

Technical Issue Update - Global High Pathogenicity Avian Influenza Events

Developed by the National Avian Influenza Wild Bird Steering Group

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Summary

While high pathogenicity H5 subtype avian influenza (HPAI) virus has been endemic in various parts of Asia for the past two decades, the number of outbreaks in both wild birds and poultry have increased dramatically in frequency overseas, notably in Europe. In addition to the increase in outbreak frequency, there has also been an important range extension, with the recent re-introduction of Asian lineage HPAI H5 viruses into North America since the northern hemisphere winter of 2014/15.

The current widespread and frequent detection of HPAI H5 viruses belonging to clade 2.3.4.4 B across the northern hemisphere show that this clade continues to be successful in infecting birds, particularly wild migratory waterbirds which have contributed to intercontinental spread. Although previous research has assessed the overall risk of introduction of HPAI to Australia to be low ([East et al. 2008](#); [East et al. 2008](#); [Curran 2012](#); [Wille et al 2019](#))¹, with the emergence of these novel strains and increase in frequency of outbreaks, the level of risk to Australia has likely increased.

Therefore, increased awareness and vigilance by Australian poultry producers and wildlife health professionals is advised. Further information about the risks to Australia and what should be done in Australia is outlined below.

To report unusual and mass sickness and deaths in domestic and wild birds:

You can call the Emergency Animal Disease Watch Hotline on 1800 675 888 wherever you are in Australia. This will put you in touch with your department of agriculture or primary industries. See: <https://www.outbreak.gov.au/report-outbreak>

Unusual signs of disease or deaths in wildlife can also be reported to [State/Territory WHA Coordinator](#)

What is Avian Influenza?

- Low pathogenicity forms of avian influenza (LPAI) naturally occur in wild birds, notably waterfowl (ducks, geese and swans) and shorebirds, with little ill effect. Wild birds harbour a considerable diversity of LPAI subtypes: 16 HA (haemagglutinin) and 9 NA (neuraminidase) subtypes.
- Some specific LPAI subtypes (subtypes H5 and H7) can evolve to high pathogenicity avian influenza (HPAI) forms following spillover and circulation in poultry.
- HPAI typically causes severe disease in poultry and may also impact other species including wild birds and humans. The *spillback* of HPAI from poultry into wild birds contributes to the geographic spread of HPAI.
- Although avian influenza viruses do not normally infect humans, some subtypes have been associated with disease in humans ranging from mild illness to severe disease.
- Multiple lineages and strains of avian influenza viruses have been classified based on sequence analysis and distributions of the viruses in hosts, geographic locations and time. Avian influenza viruses constantly evolve by error-prone replication (mutation) and reassortment resulting in ongoing emergence of new lineages and reassortants.

¹ Note: a formal risk assessment for the current HPAI strains circulating has yet to be undertaken. Note: [East et al. 2008](#); [East et al. 2008](#); [Curran 2012](#) assessed the risk of introduction of H5 clade 2.2.1 C viruses to Australia. [Wille et al 2019](#) explored exposure of the long-distance migratory red-necked stint to H5 including clade 2.3.4.4 viruses.

- Of profound concern are HPAI H5Nx viruses belonging to the A/goose/Guangdong/1/96 lineage. Since its emergence, this lineage has continued to evolve, resulting in a large diversity of clades and genotypes. The current AIV lineage circulating widely in the northern hemisphere belongs to A/goose/Guangdong/1/96 HPAI H5Nx virus clade 2.3.4.4 B.

Avian Influenza in Australia

- LPAI viruses have been detected in wild birds in Australia and are part of the natural virus community of Australian wild birds.
- Whilst a rare occurrence, LPAI viruses can spillover from wild bird populations into poultry, which may subsequently evolve to HPAI.
- HPAI viruses have not been detected via targeted wild bird surveillance in Australia². HPAI viruses detected in poultry in Australia have emerged following the spillover and subsequent evolution of LPAI H7 viruses found in Australian wild birds.
- Since 1976, there have been eight outbreaks due to HPAI H7 viruses in Australian poultry, with the most recent being in 2020 in Victoria. All had evidence of contact with wild waterfowl or inadequately treated drinking water, potentially contaminated by wild waterfowl. These outbreaks were most likely caused by introduction of local wild bird LPAI viruses and subsequent mutation from LPAI to HPAI after circulation in poultry: a well-documented occurrence.
- No HPAI H5Nx viruses belonging to the A/goose/Guangdong/1/96 lineage, including viruses in the clade 2.3.4.4 B, have thus far been found in Australia.
- The [National Avian Influenza Wild Bird Surveillance \(NAIWB\) program](#) collects and screens samples from Australian wild birds for AIVs and the data generated are used to monitor and understand avian influenza in wild birds in Australia. Sequence analysis of AIVs detected in wild birds through the NAIWB program contributes to tracking Australian virus evolution and dynamics, maintaining currency of diagnostic tests, and maintaining a virus sequence library allowing comparison of Australian and overseas strains.
- Based on sequence analysis to date it can be concluded that incursions of overseas AIVs into Australia are infrequent ([Kishida et al. 2008](#), [Vijaykrishna et al. 2013](#), [Bhatta et al. 2020](#), [Wille et al. 2021](#)).

Current Global High Pathogenicity Avian Influenza Situation

- Since 23 December 2021 more than 1050 new HPAI outbreaks were reported in domestic and wild birds across 4 geographic regions: Europe, Asia, Africa, and North America³ to the Food and Agriculture Organisation of the United Nations⁴ and the [World Organisation for Animal Health](#) (OIE)^{5,6}. Furthermore, there have been 13 human cases of avian influenza. These data are up to date as of 23 January 2022.
- HPAI H5Nx viruses belonging to the A/goose/Guangdong/1/96 lineage emerged 26 years ago, and have caused substantial losses of poultry, particularly in Asia where these viruses have become endemic in multiple countries. Around 2010, a new clade of A/goose/Guangdong/1/96 lineage emerged, 2.3.4.4.
- Clade 2.3.4.4 H5Nx viruses have the propensity to have a diversity of NA subtypes. Between 2014-2020 H5N6 and H5N8 were the dominant HA-NA subtype combinations detected. Since Oct 2021, the H5N1 subtype combination has again become the dominant subtype combination.

² There has been a single detection of HPAI (H7) virus reported in one feral Eurasian starling trapped inside an affected poultry shed during the 1985 HPAI H7 virus outbreak.

³ subtypes H5, H5N1, H5N2, H5N3, H5N5 and H5N8

⁴ https://www.fao.org/ag/againfo/programmes/en/empres/Global_AIV_Zoonotic_Update/situation_update.html

⁵ <https://www.oie.int/en/animal-health-in-the-world/update-on-avian-influenza/2020/>

⁶ <https://wahis.oie.int/#/events?viewAll=true>

- Clade 2.3.4.4 viruses have limited health impacts in some wild bird species, enabling spread of the virus by these species more widely than if they became ill. Further, clade 2.3.4.4 B viruses (a subclade of the 2.3.4.4 viruses) can infect a large range of bird species. This has led to a dramatic increase in the frequency of HPAI outbreaks, but also a substantial range expansion resulting in outbreaks in Asia, Europe, North America and Africa. With the current detections of viruses of the clade 2.3.4.4 B, the spread and impact on poultry and wild birds has increased.
- While clade 2.3.4.4 B has been detected in apparently healthy wild birds, it has also contributed to a number of substantial wild bird mortality events. This includes the mortality of 13,590 ducks in the Netherlands in 2016, 3000 red knots in Germany in 2020, and 8000 Eurasian cranes in Israel in December 2021 and January 2022, and ~10% of the Svalbard breeding population of barnacle geese in January 2022^{7,8,9}.

The risk of avian influenza to Australian wild birds and commercial poultry

- LPAI viruses known to circulate in Australian wild birds remain a constant biosecurity threat to Australian poultry through direct or indirect (e.g. contaminated drinking water) contact.
- AIV [outbreaks](#) in poultry in Australia were due to strains of AIVs closely related to LPAI viruses circulating in Australian wild bird species, and not an imported AIV strain from Asia or elsewhere. Read more about the most recent poultry outbreak that occurred in Victoria in 2020 in [the Conversation](#).
- HPAI viruses circulating in poultry and wild bird populations in the northern hemisphere are not usually considered a threat to Australia. Waterfowl appear to be largely responsible for long-distance movement of HPAI, and there are no waterfowl that migrate between Asia and Australia.
- Shorebirds regularly migrate between Australia and Asia. Recent research has demonstrated that Australian migratory shorebirds are being exposed to HPAI H5Nx clade 2.3.4.4 viruses along their migratory route between Asia and Australia. However, there is currently no evidence that these migratory birds are carrying infectious HPAI H5Nx clade 2.3.4.4 viruses when they arrive in Australia ([Wille et al 2019](#)).
- Currently (February 2022), large numbers of migratory shorebirds are in the southern parts of their range including Australia, and the next migration event (March – June) will involve mostly northbound movement of birds from Australia. Hence, the risk of viral introduction via birds migrating to Australia is low between the Australian summer and autumn. Migratory birds will return to Australia from the northern hemisphere between September and November, increasing the risk of introduction of novel viruses.
- Thus far, Australia remains free from HPAI H5Nx clade 2.3.4.4 viruses that are currently being detected in the northern hemisphere.
- The current widespread and frequent detection HPAI viruses in the northern hemisphere likely represents an increased level of risk to Australia. Previous research has assessed the overall risk of introduction of HPAI to Australia to be low ([East et al. 2008](#); [East et al. 2008](#); [Curran 2012](#))¹⁰, however this research did not include clade 2.3.4.4 viruses.

⁷ <https://www.birdlife.org/news/2022/01/10/israel-and-uk-facing-record-breaking-bird-flu-outbreaks/>

⁸ https://www.cms.int/sites/default/files/uploads/avian_influenza_0.pdf

⁹ <http://www.promedmail.org/post/8700696>

¹⁰ Note: a formal risk assessment for the current HPAI strains circulating has yet to be undertaken.

What should Australia do to reduce our exposure?

- Maintain best biosecurity practices [Biosecurity Guidelines for [Poultry Producers](#) and [Wildlife Professionals](#)]
- Deter wild birds, particularly waterfowl, from poultry farms and minimizing indirect contact by treating drinking water for poultry.
- Continue to report and investigate unusual and mass sickness and deaths in domestic and wild birds.

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- Despite the relatively low zoonotic potential of the current circulating viruses as noted above, health and safety measures should be employed for those handling birds and materials. Further Safety advice - Protecting yourself and the animal can be found on the [WHA website](#).
- Continue to strengthen and monitor AIV strains circulating in apparently healthy Australian wild birds for overseas strains through the NAIWB program.
- Continue to work with our near-neighbouring countries to monitor for AIV events.

What is currently being done to address the potential AIV threat?

- Australia's [national avian influenza wild bird surveillance program](#) includes:
 - **Targeted surveillance:** faecal environmental swabs and cloacal and/or oropharyngeal samples collected from 'apparently' healthy, live and hunter-shot wild birds
 - **General surveillance:** investigation of significant, unexplained morbidity / mortality events in wild birds (with a focus on H5 and H7 exclusion testing).
- Sequence analysis of AIVs detected in wild birds through the national program contributes to tracking Australian virus evolution and dynamics, maintaining currency of diagnostic tests, maintaining a virus sequence library allowing comparison of Australian and overseas strains. Read more in [Wild Bird News](#).
- A number of recent publications have assessed the risk to Australia from endemic and overseas AIV strains. See the [WHA website](#) for a list of recent papers.
- Current analysis and research continues on:
 - patterns of wild bird virus infections in Australia.
 - wild bird AIV sequence data to better understand transmission patterns (including reassortant events) and connections across space, time and host species.
 - development of [Nextstrain software](#) to track Australian AIV evolution in real-time.

Further information

Please note: all Australian Jurisdictions require that all avian influenza virus infection is reported to the relevant Chief Veterinary Officer (CVO). The national notifiable diseases list does not specify strains of AI but includes avian influenza. For further information see: <https://www.agriculture.gov.au/pests-diseases-weeds/animal/notifiable>

Global Situation

- World Organisation for Animal Health (OIE) updates on avian influenza in animals (types H5 and H7): <https://www.oie.int/en/disease/avian-influenza/#ui-id-5>
- Food and Agriculture Organisation of the United Nations (FAO) **Global AIV with Zoonotic Potential** situation update: https://www.fao.org/ag/againfo/programmes/en/empres/Global_AIV_Zoonotic_Update/situation_update.html
- Avian influenza in Europe update: <https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/europe-update/>
- Joint OIE-FAO Scientific Network on Animal Influenza (OFFLU) situation updates and statements on avian influenza: <https://www.offlu.org/>
- Convention on the Conservation of Migratory Species of Wild Animals Northern Winter 2021-2022 statement in response to die-offs of wild birds in UNESCO and Ramsar Sites: https://www.cms.int/sites/default/files/uploads/avian_influenza_0.pdf

AUSVETPLAN

- The on-the-ground response to this incident is in accordance with the Avian Influenza AUSVETPLAN. This plan sets out the nationally agreed approach to Avian Influenza outbreaks in Australia. This includes agreed policy in Australia with respect to LPAI or HPAI detection in wild birds. The **AUSVETPLAN Disease Strategy for Avian Influenza** can be downloaded from [Animal Health Australia website](#) under Disease-specific documents.

Australian Biosecurity Manuals

- National Farm Biosecurity Manuals – Chickens: <https://www.farmbiosecurity.com.au/industry/chickens/>
- National Wildlife Biosecurity Manual: https://wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/National_Wildlife_Biosecurity_Guidelines.PDF
- National Zoo Biosecurity Manual: <https://www.zooaquarium.org.au/public/Animal-Welfare/Biosecurity/Public/Animal-Welfare/Biosecurity.aspx>

Australian Department of Agriculture, Water and the Environment

- Information on Avian Influenza or Bird Flu: <https://www.awe.gov.au/biosecurity-trade/pests-diseases-weeds/animal/avian-influenza>
- Information for bird owners: https://www.awe.gov.au/biosecurity-trade/pests-diseases-weeds/protect-animal-plant/bird-owners/avian_influenza_bird_flu
- Descriptive characteristics of the seven HPAI outbreaks in Australia from 1976 to 2013 and of the confirmed LPAI reports in poultry in Australia from 1976 to 2018 are described in [Scott et al. 2020](#).

Wild bird surveillance

- A [Wild Bird Surveillance program](#) is in place across Australia.
- WHA Fact sheet on [avian influenza in wild birds in Australia](#).