PHSA Laboratories

BCCDC Public Health Laboratory

November 10, 2024

Laboratory Update on Highly Pathogenic Avian Influenza (H5N1)

Highly pathogenic avian influenza (H5N1) has been circulating amongst food-producing and hobby farm birds in British Columbia. On 8 November, 2024, the first presumptive human case of H5N1 infection was identified in British Columbia.[1] Along with the Ministry of Agriculture, MoH, PHO, PICNet, PHAC, NML, BCCDC and others, the BCCDC Public Health Laboratory is monitoring the situation closely and, in conjunction with the National Microbiology Laboratory, is equipped to process specimens for testing from frontline laboratories and clinicians across the province.

The BCCDC PHL requests that the following steps be taken when an individual with suspected H5N1 infection (i.e. compatible signs/symptoms and exposure history) is identified:

1. Confirm that the Medical Health Officer for the local health authority has been notified of the suspected case.
2. Contact the BCCDC PHL Medical Microbiologist on-call by email (BCCDC_MicroOncall@bccdc.ca) or phone (604-661-7033) prior to sending specimen(s) for testing.
3. Avoid discarding any respiratory or blood (serum/plasma) laboratory specimens until H5N1 testing has been completed and reported.

While it is currently low season for seasonal viruses, we are witnessing increased activity of H5N1 in poultry. Laboratories should ensure that all influenza A positive respiratory samples are typed by H1/H3 NAT. If this is not available in the local laboratory, the sample can be forwarded to BCCDC PHL for H1/H3 NAT. If a specimen is positive for influenza A but is not H1/H3 typeable, please forward to the PHL for H5 NAT. Note that NAT subtyping performs best when the cycle threshold (Ct) value is <35; please contact the BCCDC Medical Microbiologist on-call to discuss testing options if avian influenza is still suspected in the context of a low viral load.

General Testing Guidelines:

Specimen collection should align with the clinical presentation of the person under investigation. Diagnostic sensitivity is optimized by collecting multiple specimens within 5 days of symptom onset; however, longer intervals do not preclude testing as continued viral shedding may occur.

For patients with **mild** respiratory signs and symptoms:

- Submit a nasopharyngeal (NP) swab PLUS either: (1) a throat swab OR (2) a combined throat and mid-turbinate nasal swab.[2]
- In consultation with the BCCDC Medical Microbiologist on-call, alternative sample types (e.g. saline gargle) can be considered for persons who decline swab collection.

For patients with **severe** respiratory signs and symptoms:

- In addition to the samples listed above for mild disease, patients should have a lower respiratory tract specimen collected (i.e. bronchoalveolar lavage, endotracheal aspirate, and/or induced sputum).

For patients with **conjunctivitis**, with or without respiratory symptoms:

- Submit a conjunctival swab[3] PLUS an NP swab.

If the sample tests positive for influenza A, it will be subtyped with H1, H3, and H5 NATs (note: for H5, testing may be performed simultaneously or limited to situations where an endemic subtype has not been identified). H5 positive NAT results will be reported as presumptive positive and will be confirmed by sequencing at the PHL as well as testing at the National Microbiology Laboratory. Samples that are influenza A positive and have an adequate viral load, but are not typeable by NAT, will be sequenced to determine the viral subtype.

If the sample tests negative for influenza A, it will be tested for other respiratory pathogens (if not already completed by the frontline laboratory) to help provide an alternate diagnosis. If avian influenza testing is negative, but clinical suspicion of infection remains high, clinicians may consider collecting an additional set of specimens from the patient for testing.

Serological testing is available but limited to public health investigative purposes; contact the Medical Microbiologist on-call for approval if indicated. Please note: a minimum of 500 µL of serum is required for testing.

Specimen Collection & Ordering:

Complete up-to-date testing information, including appropriate specimen collection devices, procedures, and transportation, is available at: http://elabhandbook.info (Relevant sections: "*Avian Influenza A Testing"* and *"Influenza A Virus Typing NAT"*).

Please submit specimens accompanied by a completed BCCDC Virology Requisition form.[4] Check the "Avian influenza" box in the Respiratory subsection and provide necessary clinical/exposure history. If submitting specifically for H5 NAT, please complete the information in the Viral Typing By NAT/Sequencing subsection.

Note on saline gargles: Although these remain less preferable for avian influenza testing, certain circumstances may require submission of these specimens when gold-standard upper respiratory tract specimens cannot be obtained. If dedicated collection kits are not available, standard Addipak® saline vials can be used in conjunction with sterile urine containers.[5,6]

Biosafety:

Laboratory Safety:

While influenza A(H5N1) in pure culture is a Risk Group 3 pathogen and a Security Sensitive Biological Agent (SSBA), clinical samples can be safely handled in a Containment Level 2 (CL2) laboratory for non-propagative routine testing, including molecular, serological, and chemistry analyses. Complete federal biosafety standards, including a Q&A[7,8,] and interim infection prevention & control guidance documents for avian influenza including a Q&A [9,10] are available online. Please ensure your laboratory's biosafety officer (or designate) has reviewed these documents and undertaken a local risk assessment.

When handling specimens from an individual with a presumptive/confirmed positive result for H5N1, we

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recommend handling specimens in a CL2+ environment (i.e. perform all manipulations of the specimen in a biological safety cabinet, preferably with use of an N95/respirator). If specimens require centrifugation, we recommend this also be performed within a BSC.

Transportation:

- Cultures of H5N1 must be transported as Category A; however, as per TDG regulations, patient specimens that contain or may contain avian influenza A(H5N1) may be transported as Category B.

Resources:

1. News release: https://news.gov.bc.ca/releases/2024HLTH0152-001583

2. Collection procedure for combined throat/mid-turbinate swab: https://www.youtube.com/watch?v=nZ5ARMIiQ4A

3. Collection procedure for conjunctival swab: https://www.cdc.gov/bird-flu/media/pdfs/2024/07/conjunctival-swab-collection-avian-influenza.pdf

4. Virology requisition form: http://elabhandbook.info/PHSA/Files/RequisitionForms%2f2_20240826_015253_VI%20Req_June%202024.pdf
5. Adult procedure for saline gargle: http://www.bccdc.ca/Health-Info-Site/Documents/COVID_GargleSpit_Adults_instructions.pdf

6. Youth procedure for saline gargle: http://www.bccdc.ca/Health-Info-Site/Documents/COVID-gargle_youth.pdf

7. Biosafety guidelines for avian influenza: https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/biosafety-directives-advisories-notifications/alphainfluenzavirus-influenzae-h5n1-avian-influenza-a.html

8. Biosafety directive for new and emerging influenza A viruses: https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/biosafety-directives-advisories-notifications/new-emerging-influenza-a-viruses.html

9. IPAC guidelines for avian influenza: https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h5n1/health-professionals/interim-recommendations-infection-prevention-control-avian-influenza-healthcare-settings.html

10. PHAC Q&A on H5N1 biosafety and handling: https://training-formation.phac-aspc.gc.ca/mod/page/view.php?id=15866#:~:text=As%20Highly%20Pathogenic%20Avian%20Influenza,Canadian%20Biosafety%20Standard%2C%203rd%20Edition.

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