

OIE Reference Laboratory Reports Activities

Activities in 2020

This report has been submitted : 2021-01-15 16:54:12

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Rabies
Address of laboratory:	1600 Clifton Road, NE, Mail Stop G33 Atlanta, GA 30 333 UNITED STATES OF AMERICA
Tel.:	+1 404 639 1050
Fax:	+1 404 639 1564
E-mail address:	euk5@cdc.gov
Website:	
Name (including Title) of Head of Laboratory (Responsible Official):	David Lowe, PhD, Lead, Quality Management Team
Name (including Title and Position) of OIE Reference Expert:	Ryan Wallace, DVM, MPH, Veterinary Medical Officer
Which of the following defines your laboratory? Check all that apply:	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		Nationally	Internationally
IHC	Yes	13	0
Sequencing	Yes	78	167
Direct diagnostic tests		Nationally	Internationally
DFA	Yes	122	0
DRIT	Yes	26	0
RT PCR	Yes	102	0
RFFIT	Yes	257	31

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
RT-PCR LN34 Reagents	RT-PCR	Produced	0	7 packets	5	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
FDI Anti-rabies Conjugate	DFA (FAT)	Provided	0	12x5ml	2	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Millipore Low Glycerol Mounting Medium Cat# 5096	DFA (FAT)	Provided	0	14x10ml	2	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Sigma PBS Packets to prepare 1 L	DFA (FAT)	Provided	0	20 packets	2	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
1% Evans Blue	DFA (FAT)	Produced	0	5x1ml	2	<input checked="" type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Biotinylated Anti-rabies Monoclonal Antibodies CDC reagent-1	DRIT	Produced	500ml	0	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input 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?

Yes

Vaccine name	Amount supplied nationally (ml, mg) (including for own use)	Amount supplied to other countries (ml, mg)	Name of recipient OIE Member Countries
PM virus	0	1ml	MEXICO
Rabies Virus rPV-20161 Strain	0	8ml	CHINA (PEOPLE'S REP. OF)

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?

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
BELIZE	March	31 (immune status serum)	0

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
HAITI	Assist with laboratory testing, animal and human surveillance, health economics modelling, education for children, and dog vaccination.	Due to the COVID-19 pandemic, all support was provided virtually.
PERU	Electronic IBCM training	Due to the COVID-19 pandemic, all support was provided virtually.
INDIA	Laboratory capacity building (successful OIE twinning project), evaluate human and animal electronic surveillance system	Due to the COVID-19 pandemic, all support was provided virtually.
ITALY	Consultation on non-rabies lyssavirus exposure, provided West Caucasian Bat lyssavirus, advised on biosafety and propagation of WCBV	Due to the COVID-19 pandemic, all support was provided virtually.
ETHIOPIA	Virtual training of DFA diagnostic testing, microscope maintenance and lamp change, provide technical advice on use of the CDC designed lab assessment tools.	Due to the COVID-19 pandemic, all support was provided virtually.
BANGLADESH	Consultation on dog vaccination (oral rabies vaccines).	Remote technical assistance for data analysis.
VIETNAM	Assist with laboratory testing, human and animal electronic surveillance system, cost effectiveness analysis.	Four-week exchange visit with Department of Agriculture (DAH) for training on IBCM analysis, cost effectiveness analysis, expansion of the electronic app, and assisted DAH to apply for the OIE lab twinning program.
GUATEMALA	Provide tools to estimate dog populations and vaccination coverage	Due to the COVID-19 pandemic, all support was provided
ZAMBIA	Provide training in canine rabies surveillance and control	Due to the COVID-19 pandemic, all support was provided

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
Rabies surveillance in the United States during 2019.	12 months	Annual surveillance report of rabies in domestic and wild animals in the US.	Canada, Mexico, United States Department of Agriculture	CANADA MEXICO
Oral bait preferences and feasibility of oral rabies vaccination in Bangladeshi dogs.	12 months	Determine the feasibility of using ORV in Bangladesh to improve vaccination coverage.	Mission Rabies (UK), Department of Livestock Services (Bangladesh), Directorate General of Health Services (Bangladesh)	BANGLADESH
Evaluating rabies virus phylogenetics in Georgia	3 years	determine enzootic rabies transmission cycles		GEORGIA
Establishment of Canine Rabies Burden in Vietnam	4 years	Detail the process of developing a surveillance program in Vietnam	Department of Animal Health (Vietnam) and National Institute of Hygiene and Epidemiology (Vietnam)	VIETNAM
Effects of counseling on health care seeking behavior, VN	8 months	Assess the usefulness of IBCM in promoting best practices for PEP	Department of Animal Health (Vietnam) and National Institute of Hygiene and Epidemiology (Vietnam)	VIETNAM
Knowledge, Attitudes, and Practices (KAP) Study	2 years	Ascertain dog and wildlife bite rates/bite responses/knowledge of disease and post-exposure treatment/availability and accessibility of PEP	Ministry of Health Uganda, WHO Uganda	UGANDA
Knowledge, Attitudes, and Practices (KAP) Study	2 years	Ascertain dog and wildlife bite rates/bite responses/knowledge of disease and post-exposure treatment/availability and accessibility of PEP	National Biomedical Research Institute	CONGO (DEM. REP. OF THE)
Dog population study	2 years	Ascertain dog population estimates in study locations	Mission Rabies (UK), Department of Livestock Services (Bangladesh), Directorate General of Health Services (Bangladesh)	BANGLADESH

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:
Collected rabies surveillance data in domestic and wild animals for 50 states in the United States during 2020.

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:
Data is processed for the previous year and published annually. The latest report will be reported in 2020, for 2019 data. The most recent data is available here: Rabies surveillance in the United States during 2018. https://avmajournals.avma.org/doi/pdfplus/10.2460/javma.256.2.195

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: 18

Role of Oral Rabies Vaccines in the Elimination of Dog-Mediated Human Rabies Deaths. Wallace RM, Cliquet F, Fehlner-Gardiner C, Fooks AR, Sabeta CT, Setién AA, Tu C, Vuta V, Yakobson B, Yang DK, Brückner G, Freuling CM, Knopf L, Metlin A, Pozzetti P, Suseno PP, Shadomy SV, Torres G, Vigilato MAN, Abela-Ridder B, Müller T. *Emerg Infect Dis.* 2020 Dec;26(12):1-9. doi: 10.3201/eid2612.201266.

Portable Rabies Virus Sequencing in Canine Rabies Endemic Countries Using the Oxford Nanopore MinION. Gigante CM, Yale G, Condori RE, Costa NC, Long NV, Minh PQ, Chuong VD, Tho ND, Thanh NT, Thin NX, Hanh NTH, Wambura G, Ade F, Mito O, Chuchu V, Muturi M, Mwatondo A, Hampson K, Thumbi SM, Thomae BG, de Paz VH, Meneses S, Munyua P, Moran D, Cadena L, Gibson A, Wallace RM, Pieracci EG, Li Y. *Viruses.* 2020 Nov 4;12(11):1255. doi: 10.3390/v12111255.

Costs and effectiveness of alternative dog vaccination strategies to improve dog population coverage in rural and urban settings during a rabies outbreak. Undurraga EA, Millien MF, Allel K, Etheart MD, Cleaton J, Ross Y; Vaccine Evaluation Team, Wallace RM. *Vaccine.* 2020 Sep 3;38(39):6162-6173. doi: 10.1016/j.vaccine.2020.06.006. Epub 2020 Jun 29.

Bat and Lyssavirus Exposure among Humans in Area that Celebrates Bat Festival, Nigeria, 2010 and 2013. Vora NM, Osinubi MOV, Davis L, Abdurrahman M, Adedire EB, Akpan H, Aman-Oloniyo AF, Audu SW, Blau D, Dankoli RS, Ehimiyein AM, Ellison JA, Gbadegesin YH, Greenberg L, Haberling D, Hutson C, Idris JM, Kia GSN, Lawal M, Matthias SY, Mshelbwala PP, Niezgoda M, Ogunkoya AB, Ogunniyi AO, Okara GC, Olugasa BO, Ossai OP, Oyemakinde A, Person MK, Rupprecht CE, Saliman OA, Sani M, Sanni-Adeniyi OA, Satheshkumar PS, Smith TG, Soley MO, Wallace RM, Yennan SK, Recuenco S. *Emerg Infect Dis.* 2020 Jul;26(7):1399-1408. doi: 10.3201/eid2607.191016.

Epidemiology of rabies cases among international travellers, 2013-2019: A retrospective analysis of published reports. Gautret P, Diaz-Menendez M, Goorhuis A, Wallace RM, Msimang V, Blanton J, Dacheux L, Parize P, Blumberg L, Bourhy H, Grobusch MP. *Travel Med Infect Dis.* 2020 Jul-Aug;36:101766. doi: 10.1016/j.tmaid.2020.101766. Epub 2020 Jun 7.

Oral bait preferences and feasibility of oral rabies vaccination in Bangladeshi dogs. Bonwitt J, Bonaparte S, Blanton J, Gibson AD, Hoque M, Kennedy E, Islam K, Siddiqi UR, Wallace RM, Azam S. *Vaccine*. 2020 Jul 6;38(32):5021-5026. doi: 10.1016/j.vaccine.2020.05.047. Epub 2020 Jun 6.

Barriers to attendance of canine rabies vaccination campaigns in Haiti, 2017. Barbosa Costa G, Ludder F, Monroe B, Dilius P, Crowdis K, Blanton JD, Pieracci EG, Head JR, Gibson AD, Wallace RM. *Transbound Emerg Dis*. 2020 May 21. doi: 10.1111/tbed.13622. Online ahead of print.

Reviewing Solutions of Scale for Canine Rabies Elimination in India. Gibson AD, Wallace RM, Rahman A, Bharti OK, Isloor S, Lohr F, Gamble L, Mellanby RJ, King A, Day MJ. *Trop Med Infect Dis*. 2020 Mar 23;5(1):47. doi: 10.3390/tropicalmed5010047.

Risk Modeling of Bat Rabies in the Caribbean Islands. Morgan CN, Wallace RM, Vokaty A, Seetahal JFR, Nakazawa YJ. *Trop Med Infect Dis*. 2020 Mar 1;5(1):35. doi: 10.3390/tropicalmed5010035.

An epidemiological study of suspected rabies exposures and adherence to rabies post-exposure prophylaxis in Eastern Thailand, 2015. Yurachai O, Hinjoy S, Wallace RM. *PLoS Negl Trop Dis*. 2020 Feb 27;14(2):e0007248. doi: 10.1371/journal.pntd.0007248. eCollection 2020 Feb.

Human Rabies - Utah, 2018. Peterson D, Barbeau B, McCaffrey K, Gruninger R, Eason J, Burnett C, Dunn A, Dimond M, Harbour J, Rossi A, Lopansri B, Dascomb K, Scribellito T, Moosman T, Saw L, Jones C, Belenky M, Marsden L, Niezgodna M, Gigante CM, Condori RE, Ellison JA, Orciari LA, Yager P, Bonwitt J, Whitehouse ER, Wallace RM. *MMWR Morb Mortal Wkly Rep*. 2020 Feb 7;69(5):121-124. doi: 10.15585/mmwr.mm6905a1.

Quantifying the risk of rabies in biting dogs in Haiti. Ma X, Blanton JD, Millien MF, Medley AM, Etheart MD, Fénelon N, Wallace RM. *Sci Rep*. 2020 Jan 23;10(1):1062. doi: 10.1038/s41598-020-57908-9.

Public Veterinary Medicine: Public Health: Rabies surveillance in the United States during 2018. Ma X, Monroe BP, Cleaton JM, Orciari LA, Gigante CM, Kirby JD, Chipman RB, Fehlner-Gardiner C, Gutiérrez Cedillo V, Petersen BW, Olson V, Wallace RM. *J Am Vet Med Assoc*. 2020 Jan 15;256(2):195-208. doi: 10.2460/javma.256.2.195.

Evaluation of species identification and rabies virus characterization among bat rabies cases in the United States. Pieracci EG, Brown JA, Bergman DL, Gilbert A, Wallace RM, Blanton JD, Velasco-Villa A, Morgan CN, Lindquist S, Chipman RB. *J Am Vet Med Assoc*. 2020 Jan 1;256(1):77-84. doi: 10.2460/javma.256.1.77.

Evaluation of rabies virus characterization to enhance early detection of important rabies epizootic events in the United States. Pieracci EG, Chipman RB, Morgan CN, Brown CM, Kirby JD, Blanton JD, Velasco-Villa A, Martin AD, Nelson KM, Singh A, LeMasters E, Weiner Z, Wallace RM. *J Am Vet Med Assoc*. 2020 Jan 1;256(1):66-76. doi: 10.2460/javma.256.1.66.

Antiviral Ranpirnase TMR-001 Inhibits Rabies Virus Release and Cell-to-Cell Infection In Vitro. Smith TG, Jackson FR, Morgan CN, Carson WC, Martin BE, Gallardo-Romero N, Ellison JA, Greenberg L, Hodge T, Squiquera L, Sulley J, Olson VA, Hutson CL. *Viruses*. 2020 Feb 5;12(2):177. doi: 10.3390/v12020177.

Laser-assisted skin delivery of immunocontraceptive rabies nanoparticulate vaccine in poloxamer gel. Bansal A, Gamal W, Menon IJ, Olson V, Wu X, D'Souza MJ. *Eur J Pharm Sci*. 2020 Dec 1;155:105560. doi: 10.1016/j.ejps.2020.105560. Epub 2020 Sep 17.

Using the LN34 Pan-Lyssavirus Real-Time RT-PCR Assay for Rabies Diagnosis and Rapid Genetic Typing from Formalin-Fixed Human Brain Tissue. Condori RE, Niezgodna M, Lopez G, Matos CA, Mateo ED, Gigante C, Hartloge C, Filpo AP, Haim J, Satheshkumar PS, Petersen B, Wallace R, Olson V, Li Y. *Viruses*. 2020 Jan 18;12(1):120. doi: 10.3390/v12010120.

b) International conferences: 1
Rabies in the Americas. Mexico City, Mexico (October 2020): 4 presentations

c) National conferences: 1
US Animal Health Association. Nashville, TN (October 2020): 1 presentation

d) Other:

(Provide website address or link to appropriate information) 0

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?

Yes

- a) Technical visits: 2
- b) Seminars: 0
- c) Hands-on training courses: 0
- d) Internships (>1 month): 1

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
a	USA	1 (Haiti)
a	USA	18 (Ethiopia)
d	USA	1 (Vietnam)

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)
ISO17025	4740-01.pdf
CLIA	2018_2020 NCEZID CLIA Certificate_11D0668319.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Orthopox IgG ELISA	A2LA-ISO17025
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

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?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
World Rabies Day	09/2020	Virtual	Speaker (x2)	Tools for Eliminating dog-mediated human rabies: designing effective dog vaccination programs (French and English)
USAHA/AAVLD Virtual Annual Meeting	10/2020	Virtual	Speaker (x2)	Public Health Epi-in-Action: CDC's role in Domestic Rabies Surveillance (case studies), the introduction of electronic laboratory reporting, and current US rabies-related projects in the US
Rabies in the Americas Conference	10/2020	Virtual	Speaker (x5)	RECOGNIZING MILESTONES ON THE ARDUOUS JOURNEY TO RABIES FREEDOM;POPPING THE RABIES BUBBLE: EXAMINATION OF ECONOMIC, ENVIRONMENTAL, POLITICAL, SOCIAL, AND HEALTH INDICTORS' ASSOCIATIONS WITH THE GLOBAL CANINE RABIES BURDEN AND PROJECTING 2030 TRENDS IN DISEASE BURDEN; COUNTRY CLASSIFICATION SYSTEM TO INFORM RABIES VACCINE RECOMMENDATIONS FOR INTERNATIONAL TRAVELERS AND DOG IMPORTATION REGULATIONS; RABIES SURVEILLANCE IN THE UNITED STATES DURING 2019; ELECTRONIC LABORATORY REPORTING (ELR): UPDATES, OBSTACLES, AND PLANS FOR THE UNITED STATES' RABIES SURVEILLANCE SYSTEM

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?

Yes

Purpose of the proficiency tests: ¹	Role of your Reference Laboratory (organiser/participant)	No. participants	Participating OIE Ref. Labs/organising OIE Ref. Lab.
Confirm accuracy of RFFIT testing. Required for CLIA	Participate	92	ANSES: Nancy Laboratory for Rabies and Wildlife

¹ validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.

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 ¹	No. participating laboratories	Region(s) of participating OIE Member Countries
Test RFFIT accuracy with and for CLIA compliance	2	<input type="checkbox"/> Africa <input 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?

Yes

Kind of consultancy	Location	Subject (facultative)
Technical consultancy	Virtual	OIE ad hoc Group on Dog Rabies Control Program - Status Evaluation
Technical consultancy	Virtual	Global Laboratory Leaders Program - Animal Subgroup
Technical consultancy	Virtual	Rabies Reference Laboratory Network (RABLAB)

25. Additional comments regarding your report: