

# OIE Reference Laboratory Reports Activities

## *Activities in 2021*

**This report has been submitted : 2022-01-21 20:41:15**

<b>Name of disease (or topic) for which you are a designated OIE Reference Laboratory:</b>	Salmonellosis
<b>Address of laboratory:</b>	110 Stone Road West Guelph, Ontario N1G 3W4 CANADA
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<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Sara Christianson, Chief, Reference and Diagnostic Services, National Microbiology Laboratory Branch, Public Health Agency of Canada
<b>Name (including Title and Position) of OIE Reference Expert:</b>	Dr. Gitanjali Arya, Head of Guelph Reference Services Unit and the OIE Salmonella Reference Laboratory, National Microbiology Laboratory Branch, Public Health Agency of Canada
<b>Which of the following defines your laboratory? Check all that apply:</b>	Governmental

**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			
0	0	0	0
Direct diagnostic tests			
Salmonella Serotyping (total)	Yes	5407	0
Salmonella in Silico Typing Resource (SISTR) using Whole Genome Sequencing	No	2962	0

**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?

No

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
TRINIDAD AND TOBAGO	To reply to a request to upload previously sequenced Salmonella genomes to NCBI database	EMAIL correspondence
ETHIOPIA	To reply to a request to serotype 80 Salmonella isolates and procedure to ship isolates	Email correspondence
ETHIOPIA	To reply to a request to sequence previously serotyped Salmonella isolates	Email correspondence
FRANCE	To reply to a request for training in serotyping	Email correspondence

**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?

No

**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:
We require our clients to submit following metadata with their Salmonella isolates: Date Collected, Country, province, source, source type and unique sample identification of the sample

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 Data is disseminated in form of publications and conferences

**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: 14

1. Schonfeld, J., Clark, C., Robertson, J., Arya, G., Eagle, S. H. C., Gurnik, S., Johnson, R., Labbe, G., Liu, K., Kernaghan, S., Mazzocco, A., MacKinnon, J., Ziebell, K., & Nash, J. H. E. (2021). Complete Genome Sequences for 36 Canadian Salmonella enterica Serovar Typhimurium and I 1,4,[5],12:i:- Isolates from Clinical and Animal Sources. *Microbiology Resource Announcements*, 10(1). <https://doi.org/10.1128/MRA.00734-20>
2. Clark, C. G., Kearney, A. K., Tschetter, L., Robertson, J., Pollari, F., Parker, S., Arya, G., Ziebell, K., Johnson, R., Nash, J., & Nadon, C. (2021). Population structure, case clusters, and genetic lesions associated with Canadian Salmonella 4,[5],12:i:- isolates. *PLOS ONE*, 16(4), e0249079. <https://doi.org/10.1371/journal.pone.0249079>
3. Labbé, G., Kruczkiewicz, P., Robertson, J., Mabon, P., Schonfeld, J., Kein, D., Rankin, M. A., Gopez, M., Hole, D., Son, D., Knox, N., Laing, C. R., Bessonov, K., Taboada, E. N., Yoshida, C., Ziebell, K., Nichani, A., Johnson, R. P., Van Domselaar, G., & Nash, J. H. E. Y. (2021). Rapid and accurate SNP genotyping of clonal bacterial pathogens with BioHansel. *Microbial Genomics*, 7(9), 000651. <https://doi.org/10.1099/mgen.0.000651>
4. Butler, A. J., Pintar, K., Thomas, J. L., Fleury, M., Kadykalo, S., Ziebell, K., Nash, J., & Lapen, D. (2021). Microbial water quality at contrasting recreational areas in a mixed-use watershed in eastern Canada. *Journal of Water and Health*, 19(6), 975-989. <https://doi.org/10.2166/wh.2021.021>
5. Laskey, A., Devenish, J., Kang, M., Savic, M., Chmara, J., Dan, H., Lin, M., Robertson, J., Bessonov, K., Gurnik, S., Liu, K., Nash, J. H. E., Topp, E., & Guan, J. (2021). Mobility of  $\beta$ -lactam resistance under ampicillin treatment in gut microbiota suffering from pre-disturbance. *Microbial Genomics*, 7(12), 000713. <https://doi.org/10.1099/mgen.0.000713>
6. Caffrey N, Agunos A, Gow S, Liljebjelke K, Mainali C, Checkley SL. Salmonella spp. prevalence and antimicrobial resistance in broiler chicken and turkey flocks in Canada from 2013 to 2018. *Zoonoses Public Health*. 2021 Nov;68(7):719-736. doi: 10.1111/zph.12769. Epub 2021 Mar 29. PMID: 33780135.
7. Cox GW, Parmley EJ, Avery BP, Irwin RJ, Reid-Smith RJ, Deckert AE, Finley RL, Daignault D, Alexander DC, Allen V, El Bailey S, Bekal S, Chui L, German GJ, Haldane D, Hoang L, Minion J, Zahariadis G, Mulvey MR, Bharat A. A One-Health Genomic Investigation of Gentamicin Resistance in Salmonella from Human and Chicken Sources in

Canada, 2014 to 2017. *Antimicrob Agents Chemother.* 2021 Nov 17;65(12):e0096621. doi: 10.1128/AAC.00966-21. Epub 2021 Sep 27. PMID: 34570642; PMCID: PMC8597779.

8. Vogt NA, Hetman BM, Pearl DL, Vogt AA, Reid-Smith RJ, Parmley EJ, Janecko N, Bharat A, Mulvey MR, Ricker N, Bondo KJ, Allen SE, Jardine CM. Using whole-genome sequence data to examine the epidemiology of *Salmonella*, *Escherichia coli* and associated antimicrobial resistance in raccoons (*Procyon lotor*), swine manure pits, and soil samples on swine farms in southern Ontario, Canada. *PLoS One.* 2021 Nov 18;16(11):e0260234. doi: 10.1371/journal.pone.0260234. PMID: 34793571; PMCID: PMC8601536.

9. Huber L, Agunos A, Gow SP, Carson CA, Van Boeckel TP. Reduction in antimicrobial use and resistance to *Salmonella*, *Campylobacter*, and *Escherichia coli* in broiler chickens, Canada, 2013–2019. *Emerg Infect Dis.* 2021 Sep [date cited]. <https://doi.org/10.3201/eid2709.204395>

10. Chui L, Ferrato C, Li V, Christianson S. Comparison of Molecular and In Silico *Salmonella* Serotyping for *Salmonella* Surveillance. *Microorganisms.* 2021 Apr 29;9(5):955. doi: 10.3390/microorganisms9050955. PMID: 33946663; PMCID: PMC8146874.

11. Agunos A, Gow SP, Léger DF, Flockhart L, Daignault D, Desruisseau A, Zabek E, Pollari F, Reid-Smith RJ. Antimicrobial resistance and recovery of *Salmonella*, *Campylobacter*, and *Escherichia coli* from chicken egg layer flocks in Canadian sentinel surveillance sites using 2 types of sample matrices. *Can J Vet Res.* 2021 Jan;85(1):27-35. PMID: 33390650; PMCID: PMC7747663.

12. Crouse A, Schramm C, Emond-Rheault JG, Herod A, Kerhoas M, Rohde J, Gruenheid S, Kukavica-Ibrulj I, Boyle B, Greenwood CMT, Goodridge LD, Garduno R, Levesque RC, Malo D, Daigle F. Combining Whole-Genome Sequencing and Multimodel Phenotyping To Identify Genetic Predictors of *Salmonella* Virulence. *mSphere.* 2020 Jun 10;5(3):e00293-20. doi: 10.1128/mSphere.00293-20. PMID: 32522778; PMCID: PMC7289705.

13. Tran T, Checkley S, Caffrey N, Mainali C, Gow S, Agunos A, Liljebjelke K. Genetic Characterization of AmpC and Extended-Spectrum Beta-Lactamase Phenotypes in *Escherichia coli* and *Salmonella* From Alberta Broiler Chickens. *Front Cell Infect Microbiol.* 2021 Mar 12;11:622195. doi: 10.3389/fcimb.2021.622195. PMID: 33777835; PMCID: PMC7994595.

14. Edwards JJ, Amadi VA, Soto E, Jay-Russel MT, Aminabadi P, Kenelty K, Charles K, Arya G, Mistry K, Nicholas R, Butler BP, Marancik D. Prevalence and phenotypic characterization of *Salmonella enterica* isolates from three species of wild marine turtles in Grenada, West Indies. *Vet World.* 2021 Jan;14(1):222-229. doi: 10.14202/vetworld.2021.222-229. Epub 2021 Jan 25. PMID: 33642807; PMCID: PMC7896897.

b) International conferences: 1

Robertson, J., Bessonov, K., Schonfeld, J., Nash, J. (2021) Characterization of *Salmonella* plasmid population dynamics and its associations with antimicrobial resistance dissemination. *Applied Bioinformatics and Public Health Microbiology, Virtual.* May 5-7. Poster presentation.

c) National conferences: 1

1. Reid-Smith, R., Nesbitt, A. (2021). CIPARS and FoodNet Canada: Foodborne Pathogen and AMR Integrated Surveillance Programs Recent Highlights. *Virtual Federal Food Safety and Nutrition Forum.* November 30, December 1, 7 and 8. Oral presentation.

2. Dumoulin, D., (2021). Burden of Illness Associated with *S. enteritidis* and Frozen Raw Breaded Chicken Products in Canada. *Virtual Federal Food Safety and Nutrition Forum.* November 30, December 1, 7 and 8. Oral presentation.

d) Other:

(Provide website address or link to appropriate information) 3

Our laboratory provides timely and reliable reference testing of *Salmonella* from food, water, animals and environment for the Public Health Agency of Canada's national integrated surveillance programs (FoodNet Canada <https://www.canada.ca/en/public-health/services/surveillance/foodnet-canada/overview.html> and CIPARS <https://www.canada.ca/en/public-health/services/surveillance/canadian-integrated-program-antimicrobial-resistance-surveillance-cipars.html>) to facilitate source attribution. The data is published in the form of annual reports by FNC and CIPARS. Our laboratory also provides results to PulseNet Canada (<https://www.canada.ca/en/public-health/programs/pulsenet-canada.html>) for pathogen source information to support outbreak investigation and source attribution.

**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)
ISO 17025	Certi Accred 2020.pdf
NML@Guelph ISO17025 Scope	2021-09-15.NML Guelph ISO 17025 Scope.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Serotyping of Salmonella	Standards Council of Canada
Salmonella in silico Typing Resource (SISTR) using Whole Genome Sequencing	Standards Council of Canada

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?

No

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?

No

***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 <sup>1</sup>	No. participating laboratories	Region(s) of participating OIE Member Countries
Inter-Laboratory QA program regarding Salmonella Serotyping with the Laboratoire d'epidemiologie animale du Quebec, MAPAQ, StHyacinthe, Quebec	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Inter-laboratory QA program regarding Salmonella whole genome sequencing with PulseNet Canada	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
External Quality Assurance System (EQAS) for serotyping and determination of antimicrobial susceptibility of Salmonella strains, with other WHO Global Food-borne Infectious Network member laboratories	External Quality Assurance System (EQAS) for serotyping and determination of antimicrobial susceptibility of Salmonella strains, with other WHO Global Food-borne Infectious Network member laboratories	<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)
Revision of the Chapter on Salmonellosis in the Manual of Diagnostic Tests and Vaccines for Terrestrial Animals	EMAIL correspondence among the OIE member countries Experts	To update the Chapter on Salmonellosis with regards to the progress in the fields of diagnostics and vaccines for Salmonella since the last edition of OIE Terrestrial Manual from 2016

25. Additional comments regarding your report:

For inter-laboratory proficiency testing (PT) our lab annually participates in the External Quality Assurance System (EQAS) for serotyping and determination of antimicrobial susceptibility of Salmonella strains, with other WHO Global Food-borne Infectious Network member laboratories. However, for the year 2021 PT, we did not receive the panel in 2021. The proficiency testing panels were cancelled for the year 2021. We conducted inter-laboratory proficiency testing with other laboratory (MAPAQ, Quebec) for the year 2021.