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Missouri State Public Health Laboratory

Avian Influenza Information

Updated 2/2017

Instructions for the collection and submission of specimens for the detection of Avian Influenza A (H5N1) or Avian Influenza A (H7N9) Virus to the Missouri Department of Health Laboratory:

The Missouri Department of Health State Public Health Laboratory (MSPHL) provides laboratory testing services for persons with suspected infection with highly pathogenic avian influenza (H5N1) and avian influenza A (H7N9). Consultation with the Healthcare Associated Infections Coordinator at 573-441-6235 during business hours and 800/392-0272 (24/7) is required before specimens can be collected or submitted. The Healthcare Associated Infections Coordinator should be contacted during the time when avian influenza is being considered.

Please refer to the Information on Avian Influenza CDC website at:

<http://www.cdc.gov/flu/avian/professional/han020302.htm>.

It is recommended that multiple specimens be collected, and that multiple specimen types be considered. If confirmation testing is needed, it is preferable to use fresh clinical material.

Please refer to the MSPHL web page at: <http://health.mo.gov/lab/respiratory.php> for current laboratory information.

I. RESPIRATORY SPECIMENS

Oropharyngeal swab specimens and lower respiratory tract specimens (e.g., bronchoalveolar lavage or tracheal aspirates) are preferred because they appear to contain the highest quantity of virus for avian influenza detection, as determined on the basis of available data. Nasal or nasopharyngeal swab specimens are acceptable, but may contain less virus and therefore not be optimal specimens for virus detection.

Detection of avian influenza is more likely from specimens collected within the first 3 days of illness onset. If possible, serial specimens should be obtained over several days from the same patient.

A. Collecting specimens from the upper respiratory tract

1. Nasopharyngeal wash/aspirate

- Have the patient sit with head tilted slightly backward.
- Instill 1 ml–1.5 ml of nonbacteriostatic saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing with 2 ml–3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat this procedure for the other nostril.

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- Collect the specimens in sterile vials. Label each specimen container with the patient's name and ID number and the date collected.
- Refrigerate samples after collecting. Ship using cold packs to keep the sample at 4°C.

2. Nasopharyngeal or oropharyngeal swabs

- Use only sterile Dacron, Nylon or flocked swabs with plastic shafts. Do not use cotton or calcium alginate swabs or wooden shafted swabs, as they may contain substances that inactivate some viruses and inhibit PCR testing.
- To obtain a **nasopharyngeal swab**, insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nostrils.
- To obtain an **oropharyngeal swab**, swab the posterior pharynx and tonsillar areas, avoiding the tongue.
- Place the swabs immediately into sterile vials containing 2 ml of viral transport media. Break the applicator sticks off near the tip to permit tightening of the cap. Label each specimen container with the patient's name, ID number and the date the sample was collected.
- Refrigerate samples after collecting. Ship using cold packs to keep the sample at 4°C. (All types of respiratory specimens may be used in RT-PCR tests. Fresh-frozen unfixed tissue specimens may also be submitted for RT-PCR).

B. Collecting specimens from the lower respiratory tract

Bronchoalveolar lavage is considered to be a high-risk aerosol-generating procedure. Therefore, infection control precautions should include the use of gloves, gown, goggles or face shield, and a fit-tested respirator with an N-95 or higher rated filter. A loose-fitting powered air-purifying respirator (PAPR) may be used if fit-testing is not possible (for example, if the person has a beard). Detailed guidance on infection control precautions for health care workers caring for suspected influenza H5N1 patients is available.

1. Bronchoalveolar lavage, tracheal aspirate, or pleural fluid tap

- During bronchoalveolar lavage or tracheal aspirate, use a double-tube system to maximum shielding from oropharyngeal secretions.
- Centrifuge half of the specimen, and fix the cell pellet in formalin. Place the remaining unspun fluid in sterile vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. Label each specimen container with the patient's ID number and the date the sample was collected.
- Refrigerate samples after collecting. Ship using cold packs to keep the sample at 4°C

2. Sputum

- Educate the patient about the difference between sputum and oral secretions.
- Have the patient rinse the mouth with water and then expectorate deep cough sputum directly into a sterile screw-cap sputum collection cup or sterile dry container.
- Refrigerate samples after collecting. Ship using cold packs to keep the sample at 4°C.

II. BLOOD COMPONENTS

Serologic testing for influenza H5N1-specific antibody, using appropriately timed specimens, can be considered if other influenza H5N1 diagnostic testing methods are unsuccessful (for example, due to delays in respiratory specimen collection). Paired serum specimens from the same patient are required for influenza H5N1 diagnosis: one sample should be tested within the first week of illness, and a second sample should be tested 2-4 weeks later. A demonstrated rise in the H5N1-specific antibody level is required for a diagnosis of H5N1 infection. We do NOT perform this testing at the MSPHL, this testing is done at CDC.

To collect serum for antibody testing:

- Collect 5 ml–10 ml of whole blood in a serum separator tube. Allow the blood to clot, centrifuge briefly, and collect all resulting sera in vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®.
- The minimum amount of serum preferred for each test is 200 microliters, which can easily be obtained from 5 ml of whole blood. A minimum of 1 cc of whole blood is needed for testing of pediatric patients. If possible, collect 1 cc in an EDTA tube and in a clotting tube. If only 1cc can be obtained, use a clotting tube.
- Label each specimen container with the patient's name, ID number and the date the specimen was collected.
- Refrigerate and ship with cold packs to keep the sample at 4°C. If frozen, ship on dry ice. Do not freeze whole blood.

III. AUTOPSY SPECIMENS

At the MSPHL, we can perform RT-PCR on fresh-frozen unfixed lung tissue.

CDC can perform immunohistochemical (IHC) staining for influenza A (H5) viruses on autopsy specimens. Viral antigens may be focal and sparsely distributed in patients with influenza, and are most frequently detected in respiratory epithelium of large airways. Larger airways (particularly primary and segmental bronchi) have the highest yield for detection of influenza viruses by IHC staining. Collection of the appropriate tissues ensures the best chance of detecting the virus by (IHC) stains.

- If influenza is suspected, a minimum total of 8 blocks or fixed-tissue specimens representing samples from each of the following sites should be obtained and submitted for evaluation:
 - Central (hilar) lung with segmental bronchi
 - Right and left primary bronchi
 - Trachea (proximal and distal)
 - Representative pulmonary parenchyma from right and left lung laboratory diagnostics

In addition, representative tissues from major organs should be submitted for evaluation. In particular, for patients with suspected myocarditis or encephalitis, specimens should include myocardium (right and left ventricle) and CNS (cerebral cortex, basal ganglia, pons, medulla, and cerebellum). Specimens should be included from any other organ showing significant gross or microscopic pathology.

Specimens may be submitted as:

- Fixed, unprocessed tissue in 10% neutral buffered formalin, or
- Tissue blocks containing formalin-fixed, paraffin-embedded specimens, or
- Unstained sections cut at 3 microns placed on charged glass slides (10 slides per specimen)
- Specimens should be sent at room temperature (NOT FROZEN).
- Fresh-frozen unfixed tissue specimens may be submitted for RT-PCR.
- Include a copy of the autopsy report (preliminary, or final if available), and a cover letter outlining a brief clinical history and the submitter's full name, title, complete mailing address, phone, and fax numbers, in the event that CDC pathologists require further information. Referring pathologists may direct specific questions to CDC pathologists. The contact number for the Infectious Disease Pathology Activity is 404-639-3133, or the pathologists can be contacted 24 hours a day, 7 days a week through the CDC Emergency Response Hotline at 770-488-7100.

IV. SHIPPING INSTRUCTIONS

The Missouri State Public Health Laboratory (MSPHL) will supply a virus isolation kit which is suitable for the collection and transportation of avian influenza specimens. Specimens should be stored under refrigeration (4°C) and shipped on cold packs (not wet ice). Samples such as fresh-frozen autopsy samples for RT-PCR or other clinical materials may be frozen at -70°C if the package is to be held prior to shipment and then shipped on dry ice.

All specimens should be submitted to the MSPHL, including any that are being submitted to the CDC. This will ensure proper documentation and specimen packaging procedures are maintained. If mailers from the SPHL are not used, specimens should be packaged and shipped in a container suitable for the transportation of etiologic agents (infectious substances

All shipments must comply with current DOT/IATA shipping regulations.

The MSPHL provides courier services for the transportation of specimens to the laboratory. If the state courier is not used, specimens should be sent by priority shipping for receipt within 24 hours. The MSPHL shipping address is:

Missouri Dept. of Health and Senior Services
Missouri State Public Health Laboratory
Attention: Virology Unit
101 N. Chestnut Street
Jefferson City, MO 65101