World Organisation for Animal Health

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WOAH Reference Laboratory Reports Activities 2024

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LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	Avian influenza
***Address of laboratory:**	"National Veterinary Services Laboratories, National Centers for Animal Health, USDA, APHIS, Veterinary Services 1920 Dayton Ave Ames, IA 50010 UNITED STATES OF AMERICA Office: 515.337.7301"
***Tel:**	+15153377551
***E-mail address:**	mia.kim.torchetti@usda.gov
Website:	www.aphis.usda.gov/nvsl
***Name (including Title) of Head of Laboratory (Responsible Official):**	Dr. Suelee Robbe-Austerman, Director, NVSL
***Name (including Title and Position) of WOAH Reference Expert:**	Mia Kim Torchetti, Director, Diagnostic Virology Laboratory, NVSL
***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
Agar gel immunodiffusion (AGID); most testing is conducted at state level	Yes	157	0
Hemagglutination-inhibition (HI) antibody subtype identification	Yes	1449	

(H1-16)			0

Direct diagnostic tests		Nationally	Internationally
Real-time RT-PCR (IAV, subtyping)	Yes	57592	0
Virus Isolation (positive/total samples)	Yes	4146	0
Molecular pathotype (Sanger)	Yes	19	0
In vivo pathotype (IVPI)	Yes	3	0
Whole genome sequencing	Yes	16751	0

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
Reference antigen/antisera	HI/NI	both	0	5 mL	1	EL SALVADOR,
AGID reagents	AGID	both	1426 mL	76 mL	9	ARGENTINA, CANADA, CHILE, COLOMBIA, EL SALVADOR, HONG KONG, JAPAN, PANAMA, PERU,
Positive amplification controls	PCR	both	5.2 mL	0.25mL	1	EL SALVADOR,
Extraction controls	PCR	both	135mL	6mL	1	EL SALVADOR,
Proficiency test panels (avian and swine)	PCR	both	1000mL	10mL	1	CHILE,
Proficiency test panels (12 samples 1 ml each)	AGID	both	2256mL	48mL	3	ARGENTINA, CHILE, JAPAN,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

Not applicable

TOR3: NEW PROCEDURES

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

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
Characterization PCR targeting the NP gene of Genoflu genotype B3.13	n/a
Validation of the NP ELISA for bovine milk and serum	pending

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?

No

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

No

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

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

No

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

No

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:
NVSL works with another unit within USDA for distribution of analyzed data. https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections

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:
Published in reports at https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza

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:

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Youk, Sungsu, et al. "Novel reassortant H2N2 low pathogenic avian influenza virus in live bird markets in the Northeastern United States, 2019-2023." Avian Pathology (2024): 1-7.

Tawidian, Patil, et al. "Genotypic Clustering of H5N1 Avian Influenza Viruses in North America Evaluated by Ordination Analysis." Viruses 16.12 (2024): 1818.

Baker, Amy L., et al. "Dairy cows inoculated with highly pathogenic avian influenza virus H5N1." Nature (2024): 1-3.

Ahlstrom, Christina A., et al. "Genomic characterization of highly pathogenic H5 avian influenza viruses from Alaska during 2022 provides evidence for genotype-specific trends of spatiotemporal and interspecies dissemination." Emerging Microbes & Infections 13.1 (2024): 2406291.

Stimmelmayr, Raphaela, et al. "Highly pathogenic avian influenza virus A (H5N1) clade 2.3. 4.4 b infection in free-ranging polar bear, Alaska, USA." Emerging Infectious Diseases 30.8 (2024): 1660.

Prosser, Diann J., et al. "Using an adaptive modeling framework to identify avian influenza spillover risk at the wild-domestic interface." Scientific Reports 14.1 (2024): 14199.

Welch JL, et al. Inactivation of highly transmissible livestock and avian viruses including influenza A and Newcastle disease virus for molecular diagnostics. Front Vet Sci. 2024 Mar 7;11:1304022. doi: 10.3389/fvets.2024.1304022. PMID: 38515532; PMCID: PMC10955088.

Nguyen, Thao-Quyen, et al. "Emergence and interstate spread of highly pathogenic avian influenza A (H5N1) in dairy cattle." bioRxiv (2024): 2024-05.

Hall, Victoria, et al. "Surveillance for highly pathogenic avian influenza A (H5N1) in a raptor rehabilitation center—2022." Plos one 19.4 (2024): e0299330.

Lee, Dong-Hun, et al. "Genome sequences of haemagglutinin cleavage site predict the pathogenicity phenotype of avian influenza virus: statistically validated data for facilitating rapid declarations and reducing reliance on in vivo testing." Avian Pathology (2024): 1-5.

b) International conferences:

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October 2024: European Union Reference Laboratory (EURL) OIE Avian Influenza and Newcastle disease

September 2024: Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet) (virtual)

c) National conferences:

1

February 2024: VIRTUAL Live Bird Market Working Group Meeting

October 2024: United States Animal Health Association and American Association of Veterinary Laboratory Diagnosticians Annual Meeting

June 2024: National Poultry Improvement Program Biennial General Conference Committee Meeting
Aug 2024: NPIP Diagnostic Workshop in Georgia
June 2023 NIH Influenza Meeting

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

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World Organisation for Animal Heath and Food and Animal Organization (OFFLU) Avian influenza virus technical activity teleconferences and WHO Vaccine Compsition meeting preparation
HPAI sequencing at monthly National Animal Health Assembly teleconference
American College of Veterinary Microbiologists: HPAI Update: https://www.acvm.us/
Webinar - HPAI in dairy cattle - Overview from the dairy sector June 2024
Update on HPAI in the US for GF-TADS

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
American Association for Laboratory Accreditation (A2LA)	pdf	A2LA Biological Testing Certificate_2024.pdf
American Association for Laboratory Accreditation (A2LA)	pdf	A2LA PT Certificate_2024.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
AGID Hemagglutination-inhibition Neuraminidase-inhibition Real-Time RT-PCR Virus Isolation In vivo pathogenicity (IVPI)	A2LA; ISO 17025 Biological Testing

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

Yes

Biosafety, Security and Incident Response Plan and Biological Risk Assessments: NVSL-MAN-0018 and NVSL-WI-1207

TOR9: SCIENTIFIC MEETINGS

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

No

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

No

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. Do you network (collaborate or share information) with other WOAH Reference Laboratories designated for the same pathogen?

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS
OFFLU	Participant and Committee member	11	https://www.offlu.org/index.php/participatinglaboratories/

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen during the past 2 years?

Yes

Purpose of the proficiency test:	Role of your Reference Laboratory (organiser/ participant)	No. participating Laboratories	Participating WOAH Ref. Labs/ organising WOAH Ref Lab
Detection and subtyping	Participant	unknown	National Veterinary Services Laboratories / Animal and Plant Health Agency (APHA)quality assurance unit (Vetqas)
Detection and subtyping	Participant	unknown	OFFLU

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
Studies in Poultry Transmission, Airborne Spread and Mitigation Tools for Avian Influenza and Newcastle Disease in the USA	Interagency agreement	USDA ARS National Poultry Center Southeast Poultry Research Laboratory
Genetic characteristics of zoonotic influenza viruses	Data contributions to OFFLU for the twice yearly WHO Vaccine Composition Consultations	WOAH Reference Laboratories for Animal Influenza

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 during the past 2 years?

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the test	WOAH Member Countries
Administered by NVSL and required to conduct official testing in the U.S.; shipped internationally by request	Administered by NVSL and required to conduct official testing in the U.S.	293	PCR and serology	ARGENTINA, CHILE, JAPAN, UNITED STATES OF AMERICA,

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

Yes

During 2024, some testing and many activities were impacted by the ongoing H5 2.3.4.4b HPAI outbreak affecting wild birds and poultry with sporadic spilllovers into mammals as well as the spillover event in dairy which required onboarding new tests for new sample types. "The IAV viruses characterized from U.S. poultry during 2024 were predominantly Eurasian lineage goose/Guangdong H5N1 clade 2.3.4.4b. Representative sequences have been uploaded to public databases. Refer to https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/2022-hpai

Q27 Proficiency testing rounds for approved-NAHLN laboratories alternate yearly for AI/ND. 2024 is an AI year, out of cycle AI PTs were also provided as needed. "