Avian influenza in wildlife in Australia

Fact Sheet

November 2025

Key points

- Avian influenza (AI), also known as bird flu, is an infectious disease caused by strains of Influenza A virus.
- Avian influenza virus (AIV) strains are classified as 'low pathogenicity' (LPAI) and 'high pathogenicity' (HPAI) based on their clinical effect on poultry.
- Outbreaks of HPAI in Australia have occurred in poultry but not in wildlife.
- Since 2021, a strain of HPAI known as **H5 bird flu** (also referred to as 'HPAI H5N1 clade 2.3.4.4b' or 'H5 HPAI') has resulted in severe and widespread HPAI outbreaks in poultry, wild birds and mammals (domestic and wild) globally. This strain has **not** yet reached Oceania (Australia and New Zealand). See the WHA H5 bird flu resource centre https://wildlifehealthaustralia.com.au/Resource-Centre/H5-bird-flu
- LPAI viruses are considered part of the natural viral community in wild birds in Australia.
- Infection with Influenza A viruses is a **nationally notifiable disease** (see *Surveillance and management*); you must notify animal health authorities if you suspect an animal is infected with an Influenza A virus.

Aetiology

Influenza A viruses are RNA viruses belonging to the family *Orthomyxoviridae*. Influenza A viruses are classified according to the serological subtypes of their surface glycoproteins, haemagglutinin (HA) and neuraminidase (NA) [1]. To date, 17 HA and 9 NA subtypes are recognised in birds and are found in different combinations [2, 3]. Two additional HA and NA subtypes have been recognised in bats only [4].

Influenza A viruses are further designated as high pathogenicity avian influenza (HPAI) or low pathogenicity avian influenza (LPAI), based on their ability to cause disease in poultry. Avian influenza virus (AIV) subtypes H5 and H7 have the capacity to mutate from LPAI into HPAI forms when they are introduced to and subsequently mutate in poultry [5, 6].

AIVs constantly evolve, resulting in the ongoing emergence of new lineages and strains that are classified based on sequence analysis and distribution of the viruses in hosts, geographic locations and time. The dominant strain currently circulating globally is H5 bird flu caused by HPAI H5 clade 2.3.4.4b, with more than one NA subtype identified. For more information on the current global outbreak of H5 bird flu, see the WHA HPAI technical update (https://wildlifehealthaustralia.com.au/Portals/0/Incidents/HPAI_Technical_Update.pdf) and other resources on the WHA H5 bird flu resource centre (https://wildlifehealthaustralia.com.au/Resource-Centre/H5-bird-flu).

One Health implications

Wildlife and the environment: H5 bird flu has caused mass mortality events in many species of wild birds, as well as other terrestrial and marine mammal species, and may represent a population level threat to some wildlife hosts, impacting biodiversity.

HPAI strains other than H5 bird flu are less likely to cause disease in wildlife, however cases of disease and death have been reported. LPAI strains are also less likely to cause disease in wildlife, but are important, as there is potential for LPAI H5 and H7 subtypes to mutate into HPAI forms when introduced to poultry.

Domestic animals: Poultry are highly susceptible to AIVs, including H5 bird flu, and infection can result in significant disease and deaths in poultry populations. AIVs have caused disease and death in a range of other domestic species including swine, horses, cattle, dogs and cats.

Humans: AIVs do not normally infect humans, however some subtypes (both LPAI and HPAI strains) have been associated with disease in humans, ranging from mild illness to severe respiratory disease and death. Human infections with H5 bird flu have been reported overseas, with most of these cases resulting in mild respiratory symptoms. Over 476 human deaths have been reported worldwide due to HPAI H5N1 since 2003, including the current H5 bird flu strain (at 20 Jan 2025) [7].

Most illness and death associated with AIVs in humans occur after **close contact with infected poultry** or with objects contaminated by their faeces. A summary of confirmed H5N1 human cases can be accessed at www.who.int/teams/global-influenza-programme/avian-influenza. See also the interim Australian Centre for Disease Control (CDC) website for specific information on H5 bird flu infections in humans.

Natural and other hosts

Anseriformes (waterfowl: ducks, swans, geese) and Charadriiformes (gulls, terns and shorebirds) are considered the main natural reservoirs for all AIVs [8]. AIVs have been isolated from most major bird orders, including wild and domestic birds, as well as wild and domestic mammals.

The H5 bird flu strain differs from previous AIVs in its rapid global spread, frequency and severity of its impacts, and the range of species that it has impacted. In birds, H5 bird flu has affected over 560 wild bird species (for 300 species this represents the first recorded HPAI detection in that species), and 100 mammal species. The FAO website https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/bird-species-affected-by-h5nx-hpai/en) reports species affected in recent HPAI H5 outbreaks [9].

World distribution

AIVs have a global distribution, including Antarctica [2, 10-14]. H5 bird flu has spread rapidly through Asia, Africa, Europe, North and South America and into the Antarctic mainland and islands. Only

Oceania (which includes Australia and New Zealand) remains unaffected. Mass mortality events in wildlife due to H5 bird flu have occurred worldwide [15-18]. Examples include:

- 2020, Germany: 3000 red knots
- 2021-22, Israel: 8000 Eurasian cranes
- 2022, Peru: over 100,000 wild birds
- 2022, Chile: over 4,000 sea lions
- 2023, Argentina: 97% mortality of southern elephant seal pups.

For a global map of recently reported AIVs with zoonotic potential (including H5 bird flu), see www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/en.

Occurrences in Australia

HPAI H5 viruses (including H5 bird flu) have not been detected in animals in Australia.

In Australian poultry enterprises, multiple outbreaks of HPAI H7 strains have occurred between 1976 and 2025. In 2024 and 2025, premises across Vic, NSW and ACT were affected by outbreaks caused by three separate HPAI H7 strains [19-25]. Outbreaks in poultry in Australia were most likely due to LPAI viruses being transmitted to poultry from wild birds, followed by mutation to HPAI. HPAI has never been detected in free-ranging Australian wild birds. However, during a 1985 HPAI outbreak, HPAI H7 was detected in a feral Eurasian starling (*Sterna vulgaris*) trapped inside an affected poultry shed [26-29] .

LPAI viruses are considered part of the natural viral community in wild birds in Australia. Mortality due to AIVs has not been reported in wildlife (either native or feral) in Australia [27, 30, 31].

Almost all LPAI subtypes (H1-16, excluding H14 and H19) have been detected in Australian wild birds. LPAI viruses have been identified in Australian Gruiformes, Pelecaniformes, Procellariiformes, Anseriformes and Charadriiformes [26, 32-38].

Epidemiology

The incubation period for AIV varies with animal species and age, virus subtype, virus dose and virulence [39]. HPAI virus incubation in wild birds can range from a few hours to 7 days.

In wild ducks, viral replication occurs primarily in the gastrointestinal tract with high loads of virus being shed in faeces [40]. Faecal-oral transmission is thought to be the main means of AIV spread in wild bird populations. Isolates of HPAI H5 have also been found in tracheal samples, suggesting that airborne transmission may be important in some species in close contact [39]. Affected wild mammals are generally those species that predate or scavenge on infected birds (for example, foxes, bears) or live in close proximity to infected birds (for example, marine mammals) [1, 9, 41, 42].

The duration of virus shedding appears to vary with host species. Virus can be shed in poultry and wild bird faeces for 30 days or longer [43]. Virus survival outside the host is affected by environmental conditions. Avian influenza viruses can persist for extended periods in water and faeces, depending on ambient temperatures, pH and salinity [39].

The epidemiology of AIVs in wildlife globally is complex and continuously evolving. Natural reservoir hosts, primarily Anseriformes and Charadriiformes, typically shed AIVs without experiencing significant disease, enabling them to spread the virus long distances (including intercontinental spread) via migration. Other key epidemiological features of AIVs are their ability to infect a wide range of birds and mammals and for the virus to evolve rapidly, giving rise to new lineages and strains [8]. Studies indicate that host species and population ecology are important in AIV maintenance, transmission and long-distance spread [44].

The epidemiology of AIVs is likely to be different in Australia compared to other regions of the world. Much of the current understanding of AIV ecology, molecular phylogenetics and spread is derived from studies in Asia, Europe or North America [26, 45]. Both long- and medium-term rainfall patterns, as well as variation in population size, have been linked to AIV prevalence in wild duck species in south-east Australia. Rainfall events strongly influence breeding in Australian wild ducks, which can in turn determine age-structures and numbers of immunologically naïve individuals within the flock [46]. In contrast to Anseriformes species found overseas, Anseriformes species found in Australia are not migratory (they do not travel to the northern hemisphere), although they are nomadic within the Australo-Papuan region [47, 48].

The emergence of H5 bird flu has resulted in a global pandemic, characterized by a significant increase in the frequency and geographic range of HPAI outbreaks in poultry and wildlife, rapid global spread, increased range of species impacted and in some geographic areas, outbreaks occurring throughout the year with reduced seasonality [49]. All geographical regions except Oceania (which includes Australia and New Zealand) have been affected. In Oct 2025, H5 bird flu was suspected in elephant seals on Heard Is a sub-Antarctic external Australian territory over 4000 km southwest of Perth (results are pending [50]).

Prior to the emergence of H5 bird flu, the risk of introduction of HPAI into Australia via wild migratory birds was considered low. A formal risk assessment found that the risk of HPAI virus incursion/s into Australia via wild birds has increased with the emergence of H5 bird flu . The annual Spring (August – November) migration of wild shorebirds from the northern hemisphere to Australia is the most likely way for H5 bird flu to arrive in Australia. Waterfowl entering from regions just to the north of Australia, or migratory seabirds travelling from Antarctic/sub-Antarctic regions are other possible pathways for H5 bird flu to enter Australia. These wild bird movements can occur at any time of the year. See the WHA HPAI technical update (https://wildlifehealthaustralia.com.au/Portals/0/Incidents/HPAI_Technical_Update.pdf) for more information on H5 bird flu.

Clinical signs

High pathogenicity AIVs, including H5 bird flu, can result in up to 100% mortality in chickens [51] and have caused significant mortality events in wildlife overseas (see *One Health implications* and *Natural and other hosts*) [9, 11, 52].

Infected **wild birds** may have neurological signs (ataxia, paralysis, seizures, tremors, abnormal posture, head tilt, behavioural abnormalities), respiratory signs (conjunctivitis, nasal and oral discharge, sneezing, oedema of the head, dyspnoea, tachypnoea), gastrointestinal signs (diarrhoea) or sudden death without prior signs [2]. Infected **wild mammals** may also show neurological, respiratory or gastrointestinal signs (as above), or die suddenly without prior signs.

Wild birds infected with LPAI viruses usually show no clinical signs. However, reduced foraging and altered migration have been reported in infected swans in one overseas study [53]. In wild mammals, infections with LPAI viruses are usually associated with mild or no clinical signs, however cases of disease and death have been reported, including respiratory disease and deaths in pinnipeds [54].

Diagnosis

Infection with Influenza A viruses is a nationally notifiable disease (see *Surveillance and management*); you must notify animal health authorities if you suspect an animal is infected with an Influenza A virus.

A diagnosis of AIV infection must be confirmed by isolation of the virus or characterization of fragments of its genome. In Australia, samples are tested for influenza A using real time polymerase chain reaction (PCR) using pan-influenza A assays as well as specific H5 and H7 assays. Any positive isolates are further characterized via viral culture and sequencing to determine pathogenicity. Serum can be tested for antibodies to the influenza A virus using ELISA. Australia's agreed approach to diagnostic testing is covered in the AUSVETPLAN Disease Strategy: Avian Influenza [43].

There are no approved tests to diagnose AIVs outside of authorised laboratories (for example in the field or in wildlife care facilities).

Laboratory diagnostic specimens and procedures

The relevant state or territory animal health authority will advise on appropriate collection and laboratory submission protocols, which must consider the human health risks of handling and sampling wildlife (see *One Health implications*). Samples from live birds may include oropharyngeal and cloacal swabs and/or fresh faeces, and serum for antibody studies [43]. In dead birds, samples may include alimentary tract tissues (proventriculus, pancreas, intestine, caecal tonsils), respiratory tract tissues (trachea, lung) and brain; cloacal, oropharyngeal and tracheal swabs and fresh faeces. A similar range of tissues should be collected from mammals, subject to advice from the relevant animal health authority.

Clinical pathology and pathology

There is little reported information on clinical pathology of wild birds infected with AIVs as birds are found dead or die quickly, limiting live sampling opportunities. Naturally infected domestic ducks may display anaemia, reduced plasma protein and increase in a range of biochemical parameters in serum [55].

There are no characteristic lesions for avian influenza in birds [2] or mammals. Severity and distribution of lesions are dependent on the pathogenicity of the virus and host factors (such as species, age, immunity, comorbidities). In LPAI virus infections, there may be no pathological changes, or mild to moderate respiratory lesions may be present. In LPAI virus infection in seals, severe respiratory lesions were observed [56]. Similarly, in HPAI infections, findings can range from no visible pathology to severe multi-organ involvement with necrosis, inflammation and haemorrhage [2].

In H5 bird flu in wild birds, encephalitis is a common feature across species [57]. In wild mammals, systemic lesions have been observed, including pneumonia and meningoencephalitis [58].

Differential diagnoses

Differential diagnoses may include any cause of sudden death or acute onset of illness (in birds this could include acute poisoning, botulism, chlamydiosis, avian paramyxovirus, *E. coli* infection, heat stress) [43].

Treatment, prevention and control

There is no specific treatment for avian influenza, and recovery in wild birds is unlikely once clinical signs develop.

Treatment of rare and valuable wildlife by providing supportive care could be considered on a case-by-case basis if biosecurity risks can be managed [43]. In zoo birds, treatment of H5 bird flu with antiviral medications has been attempted in a small number of species. Anecdotal evidence suggests that rapid intervention and daily oral medication is required for treatment to be effective [59].

In free-ranging wildlife, treatment is not practical, and prevention and control measures based on **risk mitigation** are the mainstay of AIV management. These include:

- practicing good baseline biosecurity in all situations involving wild animals (see *National Wildlife Biosecurity Guidelines* https://wildlifehealthaustralia.com.au/Portals/0/ResourceCentre/BiosecurityMgmt/National_Wildlife_Biosecurity_Guidelines.pdf)
- good surveillance and data collection including reporting and investigation of all unusual sickness and deaths in domestic and wild birds, and wild mammals (see also WHA "*HPAI advice for veterinarians and other animal health professionals*" https://wildlifehealthaustralia.com.au/Portals/0/Incidents/HPAI_Advice_for_veterinarians_and_animal_health_professionals.pdf).
- practicing intensified surveillance and biosecurity measures in high-risk situations [60].
- supporting the general resilience of wildlife (through habitat conservation, predator control and managing human interactions, for example) is an important strategy for promoting overall health and the ability of populations to recover more rapidly from the impacts of newly emerging strains of HPAI.
- preparation: WHA has developed Risk Mitigation Toolboxes to assist wildlife managers and wildlife care providers with their preparations for the possible arrival of H5 bird flu in Australia. AviFluMap is a new online tool designed to support wildlife managers and biosecurity stakeholders in assessing and responding to the risk of H5 bird flu in Australia's wild bird populations.

Culling, containing or dispersing wild animals and the **destruction, broadscale disinfection or modification of habitat** are ineffective measures for avian influenza control and are not considered as appropriate measures under Australia's response policies to avian influenza [43, 61].

Removal of wild animal carcasses during an outbreak may reduce environmental sources of the virus but also introduces new risks and challenges such as animal disturbance, contributing to disease spread and exposure of humans to infection [60]. The advice from joint CMS and FAO's Scientific Task Force on Avian Influenza and Wild Birds is that decisions around the removal of carcasses should be determined based on a risk assessment [60].

Vaccination of rare, protected and valuable native birds could be considered in the event of a HPAI outbreak in Australia. The broadscale vaccination of birds in the wild is not considered appropriate, feasible or practicable. See https://www.agriculture.gov.au/sites/default/files/documents/ahc-avian-influenza-vaccination-policy-birds.pdf. Trials with an inactivated H5 bird flu vaccine are underway in small Australian bird species (non-poultry). See https://www.agriculture.gov.au/sites/default/files/documents/may-2025%E2%80%93h5-bird-flu-factsheet%E2%80%93vac-priority-native-bird-species.pdf

Research

Key research recommendations for the Australian situation include:

- more detailed understanding of the natural history of AIVs, including wild reservoirs and host species across the globe
- exploring environmental and species-specific variables in virus susceptibility
- exploring spatial and temporal trends, and climatic and rainfall zone effects
- further analysis of AIV phylogeny and gene flow of subtypes, ecology and epidemiology
- further analysis of the pathogenicity, for poultry, of AIV subtypes found in wild birds, in particular the ability of LPAI H5 and H7 subtypes to mutate to HPAI
- further analysis of the susceptibility, pathogenicity and transmission dynamics of LPAI and HPAI viruses in Australian wild bird and mammal species.

WHA analysis supports continued use of faecal environmental samples for wild bird surveillance due to the relative low cost and logistical ease of collecting these compared to other samples [26].

Surveillance and management

Infection with Influenza A viruses is a **nationally notifiable disease** (see www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/animal/notifiable). By law you **must** notify animal health authorities in your jurisdiction if you know or suspect that an animal has a notifiable pest or disease. Refer to advice in your jurisdiction (https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/animal/state-notifiable) and outbreak.gov.au on how to report. AI outbreaks in Australia (including in wildlife) are managed under the AUSVETPLAN Disease Strategy: Avian Influenza [43] and the National Management Agreement – H5 HPAI in wildlife.

The National Avian Influenza Wild Bird Surveillance Program coordinates information to inform the national picture on AIV. The Program includes surveillance for AIV via sampling of healthy, live and hunter-shot wild birds, and investigation of significant, unexplained morbidity and mortality events in wild birds [26], with over 155,000 samples tested [31]. Targeted surveillance has been enhanced since 2022, with increased sampling of shorebirds and seabirds and expansion of sampling locations.

Although shorebirds are exposed to HPAI viruses along the migratory route between Asia and Australia, data indicates that these birds do not commonly carry AIVs into Australia from other regions of the world [38, 62], and analysis of AIVs present in Australia demonstrates limited evidence of viral introductions [63-66]. There is no evidence that migratory birds have carried infectious H5 bird flu into Australia (inclusive of the 2023-24 migratory season) [30, 31, 66-68].

Passive surveillance in wild bird mortality events excluded AI as the cause of death in over 2,500 wild bird mortality events since 2005 [69].

Wildlife Health Australia administers Australia's general wildlife health surveillance system, in partnership with government and non-government agencies. Wildlife health data is collected into a national database, the electronic Wildlife Health Information System (eWHIS). Information is reported by a variety of sources including government agencies, zoo based wildlife hospitals, sentinel veterinary clinics, universities, wildlife rehabilitators, and a range of other organisations and individuals. Targeted surveillance data is also collected by WHA. See the WHA website for more information https://wildlifehealthaustralia.com.au/Our-Work/Surveillance and https://wildlifehealthaustralia.com.au/Our-Work/Surveillance/eWHIS-Wildlife-Health-Information-System.

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