

OIE Reference Laboratory Reports Activities

Activities in 2021

This report has been submitted : 2022-01-11 13:19:33

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Salmonellosis
Address of laboratory:	New Haw, Addlestone Surrey KT15 3NB Weybridge UNITED KINGDOM
Tel.:	+44-1932 35 73 61
Fax:	+44-1932 35 75 95
E-mail address:	rob.davies@apha.gov.uk
Website:	www.gov.uk/apha
Name (including Title) of Head of Laboratory (Responsible Official):	Dr Kath Webster, Director of APHA Science Directorate
Name (including Title and Position) of OIE Reference Expert:	Dr Rob Davies, Head of OIE Reference Laboratory
Which of the following defines your laboratory? Check all that apply:	Governmental Research Other: Governmental and some commercial activities

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	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
SAT (S. Pullorum/Gallinarum)	yes	97	0
RSA (S. Pullorum/Gallinarum)	yes	185	0
SAT (S. Typhimurium)	yes	29	9
SAT (S. Abortusequi)	yes	303	8
SAT (S. Dublin)	yes	54	23
Direct diagnostic tests		Nationally	Internationally
Serotyping	yes	6943	0
Phage typing	yes	845	0
Antimicrobial susceptibility testing	yes	5166	0
Tests for live Salmonella vaccines	yes	561	0
Monophasic STm PCR tests	yes	48	0
Salmonella isolation culture	yes	14,960	0
Whole Genome Sequencing	yes	1,800	7

**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?

No

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
Salmonella typing sera	Serotyping	22,249ml	18,507ml	NK	commercially sensitive information	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
S. Pullorum control serum	SAT	19ml	12.5ml	NK	Commercially sensitive information	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
S. Pullorum antigen	SAT and RSA	13,450ml	4,525ml	2,875ml	Commercially sensitive information	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> 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?

No

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
SAUDI ARABIA	Diagnostic testing, monitoring, laboratory standards, legislation, control methods, vaccines	On-line consultation, phone and E mail
GERMANY	Vaccinology, culture methods, control methods	On-line consultation, phone and E mail
LITHUANIA	Salmonella control feeder mice	On-line consultation, phone and E mail
DENMARK	Salmonella control in laying hen flocks	E. mail and on-line consultation
AUSTRALIA	Epidemiology of Salmonella in relation to animal feed	E. mail
ITALY	Control of Salmonella in cattle herds	E. mail
POLAND	Control of Salmonella in broiler production and processing	On-line consultation
BRAZIL	Test validation	E. mail
IRELAND	Salmonella sampling in pig farms	E. mail
SUDAN	Risk assessment	E. mail

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
BIOPIGEE	3 years	To obtain better knowledge on how to combat Salmonella and HEV in biofilms/surface microlayers by disinfection in pig farms, to help develop common biosecurity protocol	Several European Institutions	AUSTRIA
COMPARE	5 years	Microevolution study of the highly clonal monophasic Salmonella Typhimurium	Several European Institutions	DENMARK
EJP: DiSCoVeR - Discovering the sources of Salmonella, Campylobacter, VTEC and antimicrobial resistance	2.5 years	Data identification/preparing data inventories of Salmonella isolates	Several European Institutions	PORTUGAL
EJP: DiSCoVeR	2.5 years	Critical assessment/improvement of existing and development of new source attribution models. Source attribution by phylogeny	Several European Institutions	SWEDEN
EJP: ADONIS	2.5 years	Data identification/preparing data inventories of Salmonella Enteritidis isolates from 2008-2019 and on farm control of S. Enteritidis.	Several European Institutions	FRANCE
EJP: BeONE and ORION	2.5 years	BeONE is developing an integrated surveillance dashboard in which molecular and epidemiological data for foodborne pathogens can be interactively analysed, visualised and interpreted by the relevant experts across disciplines and sectors. DK, Germany, Portugal, Denmark, NL, Norway, NL and strengthening general surveillance capability	Several European Institutions	NORWAY
UK FAO Reference Centre for AMR supported studies	2 years	Collection and characterisation of Salmonella isolates from livestock	Several Nigerian institutions	NIGERIA
UK FAO Reference Centre for AMR supported study	2 years	Characterisation of Salmonella isolates from wildlife	Bangladesh Livestock Research Institute	BANGLADESH
UK FAO Reference Centre for AMR supported study	2 years	Characterisation of Salmonella isolates from retail sources	University of Ghana	GHANA

Biotechnology and Biological Sciences Research Council (BBSRC), grant number RM38G0140 awarded to MC, and the National Science and Technology Development Agency (NSTDA), grant number P-18-50454	2 years	Phage activity v. Salmonella	Public Health authorities in Thailand	THAILAND
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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

If the answer is yes, please provide details of the data collected:

Salmonella and related AMR data for the EFSA/ECDC annual One Health reports, 2020.

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

Yes

If the answer is yes, please provide details of the data collected:

The 2020 edition of Salmonella in Livestock Production in GB :
<https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain>

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: 13

Newton, K., Withenshaw, S.M., Cawthraw, S.A. and Davies, R., 2021. In-depth farm investigations and an exploratory risk factor analysis for the presence of Salmonella on broiler farms in Great Britain. Preventive Veterinary Medicine, 197, p.105498.

Gosling, R.J., Mawhinney, I., Richardson, K., Wales, A. and Davies, R., 2021. Control of Salmonella and Pathogenic E. coli Contamination of Animal Feed Using Alternatives to Formaldehyde-Based Treatments. Microorganisms, 9(2), p.263.

Withenshaw, S.M., Cawthraw, S., Gosling, B., Newton, K., Oastler, C.E., Smith, R.P. and Davies, R.H., 2021. Risk factor analysis for Salmonella contamination of broiler chicken (Gallus gallus) hatcheries in Great Britain. Preventive Veterinary Medicine, 196, p.105492.

Martelli, F., Oastler, C., Barker, A., Jackson, G., Smith, R.P. and Davies, R., 2021. Abattoir-based study of Salmonella prevalence in pigs at slaughter in Great Britain. *Epidemiology & Infection*, pp.1-14.

De Lucia A, Cawthraw SA, Smith RP, Davies R, Bianco C, Ostanello F, Martelli F. Pilot Investigation of Anti-Salmonella Antibodies in Oral Fluids from Salmonella Typhimurium Vaccinated and Unvaccinated Swine Herds. *Animals*. 2021; 11(8):2408. <https://doi.org/10.3390/ani11082408>

Wales, A. and Davies, R., 2021. How to talk to clients about giving raw food diets to their dogs and cats. In *Practice*, 43(8), pp.468-473.

Wales, A.D., Gosling, R.J., Bare, H.L. and Davies, R.H., 2021. Disinfectant testing for veterinary and agricultural applications: A review. *Zoonoses and Public Health*. <https://doi.org/10.1111/zph.12830>

Arnold, M.E., Smith, R.P., Tang, Y., Guzinski, J., Petrovska, L. (2021) Bayesian source attribution of Salmonella Typhimurium isolates from human patients and farm animals in England and Wales. *Frontiers in Microbiology*, accepted. <https://doi.org/10.3389/fmicb.2021.579888>

Wales, A.D. and Davies, R.H., 2021. Disinfection to control African swine fever virus: a UK perspective. *Journal of Medical Microbiology*, 70(9), p.001410. (paper compares disinfection of ASFV and Salmonella)

Wales, A., Taylor, E. and Davies, R., 2021. Review of food grade disinfectants that are permitted for use in egg packing centres. *World's Poultry Science Journal*, pp.1-30.

Kirkwood M, Vohra P, Bawn M, Thilliez G, Pye H, Tanner J, Chintoan-Uta C, Branchu P, Petrovska L, Dallman T, Hall N, Stevens MP, Kingsley RA. Ecological niche adaptation of Salmonella Typhimurium U288 is associated with altered pathogenicity and reduced zoonotic potential. *Commun Biol*. 2021 Apr 23;4(1):498. doi: 10.1038/s42003-021-02013-4.

Cadel-Six S, Cherchame E, Douarre PE, Tang Y, Felten A, Barbet P, Litrup E, Banerji S, Simon S, Pasquali F, Gourmelon M, Mensah N, Borowiak M, Mistou MY, Petrovska L. The Spatiotemporal Dynamics and Microevolution Events That Favored the Success of the Highly Clonal Multidrug-Resistant Monophasic Salmonella Typhimurium Circulating in Europe. *Front Microbiol*. 2021 May 21;12:651124. doi: 10.3389/fmicb.2021.651124. eCollection 2021.

Nale, J.Y., Vinner, G.K., Lopez, V.C., Thanki, A.M., Phothaworn, P., Thiennimitr, P., Garcia, A., AbuOun, M., Anjum, M.F., Korbsrisate, S. and Galyov, E.E., 2021. An optimized bacteriophage cocktail can effectively control Salmonella in vitro and in *Galleria mellonella*. *Frontiers in microbiology*, p.3370. <https://doi.org/10.3389/fmicb.2020.609955>

b) International conferences: 4

Oastler, C., Arvand, M., Konrat, K., Osland, A.M., Pfiffer, V., Vestby, L., Gosling, B. Assessment of the biofilm forming capability of Salmonella isolates sourced from pig farms in Great Britain. OHEJP 2021 annual science meeting – poster presentation.

Oastler, C., La Ragione, R., Chambers, M., Gosling, R., Martelli, F., Davies, R. Biofilm forming capability and disinfectant tolerance of persistent Salmonella 13:23:i:- isolates recovered from a poultry hatchery. OHEJP 2021 annual science meeting – poster presentation.

Martelli, F - Presentations on food safety (including Salmonella) in Qatar (March 2021) and Azerbaijan (December 2021).

c) National conferences: 14

Oastler, C., La Ragione, R., Chambers, M., Gosling, R., Martelli, F., Davies, R. Development of an in vitro model for studying biofilms in poultry drinking water systems. Avian infectious disease meeting 2021 - flash presentation (presenter: C. Oastler).

Oastler, C. Biofilms – the problems they cause and how to remove them. APHA disinfectant webinar 2021- oral presentation

Davies, R - Holistic approach to Salmonella disinfection. APHA disinfectant webinar 2021- oral presentation

Multiple unpublished webinars involving Government/Devolved Administrations, Public Health and Food Safety authorities, Official Control Laboratories, Agribusinesses, Specialist Veterinarians, Vaccine manufacturers, feed industry and biocide industries on surveillance data, sampling, detection/characterisation, risk assessment and

control of Salmonella in poultry, pigs, ruminants and animal feed production.

d) Other:

(Provide website address or link to appropriate information) 7

Salmonella poultry flocks guidance: <https://www.gov.uk/guidance/salmonella-get-your-egg-laying-hens-tested>

Poultry Health Scheme Handbook (re sampling and testing under International poultry Trade Regulations)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1012365/phs-handbook.pdf

EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards), Koutsoumanis, K, Allende, A, Álvarez-Ordóñez, A, Bolton, D, Bover-Cid, S, Chemaly, M, Davies, R, De Cesare, A, Herman, L, Hilbert, F, Lindqvist, R, Nauta, M, Ru, G, Simmons, M, Skandamis, P, Suffredini, E, Argüello, H, Berendonk, T, Cavaco, LM, Gaze, W, Schmitt, H, Topp, E, Guerra, B, Liébana, E, Stella, P and Peixe, L, 2021. Scientific Opinion on the role played by the environment in the emergence and spread of antimicrobial resistance (AMR) through the food chain. EFSA Journal 2021;19(6):6651, 188 pp. <https://doi.org/10.2903/j.efsa.2021.6651>

EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards), Koutsoumanis, K, Allende, A, Bolton, D, Bover-Cid, S, Chemaly, M, Davies, R, De Cesare, A, Herman, L, Hilbert, F, Lindqvist, R, Nauta, M, Peixe, L, Ru, G, Simmons, M, Skandamis, P, Suffredini, E, Fernández Escámez, P, Spiropoulos, J, Iulietto, MF, Ortiz-Peláez, A and Alvarez-Ordóñez, A, 2021. Scientific Opinion on the evaluation of the application for new alternative biodiesel production process for rendered fat including Category 1 animal by-products (BDI-RepCat® process, AT). EFSA Journal 2021;19(4):6511, 26 pp. <https://doi.org/10.2903/j.efsa.2021.6511>

EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards), Koutsoumanis K, Allende A, Bolton D, Bover-Cid S, Chemaly M, Davies R, De Cesare A, Herman L, Hilbert F, Lindqvist R, Nauta M, Peixe L, Ru G, Simmons M, Skandamis P, Suffredini E, Bottari B, Cummins E, Ylivainio K, Munoz Guajardo I, Ortiz-Pelaez A and Alvarez-Ordóñez A, 2021. Inactivation of indicator ~ microorganisms and biological hazards by standard and/or alternative processing methods in Category 2 and 3 animal by-products and derived products to be used as organic fertilisers and/or soil improvers. EFSA Journal 2021;19(12):6932, 111 pp. <https://doi.org/10.2903/j.efsa.2021.6932>

EFSA Panel on Biological Hazards (BIOHAZ), Koutsoumanis, K., Allende, A., Alvarez-Ordóñez, A., Bolton, D., Bover-Cid, S., Chemaly, M., Davies, R., De Cesare, A., Herman, L. and Hilbert, F., 2021. Maximum levels of cross-contamination for 24 antimicrobial active substances in non-target feed. Part 1: Methodology, general data gaps and uncertainties. EFSA Journal, 19(10), p.e06852.

The 2020 edition of Salmonella in Livestock Production in GB :

<https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain>

Contribution to APHA Risk Team qualitative import risk assessment for Defra to assess the risk to animals resulting from Prohibitions and Restrictions on animal products arriving from the EU relating to Aujeszky's disease virus, Salmonella Gallinarum and Trichinella spp. (unpublished).

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: 00

b) Seminars: 1

c) Hands-on training courses: 1

d) Internships (>1 month): 00

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 - provided remotely	Nigeria	132
b	Italy (University of Bologna)	not recorded

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?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
ISO9001	A OIE ISO9001 certificate 2020-2023.pdf
ISO 17025	A OIE ISO17025 (002).jpg

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Various Salmonella surveillance and diagnostic tests	UKAS (ISO:17025:2017)
Various serological and AMR tests	UKAS (ISO:17025:2015)
Various research methodologies	LRQA (ISO:9001:2015)

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?

No

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.
EURL-Salmonella Proficiency test PPS 2021 - Detection of Salmonella in boot-swabs	Participant	35	European Labs
EURL - Salmonella - Serotyping and WGS cluster analysis 2021	Participant	35/19	European Labs
EURL molecular typing PT (DTU) 2021	Participant	33	European Labs
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0087 Salmonella in Animal Feed	Organiser & participant	20	UK
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0088 Salmonella in Poultry	Organiser & participant	142	UK, Canada, Italy, Germany, Republic of Korea
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0090 Control of Salmonella in Poultry Order (run for UK labs only)	Organiser & participant	21	UK
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0084 Salmonella serotyping and culture	Organiser & participant	36	UK, Germany

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
Various EU-wide investigations relating to contamination of broiler meat and feeder mice - involving public and animal health authorities in Europe	WGS-based epidemiological investigations and provision of control advice	Various in Europe, including Italy, Germany
UK FAO Reference Centre for AMR supported study relating to Nigeria	Collection and characterisation of Salmonella isolates from livestock	Italy

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
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0087 Salmonella in Animal Feed	20	<input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0088 Salmonella in Poultry	142	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0090 Control of Salmonella in Poultry Order (run for UK labs only)	21	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Assess laboratory capability to conduct isolation and identification of Salmonella species to help maintain accreditation. Animal and Plant Health Agency Vetqas PT scheme PT0084 Salmonella serotyping and culture	36	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Salmonella detection, serotyping and WGS cluster analysis EU-RL and DTU ringtrials	35/19	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Salmonella serotyping/detection	58	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input checked="" type="checkbox"/> 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)
Final review of OIE manual of diagnostic tests and vaccines for terrestrial animals - chapter 3.9.8. on Salmonellosis	E mail	Diagnosis and Control
Response to ad hoc queries	E mail	Diagnosis and Control

25. Additional comments regarding your report: