

# WOAH Reference Laboratory Reports Activities 2023

## Activities in 2023

This report has been submitted : 14 juin 2024 16:38

### Laboratory Information

<b>Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:</b>	Avian influenza
<b>Address of laboratory:</b>	WOAH Reference Laboratory for Avian Influenza, Istituto Zooprofilattico Sperimentale delle Venezie (IZSve) Viale dell'Università 10 – 35020 Legnaro (PD) - Italy
<b>Tel.:</b>	+39-049 808 4381
<b>E-mail address:</b>	imonne@izsvenezie.it
<b>Website:</b>	www.izsvenezie.it
<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Calogero Terregino, Director of the Research and Development Department, Director of the Specialized Virology and Experimental Research, Acting Director of the Virology Department (IZSve)
<b>Name (including Title and Position) of WOAH Reference Expert:</b>	Isabella Monne, DVM PhD, Head of the Viral genomics and transcriptomics Laboratory, Division of Research and Innovation
<b>Which of the following defines your laboratory? Check all that apply:</b>	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	
		Nationally	Internationally
<b>Indirect diagnostic tests</b>			
Haemoagglutination inhibition (HI)		19321	6
Neuraminidase inhibition		3	0
C-ELISA (AI-type A)		17243	1
AGID		0	0
Microneutralization		6	0
<b>Direct diagnostic tests</b>			
Virus Isolation		29	26
RRT/RT-PCR		33238	2651
Sequencing of HA gene		59	42
IVPI - Intravenous Pathogenicity Index		0	2
WGS - Whole Genome Sequencing		184	328

### 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 WOA Members?

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TEST	PRODUCED/ PROVIDE	AMOUNT SUPPLIED NATIONALLY (ML, MG)	AMOUNT SUPPLIED INTERNATIONALLY (ML, MG)	NO. OF RECIPIENT WOA MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
Control positive antigens	HI serological test	12740/3450 ml	503 ml	2947 ml	39	ALBANIA, ALGERIA, AUSTRIA, BELGIUM, BULGARIA, COLOMBIA, CROATIA, CYPRUS, CZECH REPUBLIC, DENMARK, ECUADOR, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, IRELAND, ISRAEL, ITALY, KOSOVO, LATVIA, MEXICO, MOLDOVA, NORTH MACEDONIA (REP. OF), NORWAY, POLAND, ROMANIA, SERBIA, SIERRA LEONE, SLOVENIA, SPAIN, SWEDEN, SWITZERLAND, TUNISIA, TURKEY, UKRAINE, UNITED ARAB EMIRATES, UNITED KINGDOM, ZIMBABWE,
Control positive sera	HI/AGID serological test	2333/1602 ml	290 ml	1312 ml	35	ALBANIA, ALGERIA, AUSTRIA, BELGIUM, BULGARIA, COLOMBIA, CYPRUS, CZECH REPUBLIC, ECUADOR, FINLAND, FRANCE, GERMANY, GREECE, IRELAND, ISRAEL, ITALY, JORDAN, KOSOVO, LATVIA, MOLDOVA, NORTH MACEDONIA (REP. OF), NORWAY, POLAND, ROMANIA, SERBIA, SIERRA LEONE, SLOVENIA, SPAIN, SWEDEN, THAILAND, TUNISIA, TURKEY, UKRAINE, UNITED ARAB EMIRATES, ZIMBABWE,
Control negative serum	HI serological test	2060/322 ml	33 ml	289 ml	14	ALGERIA, FINLAND, GREECE, ITALY, JORDAN, KOSOVO, MOLDOVA, POLAND, PORTUGAL, ROMANIA, SIERRA LEONE, SPAIN, UNITED KINGDOM, ZIMBABWE,

## 4. Did your laboratory produce vaccines?

No

## 5. Did your laboratory supply vaccines to WOA 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 WOAHS Standards for the designated pathogen or disease?

Yes

NAME OF THE NEW TEST OR DIAGNOSTIC METHOD DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
HA and NA subtyping of Avian influenza virus by real-time RT-PCR (Hassan et al., 2022; James et al., 2018; Hoffmann et al., 2016) (Released on 28/09/23). Please note: this SOP was validated and not developed by the RL	<a href="https://www.izsvenezie.com/documents/reference-laboratories/avian-influenza/diagnostic-protocols/sop-vir-1004.pdf">https://www.izsvenezie.com/documents/reference-laboratories/avian-influenza/diagnostic-protocols/sop-vir-1004.pdf</a>
Molecular pathotyping and phylotyping of eurasian H5 avian influenza virus by Real-time RT-PCR	SOP available upon request contacting dsbio.izsve@izsvenezie.it

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

No

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

No

## TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOAHS 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
BULGARIA	2023-11-29	Real Time PCR	0	57
CROATIA	2023-06-15	Real Time PCR	0	22
CYPRUS	2023-11-17	Real Time PCR Sequencing	0	10
ESTONIA	2023-04-07	Real Time PCR RT PCR Sequencing	0	1
FINLAND	2023-07-20	Real Time PCR RT PCR	0	16
FINLAND	2023-08-01	Real Time PCR RT PCR	0	12
FINLAND	2023-08-01	Real Time PCR RT PCR	0	22
GUINEA	2023-08-07	Real Time PCR RT PCR Sequencing	0	25
IRELAND	2023-08-29	Real Time PCR RT PCR	0	14
LATVIA	2023-09-28	Real Time PCR RT PCR	0	21
LIBYA	2023-02-23	Real Time PCR	0	14
MALTA	2023-11-30	Real Time PCR ELISA	0	13
MALTA	2023-03-29	Real Time PCR	0	37
MALTA	2023-08-28	Real Time PCR	0	24
MOZAMBIQUE	2023-12-22	Real Time PCR RT PCR Isolation	0	14
NIGER	2023-04-21	Real Time PCR	0	38
NIGERIA	2023-02-28	Real Time PCR RT PCR Sequencing	0	11
NIGERIA	2023-09-12	Real Time PCR RT PCR Sequencing	0	120
NORWAY	2023-10-27	Real Time PCR	0	3
POLAND	2023-07-19	Real Time PCR RT PCR	0	21
PORTUGAL	2023-07-20	Real Time PCR Isolation IVPI HI	0	2
ROMANIA	2023-11-21	Real Time PCR	0	4
ROMANIA	2023-02-14	Real Time PCR	0	13
ROMANIA	2023-02-22	Real Time PCR	0	12
SENEGAL	2023-04-21	Real Time PCR	0	13

SENEGAL	2023-06-23	Real Time PCR RT PCR	0	9
SLOVAKIA	2023-03-02	Real Time PCR	0	12
SLOVENIA	2023-11-21	Real Time PCR	0	23
SLOVENIA	2023-03-10	Real Time PCR	0	18
SPAIN	2023-03-02	Real Time PCR	0	8
SPAIN	2023-07-14	Real Time PCR	0	22
SWITZERLAND	2023-03-23	Real Time PCR	0	5
SWITZERLAND	2023-01-24	Real Time PCR Isolation IVPI	0	3
TOGO	2023-08-31	Real Time PCR	0	13
GAMBIA	2023-06-23	Real Time PCR RT PCR	0	3

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

Yes

NAME OF THE WOA MEMBER COUNTRY RECEIVING A TECHNICAL CONSULTANCY	PURPOSE	HOW THE ADVICE WAS PROVIDED
AUSTRIA	Provided clarifications on disease-specific sampling procedure in a specific poultry category; Recommendations for sample preparation; provided SOP 1000: "Sample preparation and nucleic acids isolation for the detection and typing of Avian influenza virus and Avian Orthoavulavirus type 1 by molecular methods"; In compliance with the current EU regulations, indications provided on the application of IVPI (January and May-December 2023)	Remote assistance (email and Mattermost platform : open source messaging platform)
BELGIUM	Provided information on protocols for H5-pathotyping by realtime RT-PCR for this specific genome; SOP VIR 1005 "Molecular pathotyping and phylotyping of Eurasian H5 avian influenza virus by Real-Time RT-PCR" was also forwarded (February 2023)	Remote assistance (email)
FRANCE	Recommended methods for H5N1 detection in mammals by RT-qPCR and a conventional RT-PCR. <a href="https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/">https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/</a> (July 2023)	Remote assistance (email)
GERMANY	Provided information on the updated list of target species (source: EFSA) to be included in the wild bird surveillance programme; Opinion provided on possible validation of reference material and serological tests for the detection of AIVs in non-conventional species (fox, mink, etc.). (March and October 2023)	Remote assistance (email and Mattermost platform)
HUNGARY	Provided validation documentation of SOP VIR 063 (detection and pathotyping of avian orthoavulavirus type 1 (AOAV-1) by ONE-STEP RT-PCR and Sanger sequencing of the fusion protein cleavage site) (March 2023)	Remote assistance (email)
IRELAND	Clarification regarding protocols: SOP VIR 018 "Detection of type A Avian influenza virus by real-time RT-PCR »; SOP VIR 144 « Detection of Eurasian H7 Avian influenza virus by real-time RT-PCR"; SOP VIR143 "Detection of Eurasian H5 Avian influenza virus by real-time RT-PCR" <a href="https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/">https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/</a> ; Provided advice on how to collect samples from mammals (September 2023)	Remote assistance (email and calls)
LATVIA	Provided the IZSve guidelines "Guidance for genomic monitoring of Avian Influenza Virus » (July 2023)	Remote assistance (email)
LUXEMBOURG	Advice on how to carry out serological tests taking the minimum amount of blood needed from birds (November 2023)	Remote assistance (email)
MOLDOVA	Provided clarifications on how to perform the Analytical specificity (ASp) parameter, to complete the validation steps for the detection of H5 subtype by Real Time PCR; Clarifications on alternative methods for the detection of H5 and H7 subtypes were provided. (September 2023)	Remote assistance (email)
	Provided clarifications on the results of the Proficiency Testing	

NORWAY	AI/ND 2023 (July 2023)	Remote assistance (email)
POLAND	Following a specific request, the declaration of validation for SOP VIR 1005 SOP VIR 1005 "Molecular pathotyping and phylotyping of Eurasian H5 Avian Influenza virus by real-time PCR" was provided (February 2023)	Remote assistance (email)
PORTUGAL	Following a specific request, the declaration of validation for SOP VIR 151 "Detection of Avian Orthoavulavirus type 1 (AOAV-1) by real-time RT-PCR" was provided (March 2023) <a href="https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/">https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/</a>	Remote assistance (email)
UNITED KINGDOM	Opinion on the performance of SOP VIR 1004 HA and NA subtyping of Avian influenza virus by real-time RT-PCR (Hassan et al., 2022; James et al., 2018; Hoffmann et al., 2016) for N1s detection (October 2023)	Remote assistance (email)
UNITED STATES OF AMERICA	Provided details on the pan-H9 assay method in use at the EURL: SOP VIR 014 "Detection of H9 Avian influenza virus by real-time RT-PCR" <a href="https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/">https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/</a> ; Clarifications on the RT-qPCR assay for fast phylo-/pathotyping of H5 positive samples employed at the IZSve (March and August 2023)	Remote assistance (email)
MOZAMBIQUE	Provided technical advice for the definition of suitable molecular methods as well as for the identification of reagents to be used for detection of H7 avian influenza viruses circulating in the Southern African regions (October 2023)	Remote assistance (email)
ROMANIA	Opinion on the performance of specific tests and standard procedures for the detection of AIV genome (February 2023)	Remote assistance (email)
BULGARIA CROATIA DENMARK ESTONIA FINLAND FRANCE GAMBIA GUINEA IRELAND LATVIA LUXEMBOURG MOZAMBIQUE NIGER NIGERIA NORWAY POLAND PORTUGAL ROMANIA SENEGAL SLOVAKIA SLOVENIA SPAIN SWEDEN SWITZERLAND TOGO	The RL supported the European and African NRLs in performing genetic characterization analyses and in the process of interpreting results	Remote assistance

## TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

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

Yes

Title of the study	Duration	PURPOSE OF THE STUDY	PARTNERS (INSTITUTIONS)	WOAHP MEMBER COUNTRIES INVOLVED OTHER THAN YOUR COUNTRY
EFSA - Working Group on Avian Influenza	(for the time needed)	Avian influenza surveillance	European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden; Wageningen Bioveterinary Research, Netherlands. Erasmus MC, Rotterdam, the Netherlands Anses (French Agency for Food, Environmental and Occupational Health & Safety) Ploufragan, France Friedrich-Loeffler-Institut, Germany.	FRANCE GERMANY ITALY SWEDEN THE NETHERLANDS
Working group on HPAI vaccination "WG/U/ALPHA/2018/04 - EFSA SWG avian influenza"	(for the time needed)	<a href="https://open.efsa.europa.eu/scientific-panel/2">https://open.efsa.europa.eu/scientific-panel/2</a>	FLI Friedrich- Loeffler- Institut (Germany) ; Erasmus University Medical Center (Rotterdam) ; Estonian University of Life Sciences (Estonia); INRAE Institut national de la recherche agronomique (France); ANSES: French Agency for Food, Environmental and Occupational Health & Safety (France); EMA European Medicines Agency (The Netherlands) WOAHP <a href="https://open.efsa.europa.eu/working-group/300000012783073">https://open.efsa.europa.eu/working-group/300000012783073</a>	ESTONIA FRANCE GERMANY THE NETHERLANDS
Memorandum of Understanding: Studies on general avian virology and genetics	2019-2024	Exchange of scientists and Technicians through short to medium term missions; sharing knowledge and expertise	Avian Virology and Immunology service of Sciensano (Belgium) Reference Laboratory for Avian Influenza	BELGIUM

Memorandum of Understanding: Research studies relating to zoonotic viral agents including animal influenza viruses	2019-2024	Research collaborations for diagnostic and scientific purposes with reference to animal and human viral agents, including influenza viruses	The Institute of Veterinary Science (IVS), University of Liverpool, UK	ITALY UNITED KINGDOM
OFFLU Vaccination Composition Meeting	(for the time needed)	The aim of the network is to identify animal influenza viruses with zoonotic potential, and to speed up production of human vaccines against zoonotic influenza, or pandemic viruses that have emerged from animals and that could have negatively impact on humans	Global network of expertise on animal influenza	BRAZIL CANADA CHINA (PEOPLE'S REP. OF) EGYPT GERMANY INDIA ITALY JAPAN KOREA (REP. OF) UNITED KINGDOM
Novel test approaches to determine efficacy and potency of irradiated vaccines against avian influenza viruses	(for the time needed)	The action is part of a broader research project D32037 "Novel test Approaches to Determine Efficacy and Potency of Irradiated and Other Vaccines".	IAEA - Austria	AUSTRIA ITALY
Memorandum of Understanding	2022-2027	Collaborative studies and implementation of projects on animal health, zoonotic diseases and food safety.	The National Research Center for Tropical and Transboundary Diseases - LIBYA	ITALY LIBYA
A global harmonized classification and nomenclature system for A/H9 influenza viruses. With technical expertise and leadership of the OFFLU network (WOAH-FAO Animal Influenza Expert Network)	2023	With the technical expertise and leadership of the OFFLU network (WOAH-FAO Animal Influenza Expert Network), the RL worked together with a group of international experts on influenza A viruses to provide a practical lineage classification and nomenclature system based on the analysis of 10,638 hemagglutinin sequences from A/H9 AIVs sampled worldwide were developed.	1. National Key Laboratory of Veterinary Public Health and Safety, Key Laboratory for Prevention and Control of Avian Influenza and Other Major Poultry Diseases, Ministry of Agriculture and Rural Affairs, College of Veterinary Medicine, China Agricultural University, Beijing, China. 2. Roslin Institute, University of Edinburgh, Edinburgh, UK. 3. NHC Key Laboratory of Biosafety, National Institute for Viral Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China. 4. School of Public Health, The University of Hong Kong, Hong Kong, China. 5. Laboratory of Data Discovery for Health (D24H), Hong Kong Science Park, Hong Kong, China. 6. Center for the Ecology of Infectious Diseases, Department of Infectious Diseases, Department of Epidemiology and Biostatistics, & Institute of Bioinformatics, University of Georgia, Athens, Georgia, USA. 7. CAS Key Laboratory of Pathogen Microbiology and Immunology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China. And The International H9 Evolution Consortium	AUSTRALIA CAMBODIA CHINA (PEOPLE'S REP. OF) JAPAN KOREA (REP. OF) SOUTH AFRICA UNITED KINGDOM UNITED STATES OF AMERICA
KAPPA-FLU Horizon	2023-2027	Understanding the connectivity and dynamics of avian influenza	1. Friedrich-Loeffler-Institut (FLI), GERMANY 2. Department of Viroscience of the ERASMUS University Medical Center (ERASMUS MC), NETHERLANDS 3. Linnaeus University (LNU), SWEDEN 4. Istituto Zooprofilattico Sperimentale delle Venezie (IZSVE), ITALY 5. Swiss Ornithological Institute (SWISS OI), SWITZERLAND (associated partner) 6. Animal and Plant Health Agency (DEFRA-APHA), UNITED KINGDOM (associated partner) 7. Royal Veterinary College (RVC), UNITED KINGDOM (associated partner) 8. Canadian Food Inspection Agency (CFIA), CANADA (collaborating partner) 9. School of Public Health, The University of Hong Kong (HKU), HONG KONG (collaborating partner) 10. St. Jude Children's Research Hospital (ST JUDE), UNITED STATES (collaborating partner) 11. The Icelandic Food and Veterinary Authority (MAST), ICELAND (collaborating partner)	CANADA GERMANY HONG KONG ICELAND ITALY SWEDEN SWITZERLAND THE NETHERLANDS UNITED KINGDOM UNITED STATES OF AMERICA
			1. INRAE INRAE - Ecole nationale veterinaire de	

FLU-SWITCH ICRAD	April 2023- March 2026	Identification of factors driving the emergence and spread of avian influenza viruses with zoonotic potential	Toulous (France) 2. Friedrich-Loeffler-Institut. Institute of Molecular Virology and Cell Biology. (Germany) 3. Utrecht Institute for Pharmaceutical Science. Chemical Biology & Drug Discovery. (Netherlands) 4. The University of Edinburgh. The Roslin Institute. (UK) 5. Animal and Plant Health Agency. Virology (UK) 6. University of Warsaw. Centre of New Technologies. (Poland) 7. Izmir Biomedicine and 8. Genome Center. Technological Research Program/Emerging Viral Diseases Laboratory (Turkey)	FRANCE GERMANY ITALY POLAND THE NETHERLANDS TURKEY UNITED KINGDOM
POC4AIV ICRAD	2023-2025	Preventing zoonoses by screening Avian Influenza Virus (AIV) in wildlife birds and poultry using a novel rapid point of care system. <a href="https://www.era-learn.eu/network-information/networks/icrad/one-health-approach-to-zoonoses-research-and-innovation/preventing-zoonoses-by-screening-avian-influenza-virus-aiv-in-wildlife-birds-and-poultry-using-a-novel-rapid-point-of-care-system">https://www.era-learn.eu/network-information/networks/icrad/one-health-approach-to-zoonoses-research-and-innovation/preventing-zoonoses-by-screening-avian-influenza-virus-aiv-in-wildlife-birds-and-poultry-using-a-novel-rapid-point-of-care-system</a>	1. Danish Technical University (Denmark) 2. Nicolaus Copernicus University in Toruń (Poland) 3. Institute for Food Safety, Animal Health and the Environment 'BIOR' (Latvia) 4. Estonian University of Life Sciences (Estonia) 5. IVBIO Technology Inc. (Turkey) 6. French Agency for Food, Environmental and Occupational Health & Safety (France) 7. DNA Diagnostic A/S (Denmark)	DENMARK ESTONIA FRANCE ITALY LATVIA POLAND TURKEY
Outbreak of highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b virus in cats, Poland, June to July 2023	2023	<a href="https://pubmed.ncbi.nlm.nih.gov/37535474/">https://pubmed.ncbi.nlm.nih.gov/37535474/</a>	Outbreak of highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b virus in cats, Poland, June to July 2023 <a href="https://pubmed.ncbi.nlm.nih.gov/37535474/">https://pubmed.ncbi.nlm.nih.gov/37535474/</a> Department of Poultry Diseases, National Veterinary Research Institute, Puławy, Poland; Department of Omic Analyses, National Veterinary Research Institute, Puławy, Poland; Department of Veterinary Hygiene, Gdańsk, Poland; Department of Epizootiology and Clinic of Infectious Diseases, Faculty of Veterinary Medicine, University of Life Sciences, Lublin, Poland; Department of Preclinical Sciences and Infectious Diseases, University of Life Sciences, Poznan, Poland;	POLAND
Emergence and Persistent Circulation of Highly Pathogenic Avian Influenza Virus A (H5N8) in Kosovo, May 2021- May 2022	2023	<a href="https://www.mdpi.com/2076-2607/11/9/2226">https://www.mdpi.com/2076-2607/11/9/2226</a>	Kosovo Food and Veterinary Agency, Industrial Zone, Prishtina, Kosovo UBT—Higher Education Institution, Lagjja Kalabria, Prishtina, Kosovo Veterinary Institute, Faculty of Veterinary Medicine in Skopje, Ss. Cyril and Methodius University in Skopje, North Macedonia Agricultural and Veterinary Faculty, University of Prishtina, Kosovo	KOSOVO NORTH MACEDONIA (REP. OF)
Highly pathogenic avian influenza A (H5N1) virus infections in wild carnivores connected to mass mortalities of pheasants in Finland	2023	<a href="https://pubmed.ncbi.nlm.nih.gov/36889484/">https://pubmed.ncbi.nlm.nih.gov/36889484/</a>	Finnish Food Authority, Animal Health Diagnostic Unit, Helsinki	FINLAND
OFFLU - AIM Avian Influenza Matching (WOAH-FAO)	(for the time needed)	OFFLU-AIM is designed to provide information on possible antigenic changes in HPAI viruses that could reduce their effectiveness.	1. CSIRO Australian Centre for Disease Preparedness AUSTRALIA 2. Laboratório Federal de Defesa Agropecuária em Sao Paulo BRAZIL 3. National Avian Influenza Reference Laboratory, Animal Influenza Laboratory of the Ministry of Agriculture CHINA 4. Canadian Food Inspection Agency National Centre for Foreign Animal Disease CANADA 5. Reference Laboratory for Veterinary Quality Control on Poultry Production Animal Health Research Institute EGYPT 6. Friedrich Loeffler Institute Federal Research Institute for Animal Health GERMANY 7. Hokkaido University, Research Center for Zoonosis Control JAPAN 8. Indian Council of Agricultural Research (ICAR) INDIA 9. Animal	AUSTRALIA BRAZIL CANADA CHINA (PEOPLE'S REP. OF) EGYPT GERMANY INDIA JAPAN KOREA (REP. OF) UNITED KINGDOM UNITED STATES OF AMERICA

and Plant Quarantine Agency SOUTH KOREA 10.  
Animal and Plant Health Agency UK 11.  
National Veterinary Services Laboratories,  
USDA, APHIS USA

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

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:

- 1) National surveillance programmes for avian influenza: i) National/regional surveillance programmes following the European Commission's technical advice with reference to the circulation of avian influenza viruses in domestic species; ii) Active surveillance programmes for avian influenza virus infections in wild birds and analysis of avian fecal samples from the environment, in collaboration with the Italian National Institute for Environmental Protection and Research (ISPRA); iii) National passive surveillance programmes in wild birds.
- 2) Sample diagnostic and epidemiologic metadata accompanied by virus genetic data from European and Western African countries

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:

- 1) National Information Systems: regular reporting of epidemiological data to the Italian Ministry of Health and the EU Commission.
- 2) EU Commission, EFSA, ECDC: providing technical and scientific expertise on the phenotypic and genotypic characterization of influenza viruses; contributing to the official epidemiological reports on avian influenza in Europe.
- 3) OFFLU VCM network: identification of animal influenza viruses with zoonotic potential; speeding up production of human vaccines against zoonotic influenza, or pandemic viruses that have emerged from animals and that could negatively impact on humans. The RL generated and provided HA sequences from 355 AI viruses of the H3,H5 and H9 subtypes.
- 4) Reporting results of molecular, epidemiological and diagnostic analyses to the EU NRLs by email and/or through Mattermost, which enables and encourages safe team collaboration and enhances cooperation between veterinary/public health laboratories and scientists from the European Union (EU).
- 5) In November 2022 the IZSve launched the EURL Avian Flu Data Portal, an informative web application where all the main official data about epidemic of High Pathogenicity Avian Influenza (HPAI) in Europe are collected. Accessible data are retrieved from ADIS – Animal Disease Information System, the European Union official system used by Member States to send immediate notifications and follow-ups about infectious animal diseases.  
<https://www.izsvenezie.com/eurl-avian-flu-data-portal/>

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:

20

- güero M., Monne I., Sánchez A., Zecchin B., Fusaro A., Ruano M.J., Arrojo M.d.V., Fernández-Antonio R., Souto A.M., Tordable P., Cañas J., Bonfante F., Giussani E., Terregino C., Orejas J.J. (2023) Highly pathogenic avian influenza A(H5N1) virus infection in farmed minks, Spain, October 2022. *Eurosurveillance* 2023 Jan 28(3):2300001. <https://doi.org/10.2807/1560-7917.ES.2023.28.3.2300001>
2. Agüero M., Monne I., Sánchez A., Zecchin B., Fusaro A., Ruano M.J., Del Valle Arrojo M., Fernández-Antonio R., Souto A.M., Tordable P., Cañas J., Bonfante F., Giussani E., Terregino C., Orejas J.J. (2023) Authors' response: Highly pathogenic influenza A(H5N1) viruses in farmed mink outbreak contain a disrupted second sialic acid binding site in neuraminidase, similar to human influenza A viruses. *Euro Surveill* 28(7):2300109. doi: 10.2807/1560-7917.ES.2023.28.7.2300109.
3. Auer A., Panzarin V., Monne I., Crimauddo M., Angot A., Gourlaouen M., Lamien C.E., Cattoli G. (2023) Comparative Assessment of Lyophilized and wet Reagents for the Molecular Detection of H5N1 High Pathogenic Avian Influenza Virus and H9N2 Low Pathogenic Avian Influenza Virus. *J.Virol.Methods* :114686
4. Cana A., Zecchin B., Merovci X., Fusaro A., Giussani E., Heta S., Krstevski K., Mehmetkaj D., Goga I., Hulaj B., Murati B., Terregino C., Dodovski A. (2023) Emergence and Persistent Circulation of Highly Pathogenic Avian Influenza Virus A (H5N8) in Kosovo, May 2021-May 2022. *Microorganisms* 11(9):2226.
5. Domańska-Blicharz K., Świętoń E., Świętalska A., Monne I., Fusaro A., Tarasiuk K., Wyróstek K., Styś-Fijoł N., Giza A., Pietruk M., Zechchin B., Pastori A., Adaszek Ł., Pomorska-Mól M., Tomczyk G., Terregino C., Winiarczyk S. (2023) Outbreak of highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b virus in cats, Poland, June to July 2023. *Euro Surveill* 28(31):2300366.
6. European Food Safety Authority, European Centre for Disease Prevention and Control, European Union Reference Laboratory for Avian Influenza, Adlhoeh C., Fusaro A.,



- Gonzales J.L., Kuiken T, Marangon S., Niqueux É, Staubach C., Terregino C., Aznar I., Guajardo I.M., Baldinelli F. (2023) Avian influenza overview September - December 2022. *EFSA J* 21(1):e07786.
7. European Food Safety Authority, European Centre for Disease Prevention and Control, European Union Reference Laboratory for Avian Influenza, Adlhoch C., Fusaro A., Gonzales J.L., Kuiken T, Marangon S., Mirinavičiūtė G., Niqueux É, Stahl K., Staubach C., Terregino C., Broglia A., Baldinelli F. (2023) Avian influenza overview December 2022 - March 2023. *EFSA J* 21(3):e07917.
8. European Food Safety Authority, European Centre for Disease Prevention and Control, European Union Reference Laboratory for Avian Influenza, Adlhoch C., Fusaro A., Gonzales J.L., Kuiken T, Mirinavičiūtė G., Niqueux É, Stahl K., Staubach C., Terregino C., Broglia A., Kohnle L., Baldinelli F. (2023) Avian influenza overview March - April 2023. *EFSA J* 21(6):e08039.
9. European Food Safety Authority, European Centre for Disease Prevention and Control, European Union Reference Laboratory for Avian Influenza, Adlhoch C., Fusaro A., Gonzales J.L., Kuiken T, Melidou A., Mirinavičiūtė G., Niqueux É, Ståhl K., Staubach C., Terregino C., Baldinelli F., Broglia A., Kohnle L. (2023) Avian influenza overview April - June 2023. *EFSA J* 21(7):e08191.
10. European Food Safety Authority, European Centre for Disease Prevention and Control, European Union Reference Laboratory for Avian Influenza, Cornelia Adlhoch, Alice Fusaro, José L Gonzales, Thijs Kuiken, Gražina Mirinavičiūtė, Éric Niqueux, Christoph Staubach, Calogero Terregino, Francesca Baldinelli, Alessia Rusinà and Lisa Kohnle. (2023) Avian influenza overview June - September. *EFSA J*, doi: 10.2903/j.efsa.2023.8328
11. EFSA (European Food Safety Authority), ECDC (European Centre for Disease Prevention and Control), EURL (European Union Reference Laboratory for Avian Influenza), Adlhoch C, Fusaro A, Gonzales JL, Kuiken T, Mirinavičiūtė G, Niqueux É, Ståhl K, Staubach C, Terregino C, Willgert K, Baldinelli F, Chuzhakina K, Delacourt R, Georganas A, Georgiev M and Kohnle L. (2023). Scientific report: Avian influenza overview September–December 2023. *EFSA Journal* 2023; 21(12): 8539, 62 pp. <https://doi.org/10.2903/j.efsa.2023.8539>
12. EFSA Panel on Animal Health and Animal Welfare (AHAW), European Union Reference Laboratory for Avian Influenza; Nielsen SS, Alvarez J, Bicout DJ, Calistri P, Canali E, Drewe JA, Garin-Bastuji B, Gonzales Rojas JL, Gortázar C, Herskin M, Michel V, Miranda Chueca MÁ, Padalino B, Roberts HC, Spooler H, Stahl K, Velarde A, Winckler C, Bastino E, Bortolami A, Guinat C, Harder T, Stegeman A, Terregino C, Aznar Asensio I, Mur L, Broglia A, Baldinelli F, Viltrop A. (2023). Vaccination of poultry against highly pathogenic avian influenza - part 1. Available vaccines and vaccination strategies. *EFSA J*. 2023 Oct 10;21(10):e08271. doi: 10.2903/j.efsa.2023.8271.
13. Fornasiero D., Fusaro A., Zecchin B., Mazzucato M., Scolamacchia F., Manca G., Terregino C., Dorotea T., Mulatti P. (2023) Integration of Epidemiological and Genomic Data to Investigate H5N1 HPAI Outbreaks in Northern Italy in 2021-2022. *Pathogens* 12(1):100.
14. Harder, T., de Wit, S., Gonzales, J.L., Ho, J.H.P., Mulatti, P., Prajitno, T.Y., & Stegeman, A. (2023). Epidemiology-driven approaches to surveillance in HPAI-vaccinated poultry flocks aiming to demonstrate freedom from circulating HPAIV. *83 Biologicals, Academic Press* doi:10.1016/j.biologicals.2023.101694
15. Meseko C., Milani A., Inuwa B., Chinyere C., Shittu I., Ahmed J., Giussani E., Palumbo E., Zecchin B., Bonfante F., Maniero S., Angot A., Niang M., Fusaro A., Gobbo F., Terregino C., Olosaju T., Monne I., Muhammad M. (2023) The Evolution of Highly Pathogenic Avian Influenza A (H5) in Poultry in Nigeria, 2021-2022. *Viruses* 15(6):1387.
16. Moreno A., Bonfante F., Bortolami A., Cassaniti I., Caruana A., Cottini V., Cereda D., Farioli M., Fusaro A., Lavazza A., Lecchini P., Lelli D., Maroni Ponti A., Nassuato C., Pastori A., Rovida F., Ruocco L., Sordilli M., Baldanti F., Terregino C. (2023) Asymptomatic infection with clade 2.3.4.4b highly pathogenic avian influenza A(H5N1) in carnivore pets, Italy, April 2023. *Euro Surveill* 28(35):2300441.
17. Pinto R.M., Bakshi S., Lytras S., Zakaria M.K., Swingler S., Worrell J.C., Herder V, Hargrave K.E., Varjak M., Cameron-Ruiz N., Collados Rodriguez M., Varela M., Wickenhagen A., Loney C., Pei Y., Hughes J., Valette E., Turnbull M.L., Fumon W, Gu Q, Orr L, Taggart A., Diebold O., Davis C., Boutell C., Grey F., Hutchinson E., Digard P, Monne I., Wootton S.K., MacLeod M.K.L., Wilson S.J., Palmirani M. (2023) BTN3A3 evasion promotes the zoonotic potential of influenza A viruses. *Nature* 619(7969):338-347.
18. Rosone F., Bonfante F., Sala M.G., Maniero S., Cersini A., Ricci I., Garofalo L., Caciolo D., Denisi A., Napolitan A., Parente M., Zecchin B., Terregino C., Scicluna M.T. (2023) Seroconversion of a Swine Herd in a Free-Range Rural Multi-Species Farm against HPAI H5N1 2.3.4.4b Clade Virus. *Microorganisms* 11(5):1162.
19. Rota P., La Rocca P., Bonfante F., Pagliari M., Piccoli M., Cirillo F., Ghiroldi A., Franco V., Pappone C., Allevi P., Anastasia L. (2023) Design, Synthesis, and Antiviral Evaluation of Sialic Acid Derivatives as Inhibitors of Newcastle Disease Virus Hemagglutinin-Neuraminidase: A Translational Study on Human Parainfluenza Viruses. *ACS Infect Dis* 9(3):617-630.
20. Tammiranta N., Isomursu M., Fusaro A., Nylund M., Nokireki T., Giussani E., Zecchin B., Terregino C., Gadd T. (2023) Highly pathogenic avian influenza A (H5N1) virus infections in wild carnivores connected to mass mortalities of pheasants in Finland. *Infect Genet Evol* 111:105423.

## b) International conferences:

7

1. Fusaro, A. (2023). HPAI H5 of clade 2.3.4.4b in Europe and beyond – why trends of virus evolution are more difficult to predict. 16th International Conference on Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases, Dresden, Germany 14-17 November 2023
2. Fusaro, A. (2023). Genetic data analysis of the HPAI H5N1 viruses circulating in Europe – EURL. Joint ECDC, EFSA and EURL breakfast seminar on avian influenza viruses, online meeting 01 August 2023
3. Monne, I. (2023). Highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b viruses in Europe: an evolving scenario. Symposium on Avian influenza organized by the APQA - Animal and Plant Quarantine Agency – Korea. 10-15 September 2023 (online meeting)
4. B. Zecchin, A. Fusaro, A. Pastori, E. Giussani, E. Palumbo, A. Salviato, C. Terregino, I. Monne (2023). Exploiting genetic information to investigate the zoonotic potential and origin of a highly pathogenic avian influenza A(H5N1) virus identified at a mink farm in Spain. 8th European Congress of Virology 2023, European Society for Virology, Gdansk, Poland, 03-07 May 2023
5. B. Zecchin, A. Fusaro, A. Pastori, E. Palumbo, A. Salviato, A. Schivo, E. Giussani, F. Gobbo, A. Bortolami, I. Monne, C. Terregino (2023). Genetic diversity of HPAI A(H5) viruses across the last three epidemic waves in Italy, 2020-2023\* (poster). 9th ESWI Influenza Conference, Valencia, Spain, 16-21 September 2023
6. L. Vianello, A. Bortolami, L. Baraldo, E. Mazzacan, D. Facco, S. Maniero, C. Terregino, F. Bonfante (2023). The protective efficacy of homologous and heterologous prime-boost vaccination regimens against H5N1 HPAI in fattening turkeys. XXII<sup>nd</sup> World Veterinary Poultry Association (WVPA) Congress, September 4-8, 2023 in Verona.
7. I. Monne (2023). Avian influenza: the only certainty is change. XXII<sup>nd</sup> World Veterinary Poultry Association (WVPA) Congress, September 4-8, 2023 in Verona.

## c) National conferences:

5

- Terregino, C., Manca, G., Spada, A., Mulatti, P. (2023) Disentangling the role of wild bird species in Avian Influenza transmission to poultry (R06). *GeoVet 2023 International Conference, Silvi Marina, Teramo, Italy, 19 – 21 September 2023*

2. Bianca Zecchin, Isabella Monne, Ambra Pastori, Diletta Fornasiero, Francesca Scolamacchia, Paolo Mulatti, Annalisa Salviato, Edoardo Giussani, Alessio Bortolami, Calogero Terregino, Alice Fusaro. (2023) *The changing pattern of three epidemic waves of HPAI A(H5) viruses in Italy, 2020-2023*. 9th International Conference on Infectious Disease Dynamics, 28 November-01 December 2023, Bologna Italy
3. Fusaro A., Zecchin B., Giussani ;E., Pastori A., Palumbo E., Agüero-García M., Bachofen C., Ádám Bálint ;, Beerens N., Briand F., Brown I., Brugger B., Cana A., Christodoulou V., Dirbakova Z., Fagulha T., Fouchier R.A.M., Garza-Cuartero L., Georgiades G., Gjerset B., Grasland B., Groza O., Timm Harder ;., Henriques M., Charlotte ;., Hjulager K., Ivanova E., Krivko L., Lika A., Péter ;., Mcmenamy M.J., Nagy A., Nurmoja I., Onita I., Pohlmann A., Pridotkas G., Revilla-Fernandez S., Sánchez-Sánchez A., Savic V., Slavec B., Krzysztof Smietanka ;., Snoeck C., Steensels M., Swieton ;.E., Tammiranta N., Tinak M., Van Borm S., Zohari S., Monne I., Terregino C. (28 November - 1 December) *Highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b viruses in Europe: an evolving scenario*. 19th International Conference on Infectious Disease Dynamics Highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b viruses in Europe: an evolving scenario. 9th International Conference on Infectious Disease Dynamics, 28 November-01 December 2023, Bologna Italy
4. Mazzucato, M., Roncalli, G., Fornasiero, D., Martelli, L., Scolamacchia, F., Terregino, C., Manca, G., Serra, L. & Mulatti, P. (2023). *Spatial dynamics of mallard ducks (Anas platyrhynchos) and their potential role in the spread of Avian Influenza in Italy* (P06. 7). *GeoVet 2023 International Conference, Silvi Marina, Teramo, Italy, 19 – 21 September 2023*
5. Monne, I. (2023) *Highly pathogenic avian influenza A(H5N1) clade 2.3.4.4b viruses in Europe: an evolving scenario*. Symposium on Avian influenza organised by APQA - Animal and Plant Quarantine Agency Gimcheon, South Korea, 11-14 September 2023

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

48

Reports produced by OFFLU in collaboration with the RL experts (n°3)

1. OFFLU avian influenza matching (OFFLU-AIM) report (October 2023)

<https://www.offlu.org/wp-content/uploads/2023/11/OFFLU-AIM-REPORT-2023.pdf>

2. OFFLU avian data package for the VCM (February to September 2023)

<https://www.offlu.org/wp-content/uploads/2023/10/Avian-OFFLU-VCM-S23-OFFLU-V6-VCM-OFFLU.pdf>

3. OFFLU Annual Report 2022 (Published in May 2023)

[https://www.offlu.org/wp-content/uploads/2023/05/OFFLU\\_Annual\\_Report\\_2022.pdf](https://www.offlu.org/wp-content/uploads/2023/05/OFFLU_Annual_Report_2022.pdf)

Guidelines produced by the RL (n°1)

« Guidelines and minimum requirements for diagnosis of H5NX HPAI infection in mammals »

<https://www.izsvenezie.com/documents/reference-laboratories/avian-influenza/diagnostic-protocols/guidelines-diagnosis-h5nx-mammals.pdf>

<https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/>

Article in national journals (n°1)

Terregino C., Decaro N. (2023) *Virus H5N1 nei carnivori: il punto della situazione*. *La Settimana Veterinaria* N° 1293 13/09/2023, pgg. 26-28.

Articles in international journals (5)

1. *Incredibly concerning': Bird flu outbreak at Spanish mink farm triggers pandemic fears* (articolo a cura di Science 24/01/2023)

<https://www.science.org/content/article/incredibly-concerning-bird-flu-outbreak-spanish-mink-farm-triggers-pandemic-fears>

2. *Mink on a Spanish farm caught bird flu. Is the virus adapting to mammals?* (articolo a cura del Bulletin of the Atomic Scientists 26/01/2023)

<https://www.izsvenezie.it/documenti/comunicazione/area-stampa/rassegna-stampa/2023/2023-01/2023-01-26-bulletin-atomic-scientists.pdf>

3. Monne I (a cura di Al Jazeera 16/02/2023)

*Will bird flu spark the next pandemic?"*

<https://www.izsvenezie.it/documenti/comunicazione/area-stampa/rassegna-stampa/2023/2023-02/2023-02-16-al-jazeera.pdf>

4. *Smittefabrikker* (articolo a cura di Weekendavisen – Danimarca 10/02/2023)

<https://www.izsvenezie.it/documenti/comunicazione/area-stampa/rassegna-stampa/2023/2023-02/2023-02-10-weekend-avisen.pdf>

5. *Bird Flu Outbreak Puts Mink Farms Back in the Spotlight* (articolo a cura di The New York Times 08/02/23)

<https://www.izsvenezie.it/documenti/comunicazione/area-stampa/rassegna-stampa/2023/2023-02/2023-02-07-new-york-times.pdf>

Genetic reports produced by the EURL and shared on the Mattermost Platform (n°5):

Reports updating the gene composition of the AI viruses circulating in Europe (available at the IZSve)

EURL team at IZSve (n° 15 presentations on a total of 21)

Presentations from the 29th Annual Meeting of the National Reference Laboratories for Avian Influenza and Newcastle Disease of European Union Member States (October 2023)

<https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/workshops/>

International Training course organised by Academy World - International Society of Antimicrobial Chemotherapy – ISAC (1 presentation)

Monne, I. « H5N1 and animal health: expansion and impacts on wildlife conservation » 06/12/2023.

<https://www.youtube.com/watch?v=oeOULaLn73Y>

<https://www.isac.world/meetings/webinars/h5n1-avian-influenza>

International Training course organised by IAEA NT/5/157 TC Project - Supporting National and Regional Capacity in Integrated Action for Control of Zoonotic Diseases Virtual Training (1 presentation) Monne, I. « Avian Influenza virus (AIV) in Africa » (21/06/2023)

National Training courses organised by IZSve (2 courses, 7 presentations on avian influenza)

1. Updates on avian influenza addressed to the diagnostic laboratories of the national surveillance network (15/12/2023)

<https://izsvenezie.it/documenti/formazione/corsi-convegni/2023/2023-12-15-aggiornamenti-influenza-aviaria/programma.pdf>

2. Updates on emerging and re-emerging diseases at the animal-human interface (07/12/2023)

<https://www.izsvenezie.it/documenti/formazione/corsi-convegni/2023/2023-12-07-aggiornamenti-malattie-emergenti/programma.pdf>

Links accessible at the IZSve website (n°7):

Diagnostic protocols

<https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/diagnostic-protocols/>

New interactive dashboard for the weekly AI updates in Europe

<https://eurlaidata.izsvenezie.it/>

WOAH & FAO activities

<https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/woah-fao-activities/>

Avian influenza in Europe update

<https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/europe-update/>

[https://food.ec.europa.eu/animals/animal-diseases/diseases-and-control-measures/avian-influenza\\_it#emergency\\_and\\_control\\_measures](https://food.ec.europa.eu/animals/animal-diseases/diseases-and-control-measures/avian-influenza_it#emergency_and_control_measures)

European Union Reference Laboratory (EURL) for Avian Influenza and Newcastle Disease

<http://www.izsvenezie.com/reference-laboratories/avian-influenza-and-newcastle-disease/>

EVA-GLOBAL Biobank

<https://www.izsvenezie.com/izsve-veterinary-biobank-and-the-oie-collaborating-centre-for-veterinary-biological-biobank/>

<https://www.european-virus-archive.com/>

Integrated Services for Infectious Disease Outbreak Research (ISIDORE)

<https://www.izsvenezie.it/progetto-isidore/>

Links to other websites (n°2):

EFSA - Avian influenza

<https://www.efsa.europa.eu/en/topics/topic/avian-influenza#published-on-this-topic>

WOAH –FAO OFFLU - Network of expertise on animal influenza

<https://www.offlu.org/>

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 7

d) Internships (>1 month) 0

Type of technical training provided (a, b, c or d)	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
C	ITALY	1
C	KOSOVO	2
C	MONTENEGRO	2
C	UNITED KINGDOM	1
C	FRANCE	1

## TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
UNI CEI EN ISO/IEC 17025:2018	pdf	1_ACCREDIA Certificato di accreditamento Laboratori di prova 17025.pdf
UNI CEI EN ISO/IEC 17043:2010	pdf	3_Certificato accreditamento PT provider 17043.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Avian Influenza Viruses Antibodies agar gel immunodiffusion test	ACCREDIA – Italian Accreditation System
Avian Influenza Viruses Antibodies hemagglutination assay	ACCREDIA – Italian Accreditation System
Avian Influenza Virus Antibodies serological enzyme-linked immunosorbent assay (ELISA)	ACCREDIA – Italian Accreditation System
Avian Influenza Viruses isolation and differential diagnosis	ACCREDIA – Italian Accreditation System
Detection of type A avian influenza virus by Real-Time Reverse Transcriptase PCR	ACCREDIA – Italian Accreditation System
Avian Influenza Virus subtype H5 RT-PCR	ACCREDIA – Italian Accreditation System
Avian Influenza Virus H5 sequence analysis	ACCREDIA – Italian Accreditation System
Avian Influenza Virus subtype H7 RT-PCR	ACCREDIA – Italian Accreditation System
Avian Influenza Virus H7 sequence analysis	ACCREDIA – Italian Accreditation System
Avian Influenza virus subtype H5 rRT-PCR	ACCREDIA – Italian Accreditation System
Avian Influenza Virus subtype H7 rRT-PCR	ACCREDIA – Italian Accreditation System
Proficiency testing provider	ACCREDIA – Italian Accreditation System

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

Yes

The RL implements Biorisk management actions to prevent diseases among personnel and to protect the community from harm caused by potentially infectious pathogens. Particular attention is also paid to the safe transport management of infectious substances according to IATA guidelines and UN classification system. Agents (pathogenic or infectious organisms) posing moderate hazards to personnel and the environment are handled under BSL-2 conditions. The use of PPE, including lab coats, gloves, eye protection, and — in some cases — face shields is mandatory. On the contrary, highly pathogenic avian influenza (HPAI) viruses are handled and cultured under BSL-3 conditions. At IZSVe, since 2013, there exists a Biosafety Committee responsible for the following tasks: - Evaluation of the safety risks for workers and for the environment connected to the activities to be performed under BSL3 conditions that involves the use of microorganisms, animals and Genetically Modified Microorganisms MOGM; - Evaluation of the emergency procedures - Evaluation of all the management and operative procedures to be applied inside the BSL-3 laboratory and animal facilities including potential biosecurity issues. All Standard Operative Procedures (SOPs) and handling of pathogens are written and performed accordingly to the WHO Laboratory Biosafety Manual (4th Ed.). The BSL-3 laboratory and animal facilities are maintained regularly to ensure biocontainment during an annual suspension of activities for plant and equipment maintenance following decontamination of the premises. All the BSL-3 facilities are equipped with self-closing set of locking doors with access away from general building corridors and access is restricted and controlled at all times as part of the internal biosecurity measures.

## TOR9: SCIENTIFIC MEETINGS

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

No

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

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
WOAH-FAO VCM Influenza vaccine composition	2023-05-20	Geneva (Switzerland)	Participation in meeting as expert	//
WOAH-FAO VCM Influenza vaccine composition	2023-09-25	Geneva (Switzerland)	Participation in meeting as expert	//

## TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

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

Yes

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

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOA REF. LABS
OFFLU - joint WOA-FAO scientific network on animal influenza	Participant	0	For n° of participants and WOA ref. labs participants, refer to <a href="https://www.offlu.org/index.php/participatinglaboratories/">https://www.offlu.org/index.php/participatinglaboratories/</a>
OFFLU VCM- The aim of the network is to identify animal influenza viruses with zoonotic potential, and to speed up production of human vaccines against zoonotic influenza, or pandemic viruses that have emerged from animals and that could have negatively impact on humans.	Participant	0	For n° of participants and WOA ref. labs participants, refer to <a href="https://www.offlu.org/">https://www.offlu.org/</a> <a href="https://bulletin.woa.org/?panorama=03-3-2020-2_offlu">https://bulletin.woa.org/?panorama=03-3-2020-2_offlu</a>

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

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOA REF. LABS/ ORGANISING WOA REF. LAB.
European Proficiency Test on Avian influenza and Newcastle disease Serological, Virological and Molecular tests	Organiser	Forty-one (41) laboratories : twenty-six (26) EU National reference Laboratories (NRLs) and twelve (15) Non-EU NRLs (including four (4) from EFTA countries)	• Friedrich Loeffler Institute, Federal Research Institute for Animal Health Institute of Diagnostic Virology (Germany); • Animal and Plant Health Agency Weybridge (UK) (detailed Information and Final coded report available at the IZSVe)
OFFLU Proficiency Test on Avian influenza: Molecular test APHA Proficiency Test on Avian influenza: Molecular, Serological and Virological tests	Participant	Information available from the organiser (OFFLU consortium) Information available from the organiser	Australian Centre for Disease Preparedness CSIRO 5 Portarlington Road Private Bag 24 (Ryrie Street) Geelong 3220, Victoria AUSTRALIA The Animal and Plant Health Agency (APHA) Surrey, UK;
APHA Proficiency Test on Avian influenza and Newcastle disease: Molecular, Serological and Virological tests	Participant	Information available from the organiser	The Animal and Plant Health Agency (APHA) Surrey, UK;

26. Did your laboratory collaborate with other WOA 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 WOA REFERENCE LABORATORIES
OFFLU VCM Consultation on the Composition of Influenza Virus Vaccines for the Northern Hemisphere. (biannual meeting held at WHO headquarter, Geneva – Switzerland)	Antigenic and genetic characteristics of zoonotic influenza viruses and candidate vaccine viruses developed for potential use in human vaccines Twice a year, the WHO organises consultations with an advisory group of experts to analyse influenza virus surveillance data and issue recommendations on the composition of the influenza vaccines for the following season.	1) EU Reference Laboratory, the Animal and Plant Health Agency (APHA) Surrey, UK; 2) National Avian Influenza Reference Laboratory Animal Influenza Laboratory of the Ministry of Agriculture, Harbin People's Rep. of China; 3) Hokkaido University Research Center for Zoonosis Control, Sapporo, Japan; 4) Indian Council of Agricultural Research (ICAR) National Institute of High Security Animal Diseases (NIHSAD), Bhopal, India. See also <a href="https://www.offlu.org/index.php/oie-fao-reference-laboratories-and-experts-for-highly-pathogenic-avian-influenza-and-low-pathogenic-avian-influenza-poultry/">https://www.offlu.org/index.php/oie-fao-reference-laboratories-and-experts-for-highly-pathogenic-avian-influenza-and-low-pathogenic-avian-influenza-poultry/</a>
European Food Safety Authority	The laboratory provides technical and scientific advice to the European Commission, EFSA, and ECDC with	

European Food Safety Authority (EFSA) EFSA Panel on Animal Health and Welfare (AHAW) - WG on Avian Influenza	particular reference to the genetic and phenotypic characteristics of circulating strains; contributes to EFSA's periodic reports on the epidemiological situation of Avian Influenza in Europe	Friedrich- Loeffler- Institut (FLI) (Germany) See also <a href="https://www.efsa.europa.eu/en/topics/topic/avian-influenza">https://www.efsa.europa.eu/en/topics/topic/avian-influenza</a>
OFFLU - AIM Avian Influenza Matching (WOAH-FAO)	OFFLU-AIM is designed to provide information on possible antigenic changes in HPAI viruses that could reduce their effectiveness.	1. CSIRO Australian Centre for Disease Preparedness AUSTRALIA 2. Laboratório Federal de Defesa Agropecuária em Sao Paulo BRAZIL 3. National Avian Influenza Reference Laboratory, Animal Influenza Laboratory of the Ministry of Agriculture CHINA 4. Canadian Food Inspection Agency National Centre for Foreign Animal Disease CANADA 5. Reference Laboratory for Veterinary Quality Control on Poultry Production Animal Health Research Institute EGYPT 6. Friedrich Loeffler Institute Federal Research Institute for Animal Health GERMANY 7. Hokkaido University, Research Center for Zoonosis Control JAPAN 8. Indian Council of Agricultural Research (ICAR) INDIA 9. Animal and Plant Quarantine Agency SOUTH KOREA 10. Animal and Plant Health Agency UK 11. National Veterinary Services Laboratories, USDA, APHIS USA
FLU-SWITCH ICRAD	Identification of factors driving the emergence and spread of avian influenza viruses with zoonotic potential	1. Friedrich-Loeffler-Institut. Institute of Molecular. Virology and Cell Biology. (Germany) 2. Animal and Plant Health Agency. Virology (UK)
KAPPA-FLU Horizon	Understanding the connectivity and dynamics of avian influenza	1. Friedrich-Loeffler-Institut. Institute of Molecular. Virology and Cell Biology. (Germany) 2. Animal and Plant Health Agency. Virology (UK) 3. Canadian Food Inspection Agency (CFIA), CANADA

## TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

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

Yes

Purpose for inter-laboratory test comparisons <sup>1</sup>	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the Test	WOAH Member Countries
National Proficiency Test for Avian Influenza and Newcastle Disease	Organiser	20	Serological, Virological and Molecular tests	ITALY,
Proficiency Test on Avian influenza	Participant Organised by GD Animal Health (The Netherlands)	0	Serological test Number of participants: Information available from the organiser	

## TOR12: EXPERT CONSULTANTS

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

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
Coordinating WOA experts in revising Chapter 3.3.4 of the WOA Manual of Diagnostic Tests and Vaccines	Remote assistance	Avian influenza and high pathogenicity avian influenza viruses
Zoonotic influenza in the European region (twice a month)	Online meetings	To update Institutions on avian influenza in Europe. Data and information provided to WOA and WHO
WHO-FAO OFFLU - Worldwide Network of Expertise on avian influenza	Online meeting	To share information on the global spread of avian influenza viruses and on avian influenza outbreaks in Europe, with a wider view on animal influenza viruses in a One Health perspective. Participation in meeting, Rome 02-04/05/2023
WHO-FAO VCM - To identify animal influenza viruses with zoonotic potential and to speed up the production of human vaccines against zoonotic influenza 1. OFFLU avian data package for the VCM (February to September 2023) <a href="https://www.offlu.org/wp-content/uploads/2023/10/Avian-OFFLU-VCM-S23-OFFLU-V6-VCM-OFFLU.pdf">https://www.offlu.org/wp-content/uploads/2023/10/Avian-OFFLU-VCM-S23-OFFLU-V6-VCM-OFFLU.pdf</a> 2. OFFLU avian influenza matching (OFFLU-AIM) report (October 2023) <a href="https://www.offlu.org/wp-">https://www.offlu.org/wp-</a>	Remote assistance Participation in meeting	Influenza vaccine composition Participation in 2 meetings: Geneva (Switzerland) 20-25/02/2023 25-29/09/2023

content/uploads/2023/11/OFFLU-AIM-REPORT-2023.pdf

29. Additional comments regarding your report:

Yes

*TOR 7, Query 17, the RL provided further training to:*

*- b seminar: 80 participants from European and extra European countries at the 29th Annual Meeting of the National Reference Laboratories for Avian Influenza and Newcastle Disease of European Union Member States (02-02/10/2023 – Parma, Italy);*

*TOR 10, Query 24: It is not possible to enter the exact number of participants, we therefore indicated «0». Please refer to the related network websites*

*TOR 11, Query 27: It is not possible to enter the exact number of participants at the PT organised by GD Animal Health as this information shall be provided by the organiser*