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1.0 SITUATION

The purpose of this document is to provide public health officials with guidance on the management of human exposures to avian influenza in birds or animals or suspected human cases of avian influenza, specific to the circulating avian influenza H5N1 strain in 2021-22.

The guidance is based on the 2023 national [document](#) – [Human Health Issues related to Avian Influenza in Canada](#), and updated to reflect guidance on the current circulating strains. This guidance will be modified and updated as the situation or the virus evolves.

2.0 BACKGROUND

Avian influenza refers to an infectious disease of birds caused by type A strains of influenza virus that are not human adapted, and is transmissible between birds. The diagnosis of avian influenza must be made on the basis of laboratory confirmation.

Avian influenza A viruses are designated as highly pathogenic avian influenza (HPAI) or low pathogenicity avian influenza (LPAI) based on molecular characteristics of the virus and the ability of the virus to cause disease and mortality in birds. However, the severity of the illness in birds (i.e. whether the avian influenza virus is considered LPAI or HPAI) does not predict severity in humans. Both HPAI and LPAI strains have the potential to cause serious illness in humans. The risk to humans varies by strain type, and thus the outbreak response will vary depending on the circulating strain.

Highly pathogenic avian influenza (HPAI) H5N1 is currently widespread in Europe, South and North America including Canada with an epizootic ongoing since 2021 that is affecting domestic and wild birds, with spill over into other animals. Involvement of other animals such as raptors and a wide range of mammals such as seals, raccoons, mink, foxes and skunks has now also been reported. There is some evidence of mammal to mammal transmission in animals in the current epizootic including significant mortality event of sea lions in Chile and farmed mink in Spain.

Human infections occur following exposure to infected animals, notably poultry. This includes 240 cases of H5N1 human infection reported since 2003. Most recently a Chilean man who fell ill in March 2023. Other human cases include an asymptomatic infection in the United Kingdom in January 2022 and another locally-acquired human case with mild illness in the United States in April 2022. In total there have been 11 human cases with this current outbreak since 2022. Human to human transmission has not yet been established. However, exposure to novel influenza viruses is concerning because of the potential for human adaptation and associated pandemic risk. Such risk may be considered a “low probability, high impact” event. Prudence requires that exposures to potentially infected animals be minimized, that the risk of acquiring infection be mitigated, and that monitoring be undertaken to ensure timely identification and isolation of human cases and the collection of critical information to inform real-time risk assessment.

Further information is available on the [Public Health Agency of Canada](#) and [US CDC](#) website.

3.0 IMPACT OF AVIAN INFLUENZA ON HUMAN HEALTH

Significant risks to human health from avian influenza include:

1. Human infection with the avian influenza virus: Although avian influenza A viruses usually do not infect people, rare cases of human infection occur with these viruses following exposure to infected animals, notably poultry. Illness in humans range in severity from no symptoms or mild illness to severe disease resulting in death. Human to human transmission of avian influenza viruses has not been established but cannot be ruled out.
2. Emergence of a new strain of type A influenza: Influenza viruses are highly changeable. Concurrent infection with avian influenza and human influenza in a human host may provide an opportunity for genetic re-assortment which may facilitate human adaptation and associated pandemic risk. Such risk may be considered a “low probability, high impact” event.

3.1 Human Case Definitions

Human Avian Influenza case definitions can be found on the BCCDC [Avian Influenza: Case definitions for notification to/within public health](#) webpage.

3.2 Transmission to the Human Population

Potential sources include:

- infected poultry
- under- or uncooked products from infected birds,
- infected wild or pet birds,
- other infected animals (e.g. foxes, skunks, mustelids, seals, pigs)
- manure and litter of birds or other infected animals (can contain a high concentration of viruses)
- surfaces contaminated by bird or other infected animals dander/body fluids or body parts (e.g. carcasses, internal organs),
- contaminated vehicles, equipment, clothing and footwear at involved sites (e.g., infected poultry farms)
- contaminated air space (e.g. a barn when movement of birds\other infected animals or their litter\manure may have resulted in aerosolization of the virus)
- individuals known to be infected with an avian influenza virus
- unprotected exposure to biological material (e.g., primary clinical specimens, virus culture isolates) known to contain avian influenza virus in a laboratory setting

Avian influenza viruses have not yet acquired the capacity for easy spread from person-to-person but this cannot be ruled out. Because of the possibility that the virus could change and gain the ability to spread easily between people, monitoring for human infection and their swift isolation to prevent the potential for adapted viruses to spread is extremely important.

3.3 Incubation Period

Available data suggest that the estimated incubation period for human infection with avian

influenza A (H5N1) and A (H7N9) viruses is generally 2 to 5 days, but has been reported to be up to 7-10 days. Longer periods have, however, been suggested. (1)

In poultry, it can be a few hours to a few days in individual birds, and up to 2 weeks in the overall flock.

A 14-day incubation period, which takes into account the transmission dynamics of the virus, is used for bird populations in the context of disease control.

3.4 Communicability

Limited human-to-human transmission has been reported for avian influenza viruses. Transmission probably occurred during close unprotected contact with a severely ill patient. However, because of the possibility that bird flu viruses could change and gain the ability to spread easily between people, monitoring for human infection and person-to-person spread is extremely important for public health.

3.5 Communicable Period in Human Cases

RT-PCR detection can extend up to 21 days for H5N1 and 20 days for H7N9. (2-4) However, the lack of information on shedding of viable virus and of secondary transmission overall make the interpretation of infectivity challenging. Shedding may be assumed at least as long as seasonal human influenza (one day before to seven days after symptom onset), and longer given lack of immunity (as also for seasonal influenza in children or the immunocompromised). (5)

3.6 Signs and Symptoms

Symptoms of avian influenza in humans may range from no symptoms or mild illness to severe. Influenza-like illness, signs and symptoms include:

- Fever or feverishness
- Cough
- Rhinorrhea
- Sore throat
- Myalgia/arthralgia
- Headache
- Fatigue
- Conjunctivitis symptoms including redness to sclera, eyelid/conjunctival inflammation, excessive tearing, pruritus, eye pain/burning, discharge, photosensitivity
- GI symptoms including abdominal pain, nausea, diarrhea, vomiting
- Respiratory complications including shortness of breath, chest pain, pneumonia, and respiratory failure

4.0 RESPONSE TO AVIAN INFLUENZA IN BIRDS

H5 and H7 avian influenza is a reportable animal disease to the Chief Veterinarian (CV) under the Reportable and Notifiable Disease Regulation of the Animal Health Act. The CV reports the case to the PHO or delegate (BCCDC) under the Information Sharing Agreement for the Sharing of Zoonotic Communicable Disease Reports.

In addition, HPAI subtype H5 regardless of pathogenicity are immediately notifiable by veterinarians to the Canadian Food Inspection Agency (CFIA) under the federal Health of Animal Act and Canadian Notifiable AI Surveillance System (CanNAISS).

Successful containment of avian influenza outbreaks requires a One Health approach. In responding to avian influenza outbreaks, Public Health works closely with the Ministry of Agriculture, the [Canadian Food Inspection Agency \(CFIA\)](#), and the poultry industry to coordinate an inter-agency response to an avian influenza outbreak. Depending on the strain of avian influenza involved, animal health response activities may differ from outbreak to outbreak.

The CFIA is the lead agency for the animal health response for domestic flocks infected with H5 or H7 LPAI or HPAI. The CFIA responds to avian influenza outbreaks by establishing quarantines, ordering the humane destruction of all infected and exposed poultry, conducting trace-out activities, overseeing the cleaning and disinfection of premises, and verifying that affected farms remain free of avian influenza according to international standards.

Upon notification of an avian influenza outbreak with human health implications, public health officials should implement appropriate public health measures. Primary prevention (including infection control and antiviral prophylaxis), case and contact management, risk assessment and public education should be a top priority.

5.0 MANAGEMENT OF EXPOSURE TO AN AVIAN SOURCE (CONTACT TO AN ANIMAL/AVIAN SOURCE)

Definition of contact to an animal/avian source: An individual that has been exposed to avian influenza through direct contact with a known/highly suspected animal/avian case or an environment/object known to be associated with a known/highly suspected avian influenza outbreak.

5.1 Human Exposure (Contact) Management

Public health should obtain a list of all human exposures and individuals entering an infected poultry premises in the 21-day period prior to the onset of clinical signs in the birds. The incubation period for HPAI is highly variable, ranging a few hours in individual birds to 2 weeks in the flock.(6, 7) A 21-day period, taking into account transmission dynamics, is used for disease control.(6)

Public health follow up with all potentially exposed individuals includes:

- Assess exposure (see [Exposure Risk Assessment](#) below);
- Inquire about symptoms;
- Provide education;
- Arrange for active or passive surveillance; and
- Assess for chemoprophylaxis or treatment

5.2 Management of Asymptomatic Exposed Individuals

- Provide instructions to self-monitor for the development of symptoms for 10 days after the last exposure to a known or highly suspected source of avian influenza virus, and report any symptom development immediately to public health. See [Appendix 1](#) for self-monitoring considerations. While incubation period of greater than 10 days would be unexpected, individuals who become symptomatic 14 days after last exposure should be offered testing to account for possible changes in transmission potential of an evolving pathogen.
- Active surveillance is generally recommended for higher risk exposures (see [Exposure Risk Assessment](#)) or if there are concerns about the contact's ability or willingness to complete passive monitoring (e.g. cognitive impairment or transient population).
- As an alternative to active daily monitoring, contacts may be instructed to self-monitor for symptoms. With a passive monitoring approach, public health is recommended to conduct a follow-up call or other method of active engagement at the end of the monitoring period.
- Post-exposure antiviral prophylaxis should be considered based on risk assessment (e.g. for those with underlying comorbidity or intense exposure - see below section on [Exposure Risk Assessment](#)). Note that treatment doses are recommended even for prophylaxis indications.
- Per routine [Seasonal Influenza Vaccine Eligibility](#), people working with live poultry are recommended influenza vaccine to reduce the potential for human-avian re-assortment of genes should such workers become co-infected with human and avian influenza.

5.3 Management of Symptomatic Exposed Individuals

- Those who develop symptoms should isolate immediately, and be assessed by a health care provider for clinical management, including testing and antiviral treatment.
- A nasopharyngeal and throat swab should be sent for influenza and COVID-19 testing with appropriate IPC precautions. The sample should be sent directly to the BCCDC Public Health Laboratory and flagged as a sample from someone with known avian influenza exposure – document the exposure on the test requisition (e.g., “human high-risk AIV”). The BCCDC Medical Microbiologist on-call should be notified of the case and testing request at 604-661-7033.
- Antivirals should be readily available for the treatment of suspected and confirmed cases of avian influenza. Antiviral drugs such as oseltamivir or zanamavir can reduce the duration of illness and improve the prospect of survival if administered within 48 hours of

illness onset. If avian influenza infection is suspected, antiviral treatment should be provided without delay. Waiting for lab confirmation is not recommended.

- The person should be advised on appropriate isolation protocols, to stay away from others for seven days or until symptoms resolve, whichever is longer. If household contacts develop symptoms before test results are available, they should also isolate and notify public health. Healthcare providers should advise a case and/or their family or household members when and where to seek additional care if required, appropriate mode of transportation, and any other appropriate IPC precautions to be followed.
- Active daily follow up of the case following symptom onset should be considered where there may be concerns related to adherence with public health recommendations; otherwise, follow up with the case at the end of the isolation period may be undertaken to ensure symptom resolution, no ongoing exposure and no other contacts identified.
- If the test is negative for influenza virus, consider retesting and collecting another specimen if the clinical suspicion for avian influenza was high.
- If the test is positive for influenza virus, sub-typing will need to be done. The person should be advised of the positive influenza result, but further analysis is required to determine the sub-type of influenza virus. Depending upon the time of year and the exposure context, seasonal influenza virus may be more likely but cannot be assumed. Sub-typing is necessary before avian influenza virus can be confirmed or ruled out. Isolation protocols should be reinforced.
- If this is a confirmed case of avian influenza, additional follow up will be required to identify exposures, risk factors, and follow-up of contacts.

5.4 Exposure Risk Assessment

Management of individual contacts are based on virus-specific risk, an individual exposure assessment and consideration of other factors specific to the individual or situation. Individuals who have exposures falling into more than one risk group should be managed based on their highest risk exposure.

High exposure risk groups:

- Individuals with insufficient PPE and very close exposure to a flock or group of sick or dead animals infected with AI or to particular birds that have been directly implicated in human cases (e.g., farm family member or worker who handled sick animals)
- Individuals involved in the handling and slaughtering of live poultry and other animals, such as in a live animal market, in an affected area or visitors to an area where such activities are being undertaken while unprotected.
- Household/family contacts of or unprotected face to face interaction with a suspected or confirmed human AI patient during the expected period of communicability.
- Personnel involved in handling sick animals or exposed to affected environments (including animal disposal) as part of outbreak control efforts (e.g., cullers) and where consistent use of PPE cannot be assured.
- HCWs (i.e., those working in a setting where health care is being provided) who had no, or insufficient, PPE in place when 1) in close contact of a confirmed human AI case, or 2) in direct contact with respiratory secretions or other potentially infectious specimens from the

case (including AGMP)

- HCWs or laboratory personnel who might have unprotected contact (i.e., did not have or was wearing insufficient PPE) with specimens/secretions which contains virus or with laboratory isolates.

Moderate exposure risk groups:

- Individuals who handle single or small groups of sick or dead animals infected with AI in an open-air environment which is not densely populated by animals of the same species as the infected animal (e.g., single wild bird in a park) without PPE.

Low exposure risk groups:

- Personnel involved in culling non-infected or likely non-infected animal populations as a control measure (e.g., those exclusively culling asymptomatic animals in a control area outside of the infected and restricted zones)
- Personnel involved in handling sick animals or exposed to affected environments (including animal disposal) as part of outbreak control efforts (e.g., cullers) and where consistent use of PPE can be reasonably assured
- Individuals who handle (i.e., have direct contact with) asymptomatic animals in proximity to a geographic area where AI has recently been identified (e.g., bird banders).
- HCWs who used appropriate PPE during contact with human AI cases (i.e., in the absence of significant human to human transmission)
- Laboratory personnel working with the influenza virus using appropriate laboratory procedures and infection control precautions.

5.5 Antiviral Prophylaxis and Treatment

Chemoprophylaxis with influenza antiviral medications can be considered for the purposes of protecting the individual and/or preventing further transmission. It can be started up to 7 days after the last exposure. The following table provides guidance for the use of post-exposure antiviral chemoprophylaxis; the decision to initiate post-exposure antiviral chemoprophylaxis should be based on clinical judgment, with consideration given to risk assessment and the following factors:

- The use of PPE, and whether any breaches occurred
- The type and duration of exposure (e.g. farm workers working directly with affected birds, open air vs closed air environment)
- The time since exposure
- Whether the exposed person is at higher risk for complications from influenza more generally (refer to the National Advisory Committee on Immunization (NACI) list of [People at High Risk of Influenza-Related Complications or Hospitalization](#))
- Known infection status of the birds/animal to which the person was exposed
- Whether human to human/swine transmission is known to occur with this subtype (known to occur with H5N1)
- Potential for secondary human to human/swine transmission depending on social environment/farm environment (e.g., number and intensity of interactions with humans or swine)

Post-exposure Antiviral Prophylaxis Recommendations		Exposure Risk Assessment		
		Low Risk	Moderate Risk	High Risk
Human Illness Risk	Subtype has previously been identified and is not known to have caused human illness	no prophylaxis	no prophylaxis	consider offering prophylaxis
	Subtype is known to cause predominantly mild human illness among known cases	no prophylaxis	consider offering prophylaxis	offer prophylaxis
	Subtype is known to cause significant severe human illness among known cases	no prophylaxis	offer prophylaxis	offer prophylaxis

If post-exposure antiviral chemoprophylaxis is initiated, treatment dosing for the neuraminidase inhibitors oseltamivir or zanamivir (one dose twice daily) has been recommended instead of the typical antiviral chemoprophylaxis regimen (once daily).^A Prophylaxis should be provided for 7 days for time-limited exposures and up to 10 days (e.g. ongoing exposure).

If the exposed person becomes symptomatic and avian influenza infection is suspected based on exposure, antiviral treatment should be provided without delay. Waiting for lab confirmation is not recommended.

Pre-exposure prophylaxis (PrEP) is not a routinely recommended approach as infection control practices, such as PPE and biosecurity are effective measures in prevention. However PrEP may be considered on a case by case basis when the subtype is known to cause severe human illness in consideration with any specific risk factors. Treatment dosing is the same as post exposure, one dose twice daily of oseltamivir, required duration needs to be individually considered.

5.6 Testing

Clinicians should have a low threshold for seasonal and avian influenza virus testing of individuals with clinically compatible symptoms^B who report sick bird or other exposures of concern^C within the ten days prior to onset.

When testing is indicated, a nasopharyngeal and throat swab should be collected as close to the onset of illness as possible, preferably within five days of onset, however clinicians should have a low threshold for testing beyond this time frame as detection can occur up to 3 weeks, particularly in children and the immunocompromised. All specimens should be sent for influenza and COVID-19 testing directly to the BCCDC Public Health Laboratory (PHL). The BCCDC PHL [eLab Handbook](#) provides testing information, including: ordering procedures, process information,

specimen collection instructions, and handling and transport instructions.

Lab requisitions should specify exposure to avian influenza virus with wording such as “high-risk for AIV”. The BCCDC Medical Microbiologist on-call should be notified of the case and testing request at 604-661-7033. Anyone with exposure of concern who develops symptoms should be reminded to disclose that exposure when presenting for care. Additionally, those who routinely work with poultry or animals, who develop influenza-like symptoms should always identify themselves as an agricultural worker to medical officials when seeking care to assist with identification of influenza variants, through proper testing and documentation of the exposure on the requisition.

Nucleic acid amplification testing (NAAT) (i.e., PCR test) is the primary method used to detect infection with influenza A and its detection and further characterization can be confirmed with sequencing.

If the test is negative for influenza virus, consider retesting and collecting another specimen if the clinical suspicion for avian influenza was high.

^A This recommendation for twice daily antiviral chemoprophylaxis dosing frequency is based on limited data that support higher chemoprophylaxis dosing in animals for avian A(H5N1) virus (Boltz DA, et al JID 2008;197:1315) and the desire to reduce the potential for development of resistance while receiving once daily dosing (Baz M, et al NEJM 2009;361:2296; Cane A et al PIDJ 2010;29:384; MMWR 2009;58:969).

^B **Clinical signs/symptoms:** conjunctivitis (red eye, discharge from eye) or acute respiratory or influenza-like illness with one or more of cough, sore throat, fever or feverishness, rhinorrhea, fatigue, myalgia, arthralgia, headache. May include moderate (e.g. shortness of breath, difficulty breathing, altered mental status, seizures) or severe manifestations (e.g. pneumonia, respiratory failure, acute respiratory distress syndrome, multi-organ failure, meningo-encephalitis). Gastro-intestinal symptoms may also be present.

^C **Exposures of concern:** Close exposure (within 2 meters) to a bird, animal or other human with confirmed avian influenza A virus infection. Exposures include, but are not limited to: being in the same close airspace, touching or handling infected animals; consuming under- or uncooked poultry or egg products from an affected farm; direct contact with contaminated surfaces; being exposed to manure or litter containing high concentration of virus or being in a contaminated air space or environment; visiting a live poultry market with confirmed bird infections or associated with a case of human infection. Where avian influenza test results are not available but there is a high index of suspicion and other exposure criteria are met, also consider testing. If during on-site depopulation of birds, last exposure includes when birds are depopulated and all carcasses are disposed, and all cleaning and disinfection has been completed on the premises. Unprotected laboratory exposure also qualifies as testing indication.

5.7 Infection Control

When an avian influenza virus known to cause risk to human health (such as highly pathogenic H5N1) is known to be circulating, individuals within the affected area should take precautions to minimize risk of infection.

- Avoid direct contact with wild and domestic birds, manure or other surfaces that may be contaminated with avian influenza virus.
- Farm personnel and residents not directly involved in culling activities should avoid exposure to infected birds, manure or surfaces that may be contaminated with avian influenza virus.
- Personnel involved in culling activities and/or environmental clean-up who may be exposed to infected birds, manure or surfaces that may be contaminated with avian influenza virus should wear appropriate PPE.
- If the case requires admission to hospital, refer to the [PICNET guidance](#).

5.8 Personal Protective Equipment (PPE)

PPE, when used consistently and appropriately, reduces an individual's risk of infection with avian influenza. PPE is recommended for people that may be exposed to both [avian/animal and human cases](#) of avian influenza.

i. PPE in a Farm Setting:

Farm personnel that participate in outbreak control efforts, including culling activities or environmental clean-up, must follow PPE recommendations to minimize risk of infection.

Refer to the [AgSafe: Avian Influenza](#) for guidance on the recommended personal protective equipment in a farm setting. These include, but are not limited to:

- Fit-tested N95 respirator
- Protective eye wear
- Reusable gloves
- Protective clothing (re-usable if washed immediately after use, or disposable)

ii. PPE in a Healthcare Setting:

During assessment, testing and care or procedures, clinicians should implement appropriate protective measures. For novel influenza viruses, these include airborne, droplet and contact precautions unless otherwise advised. Refer to the [PICNET guidance](#).

5.9 Reporting and Timelines

5.10 Animal Cases

Laboratories and veterinarians should notify the Chief Veterinarian (CV) of any laboratory-confirmed animal case in BC. The CV should notify the PHO or delegate (BCCDC) and the MHO in the affected health authority. Reporting of the animal case to the MHO should occur within 24h of diagnosis.

5.11 Human Cases

Health care providers should report any symptomatic individuals who have known avian influenza exposure in the 10 days prior to symptom onset (i.e., Person under investigation (PUI) – see [Human Case Definitions](#)) to local public health.

Confirmed and probable human cases should be reported by local public health to BCCDC within 24 hours, via the Health Authority's respective electronic public health reporting system and/or the Avian Influenza Case Report Form.

5.12 Public Education

While the risk of avian influenza in the human population is low, individuals can take action to protect themselves and others:

- Avoid unnecessary contact with poultry and wild birds, especially if they are sick, dead or displaying unusual behaviours.



- Avoid contact with surfaces contaminated with bird droppings or secretions.
- Ensure eggs and poultry dishes are well cooked.
- Boil any untreated water from areas where waterfowl gather (ponds, lakes, rivers) prior to consumption.
- Get an annual flu shot. Per routine [Seasonal Influenza Vaccine Eligibility](#), people working with live poultry are recommended influenza vaccine to reduce the potential for human-avian re-assortment of genes should such workers become co-infected with human and avian influenza.
- Follow all general public health recommendations to prevent illness and infection include covering your cough, frequent hand washing with soap and water and staying home when you are sick.

6.0 APPENDIX 1: Self-monitoring considerations

- Advise contacts to self-monitor for the appearance of [symptoms](#) for 10 days from the last exposure, particularly fever and respiratory symptoms such as coughing (If someone with known exposure reports symptoms on days 11-14, testing should be considered). This includes taking and recording their temperature daily and avoiding the use of fever reducing medications (e.g., acetaminophen, ibuprofen) as much as possible. These medications could mask an early symptom of infection.
 - If symptoms occur, they isolate away from others as quickly as possible and contact public health for further direction, which will include: where to go for care, appropriate mode of transportation to use, and infection and prevention control precautions to be followed.
- Provide advice on restriction of movement of contacts - this includes recommendations not to visit other farms, to avoid serving as a vehicle for the spread of contaminated materials. Contacts should also avoid interactions with [individuals at higher risk for severe illness](#), high-risk settings, and large gatherings for 10 days following last exposure.
- Provide advice on minimizing further exposure. Those involved in the care, culling or cleaning up of infected birds or their environments should wear personal protective equipment.
- More strict quarantine measures would be considered if the outbreak involved a virus that was causing severe illness in humans or there was evidence that it could be spread efficiently from person to person.

* If someone with known exposure reports symptoms on days 11-14, testing should be considered.

6.1 REFERENCES

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