

# WOAH Reference Laboratory Reports Activities 2025

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## LABORATORY INFORMATION

<b>*Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:</b>	Escherichia coli
<b>*Address of laboratory:</b>	3200 Sicotte, Saint-Hyacinthe, Québec, J2S 2M2
<b>*Tel:</b>	+1-450 773.85.21
<b>*E-mail address:</b>	john.morris.fairbrother@umontreal.ca
<b>Website:</b>	www.ecl-lab.ca
<b>*Name (including Title) of Head of Laboratory (Responsible Official):</b>	Maud de Lagarde, DVM, DACVIM, PhD. Assistant Professor
<b>*Name (including Title and Position) of WOAH Reference Expert:</b>	John Morris Fairbrother, BVsc, PhD. Adjunct Professor
<b>*Which of the following defines your laboratory? Check all that apply:</b>	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 WOAH 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	3700	0
Whole Genome Sequencing	Yes	124	64
Antimicrobial resistance by disk diffusion	Yes	0	64

## TOR2: REFERENCE MATERIAL

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

No

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
E. coli reference strains	Conventional PCR for pathogenic E. coli	produced and provided	23	0	1	CANADA,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAHA Members?

## 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, cgMLST, 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 DNA Prep preparation kits and Illumina iSeq100 sequencing platforms and in-house in silico analysis.
Conventional PCR for pathogenic E. coli	We are developing conventional PCR tests for bovine 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?

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

## 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
SPAIN	2025-03-12	Whole genome sequencing	4	0

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

Yes

Name of the WOAHA Member Country receiving a technical consultancy	Purpose	How the advice was provided
SOUTH AFRICA	Expert advices on sequencing results about a potentially zoonotic O18 E. coli strain isolated from beef.	e-mail exchange

## 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 extraintestinal 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 cases from 2015 to 2022 including toxins and serogroups and antimicrobial resistance	3 years	Characterization of E. coli strains isolated from porcine cases in USA	Iowa State University	UNITED STATES OF AMERICA

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Genomic characterization and determination of risk factors for the presence of resistant and pathogenic <i>Escherichia coli</i> associated with eggs for consumption in southern Benin	3 years	Characterization of resistant and pathogenic <i>Escherichia coli</i> from eggs in Benin	Université d'Abomey Calavi	BENIN
Surveillance of antibiotic resistance: Avian pathogenic <i>E. coli</i> (APEC) as sentinels at the human-animal-environment interface in Benin and Quebec, Canada	3 years	Characterization of antibiotic resistance in Avian pathogenic <i>E. coli</i> from Benin and Canada	Université d'Abomey Calavi	BENIN
Genomic characterization of Enterobacteriaceae producing extended spectrum beta-lactamase isolated in hospitalized foals in Israel	1 year	Genomic characterization of Enterobacteriaceae producing extended spectrum beta-lactamase isolated in hospitalized foals in Israel	The Hebrew University of Jerusalem	ISRAEL

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, Canada.

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:

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Paiva RC, Burrough ER, Macedo N, Silva APSP, de Lagarde M, Fairbrother JM, Piñeiro PE, Almeida MN. Description of a contemporary pathogenic *Escherichia coli* isolated from pigs with post-weaning diarrhea in the United States from 2010 to 2023. *Vet Res.* 2025 Jul 1;56(1):130. doi: 10.1186/s13567-025-01568-y. PMID: 40597240; PMCID: PMC12218006.

de Lagarde M, Fairbrother JM, Archambault M, Dufour S, Francoz D, Massé J, Lardé H, Aenishaenslin C, Paradis MÈ, Roy JP. A longitudinal cohort study on the effects of reducing farm-level antimicrobial use on *Escherichia coli* antimicrobial resistance on dairy farms in Québec, Canada. *J Dairy Sci.* 2025 Oct;108(10):11339-11352. doi: 10.3168/jds.2025-26417. Epub 2025 Jul 9. PMID: 40645488.

Ajibola AT, de Lagarde M, Ojo OE, Balogun SA, Vanier G, Fairbrother JM, Shittu OB. Antimicrobial resistance and virulence gene profiles of *Escherichia coli* isolated from poultry farms using One Health perspective in Abeokuta, Nigeria. *BMC Microbiol.* 2025 Jul 16;25(1):440. doi: 10.1186/s12866-025-04135-9. PMID: 40670940; PMCID: PMC12265224.

b) International conferences:

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-10th Symposium of Antimicrobial Resistance in Animals and Environment. Genomic characterization of 2 clonal lineages of multi-drug resistant (MDR) *E. coli* responsible for septicemia in Quebec neonatal calves. (Maud de Lagarde), July 2025, Berlin, Germany (Oral presentation)

-Colloque International Francophone Maladies Infectieuses Animales. Le séquençage de génome complet pour un service diagnostic fiable et robuste : Un exemple d'isolat *E. coli* hybride ETEC:ExPEC. (Maud de Lagarde), May 2025, Rabat, Maroc (Oral presentation)

-Colloque International Francophone Maladies Infectieuses Animales. Caractérisation des *Escherichia coli* résistants aux antibiotiques associés aux œufs de consommation au Bénin. (Bruno Sawadogo), May 2025, Rabat, Maroc (Poster)

c) National conferences:

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- Journée de la recherche de la faculté de Médecine vétérinaire de l'Université de Montréal. Caractérisation génomique des *E. coli* responsable de septicémie chez les veaux lourds du Québec (Ghyslaine Vanier), March 2025, Saint Hyacinthe, Québec, Canada (Poster)

- Journée de la recherche de la faculté de Médecine vétérinaire de l'Université de Montréal. Le séquençage du génome complet au service d'un diagnostic fiable : un cas de septicémie chez l'agneau. (Maud de Lagarde), March 2025, Saint Hyacinthe, Québec, Canada (Poster)

- Journée de la recherche de la faculté de Médecine vétérinaire de l'Université de Montréal. Caractérisation des *Escherichia coli* résistants aux antibiotiques associés aux œufs de consommation au Bénin, (Bruno Sawadogo), March 2025, Saint Hyacinthe, Québec, Canada (oral presentation)

- 92ème colloque, Association canadienne-française pour l'avancement des sciences, Caractérisation des *Escherichia coli* résistants aux antibiotiques associés aux œufs de consommation au Bénin, (Bruno Sawadogo), May 2025, Montréal, Canada, (oral presentation).

- Symposium des bovins laitiers (CRAAQ). Surveiller l'antibiorésistance avec la génétique : Les impacts d'une nouvelle réglementation québécoise sur les fermes laitières. (Emma Nouhaud), Octobre 2025. Drummondville, Québec, Canada (poster)

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

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Website

[www.ecl-lab.ca/en](http://www.ecl-lab.ca/en)

Reports

- Four 2025 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 zoonositaire) porcin, Québec, Canada, March, June, September, and December 2025.

- 2024 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 zoonositaire) porcin, Québec, Canada, March 2025.

Video

La biosécurité dans la filière aviaire au Bénin, en collaboration avec l'Université d'Abomey Calavi, Bénin. <https://www.youtube.com/watch?v=qWK04icoSNI>

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOA 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	FRANCE	1
D	BENIN	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

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Test for which your laboratory is accredited	Accreditation body
Please, see: <a href="https://aavld.memberclicks.net/accreditation-requirements-page">https://aavld.memberclicks.net/accreditation-requirements-page</a>	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 WOAHP?

No

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

No

## TOR10: NETWORK WITH WOAHP REFERENCE LABORATORIES

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

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

24. Are you a member of a network of WOAHP Reference Laboratories designated for the same pathogen?

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

25. Did you organise or participate in inter-laboratory proficiency tests with WOAHP Reference Laboratories designated for the same pathogen during the past 2 years?

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

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

Not applicable (only WOAHP 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 WOAHP Reference Laboratories for the same pathogen during the past 2 years?

Yes

Purpose for inter-laboratory test comparisons <sup>1</sup>	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the test	WOAHP Member Countries
13th External Quality Assessment Scheme for Shiga toxin-producing Escherichia coli (STEC), 2023-2024 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 WOAHP?

No

29. Additional comments regarding your report:

No