

WOAH Reference Laboratory Reports Activities 2023

Activities in 2023

This report has been submitted : 3 mai 2024 18:10

Laboratory Information

Name of disease (or topic) for which you are a designated WOA Reference Laboratory:	Escherichia coli
Address of laboratory:	3200 Sicotte, Saint-Hyacinthe, Québec, J2S 2M2, Canada
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Website:	www.ecl-lab.ca
Name (including Title) of Head of Laboratory (Responsible Official):	Maud de Lagarde, DVM, DACVIM, PhD. Assistant Professor
Name (including Title and Position) of WOA Reference Expert:	John Morris Fairbrother, BVSc, PhD. Adjunct Professor
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 WOA Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
Direct diagnostic tests		Nationally	Internationally
Conventional PCR for pathogenic E. coli (up to 10 virulence genes)		4949	3
Whole Genome Sequencing		83	25

TOR2: REFERENCE MATERIAL

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

No

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

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TEST	PRODUCED/ PROVIDE	AMOUNT SUPPLIED NATIONALLY (ML, MG)	AMOUNT SUPPLIED INTERNATIONALLY (ML, MG)	NO. OF RECIPIENT WOA MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
E. coli reference strains	Conventional PCR for pathogenic E. coli	produced and provided	9 ml	9 ml	3	CANADA, FRANCE, UNITED STATES OF AMERICA,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAHA 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.)
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.

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

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOAHA 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
FRANCE	2023-02-08	Whole genome sequencing	18	0
UNITED STATES OF AMERICA	2023-03-01	Conventional PCR for pathogenic E. coli	1	0

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

No

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAHA Members other than the own?

Yes

Title of the study	Duration	PURPOSE OF THE STUDY	PARTNERS (INSTITUTIONS)	WOAHA MEMBER COUNTRIES INVOLVED OTHER THAN YOUR COUNTRY
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
Full characterization of E. coli isolated from ISU-VDL porcine		Characterization of E. coli strains		

cases from 2015 to 2022 including toxins and serogroups and antimicrobial resistance profile	3 years	isolated from porcine cases in USA	Iowa State University	UNITED STATES OF AMERICA
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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?

No

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:

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

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:

4

de Lagarde M, Fairbrother JM, Archambault M, Dufour S, Francoz D, Massé J, Lardé H, Aenishaenslin C, Paradis ME, Terrat Y, Roy JP. Clonal and plasmidic dissemination of critical antimicrobial resistance genes through clinically relevant ExPEC and APEC-like lineages (ST) in the dairy cattle population of Québec, Canada. *Front Microbiol.* 2024 Jan 18;14:1304678. doi: 10.3389/fmicb.2023.1304678. eCollection 2023. PMID: 38304859

Massé J, Vanier G, Fairbrother JM, de Lagarde M, Arsenault J, Francoz D, Dufour S, Archambault M. Description of Antimicrobial-Resistant Escherichia coli and Their Dissemination Mechanisms on Dairy Farms. *Vet Sci.* 2023 Mar 23;10(4):242. doi: 10.3390/vetsci10040242. PMID: 37104397

Smith KR, Bumunang EW, Schlechte J, Waldner M, Anany H, Walker M, MacLean K, Stanford K, Fairbrother JM, Alexander TW, McAllister TA, Abdul-Careem MF, Niu YD. The Isolation and Characterization of Bacteriophages Infecting Avian Pathogenic Escherichia coli O1, O2 and O78 Strains. *Viruses.* 2023 Oct 16;15(10):2095. doi: 10.3390/v15102095. PMID: 37896873

Saab ME, Vanier G, Sudlovenick E, Powell AL, Simonee J, Desmarais G, Muckle CA, Fairbrother JM, Daoust PY. Occurrence and antimicrobial resistance of Salmonella species and potentially pathogenic Escherichia coli in free-living seals of Canadian Atlantic and eastern Arctic waters. *Zoonoses Public Health.* 2023 Sep;70(6):542-554. doi: 10.1111/zph.13064. PMID: 37317052

b) International conferences:

1

de Lagarde, M.; Fairbrother, J.M.; Archambault, M.; Dufour, S.; Francoz, D.; Massé, J.; Roy, J.P. Clonal and plasmidic dissemination of critical antimicrobial resistance genes in dairy cattle in Québec, Canada. 9th Symposium on Antimicrobial Resistance in Animals and the Environment (ARAE 2023), Tours, France, July 3rd-5th 2023.

c) National conferences:

1

Fairbrother, J.M. Les nouveautés sur les infections à Escherichia coli chez le dindon. Le Rendez-Vous Avicole AQINAC, Saint Hyacinthe, Québec, Canada. November 15th, 2023.

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

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

Reports

-Four 2023 quarterly reports on surveillance of pathoviruses 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 zoonitaire) porcine, Québec, Canada, March, June, September, and December 2023.

-2022 annual report on surveillance of pathoviruses 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 zoonitaire) porcine, Québec, Canada, March 2023.

Book Chapter

Fairbrother, J.M., C. Gyles. Escherichia coli. In Pathogenesis of Bacterial Infections in Animals, 5th edition. Prescott, J. F., MacInnes, J. I., Van Immerseel, F., Boyce, J. D., Rycroft, A. N, Vázquez-Boland, J. (eds). Wiley-Blackwell, 2023.

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 0

d) Internships (>1 month) 2

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
D	NIGERIA	1
D	UNITED KINGDOM	1

TOR8: QUALITY ASSURANCE

18. 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)	2022.QC-CAN.SV_CERT (2023-02).Final.pdf

19. 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)

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

Yes

Our laboratories have a biosafety level 2 status (BSL-2), and we use Standard Operating Procedures following BSL-2 requirements. A biosafety officer from Prevention and Security Department at University of Montreal supports and assists our laboratories for BSL-2 status, licenses, protocols and audits.

TOR9: SCIENTIFIC MEETINGS

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

No

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

No

TOR10: NETWORK WITH WOAHA REFERENCE LABORATORIES

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

Not applicable (only WOAHA Reference Laboratory designated for the disease)

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

Not applicable (Only WOA Reference Laboratory designated for the disease)

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

Not applicable (Only WOA Reference Laboratory designated for the disease)

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

Not applicable (Only WOA Reference Laboratory designated for the disease)

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOA 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
12th External Quality Assessment Scheme for Shiga toxinproducing Escherichia coli (STEC), 2022-2023 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).	Participant	26	Conventional PCR Serotyping Whole genome sequencing	AUSTRIA, BELGIUM, BULGARIA, CANADA, CZECH REPUBLIC, DENMARK, ESTONIA, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, IRELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MONTENEGRO, NORWAY, POLAND, PORTUGAL, ROMANIA, SLOVENIA, SPAIN, SWEDEN, THE NETHERLANDS,

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

No