

Influenza symptoms and Laboratory Diagnostic Procedures

Influenza illness can include any or all of these symptoms: fever, muscle aches, headache, lack of energy, dry cough, sore throat, and possibly runny nose. The fever and body aches can last 3-5 days and the cough and lack of energy may last for 2 or more weeks. Influenza can be difficult to diagnose based on clinical symptoms alone because the initial symptoms of influenza can be similar those caused by other infectious agents including, but not limited to, *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, and *Legionella* spp.

A number of tests can help in the diagnosis of influenza (**see table**). But, tests do not need to be done on all patients. For individual patients, tests are most useful when they are likely to give a doctor results that will help with diagnosis and treatment decisions. During a respiratory illness outbreak in a closed setting (e.g. hospitals, nursing home, cruiseship, boarding school, summer camp) however, testing for influenza can be very helpful in determining if influenza is the cause of the outbreak.

Preferred respiratory samples for influenza testing include nasopharyngeal or nasal swab, and nasal wash or aspirate, depending on which type of test is used. (**See table**.) Samples should be collected within the first 4 days of illness. Rapid influenza tests provide results within 30 minutes or less; viral culture provides results in 3-10 days. Most of the rapid tests that can be done in a physician's office are approximately >70% sensitive for detecting influenza and approximately >90% specific. Therefore, false negative results are more common than false positive results, especially during peak influenza activity.

Routine serological testing for influenza requires paired acute and convalescent sera, does not provide results to help with clinical decision-making, is only available at a limited number of public health or research laboratories and is not generally recommended, except for research and public health investigations. Serological testing results for human influenza on a single serum specimen is not interpretable and is not recommended.

During outbreaks of respiratory illness when influenza is suspected, some respiratory samples should be tested by both rapid tests and by viral culture. The collection of some respiratory samples for viral culture is essential for determining the influenza A subtypes and influenza A and B strains causing illness, and for surveillance of new strains that may need to be included in the next year's influenza vaccine. During outbreaks of influenza-like illness, viral culture also can help identify other causes of illness.

The text above is taken from **Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP)** (MMWR 2006 Jul 28;55(RR10):1-42).

Influenza Diagnostic Table

Procedure	Influenza Types Detected	Acceptable Specimens	Time for Results	Rapid result available
Viral culture	A and B	NP swab ² , throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	3-10 days ³	No
Immunofluorescence DFA Antibody Staining	A and B	NP swab ² , nasal wash, bronchial wash, nasal aspirate, sputum	2-4 hours	No
RT-PCR⁵	A and B	NP swab ² , throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	2-4 hours	No
Serology	A and B	paired acute and convalescent serum samples ⁶	>2 weeks	No
Enzyme Immuno Assay (EIA)	A and B	NP swab ² , throat swab, nasal wash, bronchial wash	2 hours	No
Rapid Diagnostic Tests				
Directigen Flu A⁷ (Becton-Dickinson)	A	NP wash and aspirate	<30 minutes	Yes
Directigen Flu A+B^{7,9} (Becton-Dickinson)	A and B	NP swab ² , aspirate, wash; lower nasal swab; throat swab; bronchioalveolar lavage	<30 minutes	Yes
Directigen EZ Flu A+B^{7,9} (Becton-Dickinson)	A and B	NP swab ² , aspirate, wash; lower nasal swab; throat swab; bronchioalveolar lavage	<30 minutes	Yes
FLU OIA^{4,7} (Biostar)	A and B	NP swab ² , throat swab, nasal aspirate, sputum	<30 minutes	Yes
FLU OIA A/B^{7,9} (Biostar)	A and B	NP swab ² , throat swab, nasal aspirate, sputum	<30 minutes	Yes
XPECT Flu A&B^{7,9} (Remel)	A and B	Nasal wash, NP swab ² , throat swab	<30 minutes	Yes
NOW Influenza A^{8,9} (Binax)	A	Nasal wash/aspirate, NP swab ²	<30 minutes	Yes
NOW Influenza B^{8,9} (Binax)	B	Nasal wash/aspirate, NP swab ²	<30 minutes	Yes

NOW Influenza A&B^{8,9} (Binax)	A and B	Nasal wash/aspirate, NP swab ²	<30 minutes	Yes
OSOM® Influenza A&B⁹ (Genzyme)	A and B	Nasal swab	< 30 minutes	Yes
QuickVue Influenza Test^{4,8} (Quidel)	A and B	NP swab ² , nasal wash, nasal aspirate	<30 minutes	Yes
QuickVue Influenza A+B Test^{8,9} (Quidel)	A and B	NP swab ² , nasal wash, nasal aspirate	<30 minutes	Yes
SAS Influenza A Test^{7,8,9}	A	NP wash ² , NP aspirate ²	<30 minutes	Yes
SAS Influenza B Test^{7,8,9}	B	NP wash ² , NP aspirate ²	<30 minutes	Yes
ZstatFlu^{4,8} (ZymeTx)	A and B	throat swab	<30 minutes	Yes

1. List may not include all test kits approved by the U.S. Food and Drug Administration
2. NP = nasopharyngeal
3. Shell vial culture, if available, may reduce time for results to 2 days
4. Does not distinguish between influenza A and B virus infections
5. RT-PCR = reverse transcriptase polymerase chain reaction
6. A fourfold or greater rise in antibody titer from the acute- (collected within the 1st week of illness) to the convalescent-phase (collected 2-4 weeks after the acute sample) sample is indicative of recent infection.
7. Moderately complex test – requires specific laboratory certification.
8. CLIA-waived test. Can be used in any office setting. Requires a certificate of waiver or higher laboratory certification
9. Distinguishes between influenza A and B virus infections

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Page Located on the Web at <http://www.cdc.gov/flu/professionals/diagnosis/labprocedures.htm>

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