Draft updates of OIE Terrestrial Animal Health Code and Manual for Avian Influenza: Review and discussion for regional experts & member countries

GFTADs Regional Expert Meeting for diseases of poultry in Asia and the Pacific Region
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OIE Code for Infection with Avian Influenza Viruses – Change to Listing of Disease (10.4)

The following are included within the category of avian diseases and *infections*:

- Avian chlamydiosis
- Avian infectious bronchitis
- Avian infectious laryngotracheitis
- Avian mycoplasmosis *(Mycoplasma gallisepticum)*
- Avian mycoplasmosis *(Mycoplasma synoviae)*
- Duck virus hepatitis
- Fowl typhoid
- Infection with high pathogenicity avian influenza viruses
- Infection of birds other than *poultry*, including *wild* birds, with influenza A viruses of high pathogenicity ~~in birds other than *poultry* including wild birds~~
- Infection of domestic and *captive wild* birds with low pathogenicity avian influenza viruses having proven natural transmission to humans associated with severe consequences
- Infection with Newcastle disease virus
- Infectious bursal disease (Gumboro disease)
- Pullorum disease
- Turkey rhinotracheitis.

OIE Code for Avian Influenza – Changes in Glossary

POULTRY

1 means all ~~domesticated~~ birds~~, including backyard poultry,~~ reared or kept in captivity ~~used~~ for the production of ~~*meat* or eggs for consumption, for the production of other~~ any commercial animal products~~, for restocking supplies of game,~~ or for breeding ~~these categories of birds~~ for this purpose, ~~as well as~~ fighting cocks used for any purpose, and all birds used for restocking supplies of game or for breeding for this purpose, until they are released from captivity.

2 Birds that are kept in a single household, the products of which are used within the same household exclusively, are not considered *poultry*, provided that they have no direct or indirect contact with *poultry* or *poultry* facilities.

Birds that are kept in captivity for ~~any~~ other reasons ~~other than those reasons referred to in the preceding paragraph~~, including those that are kept for shows, ~~races~~ racing, exhibitions, zoological collections and competitions, ~~or~~ and for breeding or selling ~~these categories of birds~~ for these purposes, as well as pet birds, are not considered ~~to be~~ *poultry*~~.~~, provided that they have no direct or indirect contact with *poultry* or *poultry* facilities.

"Poultry" (Glossary):

1. New definition of poultry as term "backyard poultry" is not uniformly recognized globally, and
2. recognizing the low risk of poultry not used in trade (ie. raised and used in the household are excluded as poultry)

OIE Code for Avian Influenza – Proposed changes to notifiable AI

Notifiable AI (to be consistent with other parts of the code):

- HPAI in poultry or wild birds. The latter (wild birds) should not impact trade in poultry or poultry products; emphasized in the revision.
- “other influenza A viruses of avian host origin (i.e. low pathogenicity avian influenza viruses) may have the potential to exert a negative impact on animal and public health. A sudden and unexpected increase in virulence of low pathogenicity avian influenza viruses in poultry is notifiable as an emerging disease in accordance with Article 1.1.4. “
- “Infection of domestic and captive wild birds with low pathogenicity avian influenza viruses having proven natural transmission to humans associated with severe consequences, and
- infection of birds other than poultry, including wild birds, with influenza A viruses of high pathogenicity, are notifiable in accordance with Article 1.3.6.”

OIE Code for Avian Influenza – Proposed changes to notifiable AI

- Switch from LPAI surveillance to monitoring of LPAI (especially H5/H7)

- Notifiable AI being principally HPAI (proposed reasons for change to exclude LPAI H5/H7):
  1) Current Code placed the HPAI and H5/H7 LPAI on equal footing per restrictions on trade when the risks are much lower for LPAI than HPAI;
  2) Recommendation for surveillance was difficult because of asymptomatic nature of most LPAI infections and inadequate surveillance in many countries makes it difficult to demonstrate freedom from LPAI;
  3) Disproportionate reporting of H5/H7 LPAI by countries with good AI surveillance and their being penalized for reporting as evident by trade embargoes equal to those of HPAI, versus. countries with poor surveillance that are not reporting.

OIE Code for AI – other notable changes proposed

- “Recovery of Free Status” - For countries free from HPAI but having a “contained” outbreak, opening the possibility of declaration of HPAI freedom in less than 3 months if adequate surveillance is conducted – i.e. to as little as 2 flock incubation periods after completion of stamping-out and with negative results during the 28-day surveillance period thereafter. Here, 28 days is not automatic but must have demonstrated epidemiological and statistical adequate sampling that is negative
- Improved guidelines on targeted surveillance for AI virus in wild birds
- Improvement on surveillance requirements when vaccines are used if have disease-free status.
- New section on “Establishment of a containment zone within a country or zone free from high pathogenicity avian influenza” to be more consistent with other parts of the code; ie. containment in a HPAI free country following an outbreak versus containment in a country which is not free.
- More details on Surveillance for HPAI:
  - Principles of surveillance
  - Early warning system for HPAI detection
  - Surveillance for demonstrating freedom from HPAI – must demonstrate an effective surveillance program, and additional requirements if practicing vaccination
  - Additional requirements for recovery of free status
- Section on Surveillance of Wild Bird populations
- Section on Monitoring of LPAI in poultry

OIE Manual Chapter for AI – key changes proposed

- Manual chapter – changes made to support the changes in AI Code chapter
- Updating the taxonomy
- HPAI definition and definitions of other types if AI – including citation of OFFLU cleavage site document in multiple locations and giving range in chicken ages for IVPI (4-8 weeks)
- Stronger use of molecular criteria for HPAI (link to OFFLU MBCS listing)
- Reduction in number of References relevant to content in Manual
- Addition of NGS as diagnostic tool and to clarify problems with sanger sequencing when looking at cleavage site in mixed virus population
- Major updates in molecular tools and how to use them, including limitations
- Major update in vaccines section

Oceania (Australia) & SE Asia AI Update

Sources:
Frank Wong – CSIRO ACDP Australia
Erik Karlsson – Institut Pasteur du Cambodge
Nicola Lewis - OFFLU Technical Activity to WHO VCM

Current state of AIV surveillance

- AUSTRALIA:
  - (i) NAIWB wild bird surveillance program:
    - Annual risk-based targeted surveillance of wild bird samples
    - Predominantly fresh fecal (env) samples: PCR –> WGS/seq subtyping –> VI
    - All subtypes except H14 & H15;
  - (ii) AI outbreak investigations in poultry/domestic birds:
    - H7N7 HPAI in large commercial layer chickens at Lethbridge VIC July 2020; *n*=433,504 chickens killed/depopulated

- ACDP OIE REF LAB (SEA regional work):
  - (i) Myanmar – received samples from H5N1 HPAI outbreak investigations & live bird/wet market AIV surveillance (H5N1/H5N6/H9N2)
  - (ii) Cambodia – received samples from live bird/wet market AIV surveillance (collaborative study with Inst. Pasteur Cambodia H5 ref lab and WHO H5 ref lab Melbourne)
  - (iii) Philippines – 2020 H5 HPAI outbreaks (H5N6 HPAI) received at ACDP Dec 2020

Wild bird AI surveillance - Australia

Period	H5 LPAI	H7 LPAI
July 05 - June 06	3	0
July 06 - June 07	4	6
July 07 - June 08	17	0
July 08 - June 09	15	5
July 09 - June 10	13	6
July 10 - June 11	21	0
July 11 - June 12	32	6
July 12 - June 13	0	7
July 13 - June 14	18	3
July 14 - June 15	9	11
July 15 - June 16	12	2
July 16 - June 17	27	1
July 17 - June 18	4	14
July 18 - June 19	4	19
Total	**179**	**80**

Targeted Surveillance wb

LPAI H5 / H7 detections

No HPAI detections

HPAI History in Australia

No HPAI H5 reported in poultry or wild birds

HPAI outbreaks in commercial poultry

- **All H7 subtypes**
- Victoria: 1976, 1985, 1992;
- Queensland: 1994
- New South Wales: 1997, 2012, 2013
- Victoria 2020

All had obvious or circumstantial **evidence of contact with waterfowl or inadequately treated surface water** potentially contaminated by waterfowl.

Despite HPAI outbreaks attributed to H7 Australia shouldn't discount H5

LPAI H5 detected in poultry in 2012 (Vic) & 2013 (WA)

Source courtesy of the Australian Wildlife Health National Avian Influenza in Wild Birds (NAIWB) Program

Outbreak – Australia H7N7 HPAI (JUL 2020)

chicken/Lethbridge VIC

AUS H7 lineage (wb/poultry)

EUR H7 lineage

N.Am H7

A/goose/Guangdong/1/96 lineage A(H5) detected in poultry & wild birds (Source: OFFLU Feb 2020 to Sep 2020)

Country, area or territory	Host	Genetic clade
Bangladesh	Poultry	2.3.2.1a (H5N1), 2.3.4.4h (H5N6)
Bulgaria	Poultry	2.3.4.4b (H5N8)
Cambodia	Poultry	2.3.4.4h (H5N6)
	Poultry	2.3.2.1c (H5N1)
China	Poultry	2.3.4.4h (H5N6)
Czech Republic	Poultry	2.3.4.4b (H5N8)
Egypt	Poultry	2.3.4.4b (H5N8)
Germany	Wild bird	2.3.4.4b (H5N8)
	Poultry	2.3.4.4b (H5N8)
Hungary	Poultry	2.3.4.4b (H5N8)
Kazakhstan	Wild bird	Unknown (H5)
	Poultry	
India	Wild bird	2.3.2.1a (H5N1)
	Poultry	2.3.2.1a (H5N1)
Iraq	Poultry	Unknown (H5N8)
Poland	Poultry	Unknown (H5N6)
	Poultry	Unknown (H5N8)
Republic of the Philippines	Poultry	Unknown (H5N6)
Romania	Poultry	2.3.4.4b (H5N8)
Russian Federation	Wild bird	2.3.4.4b (H5N8)
	Poultry	
Taiwan	Poultry	2.3.4.4c (H5N2)
	Poultry	2.3.4.4c (H5N5)
Viet Nam	Poultry	2.3.2.1c (H5N1); 2.3.4.4g (H5N6); 2.3.4.4h (H5N6)

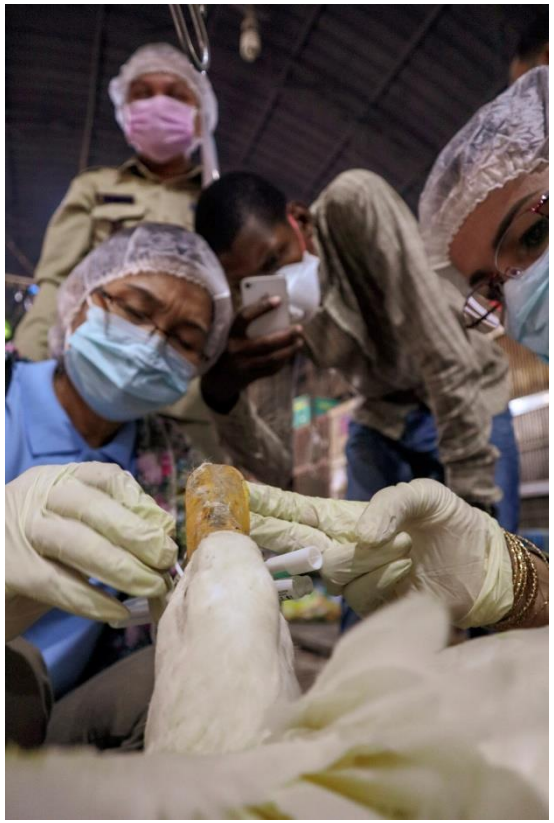
Southeast Asian events within the reporting period are highlighted

Collection Strategy in Cambodia

Institut Pasteur du Cambodge

- Collect cloacal and oropharyngeal swabs from chickens and ducks
- Pool samples from individual animals
- Test for influenza A (matrix gene), H5, H7 and H9 → quantitative RT-PCR

Environmental sample collections

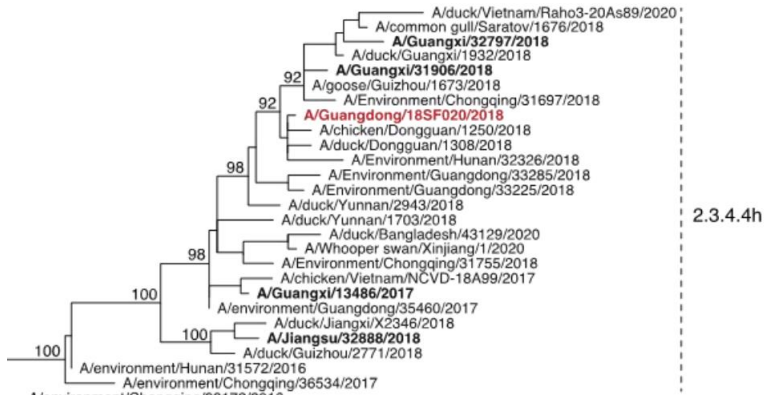


Source: Erik Karlsson

Antigenic characterization of field viruses using HI with ACDP reference chicken and ferret post-infection antisera panels

Chicken H5 clade antisera panel at ACDP:

- A/chicken/Myanmar/295/2010 (H5N1); clade 2.3.2.1a
- A/pheasant/Vietnam/3773/2013 (H5N1); clade 2.3.2.1c
- A/chicken/Laos/26/2006(H5N1); clade 2.3.4
- A/chicken/West Java/ Subang/29/2007; clade 2.1.3.1
- A/quail/Myanmar/SP232/2015 (H5N1); clade 2.3.4.2
- rgA/Sichuan/26221/2014(H5N6); clade 2.3.4.4a
- A/chicken/Philippines/0938-2/2017(H5N6); clade 2.3.4.4e
- rgA/gyrfalcon/Washington/41088-6/2014 (H5N8); clade 2.3.4.4c



WHO currently to produce new ferret antisera to representative 2.3.4.4h virus

ACDP currently to produce chicken antisera to 2.3.4.4h and 2.3.4.4b

WHO ferret antisera panel at ACDP:

Appendix Table 1. Hemagglutinin inhibition assay demonstrating fold differences between homologous and heterologous H5 clade antigens to the corresponding reference H5 clade ferret antibodies used in this study*

	Antibody						
Antigen	*1.1.1 Cambodia*	*2.1.3.2a Indonesia*	*2.3.2.1b Barn Swallow*	*2.3.2.1c Viet Nam*	*2.3.4 Guizhou*	*2.3.4.4 Gyrfalcon*	*2.3.4.4 Hubei*
1.1.1 Cambodia	**1,280**	<20	<20	<20	40	<20	<20
2.1.3.2a Indonesia	<20	**640**	<20	<20	<20	<20	<20
2.3.2.1b BarnSwallow	<20	<20	**1,280**	320	<20	<20	<20
2.3.2.1c VietNam	<20	<20	160	**320**	<20	<20	<20
2.3.4.2 Guizhou	40	<20	<20	<20	**640**	<20	<20
2.3.4.4 Gyrfalcon	<20	<20	<20	<20	<20	**160**	<20
2.3.4.4 Hubei	<20	<20	<20	<20	<20	<20	**80**

*1.1.1 Cambodia, A/Cambodia/X0810301/2013(H5N1); 2.1.3.2a Indonesia, A/Indonesia/NIHRD11771/2011(H5N1); 2.3.2.1b Barn Swallow, A/barn swallow/Hong Kong/D10-1161/2010(H5N1); 2.3.2.1c Viet Nam, A/duck/Vietnam/NCVD-1584/2012(H5N1); 2.3.4 Guizhou, A/Guizhou/1/2013(H5N1); 2.3.4.4 Gyrfalcon, A/gyrfalcon/Washington/41088-6/2014(H5N8); 2.3.4.4 Hubei, A/Hubei/29578/2016(H5N6). Bold indicates homologous antigen-antibody titer.

General issues encountered in SE Asia limiting surveillance picture

- Regional AI surveillance & sampling data in many SEA countries remains patchy
- Limited virus data captured by sporadic HPAI outbreak investigations
- Actions to periodically assess primary PCR diagnostic tests (eg. pan influenza A & H5 rRT-PCR primers/probes) by national labs limited by resource, and access to updated representative viruses across multiple lineages/clades
- Access to virus isolates for assay benchside evaluations and antigenic characterization remain limited
- Evidence of decreased sensitivity of H5 PCR tests to currently circulating 2.3.4.4 H5N6/Nx viruses
- Evidence of genetic & antigenic drift of currently circulating 2.3.4.4 viruses

OFFLU AI Technical Activity Objectives: Updated 2021 Work Plan & Identified Needs

- Continue FAO/ACDP regional and OFFLU ref lab molecular PTs for Avian Diseases and AI
- Improved H9N2 guidance:
  - Molecular and Serologic Diagnostic methods for specific regions
  - Lineage identification and nomenclature
  - Antigenic assessment using chicken post-infection antisera
- H5 & H9 chicken antisera antigenic characterisation; “regional avian VCM panels”
- Need for regional guidance on avian diseases NGS and bioinformatics.
- Maintain OFFLU H5/H7 HA Cleavage site listing
- Better structured contribution to WHO PRA programs; ie. TIPRA

http://www.offlu.net/

THANK YOU

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International Program

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