OIE Reference Laboratory Reports Activities

Activities in 2016

This report has been submitted : 2017-01-20 14:52:25

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Foot and mouth disease
Address of laboratory:	Vesicular Disease Reference Laboratory The Pirbright Institute Ash Road, Pirbright Woking, Surrey, GU24 0NF UNITED KINGDOM
Tel.:	+44-1483 23.10.21
Fax:	+44-1483 23.74.48
E-mail address:	donald.king@pirbright.ac.uk
Website:	www.pirbright.ac.uk
Name (including Title) of Head of Laboratory (Responsible Official):	Dr Bryan Charleston
Name (including Title and Position) of OIE Reference Expert:	Dr Donald King Head, Head of Vesicular Diseases Reference Laboratories
Which of the following defines your laboratory? Check all that apply:	Research Academic

ToR 1: To use, promote and disseminate diagnostic methods validated according to OIE Standards

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 OIE Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
Vaccine Matching	Yes	0	120
Virus Neutralisation Test	Yes	0	164
ELISA - Structural protein Antibody	Yes	0	51
ELISA - Non-structural protein Antibody	Yes	0	665
Direct diagnostic tests		Nationally	Internationally
Virus Isolation	Yes	0	397
Antigen ELISA	Yes	0	255
real time RT-PCR	Yes	0	794
VP1 region sequencing	Yes	0	353
Complete genome sequencing	No	0	9

ToR 2: To develop reference material in accordance with OIE requirements, and implement and promote the application of OIE Standards.
To store and distribute to national laboratories biological reference products and any other reagents used in the diagnosis and control of the designated pathogens or disease.

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

Yes

NOTE: Currently, there are 22 laboratories that produce Standard Reference Reagents officially recognised by the OIE for 19 diseases/pathogens. Please click the following link to the list of OIE-approved International Standard Sera:

http://www.oie.int/en/our-scientific-expertise/veterinary-products/reference-reagents/. If the reagent is not listed on this page, it is NOT considered OIE-approved. The next two questions allow you to indicate non-OIE-approved diagnostic reagents.

OIE-approved SRR producing laboratory – Select your lab from list:

Disease	Test	Available from
Foot and mouth disease	Enzyme-linked immunosorbent assay (antigen and antibody detection); Virus neutralisation	Dr Donald King Institute for Animal Health, Pirbright Laboratory, Ash Road, Pirbright, Woking, Surrey GU24 0NF, United Kingdom Tel: (44-1483) 23.24.41 Fax: (44-1483) 23.24.48 donald.king@pirbright.ac.uk

Type of reagent available	Related diagnostic test	Produced/ Supply imported	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	Name of recipient OIE Member Countries
Reagents	ELISA serology tests	Produced	◉<10mL ○10-100mL ○100-500mL ○>500mL	○<10mL ◉10-100mL ○100-500mL ○>500mL	AUSTRIA CHINA (PEOPLE'S REP. OF) CZECH REPUBLIC KOREA (REP. OF) NEW ZEALAND ROMANIA
LPBE kit	ELISA serological tests	Produced	◉<10mL ○10-100mL ○100-500mL ○>500mL	○<10mL ○10-100mL ○100-500mL ◉>500mL	AFGHANISTAN BANGLADESH BOTSWANA CZECH REPUBLIC ESTONIA INDONESIA IRAN IRAQ KOREA (REP. OF) MALAYSIA MONGOLIA OMAN POLAND SAUDI ARABIA UNITED ARAB EMIRATES VIETNAM

3. Did your laboratory supply standard reference reagents (non OIE-approved) and/or other diagnostic reagents to OIE Member Countries?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient OIE Member Countries	Region of recipients
Virus Isolates	FMD Virus detection tests	Produced	0	113.6 ml	7	☐Africa ☐Americas ☐Asia and Pacific ☒Europe ☐Middle East
Virus Isolates	FMD Virus detection tests	Produced	0	3.6 ml	1	☐Africa ☒Americas ☐Asia and Pacific ☐Europe ☐Middle East
Virus Isolates	FMD Virus detection tests	Produced	0	9 ml	3	☐Africa ☐Americas ☒Asia and Pacific ☐Europe ☐Middle East

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to OIE Member Countries?

No

ToR 3: To develop, standardise and validate, according to OIE Standards, new procedures for diagnosis and control of the designated pathogens or diseases

6. Did your laboratory develop new diagnostic methods validated according to OIE Standards for the designated pathogen or disease?

No

7. Did your laboratory develop new vaccines according to OIE Standards for the designated pathogen or disease?

No

ToR 4: To provide diagnostic testing facilities, and, where appropriate, scientific and technical advice on disease control measures to OIE Member Countries

8. Did your laboratory carry out diagnostic testing for other OIE Member Countries?

Yes

Name of OIE Member Country seeking assistance	Date (month)	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
AFGHANISTAN	September	0	27
BHUTAN	December	0	14
BOTSWANA	June	0	6
EGYPT	June	0	35
ETHIOPIA	February	0	16
CHINA (PEOPLE'S REP. OF)	January, June and August	0	8
IRAN	June	0	29
ISRAEL	February	0	10
KOREA (REP. OF)	January and February	0	15
KUWAIT	February	0	4
LAOS	April	0	3
MALAWI	June	0	1
MALAYSIA	September	0	26
MAURITIUS	September	0	24
MOZAMBIQUE	June	0	2
MYANMAR	October	0	4
NAMIBIA	June	0	4
NEPAL	January and July	0	50
NIGERIA	October	0	25
SAUDI ARABIA	January, March, May and October	0	36
THAILAND	April and October	0	53
UNITED ARAB EMIRATES	January and April	0	6
VIETNAM	December	0	35
ZAMBIA	June	0	3
ZIMBABWE	June	0	4

9. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country?

Yes

Name of the OIE Member Country receiving a technical consultancy	Purpose	How the advice was provided
THAILAND	Advice on testing samples by antigen ELISA	Visit to RRLSEA, Pakchong, Thailand

ToR 5: To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centres or organisations

10. Did your laboratory participate in international scientific studies in collaboration with OIE Member Countries other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
Development of vaccine matching tests for Southeast Asia	3 years	Improvement of serological tests for vaccine matching	Malaysian Governmnet	MALAYSIA
Molecular epidemiology of epizootic diseases using next generation sequencing technology	3 Years	Apply new technologies for molecular epidemiology	CODA-CERVA (Belgium), FLI (Germany), SLU (Sweden), IZSVe (Italy) and University of Glasgow (UK)	BELGIUM ITALY SWEDEN
Development of FMD ELISA tests	on-going	New ELISA tests for FMD diagnosis	IZSLER (Italy)	ITALY
Improved tools for the surveillance and diagnosis of FMD	5 years	Understanding the epidemiology of FMD in endemic settings	SUA (Tanzania) and TVLA (Tanzania)	TANZANIA
OIE Twinning Project	3 Years	Improved diagnostic capacity for Ethiopia	NAHDIC (Ethiopia)	ETHIOPIA
Validation of field tests for FMDV	1 year	Generate validation data for field tests	Miyazaki University (Japan)	JAPAN
Development of new FMDV antigen field assays	2 years	Evaluation of new antigen ELISA formats	National Institute for Animal Health (Japan)	JAPAN

ToR 6: To collect, process, analyse, publish and disseminate epizootiological data relevant to the designated pathogens or diseases

11. Did your Laboratory collect epizootiological data relevant to international disease control?

Yes

12. Did your laboratory disseminate epizootiological data that had been processed and analysed?

Yes

13. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category)

a) Articles published in peer-reviewed journals: 27

1. Bachanek-Bankowska, K., H.R. Mero, J. Wadsworth, V. Mioulet, R. Sallu, G.J. Belsham, C.J. Kasanga, N.J. Knowles, and D.P. King (2016). Development and evaluation of tailored specific real-time RT-PCR assays for detection of foot-and-mouth disease virus serotypes circulating in East Africa. Journal of Virological Methods, 237: 114-120.
2. Bachanek-Bankowska, K., J. Wadsworth, A. Gray, N. Abouchoaib, D.P. King, and N.J. Knowles (2016). Genome Sequence of Foot-and-Mouth Disease virus Serotype O Isolated from Morocco in 2015. Genome Announcements, 4(2).
3. Bachanek-Bankowska, K., J. Wadsworth, B. Thapa, D.P. King, and N.J. Knowles (2016). Complete Genome Sequence of a Serotype A Foot-and-Mouth Disease Virus from an Outbreak in Saudi Arabia during 2015. Genome announcements, 4(1).
4. Berryman, S., K. Moffat, C. Harak, V. Lohmann, and T. Jackson (2016). Foot-and-Mouth Disease virus replicates independently of phosphatidylinositol 4-phosphate and type III phosphatidylinositol 4-kinases. The Journal of General Virology, 97(8): 1841-52.
5. Colenutt, C., J.L. Gonzales, D.J. Paton, J. Gloster, N. Nelson, and C. Sanders (2016). Aerosol transmission of Foot-and-Mouth Disease Virus Asia-1 under experimental conditions. Veterinary Microbiology, 189: 39-45.
6. Freimanis, G.L., A. Di Nardo, K. Bankowska, D.J. King, J. Wadsworth, N.J. Knowles, and D.P. King (2016). Genomics and outbreaks: Foot and Mouth Disease. Revue scientifique et technique (International Office of Epizootics), 35(1): 175-89.
7. Grant, C.F.J., B.V. Carr, N.B. Singanallur, J. Morris, S. Gubbins, P. Hudelet, M. Ilott, C. Charreyre, W. Vosloo, and B. Charleston (2016). The B-cell response to foot-and-mouth-disease virus in cattle following vaccination and live-virus challenge. The Journal of General Virology, 97(9): 2201-9.
8. King, D.J., G.L. Freimanis, R.J. Orton, R.A. Waters, D.T. Haydon, and D.P. King (2016). Investigating intra-host and intra-herd sequence diversity of foot-and-mouth disease virus. Infection, Genetics and Evolution : Journal of Molecular Epidemiology and Evolutionary Genetics in Infectious Diseases, 44: 286-92.
9. King, D.J., N.J. Knowles, G.L. Freimanis, and D.P. King (2016). Genome Sequencing of Foot-and-Mouth Disease Virus Type O Isolate GRE/23/94. Genome Announcements, 4(3).
10. King, D.J., N.J. Knowles, G.L. Freimanis, and D.P. King (2016). Genome sequencing of foot-and-mouth disease virus type O isolate GRE/23/94. Genome Announcements, 4(3): e00353-16.
11. Knight-Jones, T.J.D., S. Gubbins, A.N. Bulut, K.D.C. Staerk, D.U. Pfeiffer, K.J. Sumption, and D.J. Paton (2016). Mass vaccination, immunity and coverage: modelling population protection against Foot-and-Mouth Disease in Turkish cattle. Scientific Reports, 6.
12. Knight-Jones, T.J.D., L. Robinson, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 1 - Overview of Global Status and Research Needs. Transboundary and Emerging Diseases, 63 Suppl 1: 3-13.
13. Knight-Jones, T.J.D., L. Robinson, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 2 - Epidemiology, Wildlife and Economics. Transboundary and Emerging Diseases, 63 Suppl 1: 14-29.
14. Knight-Jones, T.J.D., L. Robinson, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 4 - Diagnostics. Transboundary and Emerging Diseases, 63 Suppl 1: 42-8.
15. Knowles, N.J., K. Bachanek-Bankowska, J. Wadsworth, V. Mioulet, B. Valdazo-Gonzalez, I.M. Eldaghayes, A.S. Dayhum, A.M. Kammon, M.A. Sharif, S. Waight, A.M. Shamia, S. Tenzin, U. Wernery, S. Grazioli, E. Brocchi, S. Subramaniam, B. Pattnaik, and D.P. King (2016). Outbreaks of Foot-and-Mouth Disease in Libya and Saudi Arabia During 2013 Due to an Exotic O/ME-SA/Ind-2001 Lineage Virus. Transboundary and Emerging Diseases, 63(5):

e431-5.
16. Kotecha, A., F. Zhang, N. Juleff, T. Jackson, E. Perez, D. Stuart, E. Fry, B. Charleston, and J. Seago (2016). Application of the thermofluor PaSTRy technique for improving foot-and-mouth disease virus vaccine formulation. The Journal of General Virology, 97(7): 1557-65.
17. Ludi, A., Z. Ahmed, L.W. Pomeroy, S.J. Pauszek, G.R. Smoliga, M. Moritz, S. Dickmu, S. Abdoulkadiri, J. Arzt, R. Garabed, and L.L. Rodriguez (2016). Serotype Diversity of Foot-and-Mouth-Disease Virus in Livestock without History of Vaccination in the Far North Region of Cameroon. Transboundary and Emerging Diseases, 63(1): e27-38.
18. Ludi, A., V. Mioulet, N.J. Knowles, and D.P. King, Laboratory diagnostic methods to support the surveillance and control of foot-and-mouth disease. Foot-and-Mouth Disease Virus: current research and emerging trends, ed. F. Sobrino and E. Domingo. 2017. 275-285.
19. Mahapatra, M., B. Statham, Y. Li, J. Hammond, D. Paton, and S. Parida (2016). Emergence of antigenic variants within serotype A FMDV in the Middle East with antigenically critical amino acid substitutions. Vaccine, 34(27): 3199-206.
20. Maree, F., L.-M. de Klerk-Lorist, S. Gubbins, F. Zhang, J. Seago, E. Perez-Martin, L. Reid, K. Scott, L. van Schalkwyk, R. Bengis, B. Charleston, and N. Juleff (2016). Differential Persistence of Foot-and-Mouth Disease Virus in African Buffalo Is Related to Virus Virulence. Journal of Virology, 90(10): 5132-5140.
21. Reeve, R., D.W. Borley, F.F. Maree, S. Upadhyaya, A. Lukhwareni, J.J. Esterhuysen, W.T. Harvey, B. Blignaut, E.E. Fry, S. Parida, D.J. Paton, and M. Mahapatra (2016). Tracking the Antigenic Evolution of Foot-and-Mouth Disease Virus. PloS one, 11(7): e0159360-e0159360.
22. Robinson, L., T.J.D. Knight-Jones, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 3 - Vaccines. Transboundary and Emerging Diseases, 63 Suppl 1: 30-41.
23. Robinson, L., T.J.D. Knight-Jones, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 5 - Biotherapeutics and Disinfectants. Transboundary and Emerging Diseases, 63 Suppl 1: 49-55.
24. Robinson, L., T.J.D. Knight-Jones, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 6 - Immunology. Transboundary and Emerging Diseases, 63 Suppl 1: 56-62.
25. Robinson, L., T.J.D. Knight-Jones, B. Charleston, L.L. Rodriguez, C.G. Gay, K.J. Sumption, and W. Vosloo (2016). Global Foot-and-Mouth Disease Research Update and Gap Analysis: 7 - Pathogenesis and Molecular Biology. Transboundary and Emerging Diseases, 63 Suppl 1: 63-71.
26. Shimmon, G., B.A. Wood, A. Morris, V. Mioulet, S. Grazioli, E. Brocchi, S. Berryman, T. Tuthill, D.P. King, A. Burman, and T. Jackson (2016). Truncated Bovine Integrin α-v/β-6 as a Universal Capture Ligand for FMD Diagnosis. PloS one, 11(8): e0160696-e0160696.
27. Ularamu, H.G., J.O. Ibu, B.A. Wood, J.N. Abenga, D.D. Lazarus, Y.S. Wungak, N.J. Knowles, J. Wadsworth, V. Mioulet, D.P. King, D. Shamaki, and M.I. Adah (2016). Characterization of Foot-and-Mouth Disease Viruses Collected in Nigeria Between 2007 and 2014: Evidence for Epidemiological Links Between West and East Africa. Transboundary and Emerging Diseases.

b) International conferences: 32
Conference Presentations (international meetings):
1. Howes E., Wright C., Tulloch F., Gold S., Ryan M., King D. P., Jackson T. and Tuthill T. The effects of deletions with FMDV 3A on replication. Society for General Microbiology Annual Meeting, Liverpool, UK, March 2016.
2. Logan G., Newman J., Wright C. F., Lasecka L., King D. P., Haydon D. T., Cottam E. M. and Tuthill T. J. Virus quasispecies reveals RNA structures required for genome packaging. 19th International Picornavirus Meeting, Les Diablerets, Switzerland, September 2016.
3. Wright C. F., Orton R., Morelli M., Paton D. J., Haydon D. T. and King D. P. Impacts of genetic bottlenecks on the foot-and-mouth disease virus consensus sequence: implications for virus fitness and evolution. 19th International Picornavirus Meeting, Les Diablerets, Switzerland, September 2016.
4. Howes E., Wright C. F., Valdazo-Gonzalez B., De Clercq K., De Vleeschauwer A., Gold S., Tuthill T. J., King D. P., Ryan M. and Jackson T. Effects of a large deletion in non-structural protein 3A on FMDV replication. 19th International Picornavirus Meeting, Les Diablerets, Switzerland, September 2016.
5. Lasecka-Dykes L., Knowles N. J., Wright C. F., Logan G., Tuthill T., Jackson T. and King D. P. Next-generation sequencing reveals new SAT genotypes bringing us closer to understanding the history of foot-and-mouth disease virus in Africa. 19th International Picornavirus Meeting, Les Diablerets, Switzerland, September 2016.
6. Lasecka-Dykes L., Tulloch F., Gold S., Luke G., Wright C. F., Knowles N. J., Logan G., Tuthill T. J., Jackson T. Simmonds P., Ryan M. and King D. P. Prediction of conserved RNA structures the within foot-and-mouth disease virus genome reveals functional cis-acting elements localised in the 3D coding region. 19th International Picornavirus Meeting, Les Diablerets, Switzerland, September 2016.
7. Asfor A., Graziolli S., Brocchi E., King D. P., Parida S. and Tuthill T. Detection of antibodies against conserved capsid epitopes provides a universal serology assay for diagnosis of FMD. 19th International Picornavirus Meeting,

Les Diablerets, Switzerland, September 2016.
8. Ryan E., Zientara S., Bakkali-Kassimi L., Brocchi E., King D. P., de Clercq K. Encouraging the use of vaccination-to-live as a control strategy for FMD outbreaks: perspectives and issues. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
9. McLaws M., King D. P., Hickey K., Ludi A. and Sumption K. Which vaccines are most important? A decision support tool for foot-and-mouth disease vaccine bank managers. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
10. Lasecka-Dykes L., Knowles N. J., Wright C. F., Logan G., Tuthill T., Jackson T. and King D. P. Next generation sequencing reveals new Southern African Territories genotypes bringing us closer to understanding the history of foot-and-mouth disease virus in Africa. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
11. Casey M., Reeve R., Auty H., Bachanek-Bankowska K., Fowler V., Hamblin P., Haydon D., Kazwala R., Kibona T., King A., King D. P., Ludi A., Lugelo A., Marsh T., Mioulet V., Mshanga D., Paton D., Parekh K., Parida S., Cleaveland S. and Lembo T. Waves of FMD in East Africa and advances in practical surveillance. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
12. Knowles N. J., Bachanek-Bankowska K., Wadsworth J., Fowler V. and King D. P. The origin, evolution and diagnosis of Seneca Valley virus, a new vesicular disease causing Picornavirus of pigs. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
13. Wadsworth J., Bachanek-Bankowska K., Thapa B., King D. P. and Knowles N. J. Outbreaks of foot-and-mouth disease in the Middle East during 2015 and 2016 due to an exotic A/ASIA/G-VII (G-18) lineage. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
14. Bachanek-Bankowska K., Di Nardo A., Wadsworth J., Gray A., King D. P. and Knowles N. J. Full genome study on the evolution of the foot-and-mouth disease virus O/ME-SA/Ind-2001d lineage; evidence of recombination. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
15. Yousif H., Habiballa I., King D. P. and Knowles N. J. Molecular epidemiology of Sudanese FMD isolates in 2012. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
16. Di Nardo A., Feretti L., Ribeca P., Wadsworth J., Bachanek-Bankowska K., King D. P. and Knowles N. J. Defining the spatio-temporal scale of foot-and-mouth disease virus lineages emergence in the Middle East region. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
17. Lyon N. A., Ludi A., Wilsden G., Hamblin P., Gubbins S. and King D. P. Evaluation of routine vaccination against FMDV serotype A lineage G-VII on large-scale dairy farms in Saudi Arabia. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
18. Howson E. L. A., Orton R., Mioulet V., Cleaveland S., Lembo T., King D. P. and Fowler V. L. GoPrime: in-silico testing or rRT-PCR primers and probes for diagnosis of foot-and-mouth disease. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
19. Morris A., Mioulet V., Wood B., Henry L., Gray A., Thapa B., Wadsworth J., Knowles N. J. and King D. P. Development of a reference foot-and-mouth disease virus antigen panel for the consistent validation of diagnostic assays. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
20. Gray A. R., Mioulet V., Wood B., Reid E., Henry L., Thapa B. and King D. P. Evaluation of alternative cell lines for the isolation of FMDV. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
21. Bin-Tarif A., Statham B., Ludi A. B. and King D. P. The challenges of using in vitro tests for vaccine matching. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
22. Fowler V. L., Howson E. L. A., Mioulet V., Lyons N., Cleaveland S. Tembo T. and King D. P. Progress to develop practical field-based tools for detection of foot-and-mouth disease virus. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
23. Ludi A. B., Wilsden G., Henry L., Mioulet V., Wood B., Gray A., Thapa B. Armson B., Maryan J., Belgrave S. and King D. P. Results of the 2015 proficiency testing scheme. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal,

October 2016.
24. Kim J., Ferretti L., Bachanek-Bankowska K., Knowles N. J., King D. P. and Ribeca P. VIBAsys and FMDV-Tools: practical resources for foot-and-mouth disease virus sequence analysis. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
25. Mioulet V., Morris A., Wood B., Thapa B., Gray A., Henry L., Knowles N. J., Wadsworth J. and King D. P. Antigen-detection ELISA performance vs virus evolution. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
26. Wood B. A., Mioulet V., Henry L., Thapa B., Gray A. and King D. P. Do commercially available lysis buffers inactivate FMD virus? Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
27. Thapa B., Mioulet V., Wood B., Morris A., Henry L., Gray A., King D. P., Kanno T., Fulai K., Yoshida K., Kitano R. and Morioka K. Evaluation of a monoclonal antibody based assay for improved detection of foot-and-mouth disease virus. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
28. Howson E. L. A., Fowler V. L., Armson B., King D. P., Mioulet V., Lyons N., Nelson W. M. and Rauh R. Progress in the development of real-time RT-PCR assays for diagnosis of foot-and-mouth disease. North American PRRS symposium: emerging and foreign animal diseases, Chicago, USA, December 2016.

Invited Talks and Keynotes:
1. Invited Speaker: King D. P. EU-RL for foot-and-mouth disease: examples of coordination, advice, training and surveillance activities. Conference of Irish Food and Health National Reference Laboratories, Backweston, Ireland, February 2016.
2. Keynote: Foot-and-mouth disease: regional threats to North Africa. 5ème Journée Scientifique sur les Maladies Animales Transfrontalières, Gammarth, Tunisia, October 2016.
3. Keynote: Update on current global situation for FMD: new outbreaks and threats. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the control of Foot-and-Mouth Disease, Cascais, Portugal, October 2016.
4. Keynote: Imagining new ways to diagnose and monitor livestock diseases. 4th Congress of the European Association of Veterinary Laboratory Diagnosticians, Prague, Czech Republic, November 2016.

c) National conferences: 0

d) Other:
(Provide website address or link to appropriate information) 3
Website: wwww.wrlfmd.org
Website: www.foot-and-mouth.org/
twitter account: https://twitter.com/WRLFMD

ToR 7: To provide scientific and technical training for personnel from OIE Member Countries
To recommend the prescribed and alternative tests or vaccines as OIE Standards

14. Did your laboratory provide scientific and technical training to laboratory personnel from other OIE Member Countries?

Yes

a) Technical visits: 2
b) Seminars: 0
c) Hands-on training courses: 2
d) Internships (>1 month): 1

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	Albania	1
c	Botswana	2
c	Malta	1
c	Sweden	1
a	Tanzania	4
c	Tanzania	1
a	Ethiopia	~20
d	Kazakhstan	1

ToR 8: To maintain a system of quality assurance, biosafety and biosecurity relevant for the pathogen and the disease concerned

15. Does your laboratory have a Quality Management System certified according to an International Standard?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
ISO/IEC 17025:2005	ISO_IEC 17025-2005_4025.pdf

16. Is your laboratory accredited by an international accreditation body?

Yes

Test for which your laboratory is accredited	Accreditation body
Processing field samples for diagnosis and growth of vesicular	United Kingdom Accreditation Service
FMDV and SVDV antigen detection by ELISA	United Kingdom Accreditation Service
Svanova 1F10 lateral flow device for FMDV antigen detection	United Kingdom Accreditation Service
One step TaqMan® RT-PCR for diagnosis of FMDV and related	United Kingdom Accreditation Service
Detection of antibodies against vesicular and related viruses by the virus neutralisation test (VNT)	United Kingdom Accreditation Service
Liquid Phase Blocking ELISA (LPBE) for detection of antibodies against Foot-and-Mouth disease virus (FMDV)	United Kingdom Accreditation Service
Detection of Antibodies against the Non Structural Protein of Foot-and- Mouth disease virus (FMDV) using Ceditest® FMDV-NS (PrioCHECK® FMDV –NS) kits	United Kingdom Accreditation Service
Detection of Antibodies against the Structural Protein of Foot-and-Mouth disease virus (FMDV) by solid-phase competition ELISA (SPCE)	United Kingdom Accreditation Service
Detection of Antibodies against Foot and Mouth disease virus	United Kingdom Accreditation Service

17. 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, Chapter 1.1.4)

ToR 9: To organise and participate in scientific meetings on behalf of the OIE

18. Did your laboratory organise scientific meetings on behalf of the OIE?

Yes

National/ International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	11th OIE/FAO FMD Reference Laboratories Network Annual Meeting	ANSES, France	12/16	ANSES, Paris, France	40

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

No

ToR 10: To establish and maintain a network with other OIE Reference Laboratories designated for the same pathogen or disease and organise regular inter-laboratory proficiency testing to ensure comparability of results

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

Yes

21. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease by organising or participating in proficiency tests?

Yes

Purpose of the proficiency tests: [1]	Role of your Reference Laboratory (organiser/ participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
Panel 1: Outbreak scenarios of vesicular diseases (FMD and/or SVD)	Organiser	10	Brazil, Botswana, France, Italy, South Korea, Russia, South Africa, Thailand, United Kingdom (Organising laboratory), United States of America
Panel 2: Quality Assurance FMDV samples to ensure recent strains are detected	Organiser	11	Brazil, Botswana, China, France, Italy, South Korea, Russia, South Africa, Thailand, United Kingdom (Organising laboratory), United States of America
Panel 3: Serological samples from an outbreak scenario in panel 1	Organiser	11	Brazil, Botswana, China, France, Italy, South Korea, Russia, South Africa, Thailand, United Kingdom (Organising laboratory), United States of America

[1] *validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.*

22. Did your laboratory collaborate with other OIE 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 OIE Reference Laboratories
Development of FMD ELISA tests	Apply new technologies for molecular epidemiology	IZSLER (Italy)
Molecular epidemiology of epizootic diseases using next generation sequencing technology	Apply new technologies for molecular epidemiology	CODA-CERVA (Belgium)

ToR 11: To organise inter-laboratory proficiency testing with laboratories other than OIE Reference Laboratories for the same pathogens and diseases to ensure equivalence of results

23. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than OIE Reference Laboratories for the same disease?

Yes

Note: See Interlaboratory test comparisons in: Laboratory Proficiency Testing at: http://www.oie.int/en/our-scientific-expertise/reference-laboratories/proficiency-testing see point 1.3

Purpose for inter-laboratory test comparisons[1]	No. participating laboratories	Region(s) of participating OIE Member Countries
Panel 1: Outbreak scenarios of vesicular diseases (FMD and/or SVD)	46	☒Africa ☒Americas ☒Asia and Pacific ☒Europe ☒Middle East
Panel 2: Quality Assurance FMDV samples to ensure recent strains are detected	46	☒Africa ☒Americas ☒Asia and Pacific ☒Europe ☒Middle East
Panel 3: Serological samples from an outbreak scenario in panel 1	52	☒Africa ☒Americas ☒Asia and Pacific ☒Europe ☒Middle East

ToR 12: To place expert consultants at the disposal of the OIE

24. Did your laboratory place expert consultants at the disposal of the OIE?

Yes

Kind of consultancy	Location	Subject (facultative)
Attended OIE SEACFMD Meeting	Thailand	Presented Global update on FMD
Vaccine Tender	HQ Paris	OIE meeting to discuss vaccine bank for Southeast Asia
Road Map meeting (West EurAsia)	Kyrgyzstan	Presented global FMD situation and contributed to meeting objectives
Road Map meeting (West Africa)	Togo	Presented global FMD situation and contributed to meeting objectives
SCAD Meeting	HQ Paris	Attended meeting in Paris
OIE Ad Hoc Group on FMD	HQ Paris	Revise Chapter 8.8 of The OIE Terrestrial Code on foot and mouth disease
OIE Ad Hoc Group on Evaluation of FMD Status of Member Countries	HQ Paris	Review dossiers from Member Countries applying for recognition of an official FMD status
Assisted in finalisation for publication of a new OIE/FAO Guideline	HQ Paris	Foot and mouth disease vaccination and post-vaccination monitoring. Guidelines. (2016) (http://www.fao.org/documents/card/en/c/56c4f441-1aad-46b5-bc7a-c0ba17c1a11d/)
3rd Regional FMD South Asian Association for Regional Cooperation Roadmap Meeting	Sri Lanka	Represented EuFMD and TPI at the meeting

25. Additional comments regarding your report:

ToR4: Samples from PR China refer to specimens submitted from Hong Kong SAR.
ToR4: Six (6) samples for confirmatory diagnostic testing were received from the Palestinian Autonomous territories in February.