



# Avian Influenza (AI)

## Highly Pathogenic Avian Influenza including H5N1 and H7N2

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The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of avian influenza see: [Alberta Public Health Disease Management Guidelines: Influenza, avian.](#)

### 1. CASE DEFINITION

#### Confirmed Case

- A person with laboratory confirmation of avian influenza (AI) infection (e.g., H5N1 or H7N9), confirmed through Canada's National Microbiology Laboratory (NML)

#### Probable Case

A person with clinical illness\*\* meeting any of the exposure criteria and **ONE** of the following:

- Laboratory diagnostic testing\* is positive for influenza A, negative for H1 and H3 by real-time reverse transcription polymerase chain reaction (RT-PCR) and therefore unable to be subtyped,

#### OR

- Laboratory diagnostic testing\* is positive for influenza A and subtype is not available or is indeterminate/unreliable (such as due to specimen quality, viral load, or timing),

#### OR



- Rapid influenza diagnostic test (e.g., rapid antigen test or rapid molecular assay) is positive for influenza A (refer to Diagnosis section for more information) but subtype information is not available,

**OR**

- A person for whom laboratory testing for H5 or H7 subtype was positive but not confirmed by the NML (i.e., presumptive positive).

### **Suspect Case**

A person meeting exposure criterion and clinical illness\*\* criteria for whom laboratory results are unknown or pending.

### **Exposure Criteria**

In the 10 days before onset of illness, a person with one of the following:

- **Close** (within 2 meters) unprotected (without use of respiratory and eye protection) exposure to a person who is a confirmed, probable, or suspect case of human infection with avian influenza A virus (e.g., in a household or healthcare facility).

**OR**

- Exposure to infected birds.

**OR**

- Unprotected exposure to biological material (e.g., primary clinical specimens, virus culture isolates) known to contain AI virus in a laboratory setting.

**\*Laboratory diagnostic testing** includes PCR testing and/or sequencing for influenza A positive specimens to confirm avian influenza virus.

**\*\*Clinical illness** includes (but not limited to): cough (new or exacerbation of chronic), sore throat, fever, rhinorrhea, fatigue, myalgia (or prostration), arthralgia, headache, conjunctivitis, shortness of breath or difficulty breathing, pneumonia, respiratory failure, acute respiratory distress syndrome, multi-organ failure.

## **2. DIAGNOSIS**

- Laboratory confirmation of avian influenza from a clinical specimen.
- Both nasopharyngeal **AND** throat swabs are recommended to be collected as close to the onset of symptoms as possible.
- **Before collecting specimens** for diagnosis, contact the OCPHO by telephone (867) 920-8646 to review the case and to facilitate testing at the Alberta Provincial Laboratory.
- For more information, refer to the [Alberta Provincial Laboratory Guide to Services](#).



### 3. REPORTING

All HCPs must follow the NWT [Public Health Act](#). Measures for contact tracing and legislative requirements are laid out within the [Reportable Disease Control Regulations](#) and reporting timelines are found in the [Disease Surveillance Regulations](#).

**Note:** The only acceptable methods of reporting to the OCPHO are outlined below. Information provided outside of these methods will not be considered reported unless otherwise stated by a CPHO delegate.

- Reports of sick or dead birds or other animals where avian influenza is suspected should be reported to the territorial [Conservation Officer](#) through the Department of Environment and Climate Change or the [Canadian Wildlife Health Cooperative](#) at 1-800-567-2033.

#### Health Care Professionals

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646 **immediately** after diagnosis is made or opinion is formed,

**AND**

- Complete and fax (867) 873-0442 the [Emerging Respiratory Pathogens and Severe Acute Respiratory Infection \(SARI\) case report form](#) to the OCPHO **within 24 hours**.
- OCPHO is required to report confirmed and probable human cases of avian influenza to the Public Health Agency of Canada within **24 hours** of their own notification, as part of the [International Health Regulations](#).
- Immediately** report all outbreaks or suspect outbreaks by telephone to the OCPHO.

#### Laboratories

- Report all positive results to the OCPHO by telephone (867) 920-8646 **AND** by fax (867) 873-0442 **immediately**.

### 4. OVERVIEW

#### Causative Agent

- Avian influenza is a member of the *Orthomyxoviridae* family.
- Avian influenza (AI) viruses are type A viruses that are classified into low pathogenicity avian influenza (LPAI) A viruses or highly pathogenic avian influenza (HPAI) A viruses. The categories refer to molecular characteristics of a virus and the virus' ability to cause disease and mortality in chickens in a laboratory setting. Most AI viruses are low pathogenic. Only some AI viruses (e.g., some H5 and H7) are classified as HPAI A viruses, while most A(H5) and A(H7) viruses circulating among birds are LPAI A viruses.
- Both HPAI and LPAI viruses can spread rapidly through poultry flocks.



- HPAI and LPAI designations do not correlate with the severity of illness in cases of human infection with these viruses; both LPAI and HPAI A viruses have caused mild to severe illness in infected humans. They may include, but are not limited to, H5, H7, and H9 subtypes and may involve novel N subtypes as well (e.g., N6, N9).
- Most human infections with AI viruses have been transmitted from birds infected with either highly pathogenic avian influenza A(H5N1) Asian strain or low pathogenic avian influenza A(H7N9).
- The main global human health concern with AI virus is that outbreaks, particularly in domestic poultry flocks, present an opportunity for ongoing genetic mutation or viral reassortment. Simultaneous infection with human influenza and avian influenza viruses in an intermediary host, including a human, may provide an opportunity for an exchange of genes. One possible outcome is the emergence of a novel influenza virus subtype able to infect people easily and spread from person-to person in an efficient and sustained way that could trigger an outbreak/pandemic.
- For more information on seasonal influenza, refer to the Influenza chapter in the [NWT Communicable Disease Manual](#).

### Clinical Presentation

- Human infections from influenza A virus subtypes H5, H7 and H9 range from eye infections (conjunctivitis) to influenza-like illness (ILI) symptoms to severe respiratory illness. Clinical illness is seen predominantly in children and young adults.

### Major Complications

- In some cases, infected by A(H5N1) viruses, symptoms have rapidly progressed to severe pneumonia, acute respiratory distress syndrome (ARDS), multiple organ failure, lymphopenia, elevated liver enzyme levels and abnormal clotting profiles, diarrhea, vomiting, abdominal pain, pleuritic pain, bleeding from the nose and gums, shock and even death.

### Transmission

- Overall, the risk of transmission to humans is currently low, from either animal or human cases; however, there is always the possibility that an avian virus can change and gain the ability to spread more easily to/between humans
- Potential sources of acquisition include:
  - Infected poultry.
  - Infected wild or pet birds.
  - Other infected animals (e.g., H5N1 detections have been identified in mammalian species such as red fox, skunks, harbour seals, mink, black bear, pigs, dolphin).
  - Under- or uncooked products from infected birds (NOTE: all evidence to date indicates that thorough cooking will kill the virus).



- Manure and litter containing high concentrations of virus.
- Contaminated surfaces, vehicles, equipment, clothing, and footwear at involved sites (e.g., infected poultry farms).
- Contaminated air spaces (e.g., a barn when movement of birds or manure may have resulted in aerosolization of the virus).
- Individuals known to be infected with an avian influenza virus.
- Laboratory exposure to avian influenza virus.

### Incubation Period

- The estimated incubation period for human infection with avian influenza A(H5N1) and A(H7N9) viruses is generally 2-5 days after exposure but can be 7-10 days.
- A 21-day incubation period, which considers the transmission dynamics of the virus, is used for bird populations in the context of disease control.

### Period of Communicability

- The period of communicability for AIs is unknown. It is presumed that infected individuals can shed the virus from the day before symptoms begin and are considered infectious until symptoms resolve.
- Shedding is likely longer than for seasonal influenza due to lack of prior immunity. PCR detection of virus has been documented up to 21 days from onset of symptoms.

### Clinical Guidance

- As laboratory testing may take several days, if avian influenza is suspected (based on consultation with OCPHO), **oseltamivir (Tamiflu) treatment should be provided without delay and preferably within 48 hours from onset of symptoms.**
- For patient-specific clinical management consult your local healthcare professional, paediatrician, infectious disease specialist or clinical practice guidance from the [Association of Medical Microbiology and Infectious Diseases Canada.](#)

## 5. PUBLIC HEALTH MEASURES

### Key Investigation

Assess confirmed, probable or suspect cases for **ALL** the following possible exposures in the **10 days before onset of illness:**

- **Resided in or returned from** an area where human cases of AI have recently been detected or where AI is known to be circulating in poultry populations (including other areas of Canada).
- **Close contact** with one of the following:
  - close contact (within 2 metres) with a PUI, probable, or confirmed human case or,



- An ill person ((i.e., respiratory illness) who resided in or returned from an area where AI is known to be circulating (including other areas of Canada or Alberta).
- Direct or indirect close contact (within 2 metres) to presumptive/confirmed infected birds or other animals (e.g., visiting a live market, touching, or handling infected animals, under- or uncooked poultry or egg).
- Unprotected exposure to biological material (e.g., primary clinical specimens, virus culture isolates) known to contain avian influenza virus in a laboratory setting.

**OR**

- Unprotected, direct or close contact (within 2 metres) to contaminated environments (direct contact with surfaces contaminated with animal parts (e.g., carcasses, internal organs) or feces from H5N1 infected animals, or settings in which there have been mass animal die offs in the previous six weeks due to H5N1).

- **Occupational risks**, which include but are not limited to:

- Health care worker (HCW) providing direct care for a confirmed, probable, or suspect AI.
- Laboratory setting working with live AI virus.
- Working directly with live, dead, or recently killed birds including, but not limited to: poultry farm, poultry processing plant, culling poultry (catching, handling, transporting, or disposing of dead birds), wild bird rescue/rehabilitation, live bird market, pet bird industry, chef working with live or recently killed domestic poultry or wild game, and/or veterinary work.

- Bird exposures, for example:

- Touching infected birds,
- Touching or breathing in dust containing feces or other secretions of infected birds,
- Preparing infected poultry meat for cooking if safe food handling practices are not observed,
- Slaughtering or butchering infected birds,
- Handling birds for sale, and/or
- Attending markets that sell live birds.

- Assess use of personal protective equipment (PPE) and duration of exposure for all occupational exposures.

- Identify **close contacts\***.

**\*Close Contact** is an individual with:

- Unprotected (without appropriate use of respiratory and eye protection) exposure within approximately 6 feet (2 meters) of a confirmed, probable, or suspect human case while the



case was infectious (beginning 1 day prior to illness onset and continuing until resolution of illness).

- This may include but is not limited to:
  - Anyone who provided care for a confirmed, probable, or suspect case, including health care workers, family members, or other caregivers,
  - Others who have had similar close physical contact (kissing, shared cigarettes, food, glasses/bottles, eating utensils) with a confirmed, probable, or suspect case, or
  - Persons who lived with or stayed overnight with a confirmed, probable, or suspect case

## Management of Cases

- Confirm the diagnosis.
- Manage case of AI, especially H5N1, in the hospital, if possible, as symptoms may quickly progress to more severe disease.
- Isolate hospitalized cases with contact and droplet precautions. Use airborne precautions if performing aerosol- generating medical procedures (AGMPs). Refer to the Canadian Critical Care Society Guidance for more information.
- For non-hospitalized cases, consider conducting **active daily monitoring** (e.g., telephone contact) of the individual's health status for duration of illness depending on the severity of the AI strain.
- Non-hospitalized cases should **self-isolate at home until at least 24 hours after symptom resolution**. They should also be provided the following information:
  - Prevent spread of infection to other household contacts, by observing respiratory etiquette, hand hygiene, and limiting contact with other inside/ outside the home. Family members caring for the case should take precautions when interacting with the case and limit contact with others outside the home.
  - When/where to go for medical assessment if symptoms worsen, and instruction to disclose recent diagnosis of AI before or upon presenting to a health care setting.
  - How to prevent transmission; and
  - The importance of and how to access seasonal influenza immunization.
- Employees should notify their health and safety representative of their illness for follow-up by occupational health services.
- For more information, refer to the [Alberta Public Health Disease Management Guidelines: Influenza, avian](#), including Appendix 1: Management of Exposures to Infected Birds and/or Contaminated Sites in the Current Context which illustrates a recommended actions flow chart.



## Body of Deceased Persons

- Refer to facility's infection prevention and control policies and guidelines or consult with the infection prevention and control specialist in the facility for management of deceased persons.

## Management of Contacts

- Assess exposure, with consideration of type and duration of exposure, time since exposure, risk for secondary human/animal transmission, and whether post-exposure prophylaxis should be considered.
- Please refer to Table 1: Exposure Risk and Table 2: Summary of Public Health Management for Contacts Based on Exposure Risk in [Alberta Public Health Disease Management Guidelines: Influenza, avian](#).
- The CPHO (or designate) may recommend **post-exposure antiviral prophylaxis** based on the risk assessment (e.g., underlying comorbidity and/or intensity of exposure), with consideration of the risk of exposure based on [Public Health Agency of Canada's risk assessment](#).
- At the direction of the CPHO (or designate), more strict quarantine may be considered if there was evidence that the virus was causing severe illness or could spread more efficiently from person to person.
- Offer seasonal influenza vaccine, if not already received, to reduce the risk of human-avian reassortment.
- Refer to the [Alberta Public Health Disease Management Guidelines: Influenza, avian](#) for more information including Appendix 1: Management of Exposures to Infected Birds and/or Contaminated Sites in the Current Context which illustrates a recommended actions flow chart.

## Outbreak Management

One confirmed/probable case of human AI is considered an outbreak. AI outbreaks are managed on a situation specific basis as per direction from the CPHO.

## Travel

In the absence of efficient human-to-human transmission, and with no evidence of transmission occurring during travel, tracing contacts who were in proximity of cases who were symptomatic during a flight or while on other conveyances (e.g. train, bus) is not recommended at this time.

## Prevention

- While there is currently no AI vaccine licensed for use in Canada, there are vaccine candidate viruses that could be used to produce a vaccine if needed.



- While seasonal influenza immunization will not prevent AI infection, it may prevent co-infection. All NT residents six months of age and older are eligible to receive annual seasonal influenza vaccine. Refer to [Influenza / Flu | Health and Social Services \(gov.nt.ca\)](#).
- Pneumococcal vaccine may be useful in preventing secondary bacterial infections in populations at high risk for influenza related complications.

General and ongoing education for the public:

- If travelling to an affected area, follow the precautions below:
  - Avoid high-risk areas (e.g., poultry farms, live animal markets, areas where poultry may be slaughtered and contact with any surfaces that appear to be contaminated with feces from poultry or other animals);
  - Avoid high-risk activities (e.g., handling sick or dead birds); and
  - Practice food safety and good hygiene practices (e.g., hand washing with soap and water).
- Monitor health during/after travel:
  - See a health care provider if flu-like symptoms develop while travelling or upon returning to Canada, and
  - Make health care provider aware of travel or living in an area where AI (e.g., H5N1) is a concern.

## 6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

- For more information about Avian Influenza, including a recommended actions flow chart please refer to [Alberta Public Health Disease Management Guidelines: Influenza, avian](#)
- The Government of Canada: Canada/[Avian Influenza](#)
- The Government of Canada: [Fact Sheet/Avian Influenza](#)
- Centers for Disease Control and Prevention: [CDC/Information on Bird Flu](#)
- World Health Organization: PAHO/[Avian Influenza](#)

## 7. EPIDEMIOLOGY

- For more information on the epidemiology of Avian Influenza in the NWT see: [Epidemiological Summary of Communicable Diseases HSS Professionals](#).

## 8. REFERENCES

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[Alberta Provincial Laboratory Guide to Services](#)
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5. Ontario Ministry of Health Management of Avian Influenza or Novel Influenza in Birds or Animals Guidelines:  
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<https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h5n1/health-professionals.html#a6>
7. Public Health Agency of Canada Human health issues related to avian influenza in Canada  
<https://www.canada.ca/en/public-health/services/reports-publications/human-health-issues-related-avian-influenza.html>