Wild Bird News

National Avian Influenza Wild Bird Surveillance Newsletter - December 2018

Avian Influenza Virus

Influenza A viruses are detected in numerous bird species globally. **Waterfowl and shorebirds are the main natural reservoirs and rarely show signs of disease.** Avian Influenza Virus (AIV) can cause significant infectious disease in domestic poultry and can also infect and/or cause disease in a range of other species including wild birds and humans[1,2].

Of global concern is the capacity of AIV subtypes H5 and H7 to mutate from Low Pathogenicity (LPAI) into **High Pathogenicity (HPAI) forms which can cause significant losses in both poultry and wildlife.**

AIV in Australia

Whilst **HPAI H5 viruses have not been detected in Australia**, there have been seven outbreaks due to HPAI H7 viruses in commercial poultry operations since 1976 in Victoria, Queensland and the last in 2013 in New South Wales[3,4,5,6,7,8].

Mortality due to AIVs have not been reported in feral or native free-ranging birds[9]. However, **LPAI viruses have been detected in wild birds in Australia.**

Given Australia's geographic and ecological isolation, **it is important that assumptions about AIV epidemiology in Australia are not based entirely on studies from Asia, Europe or North America[10,11].**

More info: WHA FACT SHEET

Image Courtesy of Ákos Lumnitzer - amatteroflight.com

Wild Bird Surveillance

Detections of AIV in commercial poultry are relatively rare in Australia, therefore samples obtained through targeted AIV surveillance of wild bird reservoir species - Anseriformes (waterfowl) and Charadriiformes (shorebirds and gulls) - provide the principle source of current information on AIVs circulating in the country.

The national avian influenza wild bird (NAIWB) surveillance activities are conducted Australia-wide, with funding provided by the Australian Government Department of Agriculture. In-kind support is provided by the jurisdictional agencies, researchers and representative's institutions. Activities comprises two sampling components:

- Targeted surveillance (Pathogen-specific, risk-based surveillance) by sampling of apparently healthy, live and hunter-killed wild birds (NAIWB Surveillance Program);
- General surveillance by investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (with a focus on exclusion testing for AI virus subtypes H5 and H7).

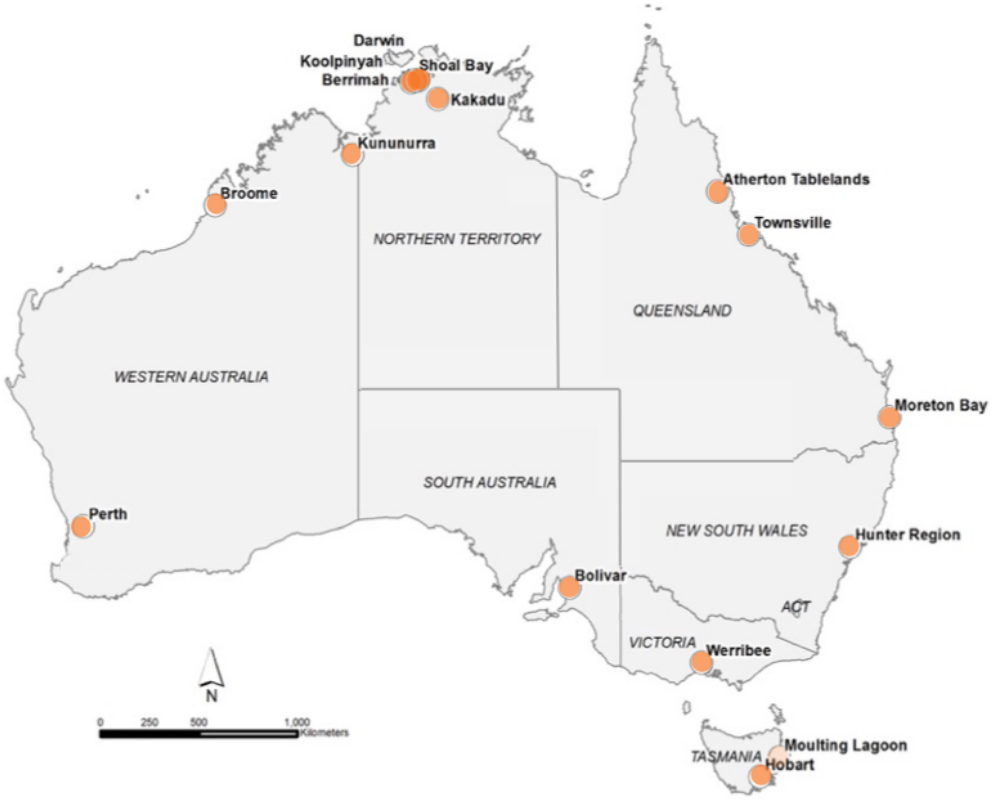
Targeted surveillance data is collected through a dedicated surveillance program, with samples collected, analysed and reported nationally through partners organisations, and stored in the NAIWB database.

Partner organisations include state and territory government

animal biosecurity agencies, including laboratories, universities and samples collected through the Northern Australia Quarantine Strategy. Targeted surveillance summary data have been prepared using data collected through the NAIWB targeted surveillance program partner organisations and agencies.

Wild bird morbidity and mortality investigation are reported into the national wildlife health information system (eWHIS) via Australia's general wildlife health surveillance program. The program relies on the detection, submission and investigation of sick/dead captive or free-living wild birds. Investigations are reported into eWHIS from multiple sources including from a network of state / territory WHA coordinators (appointed by their state / territory Chief Veterinary Officers), veterinarians at zoo based wildlife hospitals and sentinel wildlife clinics, university clinics and pathology departments, as well as researchers, other wildlife health professionals and WHA members. General surveillance summary tables are drawn from data entered into eWHIS.

Targeted Surveillance - Map of key* sampling locations



* This map shows locations where the majority of wild bird samples are collected from, on a regular basis. Locations sampled irregularly or where small numbers of samples are collected are not represented on the map.

Locations sampled for targeted wild bird surveillance include:

- Areas where migratory shorebirds and resident waterfowl species congregate;
- Areas of large waterfowl aggregations and/or known waterfowl breeding areas;
- Areas within close proximity to poultry farms and/or human populations; and
- Areas with previous evidence of AIVs in wild bird reservoirs.

Over 101,000 samples have been collected from wild birds in Australia for AIV targeted surveillance since 2005.

Fresh faecal environmental swabs were the predominant sample type, but a small portion of cloacal and/or oropharyngeal swabs from healthy live birds and hunter-shot birds are also collected.

Individual or pooled samples were tested for influenza A using a real-time reverse transcription polymerase chain reaction (rRT-PCR) assays targeting the influenza type A matrix gene.

All samples tested positive to the influenza A matrix gene PCR were tested for influenza A H5 and H7 using specific qRT- PCRs, which were further characterised as LPAI viruses at AAHL.

Additional wild bird samples collected by partner universities and collaborating centres for AIV testing are being incorporated to the national targeted program dataset.

Targeted Surveillance - Historical number of samples collected and proportion of influenza A positives*

Period	# Individual Swabs Collected	# Positives for Influenza A Virus	Proportion* of LPAI Virus Positive Swabs (%)
July 05 - June 06	5,551	64	1.2%
July 06 - June 07	10,798	113	1.0%
July 07 - June 08	11,567	133	1.1%
July 08 - June 09	11,053	173	1.6%
July 09 - June 10	9,807	122	1.2%
July 10 - June 11	8,621	259	3.0%
July 11 - June 12	8,244	262	3.2%
July 12 - June 13	7,620	205	2.7%
July 13 - June 14	6,885	273	4.0%
July 14 - June 15	6,662	257	3.9%
July 15 - June 16	4,398	118	2.7%
July 16 - June 17	4,311	206	4.8%
July 17 - June 18	5,724	192	3.4%
Total	**101,241**	**2,377**	**2.3%**

* The proportion of positive swabs is defined as the number of influenza A positives divided by the number of individual swabs collected. A number of swabs were tested as a pooled sample (up to 5 swabs in one pool). If swabs were pooled for analysis, a positive pool represents one AIV positive. A sample was considered AIV positive if tested either: a) Positive at original lab; b) Indeterminate at original lab and Positive at subsequent lab; c) Indeterminate at original lab and subtyped at any lab.

Targeted Surveillance - Historical detection* of H5 and H7 viruses

Period	H5 LPAI	H5 HPAI	H7 LPAI	H7 HPAI
July 05 - June 06	3	0	0	0
July 06 - June 07	4	0	6	0
July 07 - June 08	17	0	0	0
July 08 - June 09	15	0	5	0
July 09 - June 10	13	0	6	0
July 10 - June 11	21	0	0	0
July 11 - June 12	32	0	6	0
July 12 - June 13	0	0	7	0
July 13 - June 14	18	0	3	0
July 14 - June 15	9	0	11	0
July 15 - June 16	12	0	2	0
July 16 - June 17	27	0	1	0
July 17 - June 18	4	0	14	0
Total	**175**	**0**	**61**	**0**

* All detections of H5 and H7 viruses in wild birds at original lab are submitted to AAHL, CSIRO for further confirmatory testing and subtyping.

No HPAI H5 or H7 viruses have been detected via targeted wild bird surveillance in Australia.

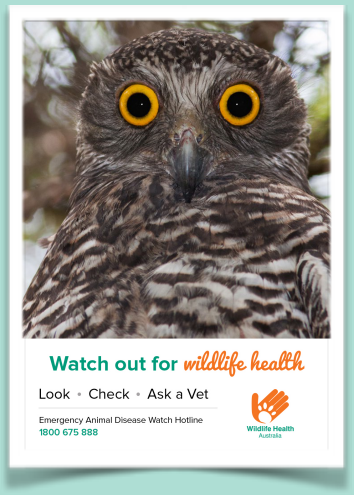
Based on phylogenetic analysis at the Australian Animal Health Laboratory (AAHL), **H5 viruses detected in Australian wild birds were all Australian lineage LPAI viruses, and NOT Asian [goose/Guangdong/96(H5N1)] lineage viruses,**

i.e. are not related to HPAI H5Nx clade 2.3.4.4 viruses that are currently circulating overseas that have shown unprecedented ability for intercontinental spread via wild birds with numerous outbreaks in poultry and wild birds in Asia, Africa, North America and Europe.

Note: **All seven HPAI outbreaks in commercial poultry in Australia** (Victoria: 1976, 1985, 1992; Queensland: 1994; New South Wales 1997, 2012, 2013) **were due to H7** subtypes viruses and all had obvious or circumstantial **evidence of contact with waterfowl or inadequately treated surface water**, potentially contaminated by waterfowl. HPAI viruses have not been detected in Australian wild birds, other than a single detection of HPAI H7 virus in one feral Eurasian starling (*Sterna vulgaris*) trapped inside an affected poultry shed during a 1985 HPAI H7 virus outbreak.

AVIAN INFLUENZA IS A NATIONAL NOTIFIABLE DISEASE AND REQUIRES REPORTING TO THE CHIEF VETERINARY OFFICER (CVO) AT THE APPROPRIATE AUSTRALIAN STATE OR TERRITORY

If you would like information about Avian Influenza testing and sample collection, please seek advice from your local WHA Coordinator or call the Emergency Animal Disease Watch Hotline (**1800 675 888**).



Targeted surveillance update Jul to Dec 2018

Between July and December 2018, pathogen-specific, risk-based surveillance occurred at sites in New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia with cloacal or faecal environmental swabs collected from 2936 waterbirds. Samples were tested using RT-PCR for AI M (Matrix) gene detection. Influenza A reactors (positives) to the influenza A matrix gene PCR were tested using specific qRT- PCRs for influenza A H5 and H7. Samples for which H5/H7 subtypes were detected by qRT-PCR were dispatched to AAHL for confirmatory and further testing.

Target Surveillance - Influenza A virus detections (Jul - Dec 2018)

State / Territory	# Individual Swabs Collected	# Positives*	H5 LPAI	H5 HPAI	H7 LPAI	H7 HPAI	Other LPAI HA Subtypes**
NSW	340	30	0	0	6	0	
NT	300	0					
Qld	718	3	0	0	1	0	H9, H11
SA	900	25	0	0	3	0	H1, H4, H9
TAS	135	1	0	0	0	0	
VIC	41	0					
WA	502	0					
Total	**2936**	**59**	**0**	**0**	**10**	**0**	

* A number of swabs were tested as a pooled sample (up to 3 swabs in one pool). A positive pool represents one AIV positive. A sample is considered AIV positive if either: a) Positive at original lab; b) Indeterminate at original lab and subsequently tested positive; c) Indeterminate at original lab and subtyped at any lab.

** When positive AIV samples (not identified as H5 or H7) are submitted for subtyping and successful.

Between July and December 2018, no HPAI viruses were identified, but target surveillance continues[11,12] to find evidence of a wide range of LPAI virus subtypes, including low pathogenicity H7.

Molecular analysis of AIVs detected through the targeted surveillance activities contribute to understanding of AIVs dynamics in Australia, help maintain currency of diagnostic tests, and serve as a point of comparison when novel avian influenza virus strains of importance emerge overseas.

From July to December 2018, targeted species for sampling were from the order Anseriformes. Other bird orders may have been present during collection.

The great majority of samples collected during this period were faecal environmental swabs. A small proportion of cloacal samples from hunter-shot birds were also collected.

General surveillance - Jul to Dec 2018

WHA received 71 reports of wild bird mortality or morbidity investigations from around Australia from July to December 2018, where testing for AIV was performed by PCR testing for influenza A. Investigations may involve a single animal or multiple animals (e.g. mass mortality event). Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries.

General Surveillance - mortality and morbidity events in which birds were tested for Influenza A viruses (Jul - Dec 2018)

Bird Order	Common Names for Bird Order*	Number of Events AIV Tested via PCR**	Number of Events AIV Positive
Accipitriformes	Osprey, hawks and eagles	2	0
Anseriformes	Magpie goose, ducks, geese, swans	6	0
Caprimulgiformes	Frogmouth, nightjars, owlet-nightjars, swifts	2	0
Charadriiformes	Shorebirds	6	1 LPAI (not H5 or H7)
Columbiformes	Doves and pigeons	4	0
Coraciiformes	Bee-eaters and kingfishers	1	0
Falconiformes	Falcons	3	0
Passeriformes	Passerines or perching birds	16	0
Pelecaniformes	Ibis, herons and pelicans	2	0
Psittaciformes	Parrots and cockatoos	14	0
Strigiformes	Typical owl and barn owls	20	0

* Common names adapted from: del Hoyo and Collar (2014) HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 1 – Non-passerines. Lynx Editions, Barcelona. (Courtesy of the Australian Department of Environment).

** Disease investigations may involve a single or multiple bird orders (e.g. mass mortality event). The number of events where AIV was tested via PCR against each bird order do not equal the total number of investigations due to multi-species events. During the semester, four wild bird events involved multiple bird orders tested for AIV. One event involved the orders Accipitriformes, Falconiformes and Strigiformes, the second event involved Anseriformes and Charadriiformes, the third event involved Anseriformes and Pelecaniformes, and the fourth involved Columbiformes and Passeriformes.

Avian influenza was not the cause of any wild bird morbidity or mortality event.

There was one AIV positive bird amongst several tested from a mass mortality event. Histopathology findings were not consistent with Avian Influenza in any of the birds examined. This detection is therefore an incidental finding (and not unusual given Charadriiformes are an AIV reservoir species).

Disclaimer

This document was developed and approved by the National Wild Bird Avian Influenza (NAIWB) Steering Group for information purposes only. NAIWB Steering Group was established to ensure national coordination and collaboration of wild bird avian influenza surveillance activities. Wildlife Health Australia provides support to the NAIWB Steering Group and collates avian influenza surveillance data from wild birds sampled across Australia. Information contained in it is drawn from a variety of sources external to Wildlife Health Australia. Data is provided on an "as is" basis and may be changed periodically; these changes may or may not be incorporated in any new version of the publication. Although reasonable care was taken in its preparation, Wildlife Health Australia does not guarantee or warrant the accuracy, reliability, completeness, or currency of the information or its usefulness in achieving any purpose. To the fullest extent permitted by law, Wildlife Health Australia will not be liable for any loss, damage, cost or expense incurred in or arising by reason of any person relying on information in this document. You may download, display, print and reproduce this material in unaltered form only for personal, non-commercial use or use within your organisation, provided due acknowledgement is made of its source. For any other use of the material contained in this document (including, but not limited to any text, illustration, table, or any other material), written permission must be obtained with Wildlife Health Australia and the NAIWB Steering Group.

References

1 Olsen B et al., 2006. Global Patterns of Influenza A Virus in Wild Birds. Science 312, 384-388.

2 Feare CJ. 2010. Role of wild birds in the spread of highly pathogenic Avian Influenza Virus H5N1 and implications for global surveillance. Avian Diseases 54, 201-212.

3 Barr DA et al., 1986. Avian Influenza on a multi-age chicken farm. Australian Veterinary Journal 63, 195-196.

4 Selleck PW et al., 1997. Identification and Characterisation of an H7N3 influenza A virus from an outbreak of virulent avian influenza in Victoria. Australian Veterinary Journal 75, 289-292.

5 Selleck PW et al., 2003. An outbreak of highly pathogenic avian influenza in Australia in 1997 caused by H7N4 virus. Avian Diseases 47(s3), 806-811.

6 Turner AJ. 1976. The isolation of fowl plague virus in Victoria. Australian Veterinary Journal 52, 384.

7 Westbury HA. 1997. History of highly pathogenic avian influenza in Australia. In: Swayne DE and Slemons RD editors. Proceedings of the 4th International Symposium on Avian Influenza, May 29–31, Athens, Georgia. Symposium on Avian Influenza, US Animal Health Association: Richmond, VA, 22–30.

8 World Organisation for Animal Health (OIE). 2018. The World Animal Health Information System. http://www.oie.int/animal-health-in-the-world/the-world-animal-health-information-system/the-world-animal-health-information-system/ . Accessed November 2018.

9 Arzey G (2004) The role of wild aquatic birds in the epidemiology of avian influenza in Australia. Australian Veterinary Journal 82, 377-378.

10 Klaassen M et al., 2011. Identifying crucial gaps in our current knowledge of the life-history of Avian Influenza Viruses – an Australian perspective. Emu 111, 103–112.

11 Grillo et al.,2015. Avian influenza in Australia: a summary of 5 years of wild bird surveillance. Australian Veterinary Journal. 93 (11): 387–393.

12 Haynes et al., (2009) Australian surveillance for avian influenza viruses in wild birds (July 2005 to June 2007). Australian Veterinary Journal. 87 (7): 266-272

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