chain reaction (RT-PCR). These tests differ in their sensitivity and specificity in detecting influenza and other respiratory viruses, the amount of time needed from specimen collection until results are available, and the tests' ability to distinguish influenza A subtypes (e.g. novel H1N1 versus seasonal H1N1 and H3N2 viruses).

For detection of influenza virus infection in respiratory specimens, RIDTs have low to moderate sensitivity compared to viral culture or RT-PCR. The sensitivities of RIDTs to detect influenza B viruses are lower than for detection of influenza A viruses. The sensitivities of RIDTs appear to be higher for specimens collected from children than specimens collected from adults.

Few comparisons of RIDTs with RT-PCR for the detection of influenza A (2009 H1N1) virus or seasonal influenza viruses have been published. In our hands, the sensitivity of the RIDT in detecting novel Influenza A H1N1 is about 60%. The specificity of RIDTs is generally high. However, especially during periods of low influenza activity (e.g. the very beginning of the season), false positive results can occur. This coincides with the published reports.

At this time, Health Network Laboratories is offering a Rapid diagnostic test (RIDT) which, when negative, is followed up by a cell culture. Neither of these diagnostic tests can further subtype Influenza A.

NEW TEST DEVELOPMENT

Health Network Laboratories is also offering a RT-PCR test which is able to detect Influenza A, B, Parainfluenza, RSV, Meta pneumovirus, Adenovirus, and Rhinovirus/enterovirus. In addition, it is able to subtype the Influenza A isolates as seasonal H1N1, Novel H1N1, and H3N2. This added information may be necessary to help guide therapy when needed.

(OVER)

Summary of Influenza testing available at HNL:

Influenza Diagnostic Tests	Method	Typical Processing Time	Viruses Detected	Sensitivity Specificity, PPVs and NPVs for the detection of 2009 H1N1	Distinguishes 2009 H1N1 influenza from other influenza A viruses?	Additional Information
<p><u>Rapid Influenza Diagnostic Test (RIDT)</u> (Directigen EZ) Order code: FLUAB</p>	Antigen detection	2 hours from time of receipt in lab	Influenza A and B	Approx. 60%	No	<p>All negatives are reflexed to Cell culture.</p> <p>Positive Rapid Influenza A's are reflexed to subtyping</p> <p>Please indicate if Reflex for subtyping is not wanted</p>
<p><u>Viral Isolation in Cell Culture</u> (R-Mix cell culture) If RIDT is not wanted, order Cell culture alone using Order Code: RVCU</p>	Virus isolation	2 -3 days	Influenza A, B, Parainfluenza 1,2,3, RSV, Adeno	R-Mix culture: 88.9%, 100%, 100%, 87.9%	No	<p>Cultures positive for Influenza A are reflexed to subtyping</p> <p>Please indicate if Reflex for subtyping is not wanted</p>
<p><u>RT-PCR Nucleic Acid Amplification Test</u> (Resp. Viral PRF, PCR) (Lumineux RT-PCR) Order code: RVPPR</p>	RNA detection	24 – 48 hours from receipt in lab [tests are batched. approx. 8 hours to perform test]	Influenza A (subtypes 2009 H1N1, seasonal H1N1 H3N1), B, Parainfluenza 1,2,3, RSV, Adeno, meta pneumo, Rhinovirus	97.8%, 100%, 100%, 97.3%.	Yes	<p>Rapid is NOT included in order code</p>

Journal of Clinical Virology, volume 45, issue 3, pages 191-195

Evaluation of multiple test methods for the detection of the novel 2009 influenza A (H1N1) during the New York City outbreak

Additional information from CDC's website:

Clinical Considerations of Testing When Influenza Prevalence is Low

When disease prevalence is relatively low, the positive predictive value (PPV) is low and false-positive test results are more likely. By contrast, when disease prevalence is low, the negative predictive value (NPV) is high, and negative results are more likely to be true.

If Flu Prevalence is...	And Specificity is...	Then PPV is...	False Pos. rate is...
VERY LOW (2.5%)	POOR (80%)	V. POOR (6-12%)	V. HIGH (88-94%)
VERY LOW (2.5%)	GOOD (98%)	POOR (39-56%)	HIGH (44-61%)
MODERATE (20%)	POOR (80%)	POOR (38-56%)	HIGH (44-62%)
MODERATE (20%)	GOOD (98%)	GOOD (86-93%)	LOW (7-14%)

The interpretation of positive results should take into account the clinical characteristics of the case. If an important clinical decision is affected by the test result, the rapid test result should be confirmed by another test, such as viral culture or polymerase chain reaction (PCR).

Clinical Considerations of Testing When Influenza Prevalence Is High

When disease prevalence is relatively high, the NPV is low and false-negative test results are more likely. When disease prevalence is high, the PPV is high and positive results are more likely to be true.

If Flu Prevalence is...	And Sensitivity is...	Then NPV is...	False Neg. rate is...
MODERATE (20%)	POOR (50%)	MODERATE (86-89%)	MODERATE (11-14%)
MODERATE (20%)	HIGH (90%)	V. GOOD (97-99%)	V. LOW (2-3%)
HIGH (40%)	POOR (50%)	MODERATE (70-75%)	MODERATE (25-30%)
HIGH (40%)	HIGH (90%)	V. GOOD (93-94%)	LOW (6-7%)

The interpretation of negative results should take into account the clinical characteristics of the patient. If an important clinical decision is affected by the test result, then the rapid test result should be confirmed by another test, such as viral culture or PCR.

Selecting Tests

Many factors should be considered when selecting a test, including the following:

- Tests with high sensitivity and specificity will provide better positive and negative predictive values.

When Is Use of Rapid Diagnostic Tests Beneficial?

- Testing during an outbreak of acute respiratory disease can determine if influenza is the cause.
- During influenza season, testing of selected patients presenting with respiratory illnesses compatible with influenza can help establish whether influenza is present in a specific patient population and help health-care providers determine how to use their clinical judgment for diagnosing and treating respiratory illness. (Testing need not be done for all patients.)
- Otherwise, rapid tests do not address the public health need for influenza virus isolated that can only be obtained through the collection of specimens for viral culture. Influenza virus isolates are essential for determining the match between circulating influenza viruses and those viruses contained in the vaccine and for aiding in the selection of new vaccine strains.