WOAH Reference Laboratory Reports Activities 2023

Activities in 2023

This report has been submitted : 31 mai 2024 12:12

Laboratory Information

Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:	Foot-and-mouth disease
Address of laboratory:	Ash Road, Pirbright Woking, Surrey, GU24 0NF
Tel.:	+44-1483 23.10.21
E-mail address:	donald.king@pirbright.ac.uk
Website:	https://www.pirbright.ac.uk/
Name (including Title) of Head of Laboratory (Responsible Official):	Prof. Bryan Charleston
Name (including Title and Position) of WOAH Reference Expert:	Dr Donald King
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
ELISA - NSP		0	403
ELISA - SP		0	809
VNT		0	6025
Vaccine matching		0	200
Direct diagnostic tests		Nationally	Internationally
Virus isolation		0	317
Antigen ELISA		0	205
Real-time RT-PCR		0	634
VP1 sequencing		0	204
Phylogenetic analyses (including sequences provided from external lab)		0	217

TOR2: REFERENCE MATERIAL

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

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TESTING	PRODUCED/ IMPORTED	QUANTITY SUPPLIED NATIONWIDE (ML, MG)	QUANTITY SUPPLIED AT INTERNATIONAL LEVEL (ML, MG)	NAME OF BENEFICIARY WOAH MEMBER

					COUNTRIES

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

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TEST	PRODUCED/ PROVIDE	AMOUNT SUPPLIED NATIONALLY (ML, MG)	AMOUNT SUPPLIED INTERNATIONALLY (ML, MG)	NO. OF RECIPIENT WOAH MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
FMD virus isolates	Antigen detection and RT-PCR	Produced/provide	81 ml	85 ml	5	EGYPT, GERMANY, ISRAEL, ITALY, JORDAN,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

No

TOR3: NEW PROCEDURES

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

Yes

NAME OF THE NEW TEST OR DIAGNOSTIC METHOD DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
Lineage-specific real-time RT-PCRs	https://pubmed.ncbi.nlm.nih.gov/38098997/

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

No

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

No

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

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOAH MEMBER COUNTRY SEEKING ASSISTANCE	DATE	WHICH DIAGNOSTIC TEST USED	NO. SAMPLES RECEIVED FOR PROVISION OF DIAGNOSTIC SUPPORT	NO. SAMPLES RECEIVED FOR PROVISION OF CONFIRMATORY DIAGNOSES
BAHRAIN	2023-06-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	10
EGYPT	2023-02-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	34
IRAQ	2023-03-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	12
ISRAEL	2023-10-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	6
JORDAN	2023-03-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	27

NEPAL	2023-05-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	80
NIGERIA	2023-09-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	13
PAKISTAN	2023-10-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	50
PALESTINIAN AUTON. TERRITORIES	2023-10-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	6
QATAR	2023-07-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	7
KOREA (REP. OF)	2023-07-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	1
THAILAND	2023-09-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	24
TURKEY	2023-10-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	20
UGANDA	2023-04-01	Virus isolation, Ag ELISA, Real-time RT-PCR, VP1 sequencing, Phylogenetic analysis, Vaccine matching	0	27
IRAQ	2023-02-01	Phylogenetic analysis	0	4
ISRAEL	2023-01-01	Phylogenetic analysis	0	1
JORDAN	2023-02-01	Phylogenetic analysis	0	1
MALAYSIA	2023-03-01	Phylogenetic analysis	0	2
OMAN	2023-04-01	Phylogenetic analysis	0	2
PALESTINIAN AUTON. TERRITORIES	2023-01-01	Phylogenetic analysis	0	2
TURKEY	2023-03-01	Phylogenetic analysis	0	1

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

Yes

NAME OF THE WOAH MEMBER COUNTRY RECEIVING A TECHNICAL CONSULTANCY	PURPOSE	HOW THE ADVICE WAS PROVIDED
THAILAND	Laboratory Management	In-country visit
ISRAEL	Update on regional FMD threats	via email
JORDAN	Advice on SAT2/XIV outbreaks	Meeting in Amman and via 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
WOAH Twinning project	3 years	Technology transfer and training	FMD Reference Laboratory, Embakasi	KENYA

Tools for FMD control	1 year	Technology transfer and training	Pusvetma and DIC-Wates	INDONESIA
FMD molecular epidemiology	3 years	Origin of FMD outbreaks in Tanzania	SAU	TANZANIA
Performance of FMD vaccines in Uganda	1 year	Post-vaccination monitoring	NaLIRRI-NARO	UGANDA
Performance of FMD vaccines in Zambia	2 years	Post-vaccination monitoring	Central Veterinary Research Institute	ZAMBIA
FMD vaccine QC	3 years	Pipelines to assess FMD vaccine quality	ICAR	INDIA

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

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:
Testing of samples associated with current FMD outbreaks (with metadata)

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:
Epidemiological data are included in diagnostic reports returned to sender and country's WOAH representative

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:

7

Zainuddin N., Susila E. B., Wibawa H., Dewi Daulay R. S., Wijayanti P. E., Fitriani D., Noor Hidayati D., Idris S., Wadsworth J., Polo N., Hicks H. M., Mioulet V., Knowles N. J. and King D. P. (2023) Genome sequence of a foot-and-mouth disease virus detected in Indonesia in 2022. Microbiology Resource Announcements 12(2): e0108122.
Liu H., Zhu Z., Xue Q., Yang F., Li Z., Xue Z., Cao W., He J., Guo J., Liu X., Shaw A. E., King D. P. and Zheng H. (2023) Innate sensing of picornavirus infection involves cGAS-STING-mediated antiviral responses triggered by mitochondrial DNA release. PLoS Pathogens 19(2): e1011132.
Ulziibat G., Raizman E., Lkhagvasuren A., Bartels C., Oyun-Erdene O., Khishgee B., Browning C., King D. P., Ludi A. B. and Lyons N. (2023) Comparison of vaccination schedules for foot-and-mouth disease among cattle and sheep in Mongolia. Frontiers in Veterinary Science 10: 990043.
Saduakassova M., Wood B. A., Henry E., Gray A. R., Mioulet V., Sultanov A. A., Wadsworth J., Knowles N. J., Di Nardo A., King D. P. and Bachanek-Bankowska K. (2023) Establishing a molecular toolbox of lineage-specific real-time RT-PCR assays for the characterisation of foot-and-mouth disease viruses circulating in Asia. Frontiers in Veterinary Science 10: 1271690.
Banda F., Ludi A. B., Wilsden G., Browning C., Kangwa H. L., Mooya L., Ngoma M., Muuka G. M., Mundia C., Fandamu P., Paton D. J., King D. P. and Quan M. (2023) The immunogenicity of a foot-and-mouth disease virus serotype O vaccine in commercial and subsistence cattle herds in Zambia. Vaccines 11: 1818.
Senawi J., Wilsden G., Browning C. F. J., Ludi A. B., Ismail M. M., Senin H., Gubbins S., King D. P. and Paton D. J. (2023) Maternally derived antibodies to foot-and-mouth disease virus modulate the antigenic specificity of humoral responses in vaccinated cattle. Vaccines 11: 1844.
Horsington J., Abbeloos E., Bakkali Kassimi L., Boonsuya Seeyo K., Capozzo A. V., Chepkwony E., Eblé P., Galdo Novo S., Gizaw D., Gouverneur L., Grazioli S., Heath L., Hudelet P., Hyera J. M. K., Ilott M., King A., Lefebvre D., Mackay D., Metwally S., Mwiine F. N., Nfon C. K., Park M-K., Pituco M., Rosso F., Simon F., Ularamu H. G., Vermeij P., Vosloo W. and King D. P. (2023) Application of the Nagoya Protocol to veterinary pathogens: concerns for the control of foot-and-mouth disease. Frontiers in Veterinary Science 10: 1271434.

b) International conferences:

13

Williamson S., Mioulet V., Wilson C., Nasou E., Drelciuc A., Taylor S., Bis J. and King D. P. Differential diagnosis of negated notifiable vesicular reports cases in England. 14th European Symposium of Porcine Health Management, Thessaloniki, Greece, June 2023.
Bronsvoort M., González L., Amanyire W., Orton R., Muwonge A., Boden L., Porphyre T., Muhanguzi D., King D. P. and Shaw A. E. Optimising simple clinical and environmental approaches to sampling foot-and-mouth disease virus for next generation sequencing. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.

Kasanga C. J., Di Nardo A., Sengiyumva K., Msomi A., Makasali R. J., Mpete H., Mkama M. M., Knowles N. J., Wambura P. N., Rweyemamu M., Paton D. J. and King D. P. Molecular epidemiology of FMDV in Tanzania: implications for FMD control in East and Southern Africa. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Colenutt C., Brown E., Limon G., Wungak Y., Oyekan O., Adedeji A., Ijoma S. I., Atai R. B., Oguche M. O., Dogonyaro B. B., Samson M., King D. P., Ludi A. B., Shaw A., Ehizibolo D. and Gubbins S. The role of small ruminants and the environment in the epidemiology and endemicity of FMDV: a longitudinal study in Northern Nigeria in 2021. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Mkama M. M., Sallu R., Fyumagwa R., Mjingo E., Mulumba M., Rweyemamu M., Wambura P. N., Maree F., King D. P. and Kasanga C. J. Sero-survey of foot-and-mouth disease virus serotypes O and A in selected livestock-wildlife interface areas in Tanzania. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Jamal S. M., Khan S., Rahman H. U., Shah S. A. A., Afzal M., Riaz A., Polo N., Wilsden G., Browning C., Wadsworth J., Knowles N., King D. P., Eschbaumer M. and Belsham G. J. Genetic and antigenic characterization of variants of serotype O/ME-SA/PanAsia sublineage circulating in Pakistan during 2012-2020. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Oyekan O., Haliru H., Gyam A. J., Yiltawe W., Ularamu H., Ehizibolo D., Ludi A. B., Mioulet V., Limon G., Knowles N. and King D. P. Detection And Characterization Of Foot And Mouth Disease Viruses In Small Ruminants In Nigeria. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Shaw A., Gonzalez L., Ilhearahu U., Lebani K., Orton R., Di Nardo A., Knowles N. J., Polo N., Freimanis G. and King D. P. Complete genome sequencing of FMDV using nanopore sequencing. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Foglia E. A., Mioulet V., Bagusi J., Bull H., Turgut S. I., Sangula A., Anfossi L., Nogarol C., Cavalera S., Henry L., Pezzoni G., Rosati S., Bulut A., King D. P., Brocchi E. and Grazioli S. Preliminary validation of multiplex lateral flow devices LFD1 and LFD2 for on-field identification and serotyping of foot-and-mouth disease viruses. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Senawi J. B., Wilsden G., Browning C., Ludi A., Bankowska K., Gubbins S., King D. P. and Paton D. J. Maternally derived antibodies to FMDV modulate the antigenic specificity of the antibody response in vaccinated cattle. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Mioulet V., Baguisi J., Henry E., Bull H., Wood B., McCarron A., King D. P., Foglia E. A., Grazioli S., Bentham A., Mitchell K. and Wakeman A. Lateral flow devices for the rapid detection of FMDV. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Paton D. J., Ludi A., King D. P., Wilsden G., Browning C., Belgrave S., Knowles N., Di Nardo A., Nwankpa N., Chitsungo E., Rahamatou C., Boulary M., Melesse G. A., Bodjo S. C., Grazioli S., Foglia E. A. and Brocchi E. Selection and use of a reference antigen panel to assess the regional relevance of foot-and-mouth disease vaccines in East Africa. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.
Selvan T. R. P., King D. P., Ludi A., Paton D. J., Gubbins S., Hosamani M., Tuthill T., Berryman S., Saravanan P., Perez E., Sreeivasa B., Goovaerts D., Patel B. H. M., Narayanan K., Wilsden G., Yasmin A., Sewell Y., Bommanna R., Sumana K., Ramakrishnan M. A., Suresh H. B., Dechamma H. J., Gnanavel V., Bhanuprakash V., Muthuchelan S. D., Mohanty N., Nihar N., Gupta V., Singh S. K., Biswal J. K., Mohapatra J. K., Chaudhuri K., Juleff N., Sanyal A., Singh R. P., Malik P., Kumar A., Jena J. K., Mitra A. and Dutt T. Improved in vitro and in vivo assays to assess the quality of FMD vaccine: Preliminary evidence from the Indian experience. Scientific meeting of the Global Foot-and-mouth Disease Research Alliance, Kampala, Uganda, November 2023.

c) National conferences:

0

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

2
https://www.wrlfmd.org/
https://www.foot-and-mouth.org/

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 : 16

b) Seminars : 20

c) Hands-on training courses: 6

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
A	THAILAND	6
A	INDONESIA	10
B	IRAN	20
C	ARGENTINA	1
C	GEORGIA	1

C	GERMANY	1
C	PORTUGAL	1
C	THAILAND	1
C	UNITED STATES OF AMERICA	1

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO17025	PDF	UCAS schedule of accreditation 2023.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Virus isolation	United Kingdom Accreditation Service
Real-time RT-PCR	United Kingdom Accreditation Service
Antigen ELISA	United Kingdom Accreditation Service
VNT	United Kingdom Accreditation Service
NSP ELISA	United Kingdom Accreditation Service
SP ELISA	United Kingdom Accreditation Service
Disinfectant testing	United Kingdom Accreditation Service

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

Yes

All work with FMDV is undertaken in high containment facilities licensed by the UK HSE

TOR9: SCIENTIFIC MEETINGS

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

Yes

NATIONAL/ INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	Annual meeting of the WOAH/FAO FMD Reference Laboratory Network	NCFAD, Canada	2023-10-01	Winnipeg, Canada	43

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

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
WOAH Symposium at the International Symposium of the World Association of Veterinary Laboratory Diagnosticians	2023-07-01	Lyon, France	Invited Speaker	Challenges in ensuring high-quality FMD vaccines
West EurAsia FMD Roadmap meeting	2023-04-01	Virtual	Invited Speaker	Regional FMD situation and impact on vaccine selection
SAARC FMD Roadmap meeting	2023-05-01	Paro, Bhutan	Invited Speaker	Regional FMD situation and impact on vaccine selection
SEACFMD National Coordinators Meeting	2023-08-01	Kuala Lumpa, Malaysia	Invited Speaker	Regional FMD situation and impact on vaccine selection
GF-TADS FMD Serotype C Taskforce	2023-06-01	Virtual	Member of Taskforce	Review of priorities to validate the extinction of serotype C

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

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

Yes

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

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS
Foot-and-mouth disease	Coordinator of WOAH/FAO FMD Laboratory Network (www.foot-and-mouth.org)	22	All 12 of the designated WOAH FMD Reference Laboratories and the WOAH Collaborating Center (Sciensano)

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

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS/ ORGANISING WOAH REF. LAB.
FMD diagnostics methods (virology and serology)	Organiser	10	Belgium, Botswana, Brazil, Canada, France, Italy, South Africa, Rep. of Korea, UK, USA
FMD diagnostics methods (virology and serology)	Participant	>25	ANSES, France

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

Yes

TITLE OF THE PROJECT OR CONTRACT	SCOPE	NAME(S) OF RELEVANT WOAH REFERENCE LABORATORIES
Molecular epidemiology of FMD in Asia	Collection of sequence data and phylogenetic analyses	APQA , Republic of Korea
IZSLER/Pirbright collaboration	Development of immunoassays for vesicular diseases	IZSLER, Italy
Improved tools for FMD vaccine quality control	Immunoassays for FMD vaccine integrity	IZSLER, Italy
SAT2/XIV	Origin and spread of SAT2/XIV	ANSES, France

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

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

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the Test	WOAH Member Countries
FMDV diagnostics (virology and serology)	Organiser	32	RT-PCR, Virus isolation, Ag-ELISA, VNT, NSP-ELISA, SP-ELISA	ALGERIA, ARMENIA, AUSTRALIA, AZERBAIJAN, BOTSWANA, BRAZIL, CHINESE TAIPEI, ESWATINI, ETHIOPIA, GEORGIA, GERMANY, HONG KONG, INDIA, INDONESIA, IRAQ, ISRAEL, KENYA, LEBANON, LIBYA, MONGOLIA, MOROCCO, NAMIBIA, NEPAL, NEW ZEALAND, NIGERIA, PHILIPPINES, SAUDI ARABIA, SENEGAL, SINGAPORE, THAILAND, TUNISIA, UNITED ARAB EMIRATES,

TOR12: EXPERT CONSULTANTS

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

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
Expert Committee	Paris	FMD Ad Hoc Group meeting in Paris

Survey	via email	Implementation of a survey to assess the potential to harmonise vaccine potency test methods - data fed back to WOAH
Presentation to WOAH SCAD	virtual	Global update on FMD
Expert opinion to WOAH Code Commission	via email and virtual	Address questions relating to the FMD Chapter
Review of WOAH Text	via email (with Network partners)	Review of the text in the Terrestrial Manual

29. Additional comments regarding your report: