

## Influenza and Other Respiratory Viruses: Test Recommendations 2018-19 Season

Influenza causes annual epidemics affecting all ages, with substantial morbidity and mortality. In recent years, four influenza viruses have co-circulated: two influenza A subtypes (A/H3N2, A/H1N1), and two B lineages (B/Victoria and B/Yamagata). The 2017-18 season was H3N2 predominant and was high severity in all age groups, resulting in an estimated 80,000 deaths in the U.S., including 180 reported deaths in children. Most at risk for serious disease are the very young, the elderly and those with underlying disease. Other respiratory viruses, especially respiratory syncytial virus (RSV), can also lead to hospitalization.

**Indications for Laboratory Testing for Influenza:** **1)** To identify influenza-infected patients for continuation of **antiviral therapy**. Treatment does NOT require laboratory confirmation, and treatment should not be delayed since early therapy confers the greatest benefit. **2)** To facilitate bed management and **infection control** in hospitalized patients. **3)** To investigate **outbreaks** in institutional or closed settings. **4)** For **public health** surveillance, and to evaluate efficacy of the vaccine. Note: All influenza positives at YNH are reported to CT DPH, the Emerging Infections Program and CDC.

**Indications for Laboratory Testing for non-influenza respiratory viruses:** **1)** To facilitate **infection control** for hospitalized patients. **2)** To assist management of **severe disease** especially in **compromised hosts**. **3)** To establish a viral diagnosis and **avert unnecessary antibiotic therapy**.

**Tests available at YNH:** Beginning last season, **Rapid Influenza A & B PCR** was implemented to facilitate the rapid identification of ED admissions with influenza to ensure proper isolation precautions, bed placement, and initiation of antiviral therapy. Rapid influenza A and B PCR is performed **24/7** to provide rapid turnaround times (TAT) for **all three YNH EDs**, in the laboratories at the York Street campus, St. Raphael's campus and Shoreline Medical Center. A version of this test is available for L&D as well.

**Respiratory Virus PCR Panel** [15 viruses] is available only when the Virology Lab is open to diagnose other respiratory viruses when needed for infection control or patient management. Samples are **batch-tested** usually 3 times a day in peak season.

Test	Sample	Result	Availability	Sensitivity
Influenza A/B PCR, rapid [LAB3978] (commercial kit) <i>ED admissions. Outpatient offices, clinics.</i>	NP swab	1 hr* (in flu season)	On demand, 24/7*	Highest
Respiratory virus PCR panel [LAB3444] (15 viruses, CDC assays, not a kit)  <i>For Inpatients with suspected viral respiratory illness. Most comprehensive. For outpatients, if result will change management.</i>	NP, throat, aspirates, sputum, BAL, tissue	5-16 hrs	1-3 times a day, 7 AM- 7 PM	Highest
DFA for 7 viruses [LAB3440] <i>Outpatient only. Less sensitive than PCR.</i>	NP swab, aspirate, BAL	2 -12 hrs	May be batched, 7 AM-10 PM	Moderate
Viral culture, Respiratory [LAB9019] Viral culture, Respiratory w/CMV [LAB8517] <i>Lower respiratory tract samples only</i>	BAL, tissue	1-10 days	Daily	Moderate-High
Flu RT-PCR (LABOR AND DELIVERY) [LAB8936] <i>Labor and Delivery only</i>	NP swab	1-2 hrs	On demand, 24/7	Highest

\*Once received in the testing Laboratory. Priority is ED Admissions for bed assignment during flu season. Other outpatient locations may have longer TAT. At YSC, rapid influenza A/B PCR is performed by Microbiology staff when Virology is closed.

Note: Five additional viruses, 4 coronaviruses and parainfluenza type 4, will be included in the **Respiratory Virus PCR Panel** for this season, bringing the total number of viruses to 15: **Influenza A & B, RSV A & B, HMPV, parainfluenza types 1-4, adenoviruses, coronaviruses (2259E, OC43, NL63, HKU1), rhinoviruses.** For public health purposes, all influenza A viruses on inpatients are subsequently subtyped as H1 or H3, and the lineage is determined for a subset of influenza B viruses.

**Respiratory Virus DFA** (direct fluorescent antibody stain of respiratory cells) is available for outpatient testing only. DFA does not “amplify” the target and is less sensitive than PCR. However, DFA is lower cost, has reasonable performance in pediatric patients, and can detect 7 viruses: influenza A & B, RSV A & B, PIV 1-3 and adenovirus. Well-collected samples are essential.

**Viral culture** is confined to lower respiratory tract samples.

**Sample collection: Nasopharynx or mid-turbinate:** Poorly collected samples can result in falsely negative results. Best results are obtained within 1-3 days of symptom onset when shedding is maximal. Insert swabs deep into nasopharynx to level of ear and gently rotate to collect cells, or swab the mid-turbinate region.

**NEJM video:** [https://www.youtube.com/watch?feature=player\\_detailpage&v=DVJNWefmHJE](https://www.youtube.com/watch?feature=player_detailpage&v=DVJNWefmHJE)

**Reporting:** Results are not routinely telephoned, but are entered into EPIC as soon as available.

**Infection Prevention:** Respiratory virus testing is used to guide infection prevention measures on inpatients.

Viruses	Isolation Precaution (in addition to standard precautions)
Adenovirus	Contact + Droplet
Coronavirus	Contact + Droplet
hMPV	Contact
Influenza	Droplet
Parainfluenza	Contact
RSV	Contact
Respiratory virus testing pending	Contact + Droplet, revise isolation orders based on test results

**Respiratory Virus Inpatient Cases at YNHH in the 2017-2018 season:**

In 6 months, 3877 virus infections were detected on inpatients. Of these, 1902 (49%) were influenza.

Respiratory Virus Cases in INPATIENTS (IP) at YNHH [Oct 1, 2017-April 14, 2018]				
Virus	Total inpatient cases	Adult %	Pediatric %	Peak months
Adenovirus	117	35	65	December-March
HMPV	263	77	23	February-April
Influenza A	1257	83	17	January-February
Influenza B	645	68	32	January-March
Parainfluenza	94	72	28	October-November, and May-June
Rhinovirus	884	74	26	September-December, and March-June
RSV	617	58	42	December-February

For table of virus-positives by week see: <https://medicine.yale.edu/labmed/sections/virology/seasonaltests.aspx>

**References:** Refer to CDC website for the latest updates during the year.

<https://www.cdc.gov/flu/pastseasons/index.htm>

<https://www.cdc.gov/flu/professionals/classifies-flu-severity.htm>

<https://www.cdc.gov/flu/about/season/index.html>

<https://www.cdc.gov/flu/professionals/index.htm>

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