World Organisation for Animal Health

Yongxiu Yao - - UNITED_KINGDOM

WOAH Reference Laboratory Reports Activities 2025

This report has been submitted: 6 janvier 2026 22:06

LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	Marek's disease
***Address of laboratory:**	Ash Road, Pirbright, Woking, Surrey, GU24 0NF UNITED KINGDOM
***Tel:**	+441487231415
***E-mail address:**	yongxiu.yao@pirbright.ac.uk
Website:	https://www.pirbright.ac.uk/facilities-and-resources/services/diagnostic-testing/mareks-disease-diagnostic-testing
***Name (including Title) of Head of Laboratory (Responsible Official):**	Dr. Yongxiu Yao
***Name (including Title and Position) of WOAH Reference Expert:**	Dr. Yongxiu Yao, Head of Viral Oncogenesis group
***Which of the following defines your laboratory? Check all that apply:**	Academic institution

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
None		0	0
Direct diagnostic tests		Nationally	Internationally
Real-time PCR for virulent MDV-1, MDV-2, HVT vaccine, CVI988 vaccine, and Prevexxion vaccine	Yes	1293	1026
Sequencing of vMDV field strains (selected genes)	No	6	24
Sequencing of MDV-2 field strains (selected genes)	No	3	3

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?

No

4. Did your laboratory produce vaccines?

Not applicable

5. Did your laboratory supply vaccines to WOAH Members?

TOR3: NEW PROCEDURES

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

No

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

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
Real-time PCR for specific detection of the new Marek's disease vaccine 'Prevexxion-RN®'	Validation of this test as an ISO/IEC 17025-accredited test has been completed; the validation report is with Pirbright's QA team, awaiting approval before submission to the UK Accreditation Service. The report could be requested from: Marek's Disease Virus Reference Laboratory, The Pirbright Institute, Ash Road, Woking, Surrey, GU24 0NF, UK (https://www.pirbright.ac.uk/facilities-and-resources/services/diagnostic-testing/mareks-disease-diagnostic-testing)

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

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

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

Name of WOAH Member Country seeking assistance	Date	Which diagnostic test used	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
UKRAINE	2025-01-14	Real-time PCR for HVT vaccine	4	0
DENMARK	2025-02-14	Real-time PCR for HVT vaccine	4	0
POLAND	2025-03-24	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	12	0
EGYPT	2025-04-07	Real-time PCR for MDV-1 field strains, MDV-2 field strains Sequencing MDV-1	9	9
SPAIN	2025-04-14	Real-time PCR for MDV-1 field strains, MDV-2 field strains Sequencing MDV-1 and MDV-2	20	0
IRELAND	2025-01-08	Real-time PCR for HVT vaccine	20	0
IRELAND	2025-01-13	Real-time PCR for HVT vaccine	20	0
IRELAND	2025-01-20	Real-time PCR for MDV-1 field strains, MDV-2 field strains	36	36
IRELAND	2025-03-03	Real-time PCR for MDV-1 field strains	2	0
IRELAND	2025-03-10	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	1	0
IRELAND	2025-03-24	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains Sequencing MDV-1	8	8
IRELAND	2025-04-07	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	9	0
IRELAND	2025-04-29	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	12	0
		Real-time PCR for CVI988		

IRELAND	2025-05-12	vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	3	0
IRELAND	2025-05-19	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	2	0
IRELAND	2025-06-18	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	11	0
IRELAND	2025-06-23	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	16	0
IRELAND	2025-07-02	Real-time PCR for MDV-1 field strains	6	0
IRELAND	2025-07-28	Real-time PCR for CVI988 vaccine, HVT vaccine, MDV-1 field strains, MDV-2 field strains	3	0
IRELAND	2025-08-04	Real-time PCR for MDV-1 field strains, MDV-2 field strains	2	0
IRELAND	2025-10-01	Real-time PCR for MDV-1 field strains	6	0
IRELAND	2025-10-06	Real-time PCR for HVT vaccine, CVI988 vaccine	20	0
IRELAND	2025-10-17	Real-time PCR for HVT vaccine, CVI988 vaccine	8	0
IRELAND	2025-10-29	Real-time PCR for HVT vaccine, CVI988 vaccine	20	0
IRELAND	2025-11-05	Real-time PCR for HVT vaccine, CVI988 vaccine	4	0
IRELAND	2025-12-06	Real-time PCR for HVT vaccine, CVI988 vaccine	5	0
IRELAND	2025-12-12	Real-time PCR for HVT vaccine, CVI988 vaccine	40	0

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?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	WOAH Member Countries involved other than your country
The consequences of transmissible vaccines on disease ecology and pathogen evolution: Marek's disease virus as a case study	5 years	To use a Marek's disease virus vaccine-challenge model to quantify the consequences of transmissible vaccine use	Pennsylvania State University	UNITED STATES OF AMERICA
Examining the molecular diversity of MDV field isolates	5 years	Epidemiological investigation, pathogenicity analysis, and evaluation of vaccine protection against the MDV isolates from MD-vaccinated poultry farms	Henan academy of Agricultural Science	CHINA (PEOPLE'S REP. OF)
Exploring the potential of MDV-2 as a vaccine vector	4 years	To study if MDV-2 infection is a good candidate for vectored vaccines against MD and other avian viral diseases	MSD Animal Health	THE NETHERLANDS

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:
We have an ongoing project to sequence the meq gene (closely linked to virulence of Marek's disease virus) of MDV-1 isolated from samples submitted from UK backyard chicken flocks and commercial chicken flocks, to investigate the phylogeny, pathology, and distribution of these viruses. This has now been extended to include some international MDV-1 strains (Spain, Egypt, Republic of Ireland). We have also sequenced selected genes from MDV-2 field strains from the UK and from some European countries (Spain and Scandinavian countries).

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

No

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. Dadousis C, Angelopoulos N, Zhang Y, Karagianni AE, Zhang H, Hammond JA, Nair V, Yao Y, Geifman N. Genetic Variation Associated with Marek's Disease Resistance and Susceptibility in White Leghorn Chickens. Poultry Science, 20 December 2025, 106311. https://doi.org/10.1016/j.psj.2025.106311

2. Ortigas-Vasquez A, Bowen CD, Renner DW, Baigent SJ, Zhang Y, Yao Y, Nair V, Kennedy DA, Szpara ML. (2025). PLoS Pathog. 25;21(8):e1013435. doi: 10.1371/journal.ppat.1013435. eCollection 2025 Aug.

3. Zhou L, Zhu R, Jiang B, Cheng J, Liu W, Yao Y, and Li Y. "Marek's Disease Virus-Encoded MicroRNA-M6-5p Facilitates Viral Latent Infection by Targeting Histone Demethylase KDM2B" J Virol. 2025 Jan 22:e0200724. doi: 10.1128/jvi.02007-24.

b) International conferences:

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Professor Venugopal Nair has given the following presentations:

1. XXIIIrd World Veterinary Poultry Association Congress, Kuching, Sarawak, Malaysia, 6-10 October 2025, Title: Marek's Disease: A major challenge for poultry health & an excellent model for viral oncogenesis.

2. 8th UK-China CERAD meeting & International Symposium on Animal Disease Control, Lanzhou, China, 18-20, October 2025, Title: Avian Disease Challenges in A Changing World: Emerging Threats and New Frontiers for Control.

Dr. Yongxiu Yao has given the following presentations:

3. 8th UK-China CERAD meeting & International Symposium on Animal Disease Control, Lanzhou, China, 18-20, October 2025, Title: CRISPR/Cas9 gene editing: Powerful tool to study virus-host interactions and recombinant vaccine development.

4. Shandong Binzhou Academy of Animal Science and Veterinary Medicine, 22 October 2025, Title: CRISPR/Cas9 gene editing: Powerful tool to study virus-host interactions and recombinant vaccine development.

Dr. Yaoyao Zhang has given the following presentations:

5. XXIIIrd World Veterinary Poultry Association Congress, Kuching, Malaysia, 6-10, October 2025, Poster presentations: 1. CRISPR/Cas9 gene editing: Powerful tool to study virus-host interactions in MDV cell lines. 2. Genome editing of Herpesvirus of turkeys for recombinant vaccine development.

6. 8th UK-China CERAD meeting & International Symposium on Animal Disease Control, Lanzhou, China, 18-20, October 2025, Title: Genome Editing of Herpesvirus of Turkeys for Recombinant Vaccine Development.

Sophie Cutts has given the following poster presentation:

7. International Herpesvirus Workshop 2025, Berlin, 26-30, July 2025. Title: "Characterising the activity of the Marek's disease virus virion host shutoff protein"

c) National conferences:

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Professor Venugopal Nair has given the following presentation:
1. Venugopal Nair gave a lecture on Marek's disease on 1st September 2025 to the international participants of the Poultry Health Course organised by the Pirbright Institute and the University of Surrey.

Dr. Susan Baigent has given the following presentations:
2. Presentation to Pirbright Institute staff. "What's new in Marek's disease virus diagnostics and research? New virus strains, and novel isothermal diagnostics", 14th January 2025.
3. Online lecture to Animal Biotechnology MSc course students, University of Nottingham on "Development and commercialisation of molecular tests for Marek's disease", February 2025
4. Endemic Diseases of Livestock meeting "Marek's disease virus serotype 2: surveillance of UK poultry farms, and development of pen-side tests", Birmingham, 5th March 2025.

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

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 3

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	INDIA	1
C	PAKISTAN	1
C	NIGERIA	1

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO/IEC 17025:2017	Certificate issued by UK accreditation service	Pirbright UKAS Certificate.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Real-time PCR testing of chicken organs, feathers, and poultry dust to detect Marek's disease virus (vMDV), MDV-2, and vaccine strains CVI988 and HVT	United Kingdom Accreditation Service (UKAS) 17025

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

Yes

MDV (including MDV serotypes 1, 2 and HVT) causes diseases in poultry species such as chickens, turkey, and quails. The viruses are exclusive pathogens of avian species and hence are unlikely to infect and cause any harm to humans. Also, no known risks to the environment have been associated with these viruses. However, when samples are prepared for qPCR and culture of the virus, all work is strictly performed with the appropriate PPE (nitrile gloves and lab coat) and in a containment level 2 environment solely for sample protection and for sterility of cultures in line with group practices for culture of avian herpesviruses.

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?

Not applicable (only WOAH Reference Laboratory designated for the disease

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

Not applicable (only WOAH Reference Laboratory designated for the disease

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?

Not applicable (Only WOAH Reference Laboratory designated for the disease)

We are the only WOAH Reference Laboratory designated for the disease.

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?

Not applicable (only WOAH Reference Laboratory designated for the disease

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?

No

Another laboratory (CESAC Centre de Sanitat Avícola de Catalunya i Aragó, Spain) is now using the MDV-1 real-time PCR and CVI988 real-time PCR which we developed (although CESAC is not accredited for these tests), and we are collaboratoring with CESAC to sequence some Spanish MDV-1 and MDV-2 strains. We expect to have an online meeting with our CESAC collaborators in January 2026, at which the possibility of inter-laboratory testing can be discussed. After completing the due diligences, CESAC could be considered as a partner for interlaboratory comparison testing.

Currently, as part of the ongoing discussion on this topic with our accreditation body, we test samples for a previous collaborator of known provenance (EQA).

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

Yes

Unlike high consequential animal diseases with epidemic/pandemic potential, Marek's disease is endemic in most member countries. As it is not a notifiable disease in these countries, testing the samples for diagnosis may be seen as less of a priority and hence large numbers of samples are not submitted to the MDVRL from many countries. However, MDVRL activities have increased significantly since 2023, especially for real-time PCR testing to monitor success of MD vaccination, and the sequencing of UK and non-UK MDV-1 and MDV-2 field strains. In addition, a new real-time PCR specific for Prevexxion vaccine has now been validated and UKAS approval is expected in early 2026. We continue to provide technical advice to queries, diagnostic support and confirmation diagnoses from other member countries, and supply standard reference reagents upon request. Other activities include collecting epidemiological data relevant to international disease control, participation in international scientific studies in collaboration with WOAH members, and dissemination of information by publishing in peer-reviewed journals and presenting at international meetings. Most of the activities are carried out using the funding from the Pirbright Institute Marek's Disease Virus Reference Laboratory (MDVRL) or from charges for the tests, as we do not receive any funding support from the WOAH or local government.

Working with Pirbright's training team, we prepared a Marek's disease e-learning course, which can be accessed via this link: https://www.pirbright.ac.uk/engage-with-us/training-pirbright/science-courses/mareks-disease-md-elearning

MDVRL is open to receive requests to deliver training (online or in-person). We contributed to an in-person Poultry Health Course hosted by the Pirbright Institute and the University of Surrey in September 2025. This included practical training on setting up and running real-time PCR to detect MDV-1, and interpretation of the results. We actively provide technical advice and respond to queries from other WOAH member countries on MD testing, disease control, and vaccination by emails, video calls, phone calls, and during our visits to other countries. In spring 2026 we expect to deliver online training to poultry vets in the Kingdom of Saudi Arabia.

As MDVRL at Pirbright is the only accredited MDV reference laboratory, there is no other MDV reference laboratory to network with for inter-laboratory proficiency testing. We hope that the Spanish laboratory CESAC (Centre de Sanitat Avícola de Catalunya i Aragó, Spain) which is using the vMDV real-time PCR and CVI988 real-time PCR which we developed, could be used as a partner for interlaboratory comparison testing. Currently, as part of the ongoing discussion on this topic with our accreditation body, we test samples for a previous collaborator of known provenance (EQA).