**OVERVIEW**

Respiratory virus testing is indicated when the identification of a specific pathogen(s) will change clinical management. There are advantages and disadvantages to each test method and PeaceHealth Laboratories provides different types of respiratory virus testing to accommodate your clinical needs for individual care.

**BENEFITS**

- Faster diagnosis may lead to improved patient management:
  - Improve antibiotic stewardship
  - Provide better infection prevention and virus surveillance
  - Reduce costs by avoiding unnecessary testing
  - Treatment for influenza

**SELECTED TESTING**

**Accuracy of Testing**

The sensitivity of all respiratory virus diagnostic testing will decline with a longer duration of symptoms due to viral titer levels decreasing after the onset of illness in normal, healthy individuals.

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Transport</th>
<th>Test Performed</th>
<th>Test TAT Released*</th>
<th>Mean TAT (90th percentile) 2011/2012 (from receipt)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Immunodiagnostic</td>
<td>Low</td>
<td>Refrigerated 48 hours</td>
<td>Daily</td>
<td>Same day as tested</td>
<td>N/A</td>
<td>Lowest</td>
</tr>
<tr>
<td>DFA</td>
<td>Moderate to High</td>
<td>Refrigerated 72 hours or freeze</td>
<td>Daily</td>
<td>Same day as tested</td>
<td>1.5 hours</td>
<td>Moderate</td>
</tr>
<tr>
<td>PCR</td>
<td>Highest</td>
<td>Refrigerated 48 hours or freeze</td>
<td>Daily</td>
<td>24-48 hours</td>
<td>25.1 hours</td>
<td>Highest</td>
</tr>
<tr>
<td>xTAG-RVP Panel</td>
<td>Highest</td>
<td>Refrigerated 48 hours or freeze</td>
<td>Daily</td>
<td>24-48 hours</td>
<td>28.3 hours</td>
<td>Highest</td>
</tr>
</tbody>
</table>

*From receipt in the laboratory in Springfield, Oregon.

**UPDATE**

November 2013

PeaceHealth Laboratories offers respiratory virus testing performed by these methods:

- Rapid immunodiagnostic (antigen)**
- Direct Fluorescent Antibody (DFA)
- Polymerase Chain Reaction (PCR)
- PCR with fluid microbead detection (Luminex) using xTAG-RVP

The accuracy, turnaround time, number of viruses tested (multiplex), specimen acceptability and cost are different considerations that vary between testing methods.

**SELECTION OF TESTING**

The sensitivity of all respiratory virus diagnostic testing will decline with a longer duration of symptoms due to viral titer levels decreasing after the onset of illness in normal, healthy individuals.

**Note:**

PeaceHealth Laboratories

800-826-3616 www.peacehealthlabs.org

*continued on next page*
Other important factors that contribute to the sensitivity of testing include the proper collection of specimens to obtain viruses contained within columnar respiratory tract cells, patient population and the prevalence of viruses in the community. Unexpected genetic mutations in respiratory viruses can also dramatically impact the test sensitivity for all testing methods.

**Rapid Immunodiagnostic (Antigen)**

Although the turnaround time for a rapid immunodiagnostic (antigen) test is short and often available as a point-of-care test, the sensitivity is generally low for most commercial products. Rapid immunodiagnostic testing has a lower sensitivity in elderly patients.

Negative immunodiagnostic test results cannot be used to rule out an influenza or RSV infection in any patient.

**Note:**

Rapid immunodiagnostic (antigen) testing is not performed at PeaceHealth Laboratories in Oregon. In Vancouver, this testing is only performed for RSV, not influenza. See table on page 4.

**Direct Fluorescent Antibody (DFA)**

DFA staining is performed using a rapid testing format and has a moderate to high level of sensitivity. In Springfield, Oregon the average (90th percentile) turnaround time for DFA testing in the 2012/2013 respiratory virus season was two hours after receipt of the specimen in the laboratory. In Vancouver, the RSV DFA turnaround time is 24 hours.

Respiratory DFA testing permits evaluation of the quality of the specimen for the presence of sufficient columnar respiratory cells and is less costly compared to PCR-based methods.

In Springfield, DFA testing is available as a large panel for influenza A, influenza B, RSV, human metapneumovirus, parainfluenza virus group, and adenovirus group. DFA testing is also available as smaller, mini-panels for:

1. Influenza A and B
2. RSV and Human Metapneumovirus
3. Influenza A and B, RSV and Human Metapneumovirus

In Vancouver, DFA testing is a reflex from a negative RSV rapid immunodiagnostic test result.

**Polymerase Chain Reaction (PCR)**

PCR testing is the most accurate method available but has a longer turnaround time and is more costly than DFA testing. PCR testing is available as laboratory-developed mini-panels to detect influenza A and B or influenza A and B with RSV.
The larger xTAG-RVP panel is PCR-based as well but detects a larger number of respiratory viral pathogens including individual detection of:

- Influenza A (including subtyping results)
- Influenza B
- Respiratory Syncytial Virus (RSV), A and B
- Human Metapneumovirus
- Adenovirus group
- Parainfluenza 1
- Parainfluenza 2
- Parainfluenza 3
- Rhinovirus/Enterovirus

The influenza PCR test is designed to detect all influenza A subtypes by targeting the matrix gene and will also specifically detect the pandemic H1N1 from 2009, referred to as A(H1N1)pdm09, by targeting this unique H1 gene. The xTAG-RVP assay also detects all influenza A subtypes and specifically detects the seasonal H1, seasonal H3 and the A(H1N1)pdm09.

**Reflex of Negative Test Results to PCR-based Testing**

PCR-based methods have the highest sensitivity and specificity and, as such, these tests are useful for reflex testing when a false negative result by a less sensitive method is suspected.

Reflex testing from a negative influenza result to a test panel for respiratory viruses can be a useful algorithm to adopt when the identification of a specific pathogen is required.

Two tests reflex to PCR automatically when negative DFA results are returned (see “Reflex Testing from DFA to PCR” in At-A-Glance Respiratory Viruses tables on page 4 of this publication).

**QUESTIONS?**

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**AT-A-GLANCE RESPIRATORY VIRUSES TESTING OPTIONS**

Available during winter respiratory virus season, pandemics and some year round

### Testing by DFA*

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Viruses</th>
<th>Collection</th>
<th>Turn Around*</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Viruses by DFA</td>
<td>Influenza A and B, Adenovirus, Metapneumovirus, Parainfluenza Virus 1-2-3, Respiratory Syncytial Virus (RSV)</td>
<td>Nasopharyngeal swab, nasal aspirate, nasal wash or nasal swab</td>
<td>Same day as tested</td>
<td>58380</td>
</tr>
<tr>
<td>Influenza A and B DFA</td>
<td>Influenza A and B</td>
<td></td>
<td>Same day as tested</td>
<td>58387</td>
</tr>
<tr>
<td>RSV and Metapneumovirus DFA</td>
<td>RSV and Metapneumovirus</td>
<td></td>
<td>Same day as tested</td>
<td>58391</td>
</tr>
<tr>
<td>Influenza A and B, RSV and Metapneumovirus DFA</td>
<td>Influenza A and B, RSV, Metapneumovirus</td>
<td></td>
<td>Same day as tested</td>
<td>58389</td>
</tr>
</tbody>
</table>

### Reflex Testing from DFA to PCR

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Viruses</th>
<th>Collection</th>
<th>Turn Around*</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A and B DFA, Reflex to Influenza A and Influenza B PCR</td>
<td>Influenza A and B (Negative DFA results will reflex to 58228 Influenza A/ Influenza B PCR)</td>
<td>Nasopharyngeal swab, nasal aspirate or nasal wash</td>
<td>Preliminary same day. Reflex results within 24-48 hours.</td>
<td>58365</td>
</tr>
<tr>
<td>Influenza A and B DFA, Reflex/RVP by PCR</td>
<td>Influenza A and B (Negative DFA results will reflex to 58370 Respiratory Virus Panel)</td>
<td></td>
<td>Preliminary same day. Reflex results within 24-48 hours.</td>
<td>58393</td>
</tr>
</tbody>
</table>

### Testing Options by PCR

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Viruses</th>
<th>Collection</th>
<th>Turn Around*</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Virus Panel by PCR</td>
<td>Influenza A and B, RSV A and B, Parainfluenza Virus 1-2-3, Metapneumovirus, Rhinovirus, Adenovirus</td>
<td>Nasopharyngeal swab, bronchial alveolar lavage, endotracheal tube aspirate or bronchial wash</td>
<td>Within 24 hours</td>
<td>58370</td>
</tr>
<tr>
<td>Influenza A/Influenza B PCR Panel</td>
<td>All Influenza A/H1N1 (2009)/Influenza B</td>
<td></td>
<td>Within 24 hours</td>
<td>58228</td>
</tr>
<tr>
<td>Influenza A/Influenza B/RSV PCR</td>
<td>All Influenza A/H1N1 (2009)/Influenza B/RSV</td>
<td></td>
<td>Within 24 hours</td>
<td>58230</td>
</tr>
<tr>
<td>RSV by PCR</td>
<td>RSV</td>
<td></td>
<td>Within 24 hours</td>
<td>58222</td>
</tr>
</tbody>
</table>

### Rapid Immunodiagnostic Test Influenza Tests *(performed only at PeaceHealth Laboratories in Washington and Alaska)*

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Viruses</th>
<th>Collection</th>
<th>Turn Around*</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A and B Antigen, Rapid</td>
<td>Influenza A and B</td>
<td>Nasopharyngeal swab, nasal aspirate, nasal wash or nasal swab. Collection devices in Washington may differ.</td>
<td>Same day as tested</td>
<td>65090</td>
</tr>
<tr>
<td>Respiratory Syncytial Virus (RSV) Antigen Detection</td>
<td>RSV</td>
<td></td>
<td>Same day as tested</td>
<td>65200</td>
</tr>
</tbody>
</table>

### Reflex Testing from Rapid Immunodiagnostic Test to DFA

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Viruses</th>
<th>Collection</th>
<th>Turn Around*</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV Detection (Vancouver only)</td>
<td>RSV</td>
<td>Nasopharyngeal swab, nasal wash</td>
<td>Same day as tested</td>
<td>RSV</td>
</tr>
</tbody>
</table>

*Note: Please contact Client Services (800-826-3616) or your account representative to have any of these tests added to your requisition.*

*Based upon receipt to Springfield, Oregon laboratory.

1. Nasopharyngeal swabs or nasal swabs using the BD Universal Viral Transport Media (UVT) collection kit (order #115528) with flocked swabs.
2. Specimen in UTM, M4 or M4RT medium is also acceptable however these collection devices are not provided.
3. Nasopharyngeal (NP), bronchial alveolar lavage (BAL), endotracheal tube aspirates (ETT), bronchial wash (BW).
4. Nasal wash/aspirate: Collect in 2-5 mL sterile saline and submit in a sterile, leak-proof container.