

# WOAH Reference Laboratory Reports Activities 2023

## Activities in 2023

This report has been submitted : 1 juillet 2024 10:37

### 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>	Animal and Plant Health Agency, Weybridge, Addlestone, Surrey KT15 3NB, United Kingdom
<b>Tel.:</b>	02082069680
<b>E-mail address:</b>	Ian.Brown@apha.gov.uk
<b>Website:</b>	<a href="https://www.gov.uk/government/organisations/animal-and-plant-health-agency">https://www.gov.uk/government/organisations/animal-and-plant-health-agency</a>
<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Mr David Holdsworth, Chief Executive
<b>Name (including Title and Position) of WOAH Reference Expert:</b>	Professor Ian Brown, Director of Woah/FAO International Reference Laboratory for Avian Influenza, Newcastle Disease and Swine Influenza
<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>			
HI		13569	70
AGID		6612	0
ELISA		0	0
<b>Direct diagnostic tests</b>			
Real-time RT-PCR M gene		10539	2627
Real-time RT-PCR H5		1024	1628
Real-Time RT-PCR H5 Pathotyping		17268	349
H5 genetic analyses by Sanger sequencing		92	0
Real-time RT-PCR N5		27	0
Real-time RT-PCR N6		3	0
Real-time RT-PCR N7		0	0
Real-time RT-PCR N8		9	0

Real-time RT-PCR N9		0	0
Real-time RT-PCR N1		6817	237
Real-time RT-PCR H7		520	1
H7 genetic analyses by Sanger sequencing		0	0
Real-time RT-PCR H9		0	2395
Next Generation Sequencing		293	161
Egg inoculation/HA		429	345
IVPI		2	0

## TOR2: REFERENCE MATERIAL

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

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOA?H 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?H MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
Antisera	HI	Provided	65ml	169ml	7	GERMANY, ITALY, LITHUANIA, PHILIPPINES, SINGAPORE, SWEDEN, UNITED KINGDOM,
Antigen	HI	Provided	379ml	527ml	6	ITALY, LITHUANIA, PHILIPPINES, UNITED KINGDOM, UNITED STATES OF AMERICA, VIETNAM,
RNA	RT-PCR	Provided	0ml	> 1ml	1	SIERRA LEONE,

4. Did your laboratory produce vaccines?

No

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

No

## TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOA?H 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
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COUNTRY	DATE	TESTS	RESULTS	STATUS
CHAD	2023-08-08	Real-time RT-PCR M gene	12	0
BANGLADESH	2023-04-13	Real-time RT-PCR M gene; Real-time RT-PCR H9; Real-time RT-PCR H5	0	2395
FALKLAND (ISLANDS)	2023-11-11	Real-time RT-PCR M gene; Real-time RT-PCR H5 Pathotyping; Real-time RT-PCR N1	185	0
NEPAL	2023-08-24	Real-time RT-PCR M gene	0	5
GHANA	2023-03-09	Real-time RT-PCR M gene; Real-time RT-PCR H5 Pathotyping; Real-time RT-PCR N1; Real-time RT-PCR H5	30	0

## 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
	ARMENIA	Offer of Assistance	Email
	AZERBAIJAN	PT Scheme Participant	NA
	BANGLADESH	Diagnostic Testing/Research	Email
	BANGLADESH	NGS Training	In-country Workshop
	BANGLADESH	PT Scheme Participant	NA
	BOTSWANA	PT Scheme Participant	NA
	CAMBODIA	PT Scheme Participant	NA
	CAYMAN (ISLANDS)	Offer of Assistance	Email
	CHAD	Diagnostic Testing	Email
	CHILE	Offer of Assistance	Email
	COLOMBIA	Offer of Assistance	Email
	COTE D'IVOIRE	Offer of Assistance	Email
	CROATIA	PT Scheme Participant	NA
	ECUADOR	Offer of Assistance	Email
	EGYPT	PT Scheme Participant	NA
	ETHIOPIA	Offer of Assistance	Email
	ETHIOPIA	PT Scheme Participant	NA
	GEORGIA	PT Scheme Participant	NA
	GERMANY	PT Scheme Participant	NA
	GHANA	Diagnostic Testing/Research	Email
	GHANA	PT Scheme Participant	NA
	INDIA	Offer of Assistance	Email
	ISRAEL	PT Scheme Participant	NA
	ITALY	PT Scheme Participant	NA
	JAPAN	Exchange of materials	Email
	KAZAKHSTAN	PT Scheme Participant	NA
	KAZAKHSTAN	WOAH Twinning	E-mail
	LIBERIA	Offer of Assistance	Email & Online meeting
	MALI	Offer of Assistance	Email
	UNITED KINGDOM	PT Scheme Participant	NA
	NIGERIA	Offer of Assistance, Research	Email
	NIGERIA	PT Scheme Participant	NA
	SENEGAL	Offer of Assistance	Email
	SIERRA LEONE	Offer of Assistance	Email & In-person meeting
	SOUTH AFRICA	PT Scheme Participant	NA
	SPAIN	PT Scheme Participant	NA
	SRI LANKA	Offer of Assistance	Email
	SWEDEN	Provision of Advice	Email
	TAJIKISTAN	PT Scheme Participant	NA
	TAJIKISTAN	Offer of Assistance, Molecular Training	Email, In-person meetings, Workshop
	THAILAND	Offer of Assistance (Audit)	Offer of Assistance (Audit)

TRINIDAD AND TOBAGO	Offer of Assistance	Email
TURKEY	PT Scheme Participant	NA
UKRAINE	Offer of Assistance	Email
VIETNAM	Offer of Assistance	Email

## 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
UK Ministry of Defence (MOD) Biothreat reduction programme (BTRP)	2022-2026	Establishing a West African network for laboratory capability in avian influenza and Newcastle disease virus: Developing capability and capacity to define disease burden.	APHA, various laboratories across West Africa including Mali, Sierra Leone, Ghana, Liberia and Guinea	GHANA GUINEA LIBERIA MALI SIERRA LEONE
Development of a Central Asian hub for AI and NDV	2020-2024	Organization of a workshop and technical support to Tajikistan – evaluating the current burden of avian influenza and Newcastle disease virus across Central Asia.	UK Ministry of Defence	TAJIKISTAN
One Health Poultry Hub	2019-2024	Hub researchers are characterising the networks through which chickens are produced and chickens and chicken products distributed to identify points of high disease risk as well as where and how interventions to mitigate disease risk are best made. Hub researchers are assessing how pathogens and genes can transmit between chickens and from chickens to people and back again - focusing in particular on how this is influenced by how chickens are kept and traded. This is vital information to inform potential interventions. <a href="https://www.onehealthpoultry.org">https://www.onehealthpoultry.org</a>	Our Hub is led by the Royal Veterinary College (RVC) London, and comprises partners in Asia, Europe and the UK. 27 partners in total. Key focus for programme Vietnam, India, Sri Lanka and Bangladesh. This project has enabled a significant increase in the amount of genomic data generated for H9 and H5 subtype avian influenza viruses	BANGLADESH VIETNAM
OFFLU VCM	Ongoing - annual	APHA has carried out testing and contributed reagents, data and expertise to the biannual WHO VCM activities.	OFFLU network	AUSTRALIA ITALY UNITED STATES OF AMERICA
Centers of Excellence for Influenza Research and response (CEIRR)	2021-2029	Development of pipelines for evaluation of the emergence of avian influenza viruses of pre-pandemic or pandemic risk. CEIRR Network ( <a href="http://ceirr-network.org">ceirr-network.org</a> )	NIAID funded programme. APHA supported via interactions with Royal Veterinary College (RVC) and PennCEIRR.	BANGLADESH UNITED STATES OF AMERICA
Avian influenza matching (AIM)	2022-2025	Antigenic characterisation of emerging HP- and LPAIV H5Nx viruses to inform vaccine matching.	Alongside FAO through OFFLU interactions this consortium includes: IZSVE, Italy Francis Crick Institute, UK CSIRO, Australia USDA, USA	AUSTRALIA ITALY UNITED STATES OF AMERICA
Flu-Switch: Identification of factors driving the emergence and spread of avian influenza viruses with zoonotic potential	2023-2026	International coordination of research on infectious animal diseases (ICRAD) This project aims to identify the factors that contribute to the evolution of AIV pathogenicity in poultry, and subsequent increased zoonotic potential that shapes its host range with the goal of defining risk factors to crossing species barriers.	Roslin institute, Edinburgh, UK Friedrich-Loeffler-Institut, Insel, Riems Animal and Plant Health Agency, Weybridge Linnaeus University Instituto Zooprofilattico Sperimentale delle Venezie All led by: Ecole nationale vétérinaire de Toulouse	FRANCE GERMANY ITALY SWEDEN
Kappa-Flu: Ecology and biology of HPAIV H5	2023-2026	HORIZON-FARM2FORK Aims at understanding the connectivity and dynamics of H5 HPAI in wild birds, poultry and the environment, including the impact of climate change.	Friedrich-Loeffler-Institut, Insel, Riems; Erasmus Universitair Medisch Centrum, Rotterdam; Animal and Plant Health Agency, Weybridge; Linnaeus University; Instituto Zooprofilattico Sperimentale	GERMANY ITALY SWEDEN SWITZERLAND THE NETHERLANDS

			delle Venezie; Royal Veterinary College, University of London; Swiss Ornithological Institute (SOI);	
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13. In exercising your activities, have you identified any regulatory research needs\* relevant for WOA?H?

Yes

### Research need : 1

**Please type the Research need:** We have undertaken some work to reduce the time for egg passage and diagnostic evaluation which will shorten the impact of premises being under restriction. This will be published soon and will need adding to the WOA?H manual.

**Relevance for WOA?H** Disease Control, Animal Welfare,

**Relevance for the Codes or Manual** Manual,

**Field** Diagnostics,

**Animal Category** Terrestrial,

**Disease:**

Avian influenza

**Kind of disease (Zoonosis, Transboundary diseases)** Zoonosis, Transboundary diseases,

**If any, please specify relevance for Codes or Manual, chapter and title**

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

**Answer:** Chapter 3.3.4. Avian influenza (including infection with HIGH PATHOGENICITY avian influenza viruses)

**Notes:**

**Answer:**

## 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:

Collection and characterisation of a range of AIV samples including meta data within the UK and internationally to provide an epidemiological picture of global disease spread.

Characterisation of AIV samples collected in Bangladesh from various studies associated with projects under Centers of Excellence for Influenza Research and response (CEIRR) and the One Health Poultry Hub.

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:

An analysis of the epidemiological data, collected nationally and internationally, was disseminated through governmental outputs, and in peer-reviewed publications, detailing the evolution of AIV and epidemiological picture with relation to the globally situation.

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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*1. Bennison, Ashley, Alexander M. P. Byrne, Scott M. Reid, Joshua G. Lynton-Jenkins, Benjamin Mollett, Dilhani De Sliva, Jacob Peers-Dent, Kim Finlayson, Rosamund Hall, Freya Blockley, Marcia Blyth, Marco Falchieri, Zoe Fowler, Elaine M. Fitzcharles, Ian H. Brown, Joe James, and Ashley C. Banyard. "Detection and Spread of High Pathogenicity Avian Influenza Virus H5n1 in the Antarctic Region." BioRxiv (2023): 2023.11.23.568045. <https://dx.doi.org/10.1101/2023.11.23.568045>.*

2. Lane, Jude V, Jana WE Jeglinski, Stephanie Avery-Gomm, Elmar Ballstaedt, Ashley C Banyard, Tatsiana Barychka, Ian H Brown, Brigitte Brugger, Tori V Burt, Noah Careen, Johan HF Castenschield, Signe Christensen-Dalsgaard, Shannon Clifford, Sydney M Collins, Emma Cunningham, Jóhannis Danielsen, Francis Daunt, Kyle JN d'Entremont, Parker Doiron, Steven Duffy, Matthew D English, Marco Falchieri, Jolene Giacinti, Britt Gjerset, Silje Granstad, David Grémillet, Magella Guillemette, Gunnar T Hallgrímsson, Keith C Hamer, Sjúrdur Hammer, Katherine Harrison, Justin D Hart, Ciaran Hatsell, Richard Humpidge, Joe James, Audrey Jenkinson, Mark Jessopp, Megan EB Jones, Stéphane Lair, Thomas Lewis, Alexandra A Malinowska, Aly McCluskie, Gretchen McPhail, Børge Moe, William A Montevecchi, Greg Morgan, Caroline Nichol, Craig Nisbet, Bergur Olsen, Jennifer Provencher, Pascal Provost, Alex Purdie, Jean-François Rail, Greg Robertson, Yannick Seyer, Maggie Sheddan, Catherine Soos, Nia Stephens, Hallvard Strøm, Vilhjálmur Svansson, T David Tierney, Glen Tyler, Tom Wade, Sarah Wanless, Christopher RE Ward, Sabina Wilhelm, Saskia Wischnewski, Lucy J Wright, Bernie Zonfrillo, Jason Matthiopoulos, and Stephen C Votier. "High Pathogenicity Avian Influenza (H5N1) in Northern Gannets: Global Spread, Clinical Signs, and Demographic Consequences." *BioRxiv* (2023): 2023.05.01.538918. <https://dx.doi.org/10.1101/2023.05.01.538918>.
3. Alkie, Tamiru N., Alexander M. P. Byrne, Megan E. B. Jones, Benjamin C. Mollett, Laura Bourque, Oliver Lung, Joe James, Carmencita Yason, Ashley C. Banyard, Daniel Sullivan, Anthony V. Signore, Andrew S. Lang, Meghan Baker, Beverly Dawe, Ian H. Brown, and Yohannes Berhane. "Recurring Trans-Atlantic Incursion of Clade 2.3.4.4b H5N1 Viruses by Long Distance Migratory Birds from Northern Europe to Canada in 2022/2023." *Viruses* 15, no. 9 (2023): 1836. <https://www.mdpi.com/1999-4915/15/9/1836>.
4. Byrne, Alexander M. P., Joe James, Benjamin C. Mollett, Stephanie M. Meyer, Thomas Lewis, Magdalena Czepiel, Amanda H. Seekings, Sahar Mahmood, Saumya S. Thomas, Craig S. Ross, Dominic J. F. Byrne, Michael J. McMenemy, Valerie Bailie, Ken Lemon, Rowena D. E. Hansen, Marco Falchieri, Nicola S. Lewis, Scott M. Reid, Ian H. Brown, and Ashley C. Banyard. "Investigating the Genetic Diversity of H5 Avian Influenza Viruses in the United Kingdom from 2020–2022." *Microbiology Spectrum* 11, no. 4 (2023): e04776-22. <https://dx.doi.org/doi:10.1128/spectrum.04776-22>.
5. Cantoni, Diego, Martin Mayora-Neto, Mariliza Dervení, Kelly da Costa, Joanne Del Rosario, Veronica O. Ameh, Claude T. Sabeta, Bethany Auld, Arran Hamlet, Ian M. Jones, Edward Wright, Simon D. Scott, Efstathios S. Giotis, Ashley C. Banyard, and Nigel Temperton. "Serological Evidence of Virus Infection in Eidolon Helvum Fruit Bats: Implications for Bushmeat Consumption in Nigeria." *Brief Research Report, Frontiers in Public Health* 11 (2023-November-27 2023). <https://dx.doi.org/10.3389/fpubh.2023.1283113>.
6. Carnegie, L, M Hasan, R Mahmud, M A Hoque, N Debnath, M H Uddin, N S Lewis, I Brown, S Essen, Md Giasuddin, D U Pfeiffer, M A Samad, P Biswas, J Raghwaní, G Fournié, and S C Hill. "H9N2 Avian Influenza Virus Dispersal Along Bangladeshi Poultry Trading Networks." *Virus Evolution* 9, no. 1 (2023). Accessed 1/4/2024. <https://dx.doi.org/10.1093/ve/vead014>.
7. Furness, Robert W., Sheila C. Gear, Kees C. J. Camphuysen, Glen Tyler, Dilhani de Silva, Caroline J. Warren, Joe James, Scott M. Reid, and Ashley C. Banyard. "Environmental Samples Test Negative for Avian Influenza Virus H5N1 Four Months after Mass Mortality at a Seabird Colony." *Pathogens* 12, no. 4 (2023): 584. <https://www.mdpi.com/2076-0817/12/4/584>.
8. James, Joe, Elizabeth Billington, Caroline J. Warren, Dilhani De Silva, Cecilia Di Genova, Maisie Airey, Stephanie M. Meyer, Thomas Lewis, Jacob Peers-Dent, Saumya S. Thomas, Abigail Lofts, Natalia Furman, Alejandro Nunez, Marek J. Slomka, Ian H. Brown, and Ashley C. Banyard. "Clade 2.3.4.4b H5N1 High Pathogenicity Avian Influenza Virus (HPAIV) from the 2021/22 Epizootic Is Highly Duck Adapted and Poorly Adapted to Chickens." *Journal of General Virology* 104, no. 5 (2023). <https://dx.doi.org/https://doi.org/10.1099/jgv.0.001852>.
9. James, Joe, Caroline J. Warren, Dilhani De Silva, Thomas Lewis, Katherine Grace, Scott M. Reid, Marco Falchieri, Ian H. Brown, and Ashley C. Banyard. "The Role of Airborne Particles in the Epidemiology of Clade 2.3.4.4b H5N1 High Pathogenicity Avian Influenza Virus in Commercial Poultry Production Units." *Viruses* 15, no. 4 (2023): 1002. <https://www.mdpi.com/1999-4915/15/4/1002>.
10. Kimberly M. Edwards, Jurre Y. Siegers, Xiaoman Wei, Ammar Aziz, Yi-Mo Deng, Sokhoun Yann, Chan Bun, Seng Bunnary, Leonard Izzard, Makara Hak, Peter Thielen, Sothyra Tum, Frank Wong, Nicola S. Lewis, Joe James, Filip Claes, Ian G. Barr, Vijaykrishna Dhanasekaran 1, and Erik A Karlsson. "Detection of Clade 2.3.4.4b Avian Influenza a (H5N8) Virus in Cambodia, 2021." *Emerging Infectious Diseases* 29 (2023). <https://dx.doi.org/https://doi.org/10.3201%2F012901.220934>.
11. Seekings, Amanda H., Caroline J. Warren, Saumya S. Thomas, Fabian Z. X. Lean, David Selden, Benjamin C. Mollett, Pauline M. van Diemen, Ashley C. Banyard, and Marek J. Slomka. "Different Outcomes of Chicken Infection with Uk-Origin H5N1-2020 and H5N8-2020 High-Pathogenicity Avian Influenza Viruses (Clade 2.3.4.4b)." *Viruses* 15, no. 9 (2023): 1909. <https://www.mdpi.com/1999-4915/15/9/1909>.
12. Slomka, Marek J., Scott M. Reid, Alexander M. P. Byrne, Vivien J. Coward, James Seekings, Jayne L. Cooper, Jacob Peers-Dent, Eric Agyeman-Dua, Dilhani de Silva, Rowena D. E. Hansen, Ashley C. Banyard, and Ian H. Brown. "Efficient and Informative Laboratory Testing for Rapid Confirmation of H5N1 (Clade 2.3.4.4) High-Pathogenicity Avian Influenza Outbreaks in the United Kingdom." *Viruses* 15, no. 6 (2023): 1344. <https://www.mdpi.com/1999-4915/15/6/1344>.
13. Slomka, Marek J., Scott M. Reid, Alexander M. P. Byrne, Vivien J. Coward, James Seekings, Jayne L. Cooper, Jacob Peers-Dent, Eric Agyeman-Dua, Dilhani de Silva, Rowena D. E. Hansen, Ashley C. Banyard, and Ian H. Brown. "Efficient and Informative Laboratory Testing for Rapid Confirmation of H5N1 (Clade 2.3.4.4) High-Pathogenicity Avian Influenza Outbreaks in the United Kingdom." *Viruses* 15, no. 6 (2023): 1344. <https://www.mdpi.com/1999-4915/15/6/1344>.

## b) International conferences:

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1. Prof Ashley C. Banyard: "HPAIV in the UK: A laboratory perspective"; Eastern Counties Veterinary Society (ECVS) meeting, 17.05.2023
2. Prof Ashley C. Banyard: "The continuing threat of clade 2.3.4.4b H5N1 high pathogenicity avian influenza virus: What have we learnt from the epizootic?"; World Society of Virology, 16.06.2023
3. Prof Ashley C. Banyard: "UK activities around the current clade 2.3.4.4b H5N1 high pathogenicity avian influenza virus"; CoVetLab Meeting, 21.06.2023
4. Scott M. Reid: "Optimisation of frontline diagnostic testing algorithm in response to the current clade 2.3.4.4b high pathogenicity avian influenza epizootic in the United Kingdom"; World Association of Veterinary Laboratory Diagnosticians (ISWAVLD), 29.06.2023

## c) National conferences:

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1. Prof Ian Brown: Turkey Science & Production Conference 2023 - Carden Park vision - what can we expect in the next 40 years from looking at the last 40 Ian Brown, APHA, Weybridge UK 23.03.2023
2. Prof Ashley C. Banyard: "An update on HPAIV in the UK and current progress with reactive avian influenza research", NFU Poultry Research Seminar, 10.05.2023
3. Prof Ashley C. Banyard: "An overview of high pathogenicity avian influenza in the United Kingdom and research efforts to understand factors influencing viral emergence", GARAD Conference, 22.05.2023
4. Prof Ashley C. Banyard: "An update on both diagnostic and research activities on Avian influenza in the UK", England Field Delivery Conference, 28.06.2023
5. Prof Ashley C. Banyard: "Linking at the One Health Interface: Applying lessons learnt from COVID to streamline response to potential human threats from the veterinary sector", Oxford Pandemic Conference, 11.07.2023
6. Prof Ashley C. Banyard: "High Pathogenicity Avian Influenza in the UK: Will it ever end?", Virtual OV Conference, 19.09.2023
7. Dr Joe James: "Clade 2.3.4.4b H5N1 highly pathogenic avian influenza virus (HPAIV) from the 2021/22 epizootic is highly duck adapted and poorly adapted to chickens", Microbiology Society General Annual Meeting, 22.04.2023
8. Dr Joe James: "Update on High Pathogenicity Avian Influenza virus (HPAIV) in the UK", Southern England Virology Network, 06.10.2023
9. Dr Joe James: "Emergence and global spread High Pathogenicity Avian Influenza virus (HPAIV)", Journal of Medical Microbiology Seminar Series, 27.10.2023
10. Dr Joe James: "Emergence and global spread High Pathogenicity Avian Influenza virus (HPAIV)", Scottish Microbiology Society, 04.11.2023

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

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1. Prof Ian Brown: Standing Group of Experts on High Pathogenicity Avian Influenza in Europe under the GF-TADs umbrella. Report from WOAHA Reference Laboratory and OFFLU regarding HPAI 02.05.2023
2. Prof Ian Brown: WOAHA 90th General Session Session 1 - Avian influenza intelligence: Surveillance and monitoring for early detection and prevention (scheduled on Monday 22 May, 9.50am – 11am) 21.05.2023
3. Prof Ashley C. Banyard: "Establishing West African AI and ND Network (WAFluNNet)", Dstl International Biosecurity Programme, 24.03.2023
4. Prof Ashley C. Banyard: "One Health and Influenza viruses", St George's University of London, 28.03.2023
5. Prof Ashley C. Banyard: "One Health and Influenza viruses", University of Sussex, 31.03.2023
6. Prof Ashley C. Banyard: "H5N1 HPAIV in mammals- investigation, testing and analysis of the results", Avian Influenza Hybrid Workshop - Welsh Government, 13.04.2023
7. Prof Ashley C. Banyard: "H5N1 HPAIV- The science – characteristics of the current strain and its genetic diversity", Avian Influenza Hybrid Workshop - Welsh Government, 13.04.2023
8. Prof Ashley C. Banyard: "H5N1 HPAIV- An update on the outbreak and the role of environmental contamination and survival of the virus on infected premises", Biosecurity Workshop - Scottish Government, 19.04.2023
9. Prof Ashley C. Banyard: "An update on HPAIV in the UK and current progress with reactive avian influenza research", Avian Expert Group Meeting, 20.04.2023
10. Prof Ashley C. Banyard: "Key messages for external stakeholders", CVOs meeting, 16.05.2023
11. Prof Ashley C. Banyard: "WP2: Defining the role of antibodies in infection with AIV within waterfowl", FluMap Meeting, 25.05.2023
12. Prof Ashley C. Banyard: "HPAIV in the UK: A laboratory perspective", Crowshall Clinical Club, 07.06.2023
13. Prof Ashley C. Banyard: "VI6: Animal Influenza and Avian Virology workgroup", Gap analysis day, 19.07.2023
14. Prof Ashley C. Banyard: "Introduction to avian influenza and the outbreak", London International Youth Science Forum (LYISF), 01.08.2023
15. Prof Ashley C. Banyard: "High Pathogenicity Avian Influenza virus, understanding infection and routes of transmission", WG Gamebird Webinar, 02.08.2023
16. Prof Ashley C. Banyard: "Introduction to APHA Virology: CDC CEIRR mission", CDC VISIT CEIRR, 09.08.2023
17. Prof Ashley C. Banyard: "High Pathogenicity Avian Influenza virus, assessing infection and routes of transmission", WG Commercial Poultry Sector Webinar, 05.09.2023
18. Prof Ashley C. Banyard: "Introduction to APHA and the current HPAIV outbreak", UK: Tajikistan training workshop on avian influenza and Newcastle Disease virus 12.09.2023
19. Prof Ashley C. Banyard: "High Pathogenicity Avian Influenza virus, assessing infection and routes of transmission", WG Backyard Flock Webinar, 12.09.2023
20. Prof Ashley C. Banyard: "The emergence and impact of Highly Pathogenic Avian Influenza in the UK, ASEAN- Prevention and Control of Cross-border Animal Diseases", 18.09.2023
21. Prof Ashley C. Banyard: "Working with Notifiable Avian Disease in high Containment", CDC VISIT CEIRR 09.08.2023
22. Prof Ashley C. Banyard: "The continuing scourge of high pathogenicity avian influenza in the UK", JGV Road Show, 16.10.2023
23. Prof Ashley C. Banyard: "Update on avian influenza in the UK", Gamebird Industry Focus Group, 20.10.2023
24. Prof Ashley C. Banyard: "Update on Avian Influenza in the UK", Bird of Prey Focus Group 09.11.2023
25. Prof Ashley C. Banyard: "Update on Avian Influenza in the UK", Avian Influenza Outbreak & Biosecurity Comms Stakeholder Meeting, 13.11.2023
26. Prof Ashley C. Banyard: "Attempting to control viral pathogens- Successes, failures and the challenges ahead", RVC Lecture, 08.12.2023
27. Prof Ashley C. Banyard: "WP2 Defining the role of antibodies in infection with AIV Project outputs", FluMap Closure Meeting WP2 11.12.2023
28. Prof Ashley C. Banyard: "Update on avian influenza in the UK", FluTrailMap One Health AIV update meeting 13.12.2023
29. Dr Joe James: "Update on High Pathogenicity Avian Influenza virus (HPAIV) in the UK", CEIRR consortia, 11.01.2023
30. Dr Joe James: "Update on High Pathogenicity Avian Influenza virus (HPAIV) in the UK", Danish chief veterinary officer meeting, 22.06.2023

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 16

d) Internships (&gt;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	TAJIKISTAN	4
C	BANGLADESH	12

## 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	ISO17025 Certificate.pdf	ISO17025 Certificate.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Haemagglutination inhibition test	UKAS
AGIDT	UKAS
Matrix (M)-gene PCR	UKAS
H5 real-time PCR(HA2)	UKAS
H5 real-time PCR(Pathotyping)	UKAS
H7 real-time PCR (cleavage site)	UKAS
Real-time RT-PCR N1	UKAS
Real-time RT-PCR N5 to N9	UKAS
Next Generation Sequencing	UKAS
H7 real-time PCR (HA2)	UKAS
Avian influenza virus Sanger nucleotide sequencing	UKAS
Neuraminidase inhibition	UKAS
Virus isolation in goose eggs (via allantoic cavity)	UKAS
Virus isolation in SPF chicken eggs (via allantoic cavity)	UKAS
IVPI	UKAS

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

Yes

See Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018, Chapter 3.3.4 APHA maintains a complete and functioning laboratory biological risk management system, which ensures that the laboratory is in compliance with applicable local, national (UK Health and Safety Executive), regional, and international standards and requirements for biosafety and laboratory biosecurity

## 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 general session	2023-05-21	Paris	Speaker/panel member	Global coordination strategy for the prevention and control of avian influenza

## 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	Organiser/Chair	3	Istituto Zooprofilattico Sperimentale delle Venezie, Italy CSIRO Australian Centre for Disease Preparedness SEPRL : USDA Agricultural Research Service, Georgia, USA

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.
Proficiency Test Exercise: Conventional and Molecular Panels	Organiser	24	Istituto Zooprofilattico Sperimentale delle Venezie, Italy Friedrich Loeffler Institute, Germany
EURL Proficiency test	Participant	40	Istituto Zooprofilattico Sperimentale delle Venezie, Italy
OFFLU Proficiency test program	Participant	10	CSIRO Australian Centre for Disease Preparedness

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	APHA has carried out testing and contributed reagents, data and expertise to the biannual WHO VCM activities.	Istituto Zooprofilattico Sperimentale delle Venezie, Italy
Avian influenza matching (AIM1 - OFFLU)	Antigenic characterisation of emerging HP- and LPAIV H5Nx viruses to inform vaccine matching.	Istituto Zooprofilattico Sperimentale delle Venezie, Italy CSIRO Australian Centre for Disease Preparedness

## 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
Proficiency Test Exercise: Conventional and Molecular Panels	Organiser	24	RT-PCR and HAIT	BOTSWANA, CAMBODIA, CROATIA, GEORGIA, GERMANY, GHANA, ISRAEL, ITALY, NIGERIA, SOUTH AFRICA, SPAIN, TAJIKISTAN, TURKEY, UNITED KINGDOM,

## TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

Yes

Note that the reference laboratory director continued to serve as the OFFLU steering committee chair (term expires October 2024)