WOAH Reference Laboratory Reports Activities 2022

Activities in 2022

This report has been submitted : 16 juin 2023 12:06

Laboratory Information

Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:	Avian Influenza
Address of laboratory:	CSIRO Australian Centre for Disease Preparedness (ACDP), 5 Portarlington Road, East Geelong, Victoria, AUSTRALIA 3219
Tel.:	+61352275000
E-mail address:	frank.wong@csiro.au
Website:	https://www.csiro.au/en/about/facilities-collections/acdp
Name (including Title) of Head of Laboratory (Responsible Official):	Professor Trevor Drew (Director Australian Centre for Disease Preparedness)
Name (including Title and Position) of WOAH Reference Expert:	Dr Frank Wong (Senior Research Scientist)
Which of the following defines your laboratory? Check all that apply:	Governmental

TOR1: DIAGNOSTIC METHODS

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.? (Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
cELISA	YES	1295	391
HI Test	YES	0	15

Direct diagnostic tests		Nationally	Internationally
Real-time PCR	YES	1055	981
Virus isolation	YES	246	39
PCR/Sequencing	YES	108	15
Immunohistochemistry	YES	1	0
HI Typing	YES	14	17
Next Generation Sequencing	YES	110	49

TOR2: REFERENCE MATERIAL

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by WOAH?

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOAH Members?

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TEST	PRODUCED/ PROVIDE	AMOUNT SUPPLIED NATIONALLY (ML, MG)	AMOUNT SUPPLIED INTERNATIONALLY (ML, MG)	NO. OF RECIPIENT WOAH MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
Avian Influenza PCR Positive Control	PCR	Produced and provided		171 ML	3 (Bangladesh, Nepal, Philippines)	Asia and Pacific
Avian Influenza Virus Antigen	Haemagglutination Inhibition (HI)	Produced and provided		223.5 ML	5 (Hong Kong SAR of China (People's Republic of), Indonesia, Italy, Nepal, Philippines)	Asia and Pacific
Avian Influenza Antisera	Haemagglutination Inhibition (HI)	Produced and provided		155 ML	4 (Hong Kong SAR of China (People's Republic of), Indonesia, Nepal, Philippines)	Asia and Pacific
Avian Influenza National Quality Control (NQC) for LEADDR network	ELISA	Produced and provided	15 ML		1 (Australia)	Asia and Pacific
Avian Influenza National Quality Control (NQC) for LEADDR network	PCR	Produced and provided	40 ML		1 (Australia)	Asia and Pacific

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

No

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

No

7. Did your laboratory validate diagnostic methods according to WOAH Standards for the designated pathogen or disease?

No

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

No

9. Did your laboratory validate vaccines according to WOAH Standards for the designated pathogen or disease?

No

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOAH Members?

Yes

NAME OF WOAH MEMBER COUNTRY SEEKING ASSISTANCE	DATE	WHICH DIAGNOSTIC TEST USED	NO. SAMPLES RECEIVED FOR PROVISION OF DIAGNOSTIC SUPPORT	NO. SAMPLES RECEIVED FOR PROVISION OF CONFIRMATORY DIAGNOSES
PHILIPPINES	2022-03-01	Real-time PCR, Next Generation Sequencing, Virus Isolation, HI Typing	0	121
TIMOR-LESTE	2022-04-01	cELISA, HI Test	210	0
NEPAL	2022-05-01	Real-time PCR, Next Generation Sequencing, Virus Isolation, HI Typing	0	19
PAPUA NEW GUINEA	2022-06-01	Real-time PCR	30	0
TIMOR-LESTE	2022-09-01	Real-time PCR, PCR/Sequencing, Next Generation Sequencing, Virus Isolation, HI Typing	194	0
SOLOMON (ISLANDS)	2022-10-01	Real-time PCR, cELISA	98	0
PAPUA NEW GUINEA	2022-11-01	Real-time PCR, cELISA	234	0

11. Did your laboratory provide expert advice in technical consultancies on the request of an WOAH Member?

Yes

NAME OF THE WOAH MEMBER COUNTRY RECEIVING A TECHNICAL CONSULTANCY	PURPOSE	HOW THE ADVICE WAS PROVIDED
AUSTRALIA	Provision of expert advice to federal and state governments/OCVOs on	Remotely by teleconferences, workshops and email

	diagnostic testing and surveillance	communications
INDONESIA	Provision of support via BICOLLAB Laboratory Strengthening project focusing on building diagnostic capacities with the Disease Investigation Centre (DIC) Wates laboratory of the Directorate-General Livestock and Animal Health Services of Indonesia in Yogyakarta to become a national reference centre for Avian Influenza, and for application of NGS & bioinformatics to EID Investigations for ASEAN.	In-person training and workshops and remotely by teleconferences, workshops and email communications
INDONESIA	Provision of expert advice to Indonesia's national Influenza Virus Monitoring (IVM) program to assess efficacy of poultry vaccines to HPAI.	Remotely by teleconferences, workshops and email communications
PAPUA NEW GUINEA	Provision of support via LABCAP laboratory Strengthening Project focusing on building diagnostic capacities for the national veterinary lab at PNG National Agriculture & Quarantine Inspection Authority (NAQIA), towards quality assurance and ISO 17025 laboratory standards	In-person training and workshops and remotely by teleconferences, workshops and email communications
PHILIPPINES	Provision of expert advice to Philippines Bureau of Animal Industry, Department of Agriculture on avian influenza diagnostic testing and HPAI outbreak investigations	In-person training and workshops and remotely by teleconferences, workshops and email communications
TIMOR-LESTE	Provision of expert advice to Timor-Leste National Director of Veterinary Directorate, Ministry of Agriculture and Fisheries on avian influenza diagnostic testing	Remotely by teleconferences, workshops and email communications
VIETNAM	Provision of support via WOAH Laboratory Twinning Project with the Regional Animal Health Office No. 6 (RAHO-6) in Ho Chi Minh City, focusing on building diagnostic and reference lab capacities for swine respiratory diseases, diagnostic quality assurance and ISO17025 laboratory standards	In-person training and workshops and remotely by teleconferences, workshops and email communications

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAH Members other than the own?

Yes

Title of the study	Duration	PURPOSE OF THE STUDY	PARTNERS (INSTITUTIONS)	WOAH MEMBER COUNTRIES INVOLVED OTHER THAN YOUR COUNTRY
OFFLU contributions on Zoonotic Influenza to the WHO Influenza Vaccine Composition Meetings (VCM)	1 year (ongoing)	As participating WOAH-RL for avian influenza, CSIRO-ACDP generates and contributes antigenic (HI) and genetic data on currently circulating avian influenza A(H5), A(H7) and A(H9) for the OFFLU contributions to the WHO Global Influenza Surveillance and Response System (GISRS) vaccine consultations to assess candidate pre-pandemic vaccine seed viruses	WOAH reference laboratories and FAO reference centres for avian influenza that contribute to the OFFLU network, and contributing member countries	INDONESIA ITALY NEPAL PHILIPPINES UNITED KINGDOM
OFFLU Avian Influenza Matching (AIM) project	1 year (ongoing)	As a participating WOAH-RL for avian influenza, CSIRO-ACDP receives and produces harmonised virus antigens and prime post-infection chicken antisera for HI testing against circulating field H5 HPAI viruses to generate antigenic data for poultry vaccine assessments	WOAH reference laboratories in Australia (ACDP), Italy (IZSVe), United Kingdom (APHA) and USA (USDA)	ITALY UNITED KINGDOM UNITED STATES OF AMERICA
AusAid supported Wildlife Interface Viromic Regional EID Surveillance (WIViREIDS) in Southeast Asia Project	2022-2027	Building field and laboratory capacity and systems in Southeast Asia for viromic and metagenomic EID surveillance at the wildlife interface	Australian Government Department of Foreign Affairs and Trade (DFAT) Global Health Program, National Animal Health and Production Research Institute (NAHPRI) Cambodia, the National Research and Innovation Agency (BRIN) Indonesia, Lao Oxford-Mahosot Hospital-Wellcome Trust Research Unit (LOMWRU) Laos, FAO-ECTAD Indonesia	CAMBODIA INDONESIA LAOS PHILIPPINES

AusAid supported BICOLLAB Laboratory Strengthening Project with Indonesia	2019-2027	Supporting laboratory capacity building through twinning with the Disease Investigation Centre (DIC) Wates, Yogjakarta, Ministry of Agriculture Indonesia, to serve as a regional reference centre for avian influenza	Australian Government Department of Foreign Affairs and Trade (DFAT) Global Health Program, DIC Wates for the Directorate-General Livestock and Animal Health Services (DGLAHS), Ministry of Agriculture of Indonesia	INDONESIA

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:
Avian influenza sample epidemiological data and virus genetic, phylogenetic and antigenic characterization data. Data from animal disease and immunological research in hosts and pathogen. Data and guidance information on validation and quality assurance testing of diagnostic tests, biosafety, operation of high-containment diagnostics animal health laboratories, and laboratory capacity building.

15. Did your laboratory disseminate epidemiological data that had been processed and analysed?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:
Avian influenza sample epidemiological data and virus genetic, phylogenetic and antigenic characterization data. Data from animal disease and immunological research in hosts and pathogen. Data and guidance information on validation and quality assurance testing of diagnostic tests, biosafety, operation of high-containment diagnostics animal health laboratories, and laboratory capacity building.

16. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category and list the details in the box)

a) Articles published in peer-reviewed journals:

11

1. Challagulla, A., Shi, S., Nair, K., O'Neil, T.E., Morris, K.R., Wise, T.G., Cahill, D.M., Tizard, M.L., Doran, T.J., Jenkins, K.A., 2022. Marker counter-selection via CRISPR/Cas9 co-targeting for efficient generation of genome edited avian cell lines and germ cells. Anim Biotechnol 33, 1235-1245.

2. Challagulla, A., Tizard, M.L., Doran, T.J., Cahill, D.M., Jenkins, K.A., 2022. Harnessing Intronic microRNA Structures to Improve Tolerance and Expression of shRNAs in Animal Cells. Methods Protoc. 2022 Feb 10;5(1):18.

3. El-Hage, C., Hartley, C., Savage, C., Watson, J., Gilkerson, J., Paillot, R., 2022. Assessment of Humoral and Long-Term Cell-Mediated Immune Responses to Recombinant Canarypox-Vectored Equine Influenza Virus Vaccination in Horses Using Conventional and Accelerated Regimens Respectively. Vaccines (Basel) 10.

4. George, A.M., Wille, M., Wang, J., Anderson, K., Cohen, S., Moselen, J., Lee, L.Y.Y., Suen, W.W., Bingham, J., Dalziel, A.E., Whitney, P., Stannard, H., Hurt, A.C., Williams, D.T., Deng, Y.M., Barr, I.G., 2022. A novel and highly divergent Canine Distemper Virus lineage causing distemper in ferrets in Australia. Virology 576, 117-126.

5. Karawita, A.C., Cheng, Y., Chew, K.Y., Challgula, A., Kraus, R., Mueller, R.C., Tong, M.Z.W., Hulme, K.D., Beielefeldt-Ohmann, H., Steele, L.E., Wu, M., Sng, J., Noye, E., Bruxner, T.J., Au, G.G., Lowther, S., Blommaert, J., Suh, A., McCauley, A.J., Kaur, P., Dudchenko, O., Aiden, E., Fedrigo, O., Formenti, G., Mountcastle, J., Chow, W., Martin, F.J., Ogeh, D.N., Thiaud-Nissen, F., Howe, K., Collins, J., Tracey, A., Smith, J., Kuo, R.I., Renfree, M.B., Kimura, T., Sakoda, Y., McDougall, M., Spencer, H.G., Pyne, M., Tolf, C., Waldenström, J., Jarvis, E.D., Baker, M.L., Burt, D.W., Short, K.R., 2022. The swan genome and transcriptome: its not all black and white. bioRxiv 2022.05.02.490350.

6. Layton, D.S., Butler, J., Stewart, C., Stevens, V., Payne, J., Rootes, C., Deffrasnes, C., Walker, S., Shan, S., Gough, T.J., Cowled, C., Bruce, K., Wang, J., Kedzierska, K., Wong, F.Y.K., Bean, A.G.D., Bingham, J., Williams, D.T., 2022. H7N9 bearing a mutation in the nucleoprotein leads to increased pathology in chickens. Front Immunol 13, 974210.

7. Layton, D.S., Mara, K., Dai, M., Malaver-Ortega, L.F., Gough, T.J., Bruce, K., Jenkins, K.A., Bean, A.G.D., 2022. Interferon Signaling in Chickens Plays a Crucial Role in Inhibiting Influenza Replication in DF1 Cells. Microorganisms 10.

8. Reid T., Singanallur N. B., Newberry K., Waugh C., Bowden T., Colling A. Validation of diagnostic tests for infectious diseases: challenges and opportunities. International Symposium on Sustainable Animal Production and Health Current Status and Way Forward. 28 June - 2 July 2021, Joint FAO/IAEA Centre. Accepted for publication in proceedings 7 April 2022.

9. Wille, M., Grillo, V., Ban de Gouvea Pedroso, S., Burgess, G.W., Crawley, A., Dickason, C., Hansbro, P.M., Hoque, M.A., Horwood, P.F., Kirkland, P.D., Kung, N.Y., Lynch, S.E., Martin, S., McArthur, M., O'Riley, K., Read, A.J., Warner, S., Hoye, B.J., Lisovski, S., Leen, T., Hurt, A.C., Butler, J., Broz, I., Davies, K.R., Mileto, P., Neave, M.J., Stevens, V., Breed, A.C., Lam, T.T.Y., Holmes, E.C., Klaassen, M., Wong, F.Y.K., 2022. Australia as a global sink for the genetic diversity of avian influenza A virus. PLoS Pathog. 2022 May 10;18(5):e1010150.

10. Woolaston, K., Nay, Z., Baker, M.L., Brockett, C., Bruce, M., Degeling, C., Gilbert, J., Jackson, B., Johnson, H., Peel, A., Sahibzada, S., Oskam, C., Hewitt, C.L., 2022. An argument for pandemic risk management using a multidisciplinary One Health approach to governance: an Australian case study. Global Health 18, 73.

11. Young, A., Isaacs, A., Scott, C.A.P., Modhiran, N., McMillan, C.L.D., Cheung, S.T.M., Barr, J., Marsh, G., Thakur, N., Bailey, D., Li, K.S.M., Luk, H.K.H., Kok, K.H., Lau, S.K.P., Woo, P.C.Y., Furuyama, W., Marzi, A., Young, P.R., Chappell, K.J., Watterson, D., 2022. A platform technology for generating subunit vaccines against diverse viral pathogens. Front Immunol 13, 963023.

b) International conferences:

22

1. Wong, Frank. Genetic and antigenic diversity of H5 and H9 viruses. In: Influenza Virus Monitoring Coordination and Management Meeting, FAO-ECTAD and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), Jakarta, Indonesia. 24-25 January 2022; Delivered Online.

2. Williams, David. ACIAR One Health Surveillance project overview. LabCap PNG Project Launch and Inception Workshop; 29-30 Mar 2022; Papua New Guinea

3. Williams, David. LabCap Project Objectives. In: PNG Project Launch and Inception Workshop; 29-30 Mar 2022; Papua New Guinea.

4. Durr, P.A. and Graham, K. "Big challenges with using Big data for animal health surveillance". 4th International Conference on Animal Health Surveillance; 3-5 May 2022, Copenhagen, Denmark.

5. Newberry, Kim. User beware: Is your diagnostic test fit for its intended purpose. In: 2022 NRL Asian Summit; 23-24 May 2022; Delivered Online.

6. Williams, David. Update on capacity building activities in the region. In: WOAH Pacific Partners Meeting; 31 May 2022; Delivered Online.

7. Wong, Frank. PCR related activities in OFFLU 2021/22. In: 12th WHO Working Group Meeting for the Molecular Detection and Subtyping of Influenza Viruses and the use of Next Generation Sequencing (NGS) in GISRS. Istanbul, Turkey, 13-15 June 2022; Delivered Online.

8. Wong, Frank. Swine Influenza Overview Australia. In: OFFLU Swine Influenza Virus Technical Activity Meeting. World Organization for Animal Health, Paris, France, 16 June 2022; Delivered Online.

9. Wong, Frank. Australia country report on avian influenza and update on OFFLU technical activities. In: WOAH Subregional Meeting on Avian Diseases in Southeast Asia. Tokyo, Japan, 18 July 2022; Delivered Online.

10. Wong, Frank. Overview of OFFLU avian influenza technical activities 2021/2022. In: ASEAN One Health Bioinformatics Training Workshop for ASEAN and ZDAP Countries. FAO, SMART-ASEAN and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), 22-26 August 2022, Yogyakarta, Indonesia.

11. Paulley, J.T. Balancing the Ongoing Operation of an Ageing Biocontainment Facility with Increasing Regulatory Oversight and Evolving Standards. In: BSL4ZNet International Conference Session 2; 16 Sep 2022; Online webinar.

12. Howard, Rod. Preparing for the ACDP Part Life Refit. International Veterinary Biosafety Workgroup Webinar; 21-22 Sep 2022; Online Webinar

13. Eagles, D. The Importance of a One Health Approach to Preparedness and Response. In: ASEAN Defence Ministers' Meeting – Plus Chemical, Biological and Radiological (CBR) Conference, 12 October 2022.

14. Drew, Trevor W. Dual use and gain of function: The responsibilities of scientists and institutions. In: BSL4Znet International Conference Session 4 – Advances in Biosafety, Biosecurity & Surveillance. 14 October 2022; Delivered Online.

15. Coggon, Amelia and Wong, Frank. OFFLU contributions to WHO VCM on zoonotic influenza. In: WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.

16. Singanallur Balasubramani, Nagendra. Validation principals for new tests and technologies. In: WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.

17. Waugh, Caryll. Proficiency testing and its role in supporting laboratory capability. In: WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31Oct 2022 - 2 Nov 2022; Geelong Australia.

18. Wong Frank, Pavade Gounalan, and Coggon Amelia. Overview of the global and regional networks, data bases and information sharing platforms, including WAHIS and OFFLU. In: WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong Australia.

19. Wong, Frank. Update on Avian influenza in Australia. In: WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region; 31 Oct 2022 - 2 Nov 2022; Geelong, Australia.

20. Amelia Coggon and Wong, Frank. Overview of the OFFLU Avian Influenza Matching (AIM) activity. In: FAO Regional Consultation on

Avian Influenza Surveillance in Asia; 02-04 November 2022; Geelong, Australia.

21. Saputra Sugiyono, Nugroho Herjuno A, Rizal Syaiful, Dharmayanthi Anik B, Masrukhin Masrukhin, Nangoy Meis J, Joseph Ancy, Mileto Patrick, Neave Matthew, Wong Frank. Longitudinal survey of potential zoonotic viruses from wildlife and environmental samples at high-risk human-animal interfaces in Indonesia. In: 7th World One Health Congress; 07-11 Nov 2022; Singapore, Singapore.

22. Singanallur Balasubramani, Nagendra. "Biosafety Measures for the Transport of Dangerous Biological Goods." In: Biorisk Management Workshop for Research Institutions with BSL-3 Laboratories; 19-20 Nov 2022, India, Delivered online.

c) National conferences:

8

1. Eagles, D. Future Focused: How science and technology are paving the way forward. Keynote Presentation. In: 2nd Australian Biosecurity Symposium; 03-05 May 2022, Gold Coast QLD.

2. Wong, Frank. Avian influenza outbreak in Victoria 2020: Virus genome characterisation and government and industry consultation. In: Animal Pathology Standards Program (AAPSP) and Australian Society for Veterinary Pathology (ASVP) Foreign Animal Disease and Outbreak Preparedness Workshop. Davis-Thompson Foundation Webminar Series, 19 May 2022; Delivered Online.

3. Moody, Nick. Regulatory compliance – a science perspective. In: Association of Biosafety for Australia and New Zealand (ABSANZ); 29 Jun 2022 - 01 Jul 2022; Adelaide SA.

4. Magor, Joshua; Directional Airflow Versus Differential Pressures – A cautionary tale of misdirection. In: Association of Biosafety for Australia and New Zealand (ABSANZ); 29 Jun 2022 - 01 Jul 2022; Adelaide SA.

5. Waugh, Caryll. Proficiency testing and its role in supporting laboratory capability. In: DAFF Chief Veterinary Office Forum; 19 Aug 2022; Online Webinar.

6. Singanallur Balasubramani, Nagendra. 'Systems approaches" in studying host-pathogen interactions. In: The Australasian Society for Microbiology – Veterinary Microbiology special interest group; 06 Sep 2022; Online Webinar.

7. Grimaldi, Sheree. Non-surgical and reversible chemical castration to control oestrous and behavioural adversities in ferret colonies. In: Australian New Zealand Laboratory Animal Association (ANZLAA); 21-23 Sep 2022; Campbelltown, Sydney, NSW.

8. Pharo, Elizabeth. Pandemic Influenza A(H1N1)pdm09 infection of an ex vivo human lung co-culture model system. In: Australasian Virology Society AVS11 2022 Meeting; 05-08 Dec 2022; Gold Coast QLD.

d) Other (Provide website address or link to appropriate information):

14

1. Wong, F. Contributions as Chair of OFFLU Avian Influenza Technical Activity and member of OFFLU Executive Committee 2022. Available at: https://www.offlu.org/index.php/offlu-organisation/

2. Wong, F. Contribution to OFFLU Update to the Influenza A Cleavage Site document. 4 January 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/01/Influenza-A-Cleavage-Sites-Final-04-01-2022.pdf

3. Wong, F. Contribution to OFFLU wild bird experts group zoom call on update of wild bird AI events in Canada, UK, Israel and other European countries. 12 January 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/02/OFFLU-wild-bird_jan2022summary_final.pdf

4. Wong, F. Contribution as member of OFFLU Executive Committee to the OFFLU Steering and Executive Committee Meeting on 20

January 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/06/OFFLU-SC_EC_Jan2022.pdf

5. Wong, F for OFFLU. Contribution to CMS FAO Co-convened Scientific Task Force on Avian Influenza and Wild Birds (2022). Scientific Task Force on Avian Influenza and Wild Birds statement. H5N1 Highly Pathogenic Avian Influenza in poultry and wild birds: Winter of 2021/2022 with focus on mass mortality of wild birds in UK and Israel, 24 January 2022. Available at: https://www.cms.int/sites/default/files/uploads/avian_influenza_0.pdf

6. Wong, F for OFFLU. Contribution to Zoonotic Influenza component of WHO Vaccine Composition Meeting. February 2022. Available at: https://www.offlu.org/index.php/2022/03/11/offlu-who-vcm/ and https://cdn.who.int/media/docs/default-source/influenza/who-influenza-recommendations/vcm-northern-hemisphere-recommendation-2022-2023/202203_zoonotic_vaccinevirusupdate.pdf?sfvrsn=29b24f50_7

7. Wong, F for OFFLU. Contribution to the Concept Note for the OFFLU Avian Influenza Matching (AIM) Technical Activity – Characterisation of avian influenza viruses to support poultry vaccination (avian influenza vaccine antigen updates). April 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/11/Concept-note-OFFLU-AIM.pdf

8. Wong, F. Contribution to OFFLU Annual Report 2021. 13 April 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/04/OFFLU_Annual_Report_2021_FINAL.pdf

9. Wong, F. Contribution to Preliminary FAO/OIE/WHO Joint Rapid Risk Assessment Human infection with Influenza A(H3N8), China. 18 May 2022. Available at: https://www.woah.org/app/uploads/2022/05/h3n8-human-ra.pdf

10. Wong, F for OFFLU. Contribution to OFFLU H3N8 Technical Statement. 14 June 2022. Available at: https://www.offlu.org/index.php/2022/06/14/human-infection-with-influenza-ah3n8-china-2/

11. Wong, F. Contribution as member of OFFLU Executive Committee to the OFFLU Steering and Executive Committee Meeting on 22 June 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/10/OFFLU-COMMITTEE-MEETING_June2022.pdf

12. Wong, F for OFFLU. Contribution to the Zoonotic Influenza component of WHO Vaccine Composition Meeting. September 2022. Available at: https://www.offlu.org/wp-content/uploads/2022/10/VCM-roundup-Sept22-Final.pdf and https://cdn.who.int/media/docs/default-source/influenza/who-influenza-recommendations/vcm-southern-hemisphere-recommendation-2023/202209_zoonotic_vaccinvirusupdate.pdf?sfvrsn=a91f123b_4

13. Wong, F. Contribution as member of OFFLU Executive Committee to the OFFLU Steering and Executive Committee Meeting on 21 October 2022. Available at: https://www.offlu.org/wp-content/uploads/2023/02/OFFLU-COMMITTEE-MEETING_Oct2022.pdf

14. Wong, F for OFFLU. Contribution to the WHO Rapid Risk Assessment of risk associated with recent influenza A(H5N1) clade 2.3.4.4b viruses. 21 December 2022. Available at: https://cdn.who.int/media/docs/default-source/influenza/avian-and-other-zoonotic-influenza/h5-risk-assessment-dec-2022.pdf?sfvrsn=a496333a_1&download=true

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOAH Members?

Yes

a) Technical visit : 47 persons

b) Seminars : 100 persons

c) Hands-on training courses: 163 persons

d) Internships (>1 month) 0 persons

Type of technical training	Country of origin of the expert(s) provided with training	No. participants from the

provided (a, b, c or d)		corresponding country
(B) (C) Regional Proficiency Testing Provider Training, 21-25 February 2022 (remote)	China, Vietnam, Thailand, Malaysia, South Korea, Japan, Indonesia, India	14
(B) NGS Wet-Lab Protocols for RNA and DNA viruses Workshop, 21-23 March 2022 (remote)	Indonesia	13
(B) (C) Biosafety Leadership Training, April-December 2022 (monthly engagement, remotely)	Thailand, Laos, Vietnam, Cambodia, Malaysia, Indonesia, Papua New Guinea, Singapore, Timor-Leste	19
(B) (C) Laboratory Refresher Proficiency Test Workshop, Denpasar, Indonesia 4-6 July 2022 (remote)	Indonesia	20
(B) (C) Refresher Proficiency Test Workshop, Yogyakarta, Indonesia, 26-27 July 2022 (remote)	Indonesia	16
(C) FAO-ECTAD SMART-ASEAN One Health Bioinformatics Training Workshop, Yogjakarta, Indonesia, 22-26 Ausgust 2022 (in-person and remote)	ASEAN and ZDAP member countries	43
(A) (C) Validation and Verification Workshop, Yogyakarta, Indonesia, 12-16 September 2022 (in-person)	Indonesia	25
(A) (C) Biosafety training, Risk assessments, spills training and chemical safety, Yogyakarta, Indonesia, 12-16 September 2022 (in-person)	Indonesia	22
(C) Pathology and Histology Training, Geelong, Australia, 24 October-4 November 2022 (in-person)	Indonesia	2
(C) Sequencing and Bioinformatics Training, Geelong, Australia, 24 October-4 November 2022 (in-person)	Indonesia	2
(B) Diagnostic test evaluation and result interpretation to Latin American country members	Argentina, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela	18

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO 17025	NATA ISO 17025 SEP 2022.PDF	NATA ISO 17025 SEP 2022.pdf
ISO 17043	NATA ISO 17043 SEP 2022.PDF	NATA ISO 17043 SEP 2022.pdf
ISO 9001	BSI ISO 9001 NOV 2022.PDF	BSI ISO 9001 NOV 2022.pdf
ISO 14001	BSI ISO 14001 NOV 2022.PDF	BSI ISO 14001 NOV 2022.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Testing for sterility and freedom from contamination of biological materials intended for veterinary use – Innocuity (Bacterial culture - Biphasic medium, mycoplasma broth; Dark field microscopy; Embryonated egg culture; Enzyme linked immunosorbent assay (ELISA); Fluorescent antibody test; Haemagglutination; PCR - Quantitative (qPCR); Polymerase chain reaction (PCR); Virus isolation)	NATA (ILAC affiliated)
Testing for sterility and freedom from contamination of biological materials intended for veterinary use – Innocuity (Embryonated egg culture; Enzyme linked immunosorbent assay (ELISA); Fluorescent antibody test; Bacterial culture – Biphasic medium, mycoplasma broth; Dark field microscopy; PCR 16S Universal; Virus isolation; Haemagglutination; Indirect fluorescent antibody; Polymerase chain reaction (PCR); PCR – Quantitative (qPCR))	NATA (ILAC affiliated)
Detection and identification of viruses (PCR – Quantitative (qPCR))	NATA (ILAC affiliated)
Necropsy services (Microscopic examination; Anatomical pathology)	NATA (ILAC affiliated)
Molecular analysis - Bioinformatic analysis and interpretation (To be determined; Analysis of DNA alignment; DNA alignment to reference sequence)	NATA (ILAC affiliated)
Molecular analysis - Sequencing (Sanger sequencing)	NATA (ILAC affiliated)
Microbiology - Serology of infection – Microbial antibody and/or antigen detection and/or quantitation (Haemagglutination inhibition)	NATA (ILAC affiliated)
Microbiology - Serology of infection – Microbial antibody and/or antigen detection and/or quantitation (Agar gel immunodiffusion (AGID))	NATA (ILAC affiliated)
Microbiology - Serology of infection – Microbial antibody and/or antigen detection and/or quantitation (Enzyme linked immunosorbent assay (ELISA))	NATA (ILAC affiliated)
Detection and identification of viruses (Embryonated egg culture; Haemagglutination Inhibition)	NATA (ILAC affiliated)
Accreditation No: 13546 (scope last change 2021)	NATA (ILAC affiliated)

20. Does your laboratory maintain a "biorisk management system" for the pathogen and the disease concerned?

Yes

The laboratory has a dedicated Biorisk Management Team (14 Members) who provide specialist advice, monitor and improve Biosafety, Biosecurity and Biocontainment activities and perform maintenance on Biocontainment systems. The team uses a risk analysis approach to management of biological risks for biosafety and biosecurity to inform and determine the policy and procedures that in turn give confidence that the laboratory procedures for each of the biological materials handled by the laboratory pose negligible danger to Australia's animal and human populations. 261 Policies and procedures are contained in the annually reviewed ACDP Biorisk Manual consisting of various sections as follows: Section 1 Administration Section 2 PC2 Procedures and Policies Section 3 PC3 Procedures and Policies Section 4 PC4 Procedures and Policies Section 5 Large Animal Facility (LAF) Procedures and Policies Section 6 Personnel and

Procedural Controls Section 7 Transport and Storage of Biological Material Section 8 Movement of Material, Equipment and Waste Section 9 Engineering Procedures and Polices Section 10 Microbiological Incident Response Procedures and Policies Section 11 Laboratory Services Group Section 12 Containment Services Group The successful ACDP biological risk management system has clear and unequivocal commitment by laboratory management, who ensure that roles, responsibilities, resources and authorities related to biological risk management are defined, documented, and communicated to those who manage, perform, and verify work associated with biological agents and toxins in the laboratory. The Biorisk Management Team are audited over 3 days every 6 months by an external security assessment team to provide an independent review of elements affecting ACDP's microbiological and physical security operations and to advise CSIRO senior executive management of any areas of concern or risk. The laboratory is aspiring to become accredited to ISO 35001:2019 Biorisk management for laboratories and other related organisations.

TOR9: SCIENTIFIC MEETINGS

21. Did your laboratory organise scientific meetings related to the pathogen in question on behalf of WOAH?

Yes

NATIONAL/ INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	WOAH Regional Expert Group Meeting for diseases of poultry in Asia and the Pacific Region. Geelong, Australia 31 October – 2 November, 2022	WOAH Regional Representation for the Asia-Pacific, Australian Government Department of Agriculture, Forestry and Fisheries (DAFF)	2022-10-31	Geelong, Australia	38
International	FAO Regional Avian Influenza in Asia. Geelong, Australia 2-4 November, 2022	FAO Regional Office Asia-Pacific	2022-11-02	Geelong, Australia	20

22. Did your laboratory participate in scientific meetings related to the pathogen in question on behalf of WOAH?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
Influenza Virus Monitoring Coordination and Management Meeting, FAO-ECTAD and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), Jakarta, Indonesia	2022-01-01	Online webinar	Speaker	Genetic and antigenic diversity of H5 and H9 viruses through OFFLU
Virtual Inception Meeting for Strengthening Mechanisms in Animal-				Overview of CSIRO-ACDP Emergency

Health for a Resilient ASEAN (SMART-ASEAN) Project for Partners, FAO-ECTAD & AUSAID	2022-02-01	Online webinar	Short communications	Transboundary Animal Disease Reference Centre and OFFLU activities
WOAH Pacific Partners Meeting	2022-05-01	Online webinar	Speaker	Update on capacity building activities in the region
12th WHO Working Group Meeting for the Molecular Detection and Subtyping of Influenza Viruses and the use of Next Generation Sequencing (NGS) in GISRS, Istanbul, Turkey	2022-06-01	Online webinar	Speaker	PCR and NGS related activities in OFFLU 2021/22
OFFLU Swine Influenza Virus Technical Activity Meeting. World Organization for Animal Health, Paris, France	2022-06-01	Online webinar	Speaker	Swine Influenza Overview Australia
WOAH Subregional Meeting on Avian Diseases in Asia and the Pacific Region, Tokyo, Japan	2022-07-01	Online webinar	Speaker	Australia country report on avian influenza and update on OFFLU technical activities
ASEAN One Health Bioinformatics Training Workshop for ASEAN and ZDAP Countries. FAO, SMART-ASEAN and Government of Indonesia Directorate-General Livestock and Animal Health Services (DGLAHS), Yogyakarta, Indonesia	2022-08-01	Yogyakarta, Indonesia	Speaker	Overview of OFFLU avian influenza technical activities 2021/2022
WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region, Geelong Australia	2022-10-01	Geelong, Australia	Speaker	OFFLU contributions to WHO VCM on zoonotic influenza.
WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region, Geelong Australia	2022-10-01	Geelong, Australia	Speaker	Validation principals for new tests and technologies
WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region, Geelong Australia	2022-10-01	Geelong, Australia	Speaker	Proficiency testing and its role in supporting laboratory capability
WOAH Regional Expert Group meeting for				Overview of the global and regional networks,

diseases of poultry in Asian and Pacific region, Geelong Australia	2022-10-01	Geelong, Australia	Speaker	data bases and information sharing platforms, including WAHIS and OFFLU
WOAH Regional Expert Group meeting for diseases of poultry in Asian and Pacific region, Geelong Australia	2022-10-01	Geelong, Australia	Speaker	Update on Avian influenza in Australia
FAO Regional Consultation on Avian Influenza Surveillance in Asia, Geelong, Australia	2022-11-01	Geelong, Australia	Speaker	Overview of the OFFLU Avian Influenza Matching (AIM) activity

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOAH Reference Laboratories designated for the same pathogen or disease?

Yes

24. Are you a member of a network of WOAH Reference Laboratories designated for the same pathogen?

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS/ ORGANISING WOAH REF. LAB.
OFFLU Avian Influenza Technical Activity Group	Chairperson and participant		Contributing WOAH RLs for Avian Influenza and contributing WOAH members
OFFLU Executive Committee	Chairperson and participant	6	OFFLU Executive Committee members
FAO Regional Avian Influenza Network for Asia	Participant		Asian member countries
WOAH Regional Representation for Asia and the Pacific Expert Group for Avian Diseases	Organiser and participant		Asian member countries

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen?

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS/ ORGANISING WOAH REF. LAB.
OFFLU Molecular PT for detection of avian influenza A to inform on the capability of the OFFLU contributing reference laboratories to detect and characterise H5/H7/H9 subtype viruses of different lineages circulating in different regions	Organiser and participant	9	WOAH Ref. Labs on Avian Influenza in Australia, Brazil, Canada, Germany, Japan, Republic of Korea, Italy (EURL), United Kingdom, and USA

26. Did your laboratory collaborate with other WOAH Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

Yes

TITLE OF THE PROJECT OR CONTRACT	SCOPE	NAME(S) OF RELEVANT WOAH REFERENCE LABORATORIES
OFFLU Avian Influenza Technical Activity	Chair of OFFLU Avian Influenza Technical Activity and contributed epidemiological data	Contributing WOAH RLs for avian influenza, including Australia
OFFLU VCM Technical Activity	Contributed expertise and epidemiological data to the WHO consultations on the composition of influenza virus vaccines (WHO-VCM)	Contributing WOAH RLs for avian influenza, including Australia
OFFLU Swine Influenza Technical Activity	Contributed epidemiological data to global surveillance updates on influenza in swine	Contributing WOAH RLs for avian influenza, including Australia
OFFLU Avian Influenza Monitoring (AIM) Technical Activity	Contributed expertise, epidemiological data and analysis	Contributing WOAH RLs for avian influenza, including Italy (EURL), United Kingdom, Australia and USA
WHO Tool for Influenza Pandemic Risk Assessment (TIPRA)	Contributed to pandemic risk guidance and scoring updates for the WHO Tool for Influenza Pandemic Risk Assessment (TIPRA) for swine H1 1C lineage (Eurasian avian lineage) and avian influenza H3N8	Contributing WOAH RLs for avian influenza, including Australia
WOAH Regional Expert Network Meeting for Avian Diseases in Asia & the Pacific	Contributed expertise, epidemiological data and analysis	WOAH Reference Laboratories for Avian Influenza in the Asia-Pacific region, including Australia, China (People's Republic of), Japan, Korea (Republic of), India, Russia

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAH Reference Laboratories for the same pathogen?

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Region(s) of participating WOAH Member Countries
Provision of PT for the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network in Australia and NZ on PCR detection of AIV	Organiser and participant	8	Asia and Pacific
Provision of PT for the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network in Australia and NZ on detection of AIV by ELISA	Organiser and participant	7	Asia and Pacific
FAO-RAP regional PT for avian diseases on detection of AIV by PCR	Organiser	20	Asia and

			Pacific
Australian National Quality Assurance Programme (ANQAP) for AIV agar gel immunodiffusion (AGID) assay (http://www.anqap.com/)	Participant	1	Asia and Pacific
GD Deventer PT Scheme for AIV H5/H7/H9 Haemagglutination Inhibition (HI) test (https://www.gdanimalhealth.com/en/PTS)	Participant	1	Asia and Pacific
GD Deventer PT Scheme for AIV ELISA (https://www.gdanimalhealth.com/en/PTS)	Participant	1	Asia and Pacific
GD Deventer PT Scheme for AIV PCR (https://www.gdanimalhealth.com/en/PTS)	Participant	1	Asia and Pacific
The Royal College of Pathologists of Australasia Quality Assurance Program for AIV PCR (http://www.rcpaqap.com.au)	Participant	1	Asia and Pacific
The Royal College of Pathologists of Australasia Quality Assurance Program for Anatomical Pathology (http://www.rcpaqap.com.au)	Participant	1	Asia and Pacific
Australian Animal Pathology Standards Programme for Histopathology Proficiency (http://www.animalhealthaustralia.com.au/programmes/ahsp/aapsp.cfm)	Participant	1	Asia and Pacific

TOR12: EXPERT CONSULTANTS

28. Did your laboratory place expert consultants at the disposal of WOAH?

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
Vice President of the WOAH Scientific Commission for Animal Diseases (SCAD), February 2022	Remote through WOAH, Paris	Participation in SCAD meeting
Membership of WOAH Specialist Commission for Animal Diseases	Remote through WOAH, Paris	Scrutiny, discussion and feedback on SCAD papers
Contribution of expertise and data to the WOAH/FAO Network of Expertise on Animal Influenza (OFFLU) Vaccine Composition Meeting (VCM) Technical Activities, February and September 2022	Remote through OFFLU Secretariat at WOAH, Paris	OFFLU contributions on Zoonotic Influenza to the WHO-GISRS Influenza Vaccine Composition Meetings (VCM)
Chair and member of the WOAH/FAO Network of Expertise on Influenza (OFFLU) Executive Committee	Remote through OFFLU Secretariat at WOAH, Paris	Planning and coordination meetings for the OFFLU Strategy and Technical Activities
Chair, member and expert contributor to the WOAH/FAO Network of Expertise on Influenza (OFFLU) Avian Influenza Technical Activity	Remote through OFFLU Secretariat at WOAH, Paris	Coordination and update meetings, and development of guidance notes under the OFFLU Avian Influenza Technical Activities (www.offlu.org)
WOAH RL for Avian Influenza and OFFLU representation to the WHO-GISRS consultations and working group activities	Remote through WHO-GISRS, Geneva	WOAH/OFFLU contributions to the WHO Working Group Meeting for the Molecular Detection and Subtyping of Influenza Viruses

on zoonotic influenza, June 2022		and the use of Next Generation Sequencing (NGS) in GISRS
WOAH RL for Avian Influenza and OFFLU representation to the WHO-GISRS consultations and working group activities on zoonotic influenza, 2022	Remote through WHO-GISRS, Geneva	WOAH/OFFLU contributions to the WHO Tool for Pandemic Risk Assessment (TIPRA) on zoonotic influenza viruses
Member of the WOAH Regional Expert Network Meeting for Avian Diseases in Asia & the Pacific, October 2022	Remote through WOAH Regional Representation for Asia & the Pacific, Tokyo	Coordination and situation update meetings for the WOAH Regional Expert Network Meeting for Avian Diseases in Asia & the Pacific
WOAH Pacific Partners Meeting, May 2022	Remote	Update on laboratory capacity building activities in SPCs
Technical advice to National Authority	Remote and in-person through Australian Government Department of Agriculture, Forestry and Fisheries (DAFF), Canberra, Australia	Review of WOAH Terrestrial Code and Manual chapters (via DAFF Australia)

29. Additional comments regarding your report:

No