

Case Definition

Avian Influenza (AI) in Poultry (Notifiable)

March 2025

1. Disease Information

1.1 General Disease and Pathogen Information: Avian influenza (AI) is a viral infection of birds, including chickens, turkeys, guinea fowl, and other avian species. The agent responsible for AI is a member of the family *Orthomyxoviridae* and placed in the genus *Alphainfluenzavirus* (influenza virus A or influenza A virus). Influenza A viruses are further classified into subtypes based on antigenic differences of two surface proteins, hemagglutinin (HA) and neuraminidase (NA). There are at least 16 HA and 9 NA subtypes recognized to be of avian origin.

Migratory waterfowl are natural reservoirs for low pathogenic avian influenza (LPAI) viruses but not typically highly pathogenic avian influenza (HPAI) viruses.¹ The goose/Guangdong-lineage (gs/GD) H5 HPAI viruses are an exception; clade 2.3.4.4 continues to circulate in migratory wild birds, posing an ongoing threat to animals worldwide. Wild waterfowl often show no signs of illness due to AI virus infection and may shed virus in feces for long periods.

AI is spread by direct contact between healthy and infected birds and by indirect contact with contaminated equipment and materials. The virus is excreted through the feces of infected birds and secretions from the upper respiratory tract and eyes. The World Organisation for Animal Health (WOAH) recognizes a 14-day incubation period at the flock level for poultry.

All sudden and unexplained spikes in poultry mortality should be investigated. In the United States, IAV subtype H5 and H7 infections are immediately notifiable to State and Federal regulatory officials, regardless of pathogenicity, as these subtypes have the potential to mutate into HPAI during replication in non-traditional host species, such as gallinaceous birds.

Some avian-origin strains of IAV may cause zoonotic disease, with most of the human cases occurring after direct contact with infected animals.

1.2 Clinical Signs: AI virus infections in domestic poultry may be clinically inapparent or result in disease that ranges from mild transient clinical signs to 100 percent morbidity and/or mortality, depending on strain virulence. Factors such as genetics, nutrition, and co-infection with other pathogens can also affect clinical outcome. When seen, clinical signs can include respiratory, enteric, cardiovascular, or reproductive signs (e.g., decreased egg production).

¹ Infection of any species with influenza A viruses (IAV) determined to be of high pathogenicity in accordance with the World Organisation for Animal Health (WOAH) Terrestrial Manual are internationally reportable.

1.2.1 LPAI H5/H7 viral infection often causes either mild or no signs of clinical disease, but may cause increased mortality, decreased feed consumption, respiratory signs (e.g., nasal discharge, sneezing), and decreased egg production.

1.2.2 HPAI viral infection is usually associated with sudden and increased morbidity and mortality, along with significant drops in feed and water intake and egg production. Swelling and purple discoloration of the combs or wattles, hemorrhages on the unfeathered parts of legs and feet, and neurologic signs may be seen.

2. Laboratory Criteria

The most sensitive and specific tools for AI virus detection target conserved regions of the AI genome (e.g., matrix, nucleoprotein genes). Subclinical infections identified through active laboratory surveillance or clinical cases with compatible clinical signs and pathologic lesions in a susceptible species are evaluated using laboratory criteria for HPAI and LPAI H5/H7 as defined by one or more of the following diagnostic strategies. Testing for AI in all commercial poultry must occur at National Animal Health Laboratory Network (NAHLN)-approved or National Poultry Improvement Program (NPIP)-authorized laboratories approved to test for AI. Non-negative antibody results must be investigated further by collecting appropriate swabs to determine the virus status of the flock. All non-negative polymerase chain reaction (PCR) samples and serological positives from official program testing and foreign animal disease investigations must be forwarded to the National Veterinary Services Laboratories (NVSL), National Centers for Animal Health at Ames, Iowa, for confirmatory testing.

2.1 Agent Isolation and Identification: Tracheal/oropharyngeal and cloacal swabs, fresh feces from live or dead birds, or appropriate tissues collected as described in [Avian Sample Collection for Influenza A and Newcastle Disease](#) are tested by real-time PCR assays for IAV and H5/H7 virus subtypes to detect presence of IAV. Generally, subtype assays should only be used in conjunction with IAV detection assays. Virus isolation may also be performed.

2.2 Agent Characterization: Genome sequencing methods are used to determine the nucleotide sequence at the portion of the HA gene that encodes the hemagglutinin cleavage site. The amino acid sequence deduced from the nucleotide sequence is analyzed to pathotype viruses per the WOAHA Terrestrial Manual. Lineage-specific pathotyping PCR assays may be used where appropriate. In vivo testing is available at NVSL. H5 or H7 subtypes that do not meet the criteria for HPAI virus at NVSL are classified as LPAI.

2.3 Serology:

2.3.1 Agar gel immunodiffusion (AGID; reagents supplied by NVSL) or USDA-licensed influenza A enzyme-linked immunosorbent assay (ELISA); **AND**

2.3.2 Subtype specific H5 or H7 antibodies as determined by hemagglutination inhibition (HI) test.

3. Case Classification

3.1 Suspect Case:

- 3.1.1** Illness compatible with HPAI or H5/H7 LPAI virus infection; **OR**
- 3.1.2** Detection of AI antibodies that cannot be explained by vaccination² as determined by AGID or ELISA serological test with or without the presence of compatible illness; **OR**
- 3.1.3** Detection of AI virus antigen by USDA-licensed commercially available influenza A antigen test kit (guidance for use of a USDA-licensed antigen capture assay is available [here](#)).

3.2 Presumptive Positive Case:

- 3.2.1** A suspect case as defined above with detection of H5/H7 antibodies by HI subtyping; **OR**
- 3.2.2** Detection in poultry of influenza A virus subtype H5/H7 by PCR with or without the presence of compatible illness.

3.3 Confirmed Positive Case: Identification of HPAI or a H5/H7 LPAI virus in poultry at NVSL by molecular assay, genome sequencing, and/or in vivo methods.

4. Reporting Criteria

All detection of AI must be characterized by NVSL. HPAI (regardless of subtype) and any H5/H7 subtypes are investigated and immediately reportable under the APHIS [National List of Reportable Animal Diseases \(NLRAD\)](#).

4.1 NLRAD Reporting: In accordance with the [NLRAD System Standards](#) for Notifiable diseases; and by APHIS to the [World Organisation for Animal Health](#); **AND**

4.2 Foreign Animal Disease or Emerging Disease Incidents: Follow standard procedures according to the [Policy for the Investigation of Potential Foreign Animal Disease/Emerging Disease Incidents](#); **AND**

4.3 Reporting to APHIS NPIP Office: Adhere to the Memorandum of Understanding with the Official State Agency for H5/H7 LPAI detections.

² USDA permission is required for H5 and H7 vaccine use.