

OIE Reference Laboratory Reports Activities

Activities in 2021

This report has been submitted : 2022-01-19 19:41:45

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Escherichia coli
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Name (including Title) of Head of Laboratory (Responsible Official):	John Morris Fairbrother, BVsc, PhD, Professor
Name (including Title and Position) of OIE Reference Expert:	John Morris Fairbrother, BVsc, PhD, Professor
Which of the following defines your laboratory? Check all that apply:	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	
		Nationally	Internationally
Indirect diagnostic tests			
Direct diagnostic tests			
Conventional PCR for pathogenic E. coli (up to 10 virulence genes)	Yes	6856	44
Antimicrobial resistance by minimal inhibition concentration, disk diffusion, PCR or gene sequencing)	Yes	1228	13
Whole Genome Sequencing	Yes	145	61

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
E. coli reference strains	Conventional PCR for pathogenic E. coli	produced and provided	2 ml	6 ml	3	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input 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?

Yes

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

No

Name of the new test or diagnostic method or vaccine developed	Description and References (Publication, website, etc.)
Whole genome sequencing (WGS) of E. coli isolates	We are offering rapid WGS testing of E. coli isolates for O:H serotyping, MLST, cg MLST, and detection of virulence genes and prediction of antimicrobial resistance based on the presence of antimicrobial resistance genes and chromosomal point mutations using Illumina Nextera XT or DNA Prep preparation kits and Illumina iSeq100/Miseq sequencing platforms and in-house in silico analysis.
Conventional PCR for pathogenic E. coli	We are developing conventional PCR tests for porcine and avian pathogenic E. coli using virulence markers based on our WGS results from strains isolated from diseased or healthy animals.

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
FRANCE	January, April, June, August, October, Novembre, December	52	0
UNITED STATES OF AMERICA	February, April, May, June, August, September, October	8	0
COSTA RICA	March	1	0
SPAIN	July	1	0

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

No

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
Study of the antimicrobial resistance in avian and porcine bacteria from WAEMU (West African Economic and Monetary Union) countries	3 years	Study of the antimicrobial resistance in avian and porcine bacteria from WAEMU countries (mainly Togo and Ivory Coast)	École Inter-États des Sciences et Médecine Vétérinaires (EISMV), Sénégal	SENEGAL
Antimicrobial resistance and interrelatedness of extra-intestinal pathogenic Escherichia coli in human, poultry, companion animals and environment: a One Health approach	1 year	Characterization of E. coli strains isolated from human urine, animal (birds and dogs) fecal samples and environmental samples in Nigeria	Federal University of Agriculture, Abeokuta (FUNAAB)	NIGERIA

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?

No

If the answer is no, please provide a brief explanation of the situation:

Currently, we are collecting epizootiological data on a provincial basis (Québec, Canada), but not on a national or international basis.

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:

Quarterly and annual reports on surveillance of pathovirotypes and antimicrobial resistance of E. coli in diseased pigs in Québec.

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: 4

de Lagarde M, Fairbrother JM, Archambault M, Dufour S, Francoz D, Massé J, Lardé H, Aenishaenslin C, Paradis M-E, Roy JP. Impact of a regulation restricting critical antimicrobial usage on prevalence of antimicrobial resistance in Escherichia coli isolates from fecal and manure pit samples on dairy farms in Québec, Canada. Submitted to

Front Vet Sci. Dec 2021.

Massé J, Lardé H, Fairbrother JM, Roy JP, Francoz D, Dufour S, Archambault M. Prevalence of Antimicrobial Resistance and Characteristics of Escherichia coli Isolates From Fecal and Manure Pit Samples on Dairy Farms in the Province of Quebec, Canada. Front Vet Sci. 2021 May 21;8:654125. doi: 10.3389/fvets.2021.654125. eCollection 2021. PMID: 34095273

de Lagarde M, Vanier G, Arsenault J, Fairbrother JMM. High Risk Clone: A Proposal of Criteria Adapted to the One Health Context with Application to Enterotoxigenic Escherichia coli in the Pig Population. Antibiotics (Basel). 2021 Feb 28;10(3):244. doi: 10.3390/antibiotics10030244. PMID: 33671102

de Lagarde M, Vanier G, Desmarais G, Kohan-Ghadr HR, Arsenault J, Fairbrother JM. A new multidrug-resistant enterotoxigenic Escherichia coli pulsed-field gel electrophoresis cluster associated with enrofloxacin non-susceptibility in diseased pigs. J Appl Microbiol. 2021 Mar;130(3):707-721. doi: 10.1111/jam.14816. Epub 2020 Aug 25. PMID: 32767832

b) International conferences: 0

c) National conferences: 0

d) Other:

(Provide website address or link to appropriate information) 5

www.ecl-lab.ca/en (Our window for dissemination of information on our OIE related activities.)

www.apzec.ca (Our online database)

<https://www.facebook.com/OIE-Reference-Laboratory-for-Escherichia-coli-2300853137006655/>

Reports

Four 2021 quarterly reports on surveillance of pathovirotypes and antimicrobial resistance of Escherichia coli in diseased pigs, MAPAQ (Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec), RAIZO (Réseau d'alerte de d'information zoonositaire) porcin, Québec, Canada, March, June, September, and December 2021. 2020 annual report on surveillance of pathovirotypes and antimicrobial resistance of Escherichia coli in diseased pigs, MAPAQ (Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec), RAIZO (Réseau d'alerte de d'information zoonositaire) porcin, Québec, Canada, March 2021. (Available online: https://www.mapaq.gouv.qc.ca/SiteCollectionDocuments/Santeanimale/Reseauporcin/Rapport_Ecoli2020_RAIZO.pdf)

Proceedings

Fairbrother JM, The challenges of Escherichia coli postweaning disease in pigs. Proceedings of the International Pig Veterinary Society Congress – IPVS2020. 2021. <https://en.engormix.com/pig-industry/articles/the-challenges-escherichia-coli-t47568.htm>

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?

No

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)
American Association of Veterinary Laboratory Diagnosticians (AAVLD)	2016 AAVLD Certificate U of Montreal.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Please, see: https://aavld.memberclicks.net/accreditation-requirements-page	American Association of Veterinary Laboratory Diagnosticians (AAVLD)

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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
POSTPONED to 2022 - 11th External Quality Assessment Scheme for Shiga toxinproducing Escherichia coli (STEC), 2020-2021 Covering the following: • Serotyping (O group and H type) • Virulence gene determination (aaic, aggR, eae, stx1, stx2 and subtyping) • Cluster analysis (WGS derived data) Organized by Statens Serum Institut (SSI).	More than 30 countries	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input 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?

No

25. Additional comments regarding your report:

Due to the COVID-19 pandemic, participation to international or national conferences was not possible.

Due to the COVID-19 pandemic, internships with international participants were not allowed by our University.

Due to the COVID-19 pandemic, the inter-laboratory proficiency testing we were used to participate in was postponed to 2022 (see question 23).