

WOAH Reference Laboratory Reports Activities 2025

This report has been submitted: 26 février 2026 21:30

LABORATORY INFORMATION

*Name of disease (or topic) for which you are a designated WOAHO Reference Laboratory:	Rabies
*Address of laboratory:	1600 Clifton Road
*Tel:	404-639-1050
*E-mail address:	euk5@cdc.gov
Website:	www.cdc.gov/rabies
*Name (including Title) of Head of Laboratory (Responsible Official):	Christina Hutson, PH.D., M.S., Branch Chief
*Name (including Title and Position) of WOAHO Reference Expert:	Ryan Wallace, DVM, MPH, Veterinary Medical Officer
*Which of the following defines your laboratory? Check all that apply:	Governmental

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 WOAHO Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests			
IHC	Yes	12	0
Sequencing	Yes	348	4
Direct diagnostic tests			
DFA	Yes	400	0
DRIT	Yes	0	0
RT PCR	Yes	444	0
RFFIT	Yes	120	0

TOR2: REFERENCE MATERIAL

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

No

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

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient WOAHO Member Countries	Country of recipients
Low Glycerol Mounting	DFA	Provided	0	60 ml	1	ETHIOPIA,

Ryan Wallace - - UNITED_STATES_OF_AMERICA

Medium						
FITC Anti Rabies Monoclonal Globulin	DFA	Provided	0	30 ml	1	ETHIOPIA,
PBS Packets	DFA	Provided	0	50 units	1	ETHIOPIA,
LN34 Primers and Probes	RABV PCR (LN34)	Produced and provided	42	0	1	UNITED STATES OF AMERICA,
Positive control RNA	RABV PCR (LN34)	Produced and provided	42	0	1	UNITED STATES OF AMERICA,
LFD	Rabies LFD	Provided	150	700	7	ETHIOPIA, GUINEA, HAITI, INDONESIA, LIBERIA, UNITED STATES OF AMERICA,
DRIT	DRIT	Produced and provided	0	20	1	CANADA,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOA Members?

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

No

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

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
LN34 updated multiplexed format and video protocol	Gigante, Crystal M., et al. "Optimization of pan-lyssavirus LN34 assay for streamlined rabies diagnostics by real-time RT-PCR." Journal of Virological Methods 333 (2025): 115070. Gigante, Crystal M., et al. "Postmortem Diagnosis of Rabies in Animals by the Updated, Multiplexed LN34 Real-Time Reverse Transcription-Polymerase Chain Reaction Assay." Journal of Visualized Experiments (JoVE) 219 (2025): e66761.
BioNote Anigen Lateral Flow Test	High Sensitivity of the BioNote Anigen™ Rapid Rabies Antigen Test in Detection of Diverse Rabies Virus Variants Suggests Utility for Global Rabies Control J. Clin Micro. 2026 (under review)

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

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

TOR4: DIAGNOSTIC TESTING FACILITIES

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

No

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

Yes

Name of the WOA Member Country receiving a technical consultancy	Purpose	How the advice was provided
CANADA	Laboratory based surveillance consultation	Remote technical assistance
HAITI	Dog vaccination training, LFD training, lab supplies, laboratory-based surveillance	Standing communication
ETHIOPIA	Diagnostic support	Remote technical support, protocol sharing, reagents and supplies
GUINEA	LFD, dog vaccination training	In-person training, protocol sharing
MALAWI	Surveillance system evaluation	Remote technical support
	Laboratory based surveillance	

Ryan Wallace - - UNITED_STATES_OF_AMERICA

SENEGAL	consultation	In-person training, protocol sharing
TANZANIA	laboratory based surveillance, dog vaccination	In-person training, remote technical assistance
ZAMBIA	Dog vaccination and laboratory-based surveillance training	In-person training, protocol sharing
CAMBODIA	Dog vaccination	In-person training, protocol sharing
INDONESIA	Site-visit to Provincial Rabies Laboratory, national planning, dog vaccination	Protocol sharing, In-person training
LAOS	Dog vaccination	In-person training, protocol sharing
THAILAND	Rabies sequencing technical consult	Teleconference, protocol sharing
TIMOR-LESTE	National planning, dog vaccination	In-person training, protocol sharing
VIETNAM	Protocol and study development	In-person training
INDIA	Dog vaccination	In-person training, protocol sharing

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

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

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	WOAH Member Countries involved other than your country
LN34 multi-plexed format evaluation	1 year	Evaluate performance of a multiplexed version of the LN34 real-time PCR assay	The Antimicrobial Service of the National Institute of Infectious Diseases (ANLIS-Dr. Carlos G. Malbrán) Argentina, multiple veterinary and human public health institutions of Thailand	ARGENTINA THAILAND
Zambia Sequencing	4 years	Characterize rabies virus clades circulating in Zambia	"Innovative Virology Laboratory Research and Innovation Department of the Istituto Zooprofilattico Sperimentale delle Venezie, PD, Italy Central Veterinary Research Institute (CVRI) - Zambia	ZAMBIA
LFD International field evaluation	5 years	Develop and validate a modified rabies LFD protocol for WOAHO recognition	Haiti MARDR, Guatemala UVG, Zambia, Vietnam DAH, Ethiopia National Laboratory	ETHIOPIA GUATEMALA HAITI VIETNAM ZAMBIA
Vietnam rabies capacity building	9 years	Improving rabies surveillance and bite case management in Vietnam	Vietnam Department of Animal Health	VIETNAM
Haiti/DR Sequencing	11 years	Characterize rabies virus clades circulating in Haiti/DR	Ministry of Health - DR	DOMINICAN (REP.) HAITI
Rabies Surveillance in North America during	12 months	Annual surveillance report of rabies in domestic and wild animals in the US	Canada, Mexico, United States Department of Agriculture	CANADA MEXICO
REACT Risk Assessment Model	16 months	Develop a model to predict the probability that an animal is rabid and gain insight into the overall epidemiologic landscape of a project area	Mission Rabies NGO, Zambia MFL, India, Haiti MARDR, Vietnam DAH, Malawi, Cambodia	HAITI INDIA MALAWI VIETNAM ZAMBIA
Guinea dog vaccination	3 years	Conduct and evaluate dog vaccination strategy based on risk mapping	Mission Rabies NGO, Guinea National Directorate of Veterinary Services (DNVS)	GUINEA
Senegal integrated rabies surveillance	3 years	Improving rabies surveillance in Senegal	Mission Rabies NGO, Institut Pasteur Dakar (IPD)	SENEGAL

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAHO?

No

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

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

Collected rabies surveillance data in domestic and wild animals for 54 jurisdictions during 2025. Collected surveillance data from animal investigations in Haiti, Vietnam, India, Malawi, Zambia.

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:

Data is processed for the previous year and published annually. The latest report will be reported in the Journal of the American Veterinary Medical Association. Surveillance data collected via mobile application is analyzed and distributed to relevant country authorities. GIS data analyzed to prioritize locations for rabies vaccination planning in Haiti, Zambia, Guinea, and Cambodia.

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:

12

1. Boutelle, C., Bonaparte, S., Orciari, L. A., Kirby, J. D., Chipman, R. B., Fehlner-Gardiner, C., Thang, C., Julien, D., Hirose, J. A. M., Garcia, B. C., Wallace, R. M., & Blanton, J. D. (2025). Rabies surveillance in the United States during 2023. *Journal of the American Veterinary Medical Association*, 263(10), 1310–1317. <https://doi.org/10.2460/javma.25.05.0344>
2. Condori, R. E., Dilius, A. P., Cadet, R., Lopez-Nuñez, G., Díaz-Mateo, E., Gomez-Belliard, A. K., ... & Wallace, R. M. Using molecular approaches to determine rabies diversity in Haiti and Dominican Republic. *Frontiers in Microbiology*, 16, 1688184.
3. Boutelle, C., Mollentze, N., Gigante, C., Rocha, F., Vigilato, M. A. N., Streicker, D. G., & Wallace, R. (2025). A logistic regression model to predict the next rabies virus host-shift event. *Scientific reports*, 15(1), 19306. <https://doi.org/10.1038/s41598-025-98986-x>
4. Carpenter, A., Price, E. R., Stein, S. R., Beron, A. J., Divis, A., Mix, S., Hess, A. R., Nelson, K. M., Wetzel, C. T., Fredrick, J., Huse, L., Horn, A., Loy, D. S., Loy, J. D., Morgan, C. N., Rodriguez, S. E., Shelus, V., Gigante, C. M., Hutson, C. L., Orciari, L. A., ... Buss, B. F. (2024). Identification of raccoon rabies virus variant in a stray kitten: the role of veterinary practitioners in detection and reporting of a non-native zoonotic pathogen-Nebraska, 2023. *Journal of the American Veterinary Medical Association*, 263(2), 149–152. <https://doi.org/10.2460/javma.24.08.0542>
5. Chazya, R., Mulenga, C. A. S., Gibson, A. D., Lohr, F., Boutelle, C., Bonaparte, S., Sinywibulula, O., Thomas, G., Bwalya, P., Dautu, G., Munsimbwe, L., Muuka, G., Gamble, L., Wallace, R. M., & Waltenburg, M. A. (2025). Rabies vaccinations at the rural-urban divide: successes and barriers to dog rabies vaccination programs from a rural and urban campaign in Zambia. *Frontiers in veterinary science*, 11, 1492418. <https://doi.org/10.3389/fvets.2024.1492418>
6. Gigante, C. M., Hartloge, C., Condori, R. E., Kirby, J. D., Hovis, L., Nelson, K. M., Wallace, R., Li, Y., & Chipman, R. B. (2025). Enhanced rabies surveillance in roadkill specimens by real-time RT-PCR. *PLoS neglected tropical diseases*, 19(7), e0013348. <https://doi.org/10.1371/journal.pntd.0013348>
7. Gigante, C. M., Wicker, V., Condori, R. E., Wilkins, K., & Li, Y. (2025). Postmortem Diagnosis of Rabies in Animals by the Updated, Multiplexed LN34 Real-Time Reverse Transcription-Polymerase Chain Reaction Assay. *Journal of visualized experiments : JoVE*, (219), 10.3791/66761. <https://doi.org/10.3791/66761>
8. Gigante, C. M., Wicker, V., Wilkins, K., Seiders, M., Zhao, H., Patel, P., Orciari, L., Condori, R. E., Dettinger, L., Yager, P., Xia, D., & Li, Y. (2025). Optimization of pan-lyssavirus LN34 assay for streamlined rabies diagnostics by real-time RT-PCR. *Journal of virological methods*, 333, 115070. <https://doi.org/10.1016/j.jviromet.2024.115070>
9. Ludmer, S., Crum, D., Wallace, R., & Hutson, J. (2025). Rabies Outbreak in an Urban, Unmanaged Cat Colony - Maryland, August 2024. *MMWR. Morbidity and mortality weekly report*, 74(31), 480–483. <https://doi.org/10.15585/mmwr.mm7431a2>
10. Michalska-Smith, M., Craft, M. E., Davis, A. J., Gilbert, A. T., Chipman, R. B., Kirby, J., Nelson, K. M., Ma, X., Wallace, R., Miller, G., & Pepin, K. M. (2025). Landscape-scale analysis of raccoon rabies surveillance reveals different drivers of disease dynamics across latitude. *PLoS neglected tropical diseases*, 19(9), e0013581. <https://doi.org/10.1371/journal.pntd.0013581>
11. Nathan, M., Boutelle, C., Ross, Y., Wallace, R. M., & Bonaparte, S. (2025). Vaccination protects animal and human health and reduces the economic burden of preventable cases: rabies in vaccinated dogs and cats (2002-2022). *Journal of the American Veterinary Medical Association*, 263(10), 1213–1222. <https://doi.org/10.2460/javma.25.01.0036>
12. Payette-Stroman, A., Ross, Y., Ma, X., Boutelle, C., Holschbach, C., Blanton, J. D., & Wallace, R. (2025). Rabies in livestock in the United States (2012-2021). *American journal of veterinary research*, 86(10), ajvr.25.01.0019. <https://doi.org/10.2460/ajvr.25.01.0019>

b) International conferences:

c) National conferences:

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

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 : 150

c) Hands-on training courses: 24

d) Internships (>1 month) 0

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	UNITED STATES OF AMERICA	24
B	UNITED STATES OF AMERICA	100
B	THAILAND	30
B	ETHIOPIA	20

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
CLIA	PDF	CLIA-Certificate-11D0668319-2024-09-30_Apr7-Final.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Rapid Fluorescent Foci Inhibition Test	CLIA
Indirect Fluorescent Antibody Test	CLIA
Direct Fluorescent Antibody test	CLIA
Real Time Reverse Transcriptase Polymerase Chain Reaction (RT-PCR)	CLIA

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

Yes

CDC Biosafety (OLSS)

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 WOA?H?

Yes

Title of event	Date	location	Role (speaker, presenting poster, short communications)	Title of the work presented
SEA Meeting	2025-11-24	Bangkok	remote technical support	Provided technical support through IRT

TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

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

Yes

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

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOA?H REF. LABS
RABLAB	Chair	12	.

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

Yes

Purpose of the proficiency test:	Role of your Reference Laboratory (organiser/ participant)	No. participating Laboratories	Participating WOA?H Ref. Labs/ organising WOA?H Ref Lab
University of Missouri Serology PT	Organizer and participant	38	France, USA

26. Did your laboratory collaborate with other WOA?H 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 WOA?H Reference Laboratories
Systematic review	extra label vaccination study	Germany

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOA?H Reference Laboratories for the same pathogen during the past 2 years?

Yes

Purpose for inter-laboratory test comparisons ¹	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the test	WOA?H Member Countries
WSLH PT - April	Participant	132	DFA/DRIT	UNITED STATES OF AMERICA,
WSLH PT - October	Participant	132	DFA/DRIT	

TOR12: EXPERT CONSULTANTS

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

Yes

Kind of consultancy	Location	Subject (facultative)
Ad hoc group meeting	Paris/Virtual	Dog mediated rabies control program
Attendance at Southeast Asia Workshop	Bangkok/Virtual	Rabies control in Southeast Asia

29. Additional comments regarding your report:

No