

WOAH Reference Laboratory Reports Activities 2023

Activities in 2023

This report has been submitted : 1 juillet 2024 13:21

Laboratory Information

Name of disease (or topic) for which you are a designated WOA Reference Laboratory:	Brucella abortus, Brucella melitensis, Brucella suis
Address of laboratory:	Department of Bacteriology, APHA, Woodham Lane, Addlestone, Surrey, UNITED KINGDOM
Tel.:	01932357610
E-mail address:	adrian.whatmore@apha.gov.uk
Website:	www.apha.gov.uk
Name (including Title) of Head of Laboratory (Responsible Official):	David Holdsworth
Name (including Title and Position) of WOA Reference Expert:	Dr Adrian Whatmore, Head of Bacteriology
Which of the following defines your laboratory? Check all that apply:	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 WOA Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests			
iELISA (serum)		4129	3
cELISA		13849	537
CFT		967	1289
RBT		4080	198
SAT		278	80
iELISA (milk)		30909	0
RSA (canis)		1605	808
SAT (canis)		9640	442
iELISA (canis)		7424	0
Direct diagnostic tests			
Bacterial culture		1882	9
Real-time PCR		34	0
Bruceladder		1	0
SNP typing		1	0
MLST		0	9
MLVA		0	

			0
Whole genome sequencing		4	9

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
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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
Diagnostic kit	Milk iELISA	Produced	2 kits	2 kits	2	TANZANIA, UNITED KINGDOM,
Diagnostic kit	cELISA	Produced	2 kits	1 kit	2	BELGIUM, UNITED KINGDOM,
Antigen	Milk Ring Test	Produced	1600ml	700ml	5	ALBANIA, AZERBAIJAN, MOZAMBIQUE, SINGAPORE, UNITED KINGDOM,
Antigen	Serum Agglutination Test	Produced	200ml	500ml	6	DENMARK, HUNGARY, KAZAKHSTAN, SINGAPORE, UNITED KINGDOM, UNITED STATES OF AMERICA,
Antigen	Complement Fixation Test	Produced	2300ml	4200ml	11	AUSTRALIA, BOSNIA AND HERZEGOVINA, DENMARK, ECUADOR, HUNGARY, KAZAKHSTAN, MALAYSIA, PHILIPPINES, SINGAPORE, UNITED KINGDOM, UNITED STATES OF AMERICA,
Positive control antisera	Various	Produced	10ml	18ml	9	BOSNIA AND HERZEGOVINA, DENMARK, GERMANY, HUNGARY, KAZAKHSTAN, NORWAY, SINGAPORE, SWITZERLAND, UNITED STATES OF AMERICA,
Monospecific serum	Biotyping	Produced	2ml	10ml	2	ITALY, TANZANIA,

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.)
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Research into various tools applicable to disease control.

Activities of the Brucellosis Unit at APHA are underpinned by an applied research programme core funded by government. The focus of this programme is to continually look to improve diagnostic tests, typing tools and means of addressing outbreaks of disease. The research team is split into two units one focussing on immunodiagnosis and vaccine development, and another on development and application of new molecular tools, both areas where the APHA team have provided considerable international leadership. This year we have provided novel diagnostic antigens from our R&D programme to several veterinary diagnostic companies who are using these to develop and licence serodiagnostic kits for brucellosis (*Brucella abortus*, *Brucella melitensis*, *Brucella suis*, *Brucella canis*) and for infection with *Brucella ovis*. We are also progressing with the development of a novel glycoconjugate DIVA vaccine for brucellosis with the support of a commercial partner. The vaccine candidate is within the AgResults Brucellosis Vaccine Challenge Project. The candidate is currently in small animal trials. The molecular team continue to develop improved tools to understand the epidemiology of *Brucella* with an increasing focus on the use of whole genome sequencing as a tool to understand both local transmission and global epidemiology (see 1,2) (1) Edao BM, Ameni G, Berg S, Tekle M, Whatmore AM, Wood JL, van Tonder A, Ashford RT. Whole genome sequencing of Ethiopian *Brucella abortus* isolates expands the known diversity of an early branching sub-Saharan African lineage. *Frontiers in Microbiology*. 2023; 14: 1128966. Doi: 10.3389/fmicb.2023.1128966 (2) Janke, N. R., C. H. D. Williamson, K. P. Drees, M. Suárez-Esquivel, A. R. Allen, J. T. Ladner, C. R. Quance, S. Robbe-Austerman, D. O'Callaghan, A. M. Whatmore, and J. T. Foster. (2023) Global phylogenomic diversity of *Brucella abortus*: spread of a dominant lineage. *Front Microbiol*, 14: 1287046.

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

No

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

Yes

NAME OF THE NEW VACCINE DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
Early research.	See section 7.

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

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOA 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
IRAN	2023-09-30	MLST	9	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
UNITED ARAB EMIRATES	PCR guidance	email
UNITED KINGDOM	Outbreak guidance (UK consultancy to Middle East)	email
AUSTRALIA	Diagnostics guidance	email

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOA 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
		To protect human and animal health by describing and		

Role of Camels in the Transmission of <i>Brucella</i> spp and Middle East Respiratory Syndrome Coronavirus to Humans in Kenya.	4 years.	quantifying the transmission dynamics of <i>Brucella</i> spp and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and developing a robust brucellosis prevention and control model for Kenya.	Defence Threat Reduction Agency - USA, Washington State University. Multiple local institutions.	KENYA UNITED STATES OF AMERICA
Supporting the Safe and Effective Control of Brucellosis in Africa.	3 years.	Capacity building	UK International Biological Security Programme (IBSP), veterinary and public health laboratories in Rwanda (University of Rwanda; Rwandan Agriculture Board) and Tanzania (Kilimanjaro Clinical Research Institute; Nelson Mandela African Institute of Science and Technology) , Penn State University (USA).	RWANDA TANZANIA UNITED STATES OF AMERICA

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

No

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:

See publications on the local and global epidemiology of *B. abortus* based on whole genome sequencing

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:

As above - via publications

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:

8

Cloekaert, Axel, Roy Martin Roop II, Holger C Scholz, Adrian M Whatmore, and Michel Stanislas Zygmunt. *Pathogenomics of the Genus Brucella and Beyond, Volume II. Frontiers in Microbiology*, 15: 1370330.

Djokic, V, Freddi, L., de Massis, F., Lahti, E., van den Esker, M.H., Whatmore, A.M., Haughey, A., Ferreira, A.C., Garofolo, G., Melzer, F., Sacchini, F., Koets, A., Wyllie, S., Fontbonne, A., Girault, G., Vicente, A.F., McGiven, J, and Ponsart, C. (2023) *The emergence of Brucella canis as a public health threat in Europe: what we know and what we need to learn. Emerging Microbes & Infections*, 12: 2249126.

Edao, B. M., Ameni, G., Berg, S., Tekle, M., Whatmore, A. M., Wood, J. L. N., van Tonder, A. J, and Ashford, R. T. (2023) *Whole genome sequencing of Ethiopian Brucella abortus isolates expands the known diversity of an early branching sub-Saharan African lineage. Front Microbiol*, 14: 1128966.

Janke, N. R., C. H. D. Williamson, K. P. Drees, M. Suárez-Esquivel, A. R. Allen, J. T. Ladner, C. R. Quance, S. Robbe-Austerman, D. O'Callaghan, A. M. Whatmore, and J. T. Foster. (2023) *Global phylogenomic diversity of Brucella abortus: spread of a dominant lineage. Front Microbiol*, 14: 1287046.

Moreno, E., et al., including McGiven, J and Whatmore, A.M. (2023) *If You're Not Confused, You're Not Paying Attention: Ochrobactrum Is Not Brucella. J Clin Microbiol*, 61: e0043823.

Mbwambo, Gershom A., Marco van Zwetselaar, Tolbert Sonda, AbdulHamid S. Lukambagire, Judith S. Njau, Boaz Wadugu, Ignass P. Ignass, Nelson B. Amani, Ephrasia A.

Hugho, Matthew P. Rubach, Philoteus Sakasaka, Rose S. Oisso, Nestory Mkenda, Gabriel Shirima, Roland T. Ashford, Daniel T. Haydon, Venance P. Maro, Rudovick R. Kazwala, Happiness H. Kumburu, Blandina T. Mmbaga, and Jo E. B. Halliday. (In Press) Complete genome sequence of *Brucella abortus* isolated from a human blood culture sample in Tanzania. *Microbiology Resource Announcements*, 0: e00930-23.

Gilles, V., Zygmunt, M., Ashford, R.T., Whatmore, A.M. and Cloeckaert, A. (2024) Genomic Diversity and Zoonotic Potential of *Brucella neotomae*. *Emerging Infectious Diseases*, 30: 155.

Holt HR, Walker M, Beauvais W, Kaur P, Bedi JS, Mangtani P, Sharma NS, Gill JPS, Godfroid J, McGiven J, Guitian J. Modelling the control of bovine brucellosis in India. *J R Soc Interface*. 2023 Mar;20(200):20220756.

b) International conferences:

0

c) National conferences:

0

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

4

Curator of *Brucella* multilocus sequencing international database. Tool originally developed by APHA and now very widely used globally to type *Brucella*. Curated by Adrian Whatmore/Roland Ashford. <https://pubmlst.org/brucella/>

Adrian Whatmore also a curator of MLVA database (alternative typing tool best suited to local epidemiology). <http://mlva.i2bc.paris-saclay.fr/brucella/>

Adrian Whatmore. Editor of *Frontiers Topic 'Pathogenomics of the Genus Brucella and Beyond II'*. (Ongoing). <https://www.frontiersin.org/research-topics/27179/pathogenomics-of-the-genus-brucella-and-beyond-volume-ii>

Adrian Whatmore. Editor. *Thematic Series in 'Infectious Diseases of Poverty. 'Control strategy and case management of human brucellosis'*. Ongoing. <https://www.biomedcentral.com/collections/cscmh>

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 5

b) Seminars : 50

c) Hands-on training courses: 14

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	TANZANIA	5
C	TANZANIA	5
B	RWANDA	50
B	TANZANIA	50
C	KENYA	6
C	RWANDA	3

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
		ANIMAL PLANT HEALTH AGENCY - Certificate

ISO9001:2015	BV ISO9001:2015 certificate	UK013916 - ISO 9001 - exp. 25-07-2026.pdf
ISO17025:2017	UKAS ISO17025:2017 certificate	APHA UKAS cert to 25 Nov 25.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
iELISA (serum)	ISO17025:2017
cELISA	ISO17025:2017
CFT	ISO17025:2017
RBT	ISO17025:2017
SAT	ISO17025:2017
iELISA (milk)	ISO17025:2017
RSA (B. canis)	ISO17025:2017
SAT (B. canis)	ISO17025:2017
iELISA (B. canis)	ISO17025:2017
Brucella isolation	ISO17025:2017
Phenotypic characterisation (biotyping)	ISO17025:2017
Real time PCR	ISO17025:2017

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

Yes

APHA complies with HSE working standards (<http://www.hse.gov.uk>) that are monitored by them. All live work with Brucella is carried out at CL3.

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?

No

TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

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

Yes

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

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOA?H REF. LABS
Brucellosis	Informal network e.g. for manual revision	10	All invited.

25. Did you organise or participate in inter-laboratory proficiency tests with WOA?H 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?H REF. LABS/ ORGANISING WOA?H REF. LAB.
VETQAS PT0015 B. abortus CFT/SAT	Organiser and participant	2	APHA Weybridge, UK Central Veterinary Research Laboratory, UNITED ARAB EMIRATES
VETQAS PT0016 B. abortus ELISA	Organiser and participant	3	APHA Weybridge, UK Animal and Plant Quarantine Agency (QIA)Ministry of Agriculture, Food and Rural Affairs (MAFRA), KOREA Central Veterinary Research Laboratory, UNITED ARAB EMIRATES
VETQAS PT0018 B. abortus milk iELISA	Organiser and participant	1	APHA Weybridge, UK
VETQAS PT0019 B. abortus Milk Ring Test	Organiser and participant	1	APHA Weybridge, UK

VETQAS PT0020 B. abortus Rose Bengal Test	Organiser and participant	3	APHA Weybridge, UK Animal and Plant Quarantine Agency (QIA) Ministry of Agriculture, Food and Rural Affairs (MAFRA), KOREA Central Veterinary Research Laboratory, UNITED ARAB EMIRATES
VETQAS PT0022 B. canis	Organiser and participant	3	APHA Weybridge, UK IZS, Italy Animal and Plant Quarantine Agency (QIA) Ministry of Agriculture, Food and Rural Affairs (MAFRA), KOREA
VETQAS PT0025 B. abortus Stain Slide and ID	Organiser and participant	1	APHA Weybridge, UK
VETQAS PT0187 Brucella PCR	Organiser and participant	1	APHA Weybridge, UK

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

No

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

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

Yes

Purpose for inter-laboratory test comparisons ¹	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the Test	WOAH Member Countries
VETQAS PT0015 B. abortus CFT/SAT	Organiser and Participant	36	B. abortus CFT/SAT	ARMENIA, AUSTRALIA, AUSTRIA, BOTSWANA, BRAZIL, CANADA, CYPRUS, DENMARK, GREECE, IRELAND, ISRAEL, MOROCCO, PORTUGAL, ROMANIA, SOUTH AFRICA, SWITZERLAND, THE NETHERLANDS, UNITED ARAB EMIRATES, UNITED KINGDOM, UNITED STATES OF AMERICA,
VETQAS PT0016 B. abortus ELISA	Organiser and Participant	36	B. abortus ELISA	AZERBAIJAN, DENMARK, ECUADOR, GERMANY, GREECE, GUATEMALA, INDIA, IRELAND, KOREA (REP. OF), KOSOVO, MALTA, PORTUGAL, ROMANIA, SERBIA, SWITZERLAND, UNITED ARAB EMIRATES, UNITED KINGDOM, UNITED STATES OF AMERICA,
VETQAS PT0018 B. abortus milk iELISA	Organiser and Participant	15	B. abortus milk iELISA	AUSTRIA, GREECE, KOSOVO, PORTUGAL, UNITED ARAB EMIRATES, UNITED KINGDOM,
VETQAS PT0019 B. abortus Milk Ring Test	Organiser and Participant	7	B. abortus Milk Ring Test	AZERBAIJAN, BRAZIL, MALTA, MEXICO, SOUTH AFRICA, UNITED ARAB EMIRATES, UNITED KINGDOM,
VETQAS PT0020 B. abortus Rose Bengal Test	Organiser and Participant	73	B. abortus Rose Bengal Test	ARMENIA, AZERBAIJAN, BOSNIA AND HERZEGOVINA, BOTSWANA, BRAZIL, CANADA, CHILE, CROATIA, DENMARK, ECUADOR, ETHIOPIA, GREECE, GUATEMALA, IRELAND, ISRAEL, KOREA (REP. OF), KOSOVO, MALTA, MOROCCO, NEW ZEALAND, NORTH MACEDONIA (REP. OF), PAKISTAN, PORTUGAL, ROMANIA, SERBIA, SINGAPORE, SOUTH AFRICA, SWITZERLAND, UNITED ARAB EMIRATES, UNITED KINGDOM,
VETQAS PT0022 B. canis	Organiser and Participant	12	B. canis identification	AUSTRIA, ISRAEL, ITALY, KOREA (REP. OF), PORTUGAL, ROMANIA, SOUTH AFRICA, SWITZERLAND, THE NETHERLANDS, UNITED KINGDOM, UNITED STATES OF AMERICA,
VETQAS PT0025 B. abortus Stain Slide and ID	Organiser and Participant	20	B. abortus Stain Slide and identification	ISRAEL, ROMANIA, SWEDEN, SWITZERLAND, UNITED ARAB EMIRATES, UNITED KINGDOM,

VETQAS PT0187
Brucella PCR

Organiser and Participant 23

Brucella PCR

AUSTRALIA, BOTSWANA, BRAZIL, DENMARK, IRELAND,
ISRAEL, KOSOVO, MALAYSIA, NORTH MACEDONIA (REP. OF),
NORWAY, PORTUGAL, SERBIA, SINGAPORE, SOUTH AFRICA,
SWITZERLAND, THE NETHERLANDS, UNITED ARAB
EMIRATES, UNITED STATES OF AMERICA,**TOR12: EXPERT CONSULTANTS**

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

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
Consultancy around lessons learnt in twinning projects related to previous projects in Turkey, Sudan and Afghanistan.	APHA Weybridge	Twinning Projects

29. Additional comments regarding your report: