

Respiratory Viral Diagnostic Tests

Most upper and lower respiratory infections are caused by viruses, the highest incidence occurring in children. Viral diagnostic tests can be cost effective. Maximum savings occur in the sickest patients and also in controlling local or widespread outbreaks. Savings occur when knowledge of the etiologic agent obviates other workup and therapy (as in sepsis, respiratory complications, etc.) and when specific viruses have effective therapeutic agents (Influenza A & B, RSV, Herpes viruses, etc.)

A study done by Monto et al showed that abrupt onset of fever (>37.8 C) and cough within 2 days of presentation had a positive predictive value of 81% for diagnosing Influenza (63% sensitivity, 71% specificity) when Influenza is circulating in the population. Therefore the vast majority of adults with influenza can be successfully diagnosed and managed without laboratory confirmation during this time. The entire community can benefit by establishing a laboratory diagnosis confirming the start and end of influenza season. There are also circumstances (institutional outbreaks and unusual clinical manifestations) where it is desirable to obtain a laboratory diagnosis, preferably with a culture .

The preferred specimen is a nasopharyngeal aspirate/washing. Nasopharyngeal swabs can be used but may be less sensitive. If nasopharyngeal swabs are used, use two, one for each nares. They may be submitted together in the same transport vial. The metal handle can be cut off with ordinary scissors. Throat (oropharyngeal) swabs are insensitive and not recommended for detection of systemic and lower respiratory pathogens. Wood and cotton are toxic to viruses and should not be used. Sputum contains inhibitors and should not be used. Place specimen in M5 viral transport medium (pink) and refrigerate.

ORDER:

- Rapid Influenza A Screen *
- Rapid Influenza A & B Screen *
- Rapid Influenza B Screen (If you use Cerner to order, this is an unlisted procedure. If you use MIS to order, this is a type-in order.) *
- Rapid RSV Screen *
- Respiratory viral panel (culture)-please specify virus clinically suspected

**To add "culture (respiratory viral panel) if negative": In Cerner add an order comment, In MIS add a type-in order for an unlisted procedure. "Culture if negative" is recommended for hospitalized patients.*

RAPID SCREEN TESTS FOR INFLUENZA A AND B

- The direct fluorescent antibody (DFA) rapid screen method is used and **recommended as the most sensitive and specific rapid test available.** It detects infected columnar nasopharyngeal cells.
- The preferred specimen is a nasopharyngeal aspirate/washing.
- DFA tests are batched and run twice (2 times) a day starting at 8 AM and 2 PM. Specimens received by the start time of the run will be included in the run. Results are available approximately four hours after the run start.
- Sensitivity is approximately 91%. Specificity is approximately 99%, according to in-house studies.
- If results are needed immediately, special arrangements can be made by contacting pathology, however, this stat method (Directigen) is less sensitive (86%), less specific (97%) more expensive. The stat method includes both Influenza A and B. **Both positive and negative results need to be confirmed by culture at the beginning and end of respiratory viral season due to the high rate of false positive and false negative results with these tests when the disease is at a low prevalence in the population.**

RAPID SCREEN TESTS FOR RSV (Respiratory Syncytial Virus):

- DFA tests are batched and run twice (2 times) a day at 8 AM and 2 PM. Specimens received by the start time of the run will be included in the run. Results are available approximately four hours after the run is started.
- The preferred specimen is a nasopharyngeal aspirate/washing.
- DFA method sensitivity is 90% and specificity is 99%.
- A stat method (Directigen) is available, but is less sensitive (81%) and less specific (96%).

VIRAL CULTURE (Respiratory Viral Panel)

- Detects Influenza A & B; RSV; Adenovirus; Parainfluenza 1, 2, 3, & 4. If you suspect Herpes simplex (HSV) or Enterovirus in a respiratory sample, please order these separately.
- 90% of positives are detected by 2 days. Negatives are final at 5 days.
- The shell vial method with centrifuged inoculation onto multiple monolayer cell cultures is used. Detection is confirmed by monoclonal antibodies.
- Culture is more sensitive and specific than rapid screen tests
- If a screening test is negative and a culture is performed one of the pathogens listed above will be detected in an additional 27-38% of patients, depending on the time of year. (1)
- Respiratory viral culture is positive in approximately 20% of all cultured patients, also varying with the time of year. (1)

FOR SUBMITTING SPECIMENS VIA COURIER

Specimen stability in M5 viral transport medium:

- Antigen and culture tests for respiratory viruses are relatively stable at 2-8° C. for 48 hours, although viability decreases with time.
- Residual specimens in M5 viral transport medium are held frozen for 30 days for further testing if necessary.

REFERENCES:

(1) In house data by Dr. Paul Yam

Yam P, Kruger R, Evaluation of Rapid Detection Methods for Respiratory Viruses in Nasopharyngeal Specimens of Pediatric Patients, ASM General Meeting Abstracts, May 1992.

Wiedbrauk DL, Johnston SL, *Manual of Clinical Virology*, Raven Press, 1992.

Monto AS, Gravenstein S, Elliott M, Colopy M, Schwinle J, Clinical Signs and Symptoms Predicting Influenza Infection, *Arch Intern Med*, Vol 160, Nov 2000, 3243-3247.

SCIENTIFIC INFORMATION CONTACT: Nancy Cornish, M.D., Pathologist, Director of Microbiology (402) 354-4540
Paul Yam, PhD, Microbiology (402) 955-5535