

WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

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Centre Information

Title of WOA Collaborating Centre	
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Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Dr. Suelee Robbe-Austerman Director, National Veterinary Services Laboratories USDA, APHIS, VS, DB
Name of the writer:	Dr. Suelee Robbe-Austerman Director, National Veterinary Services Laboratories USDA, APHIS, VS, DB

TOR1 AND 2: SERVICES PROVIDED

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Diagnosis, biotechnology and laboratory	
Title of activity	Scope
	Diagnostic materials produced and/or provided to WOA

Foot and Mouth Disease Virus (FMDV) Reference Materials produced and provided.	member countries include: FMDV positive amplification control (PAC) for use in FMDV rRT-PCR
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Rinderpest Virus (RPV) Reference Materials produced and provided	Diagnostic materials produced and/or provided to WOAHP member countries include: non-pathogenic proficiency test (PT) panels, PEC and PAC controls
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Peste des Petits Ruminants Virus (PPRV) Reference Materials produced and provided	Diagnostic materials produced and/or provided to WOAHP member countries include: non-pathogenic PPRV PT panels, PEC and PAC controls
Diagnosis, biotechnology and laboratory, Zoonosis	
Title of activity	Scope
Leptospirosis Reference Materials produced and provided	Diagnostics materials produced and/or provided to WOAHP member countries include: both reference positive and negative control sera for use in MAT and serogrouping testing; multivalent fluorescent antibody conjugate for FAT testing, and Leptospira medium for MAT, FAT and isolation testing
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Anthrax Reference Materials produced and provided	Diagnostics materials produced and/or provided to WOAHP member countries include: Gamma phage reagent for use in the gamma phage lysis diagnostic test
Diagnosis, biotechnology and laboratory, Avian diseases, Training, capacity building	
Title of activity	Scope
Avian Influenza (AI) Reference Materials produced and provided	Diagnostics materials produced and/or provided to WOAHP member countries include: Reference antigen and antisera for HI H1-H16, AGID reagents, RT-PCR positive amplification controls for matrix, H5, H7, RT-PCR positive extraction control, RT PCR negative extraction control, and RT PCR and AGID proficiency test panels
Diagnosis, biotechnology and laboratory, Avian diseases	
Title of activity	Scope
	Diagnostic materials for Newcastle Disease produced and/or

Newcastle Disease (ND) Reference Materials produced and provided	supplied to OIE member countries included: real-time PCR positive amplification and extraction controls as well as positive antigen and antisera for HI tests and proficiency test panels.
Diagnosis, biotechnology and laboratory, Zoonosis	
Title of activity	Scope
Swine Influenza virus (SIV) Reference Materials produced and provided	Diagnostic materials provided to OIE member countries included: antigen and antisera for HI tests, PCR positive amplification control, and proficiency panels for PCR tests.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Vesicular Stomatitis (VSV) Reference Materials produced and provided	Diagnostic materials produced and/or provided to OIE member countries included: antigen, complement, and test panels for CF test, antiserum for multiple diagnostic tests, reference viruses for VN testing, recombinant antigen and polyclonal ascites for cELISA and proficiency panels for the cELISA and PCR tests
Diagnosis, biotechnology and laboratory,	
Title of activity	Scope
Equine Infectious Anemia (EIA) Reference Materials produced and provided	Diagnostic materials produced and/or supplied to OIE member countries included: strong and weak positive and negative antiserum for AGID, ELISA and cELISA tests as well as proficiency test panels for AGID, ELISA and cELISA.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Bluetongue virus (BTV) Reference Materials produced and provided	Diagnostic materials produced and provided supplied to OIE member countries included: BT virus serotypes for VN testing, BT conjugate for FA testing, BT antisera used for ELISA/AGID diagnostic test; BT strong positive antisera used in both ELISA and AGID diagnostic tests; and BT proficiency panels for ELISA/AGID tests
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Contagious Equine Metritis (CEM) Reference Materials produced	Diagnostic materials produced for OIE member countries included: Modified Timoney-Shin agar, Eugin agar with 10% chocolate horse blood and culture control isolates for use in identification protocols
Disease control	
Title of activity	Scope

Collection/Dissemination of epidemiological data relevant to AI	NVSL works with another unit within USDA for distribution of analyzed data. USDA APHIS 2022-2023 Detections of Highly Pathogenic Avian Influenza
Disease control	
Title of activity	Scope
Collection/Dissemination of epidemiological data relevant to SIV	USDA Swine Surveillance: NVSL works with another unit within USDA for distribution of analyzed data. USDA APHIS What is Influenza A Virus in Swine (IAV-S)
Disease control	
Title of activity	Scope
Collection/Dissemination of epidemiological data relevant to VSV	USDA Vesicular Stomatitis: NVSL works with another unit within USDA for distribution of analyzed data. USDA APHIS Vesicular Stomatitis
Disease control	
Title of activity	Scope
Collection/Dissemination of epidemiological data relevant to EIA	USDA Equine Infectious Anemia cases in the United States: NVSL works with another unit within USDA for distribution of analyzed data. USDA APHIS Equine Infectious Anemia (EIA)
Disease control	
Title of activity	Scope
Collection/Dissemination of epidemiological data relevant to ND	NVSL works with another unit within USDA for distribution of analyzed data. Epidemiologic Analyses of Virulent Newcastle Disease in Poultry in California (usda.gov)
Training, capacity building	
Title of activity	Scope
Regionalization and evaluation services site visit to Columbia	Evaluated diagnostic laboratory capacity, biosafety, and biosecurity procedures, and testing methodologies for Foot and Mouth Disease (FMD). Participating Laboratories: 2
Training, capacity building	
Title of activity	Scope

Maintain diagnostic performance quality in the United States National Animal Health Laboratory Network (NAHLN) of diagnostic laboratories for FMD testing	Participating NAHLN Laboratories: 53
Training, capacity building	
Title of activity	Scope
EIA training course	Organized four training courses for 162 participants. Trainees provided with information and skills to set and interpret EIA AGID and ELISA reactions and earn certification to perform USDA-approved testing.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for African swine disease (ASF)	Indirect diagnostic test methods: ELISA, IP, and IFA Indirect test methods performed: 6,244 Nationally; 944 Internationally. Direct diagnostic test methods: PCR, VI, and Sequencing Direct test methods performed: 9,238 Nationally; 1,655 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Whole genome sequencing (WGS)	WGS was conducted on field specimens from the Dominican Republic ASF outbreak, from the HPAI outbreak, from several bovine TB outbreaks internationally. Information including animal location and testing data were also assembled.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Foot and Mouth Disease (FMD)	Indirect diagnostic test methods: 3ABC ELISA, Vaccine Matching, Virus neutralization, and VIAA Agar gel immunodiffusion (AGID) Indirect test methods performed: 397 Nationally, 0 Internationally Direct diagnostic test methods: VI, Antigen ELISA, PCR, Sequencing Direct test methods performed: 7,481 Nationally; 0 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Rinderpest (RPV)	Direct diagnostic test methods: RT-PCR Direct test methods performed: 910 Nationally, 0 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope

Diagnostic activities for Tuberculosis	Indirect diagnostic test methods: interferon-gamma release assay, lateral flow-cervid, lateral flow-zoo Indirect test methods performed: 15,555 Nationally, 0 Internationally. Direct diagnostic test methods: culture-livestock and wildlife, culture-zoo, direct PCR-livestock and wildlife, direct PCR-zoo, histopathology. Direct test methods performed: 22,533 Nationally; 255 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Chronic Wasting Disease (CWD)	Direct diagnostic test method: Immunohistochemistry Direct diagnostic test methods performed: 6,904 Nationally; 0 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Leptospirosis	Direct diagnostic test methods: MAT, fluorescent antibody testing, isolation and identification, RT LipI32 PCR, WGS, 165 and secY PCR, serogrouping, MALDI species and identification Direct diagnostic test methods performed: 4,357 Nationally, 402 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Anthrax	Direct diagnostic test methods: Isolation and Identification Direct diagnostic test methods performed: 7 Nationally, 1 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Avian Influenza	Indirect diagnostic test methods: AGID, Hemagglutination-inhibition (HI) antibody subtype identification (H1-16), and Neuraminidase-inhibition (NI) antibody subtype identification (N1-9) Indirect diagnostic test methods performed: 3,607 Nationally, 221 Internationally Direct diagnostic test methods: Real-time RT-PCR (IAV, subtyping), Virus Isolation (VI) positive/total samples, Molecular pathotype (Sanger), In vivo pathotype (IVPI), and WGS Direct diagnostic test methods performed: 33,214 Nationally, 1,541 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
	Indirect diagnostic test methods: HI antibody identification (APMV-1) Direct diagnostic test methods: RT-PCR (matrix,

Diagnostic activities for Newcastle Disease	fusion), VI (positive/total samples), Molecular pathotype (Sanger), In vivo pathotype (ICPI), WGS Direct diagnostic test methods performed: 5,370 Nationally, 1,420 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Swine Influenza	Indirect diagnostic test methods: research and development support to swine study for USDA-ARS Indirect diagnostic test methods performed: 200 Nationally, 0 Internationally Direct diagnostic test methods: RT-PCR (IAV, subtyping), VI, Sequencing, Repository propagation Direct diagnostic test methods performed: 2,318 Nationally, 0 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Equine Infectious Anemia (EIA)	Indirect diagnostic test methods: AGID, Enzyme-linked immunosorbent assay and cELISA, Immunoblot Indirect diagnostic test methods performed: 5,525 Nationally, 24,110 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Bluetongue virus (BTV)	Indirect diagnostic test methods: AGID, enzyme-linked immunosorbent assay and cELISA, VN Indirect diagnostic test methods performed: 459 Nationally, 73 Internationally Direct diagnostic test methods: VI, RT-PCR, Molecular serotyping, WGS Direct diagnostic test methods performed: 979 Nationally, 120 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Vesicular Stomatitis (VSV)	Indirect diagnostic test methods: Competitive enzyme-linked immunosorbent assay (cELISA; Indiana-1 and New Jersey serotypes), Complement fixation, VN Indirect diagnostic test methods performed: 3,074 Nationally, 440 Internationally Direct diagnostic test methods: VI, RT-PCR, Sequencing Direct diagnostic test methods performed: 383 Nationally, 0 Internationally
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnostic activities for Contagious Equine Metritis (CEM)	Indirect diagnostic test methods: Complement fixation Indirect diagnostic test methods performed: 2070 Nationally, 344 Internationally Direct diagnostic test methods: Identification of the agent, RT-PCR, WGS Direct diagnostic test methods performed: 997 Nationally, 47 Internationally

TOR3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable area
In-house immunoperoxidase test (IPT) for ASF	NVSL ISO 17025 accredited	Laboratory expertise
Multiplex qRT-PCR for ASF and CSF	NVSL ISO 17025 accredited	Laboratory expertise Training and education
Aggregate oral fluid validation for ASF diagnosis	Goonewardene KB, Chung CJ, Goolia M, Blakemore L, Fabian A, Mohamed F, Nfon C, Clavijo A, Dodd KA, Ambagala A. Evaluation of oral fluid as an aggregate sample for early detection of African swine fever virus using four independent pen-based experimental studies. <i>Transbound Emerg Dis.</i> 2021 Sep;68(5):2867-2877. doi: 10.1111/tbed.14175. Epub 2021 Jun 17. PMID: 34075717	Laboratory expertise
Blood and spleen swab validation for ASF diagnosis	NVSL ISO 17025 accredited	Laboratory expertise
WGS of ASFV and Rift Valley fever virus on Nanopore and Illumina platforms for more comprehensive characterization genomic epidemiology of disease outbreaks	Lakin SM, O'Donnell VK, Xu L, Barrette RW, Barnabei J, Núñez R, Holland R, Faburay B, Robbe-Austerman S. WGS and molecular epidemiology of the 2021 African swine fever virus outbreak in the Dominican Republic. <i>Transbound Emerg Dis.</i> 2022 Oct 31. doi: 10.1111/tbed.14751. Epub ahead of print. PMID: 36314984.	Laboratory expertise
FMDV nonstructural protein antibody ELISA	Performed validation using well-characterized experimental and field samples, with analytical and diagnostic performance characteristics defined and compared with currently used non-structural protein ELISA (VMRD vs PrioCheck)	Laboratory expertise
Molecular serotyping of FMDV	Based on rapid sequencing and characterization of FMDV genetic sequences and match to virus serotype	Laboratory expertise
	Sequencing of FMDV on the Nanopore platform directly from the viral RNA without the reverse	Laboratory expertise

Direct RNA FMDV sequencing	transcription step in order to shorten the time to acquiring the whole genome sequence for characterization	
Verification method used for the PPRV inactivation verification	Developed and established a virus capture method using Nanotrap® magnetic virus particles to assess and verify chemical inactivation of PPRV	Laboratory expertise
WGS of TB	WGS of cultured isolates was analyzed to determine the phylogenetic relationships between new isolates and isolates in previous outbreaks. The analysis was distributed to federal and state animal health officials	Laboratory expertise
New test/diagnostic method developed for AIV	H5 2.3.4.4 real-time PCR assays in process	
New test/diagnostic method developed for BT	Subtyping real-time PCR assays in process	

4. Did your Collaborating Centre maintain a network with other WOAHA Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Global Partnership for Animal and Zoonotic Disease Surveillance (GPAZDS)	USDA, NVSL, NBAF	Africa Asia and Pasific	Diagnostic surveillance-related studies on African swine fever, Classical swine fever, Foot-and-Mouth Disease, Rift Valley fever, Japanese Encephalitis, Crimean-Congo hemorrhagic fever, Marburg/Filoviruses, PPRV
African Center of Excellence for Genomics of Infectious Diseases (Nigeria)	Nigeria	Africa	Genomic sequencing and surveillance of ASFV in West Africa
Central Veterinary Laboratory (LAVECEN)	Dominican Republic	Americas	Diagnosis and genomic surveillance of ASFV in

Dominican Republic			Dominican Republic and Haiti
Mexico (SENESICA)	Baja California, Mexico	Americas	Five-year prospective evaluation of BCG vaccine efficacy in naturally infected dairy cattle in Baja California, Mexico
Panama	Panama	Americas	Carried out PRC, sequencing for avian influenza
WOAH/FAO Reference Laboratories for Animal Influenza		Americas	Genetic characteristics of zoonotic influenza viruses - Data contributions to OFFLU for the twice yearly WHO Vaccine Composition Consultations
USDA's Agricultural Research Service National Poultry Center		Americas	Studies in Poultry Transmission, Airborne Spread and Mitigation Tools for Avian Influenza and Newcastle Disease in the USA

TOR4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAHC Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
CISA-INIA			Proficiency test participant in ASF Interlaboratory Comparison Test
PANAFTOSA, Brazil			FMD and vesicular stomatitis proficiency testing scheme participant
China Institute of Veterinary Drug			Answered an inquiry about

Control (IVDC)			the non-pathogenic RPV PT initiated by FADDL
Canadian WOH Reference Laboratory (ASF)			Evaluation of LFA's for ASF, Harmonization activities with PCR.
Canadian WOH Reference Laboratory (CWD)			Evaluation of IDEXX HerdChek CWD Ag Test, Proficiency test participant in IHC
Australian National Quality Assurance Program (ANQAP)			Proficiency test participant in EIA
Australian National Quality Assurance Program (ANQAP)			Proficiency test participant in BTV
National Veterinary Services Laboratories / Animal and Plant Health Agency (APHA) quality assurance unit (Vetqas)		Europe	Proficiency test participant in Isolation and Identification of CEM

TOR6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOH?

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

For bovine tuberculosis: Sample processing, colony identification, acid-fast staining, direct PCR, real-time PCR detection, and interpreting WGS advice was provided to Guatemala and Honduras virtually and in-person.

For ASF, deployed over 24 individuals in three week rotations to the Dominican Republic to provide outbreak support testing.

Carried out MAT testing for leptospirosis at the request of Belgium, Columbia, Panama, Curacao, Guatemala, Trinidad and Tobago.

Participated with international regionalization evaluations for avian influenza and Newcastle disease in Panama and Brazil.

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOH, to personnel from WOH Members?

Yes

a) Technical visit : 2

b) Seminars : 1

c) Hands-on training courses: 8

d) Internships (>1 month) :

TYPE OF TECHNICAL TRAINING PROVIDED (A, B, C OR D)	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH TRAINING	NO. PARTICIPANTS FROM THE CORRESPONDING COUNTRY
Hands-on training courses	Foreign Animal Disease Diagnostician Training Course	United States	80
Hands-on training courses	ACVPM Preparatory Course	United States	UNK
Technical visit	Bovine TB: sample processing, colony identification, acid-fast staining, direct PCR, real-time PCR detection, interpreting whole genome sequencing	Honduras	2
Technical visit	Bovine TB: sample processing, colony identification, acid-fast staining, direct PCR, real-time PCR detection, interpreting whole genome sequencing	Guatemala	1
Hands-on training courses	Direct PCR for tuberculosis	Guatemala	10
Hands-on training courses	Direct PCR for tuberculosis	Honduras	2
Hands-on training courses	EIA Training Courses (four held)	United States	162

TOR8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOA?H?

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	euFMD Open Session			Virtual	1
International	FMD Reference Lab Network Meeting			Lelystad, Netherlands	2
International	Rinderpest Holding Facility (RHF) Network Meeting			Virtual	1
International	5th Outreach Meeting for Maintaining Global Freedom from Rinderpest			Rome, Italy	1

TOR9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOAHA that may be useful to Members of WOAHA

a) Articles published in peer-reviewed journals:

23

Whole genome sequencing data were submitted into GenBank and a manuscript analyzing the data was published as a peer-reviewed publication.

Lakin SM, O'Donnell VK, Xu L, Barrette RW, Barnabei J, Núñez R, Holland R, Faburay B, Robbe-Austerman S. Whole genome sequencing and molecular epidemiology of the 2021 African swine fever virus outbreak in the Dominican Republic. Transbound Emerg Dis. 2022 Oct 31. doi: 10.1111/tbed.14751. Epub ahead of print. PMID: 36314984.

Antagnoli CM, Holland R, Robbe-Austerman S, Vargas J, Griselda L, Schumann K, Barnabei J, Gonzalez W, Duerr C, Morales P, Soltero F, Shere J. African swine fever detection and response in Hispaniola: USDA APHIS' support to an insular response.

Mason J, Primavera V, Martignette L, Clark B, Barrera J, Simmons J, Hurtle W, Neilan JG, Puckette M. Comparative Evaluation of the Foot-and-Mouth Disease Virus Permissive LF-BK α V β 6 Cell Line for Senecavirus A Research. Viruses. 2022 Aug 25;14(9):1875. doi: 10.3390/v14091875. PMID: 36146682; PMCID: PMC9503874.

Palinski RM, Sangula A, Gakuya F, Bertram MR, Pauszek SJ, Hartwig EJ, Smoliga GR, Obanda V, Omondi GP, VanderWaal K, Arzt J. Genome Sequences of Foot-and-Mouth Disease Virus SAT2 Strains Purified from Coinfected Cape Buffalo in Kenya. Microbiol Resour Announc. 2022 Oct 20;11(10):e0058522. doi: 10.1128/mra.00585-22. Epub 2022 Sep 12. PMID: 36094207; PMCID: PMC9584222.

Palinski RM, Sangula A, Gakuya F, Bertram MR, Pauszek SJ, Hartwig EJ, Smoliga GR, Obanda V, Omondi GP, VanderWaal K, Arzt J. Genome Sequences of Foot-and-Mouth Disease Virus SAT1 Strains Purified from Coinfected Cape Buffalo in Kenya. Microbiol Resour Announc. 2022 Oct 20;11(10):e0058422. doi: 10.1128/mra.00584-22. Epub 2022 Sep 12. PMID: 36094180; PMCID: PMC9584208.

Naqvi SS, Bostan N, Fukai K, Ali Q, Morioka K, Nishi T, Abubakar M, Ahmed Z, Sattar S, Javed S, Tariq A, Sadiq A. Evolutionary Dynamics of Foot and Mouth Disease Virus Serotype A and Its Endemic Sub-Lineage A/ASIA/Iran-05/SIS-13 in Pakistan. Viruses. 2022 Jul 26;14(8):1634. doi: 10.3390/v14081634. PMID: 35893699; PMCID: PMC9331208.

Ahmed Z, Velazquez-Salinas L, Mwiine FN, Vander Waal K, Rieder E. Complete Coding Genome Sequences of Five Foot-and-Mouth Disease Viruses Belonging to Serotype O, Isolated from Cattle in Uganda in 2015 to 2016. Microbiol Resour Announc. 2022 Aug

18;11(8):e0044522. doi: 10.1128/mra.00445-22. Epub 2022 Jul 12. PMID: 35863055; PMCID: PMC9387231.

Paton DJ, Gubbins S, Dekker A, Ludi AB, Wilsden G, Browning CFI, Eschbaumer M, Barnabei JL, Duque H, Pauszek L, King DP (2022) "Predicting cross-protection against foot-and-mouth disease virus strains by serology after vaccination". Accepted to *Front. Vet. Sci.* 18Nov2022.

Stenfeldt C, Bertram M, Holinka-Patterson L, Fish I, Farooq U, Ahmed Z, Hartwig EJ, Smoliga GR, Naeem K, Rodriguez L, Arzt J. Genome Sequences of Foot-and-Mouth Disease Virus Serotype A and O Strains Obtained from Subclinically Infected Asian Buffalo (*Bubalus bubalis*) in Pakistan. *Microbiol Resour Announc.* 2022 Aug 18;11(8):e0057522. doi: 10.1128/mra.00575-22. Epub 2022 Jul 18. PMID: 35862920; PMCID: PMC9387223.

Das A, Wang Y, Babiuk S, Bai J, Dodd K, Jia W. Development of multiplex real-time PCR assays for differential detection of capripoxvirus, parapoxvirus and foot-and-mouth disease virus. *Transbound Emerg Dis.* 2022 May;69(3):1326-1337. doi: 10.1111/tbed.14099. Epub 2021 Apr 27. PMID: 33837669.

Palinski RM, Brito B, Jaya FR, Sangula A, Gakuya F, Bertram MR, Pauszek SJ, Hartwig EJ, Smoliga GR, Obanda V, Omondi GP, VanderWaal K, Arzt J. Viral Population Diversity during Co-Infection of Foot-And-Mouth Disease Virus Serotypes SAT1 and SAT2 in African Buffalo in Kenya. *Viruses.* 2022 Apr 25;14(5):897. doi: 10.3390/v14050897. PMID: 35632639; PMCID: PMC9145140.

Tewari D, Fasnacht M, Ritzman M, Livengood J, Bower J, Lehmkuhl A, Nichols T, Hamberg A, Brightbill K, Henderson D. Detection of chronic wasting disease in feces and recto-anal mucosal associated lymphoid tissues with RT-QuIC in a naturally infected farmed white-tailed deer herd. *Front. Vet. Sci.* 2022 Sep 13;9:959555. doi: 10.3389/fvets.2022.959555. eCollection 2022.

Hamond C, LeCount K, Putz EJ, Bayles DO, Camp P, Goris M G. A., van der Linden H, Stone NE, Schlater L, Sahl JW, Wagner DM, Nally JE. Bovine Leptospirosis Due to Persistent Renal Carriage of *Leptospira borgpetersenii* Serovar Tarassovi. *Front. Vet. Sci.* 2022, 9. DOI: 10.3389/fvets.2022.848664

Hamond C, Browne AS, de Wilde LH, Hornsby RL, LeCount K, Anderson T, Stuber T, Cranford HM, Browne SK, Blanchard G, Horner D, Taylor ML, Evans M, Angeli NF, Roth J, Bisgard KM, Salzer JS, Schafer JJ, Ellis BR, Alt DP, Schlater L, Nally JE, Ellis EM. Assessing rodents as carriers of pathogenic *Leptospira* species in the U.S. Virgin Islands and their risk to animal and public health. *Sci Rep.* 2022 Jan 21;12(1):1132. doi: 10.1038/s41598-022-04846-3. PMID: 35064157; PMCID: PMC8782869.

Outbreak of Highly Pathogenic Avian Influenza H5N1 in New England Seals
<https://www.biorxiv.org/content/10.1101/2022.07.29.501155.abstract>

Intercontinental movement of H5 2.3. 4.4 Highly Pathogenic Avian Influenza A (H5N1) to the United States, 2021
<https://www.biorxiv.org/content/10.1101/2022.02.11.479922.abstract>

Intercontinental movement of highly pathogenic avian influenza A (H5N1) clade 2.3. 4.4 virus to the United States, 2021

Pandemic lineage 2009 H1N1 influenza A virus infection in farmed mink in Utah
<https://journals.sagepub.com/doi/pdf/10.1177/10406387211052966>

Evaluation of PCR-based hemagglutinin subtyping as a tool to aid in surveillance of avian influenza viruses in migratory wild birds
<https://www.sciencedirect.com/science/article/pii/S0166093422001410>

Evolution of the North American Lineage H7 Avian Influenza Viruses in Association with H7 Virus's Introduction to Poultry
<https://journals.asm.org/doi/abs/10.1128/jvi.00278-22>

Transmission dynamics of low pathogenicity avian influenza (H2N2) viruses in live bird markets of the Northeast United States of America, 2013–2019
<https://academic.oup.com/ve/article-abstract/8/1/veac009/6525333>

Rapid evolution of A (H5N1) influenza viruses after intercontinental spread to North America

b) International conferences:

6

FMD Reference Laboratory Network Meeting, Lelystad Netherlands, 11/22

euFMD Meeting, 10/22

Rinderpest Holding Facility (RHF) Network Meeting 7/22

5th Outreach Meeting for Maintaining Global Freedom from Rinderpest 9/22

Camila Hamond. International Forum on Public Health and Health Care Management. "Animal's carriers of Leptospira spp. and recreation area and farm environmental as risk for public and animal health". September 19-21, 2022.

CDC Confirms Two New Human Infections with Flu Virus from Pigs During 2022 | CDC

c) National conferences:

17

United States Swine Health Improvement Plan, Minneapolis MN, Oct. 22

United States National Milk Producers Federation, Arlington VA and virtual, June 22

Bovine Germplasm Movement Plan, Madison WI and virtual, May 22

*Rosenbaum M, Hill N, Maddison J, Benson H, Specht A, Paduch L, Krull M, Hertzell H, Stone NE, Wagner DM, Busch JD, Nally JE, Hamond C, LeCount K, Schlater L, Clegg J, Phipatanakul W, Skidmore AM, Bradfute SB, Cardenas Y, Thomas G, Ulrich J, McDaniel K, Leibler J, Galloway R, Weiner Z, Runstadler J. The Boston Urban Rat Study: Preliminary results on zoonosis and population structure of the synanthropic Norway rat (*Rattus norvegicus*). Annual Meeting American Public Health Association, Nov 2022, Boston, MA.*

Sykes JE, Sebastian J, Reagan KL, Hamond C, LeCount K, Stuber T, Schlater L, Goris MGA, van der Linden H, Schreiber A, Yoshimoto S, Nally JE. Identification of serovar Canicola in association with an outbreak of canine leptospirosis in west Los Angeles, California: One Health implications. Annual Meeting American Public Health Association, Nov 2022, Boston, MA.

*Anderson T, Hamond C, Haluch A, Toot K, LeCount K, Schlater L. Animals exposed to *Leptospira* spp. in the United States and Puerto Rico during 2018-2020. American Association of Veterinary Laboratory Diagnosticians. October 6-12, 2022, Minneapolis, MN.*

*LeCount K, Hamond C, Stuber T, Haluch A, Toot K, Anderson T, Bayles DO, Nally JE, Schlater L. Whole Genome Sequencing of *Leptospira* isolates from animals: a one health approach improving the biobank for future genomic research in diagnosis and control strategies. American Association of Veterinary Laboratory Diagnosticians. October 6-12, 2022, Minneapolis, MN.*

*Hamond C, LeCount K, Haluch A, Toot K, Anderson T, Nally JE, Schlater L. Use of lipL32 rt-PCR to identify animal carriers of *Leptospira* spp. American Association of Veterinary Laboratory Diagnosticians. October 6-12, 2022, Minneapolis, MN.*

Clegg J, Stone N, Hamond C, Hertzell H, Busch J, Hornsby R, Sahl J, LeCount K, Schlater L, Hill N, Madison J, Nally JE, Rosenbaum M, Wagner DM. Limited dispersal among brown Norway rats in Boston, MA. In: 61st Annual Meeting of Arizona and Southern Nevada Branch of the American Society for Microbiology, April 16, 2022, and Northern Arizona University Undergraduate Expo & Symposium, April 22, 2022.

VIRTUAL Live Bird Market Working Group Meeting, Feb. 22

United States Animal Health Association and American Association of Veterinary Laboratory Diagnosticians Annual Meeting, Oct. 22

National Poultry Improvement Program Biennial General Conference Committee Meeting, June 22

NPIP Diagnostic Workshop in Georgia, Aug. 22

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

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<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/fmd/index>

Review for journal: Journal of Microbiological Methods, Journal of Clinical Microbiology, Epidemiology and Infection, Equine Veterinary Education, Advances in Infectious Diseases, Plos Neglected Disease, Plos One, Tropical Animal Health and Production Microbial Pathogenesis, Journal of Applied Microbiology, BMC Microbiology, Cells and European Journal of Medical Research.

Editor: Co-editor in Special issue on "New Insights in Leptospirosis". Tropical Medicine and Infection Disease. 2022

Participation in master's and doctoral committees: thesis on leptospirosis. Bahia Federal University and Dourados University, Brazil.

Publication- Book Chapter: Camila Hamond and Franklin Riet-Correa. Chapter: Leptospirosis. Ruminant and Equine Infection Diseases – 3rd ed., Varela, Brazil, 2022.

Under the Microscope

Protecting Chickens from Highly Pathogenic Avian Influenza

ACVM: HPAI Update: <https://www.acvm.us/>

HPAI sequencing and genetics at the monthly NASAHO call

Avian Influenza panel at Iowa Egg Producers meeting

Advanced Virus Detection Technologies Interest Group (AVDTIG) Subgroup AB meeting related to sample preparation for whole genome sequencing and detection of adventitious agents

Participated with international regionalization evaluations for avian influenza and Newcastle disease in two countries

World Organisation for Animal Health and Food and Animal Organization (OFFLU) Swine influenza virus technical activity teleconference

Hosted visiting scientist from the Animal Plant Health Agency

GenBank deposits: approximately 2200 sequences deposited in GenBank in 2021. <https://www.ncbi.nlm.nih.gov/genbank/>

14th workshop of the European Reference Laboratories for Equine Infectious Anemia

USDA APHIS | Bluetongue

USDA APHIS | Contagious Equine Metritis (CEM)

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

Organizer of ASF diagnostic performance quality in 52 State diagnostic laboratories

Organized proficiency tests to approve partners for testing of CWD by ELISA

Organized proficiency tests for Leptospira Microscopic Agglutination Test for 36 participating laboratories

12. Additional comments regarding your report:

Submitted a project proposal of Rinderpest Virus (RPV) Sequencing and Destruction and associated documents to FAO/WOAH Rinderpest-Secretariat for review and approval.

Participated in multiple surveillance studies that greatly increased variety of tests and testing numbers this year. A post-doc is currently on staff that has increased testing as well.

Anthrax is a well-controlled disease within the United States and the rest of North America. Within the United States, there were less than a dozen premises with animals that tested positive for anthrax in 2022. The positive cases occurred in states that are endemic for anthrax and are well prepared to confirm their own samples. The NVSL did not receive any requests for international diagnostic testing in 2022, although we did support Belize with testing four samples in 2021. We maintained our availability and proficiency and are happy to accept samples from other countries. The NVSL does consistently produce and distribute reagents internationally and provide scientific guidance to our international partners. The NVSL had planned twinning activities such as training other laboratories to improve their diagnostic activities, harmonize and extend our methods to include WGS, and to discuss other possible collaborations with our Canadian Anthrax expert counterparts, but plans were cancelled due to the global COVID pandemic. Internally, we have discussed restarting the cancelled twinning activities, but have yet reached out to Canada. We do not see the demand for testing increasing, and since NVSL's mission is primarily diagnostics and not research, we do not expect our activities to change.

The IAV viruses characterized from U.S. poultry during 2022 were predominantly Eurasian lineage goose/Guangdong H5N1 clade 2.3.4.4b.

APMV-1 are routinely characterized for monitoring.

The national swine surveillance program is anonymous and based upon PCR and sequencing; serology is not typically conducted at NVSL.

There have been no detections of VSV in the U.S. since the 2020 outbreak.

Routine import testing is conducted at another laboratory at NVSL with all confirmatory testing remaining with DVL. UPDATE 2022: participated with other EIA Reference laboratories to share current assays and developments and to share biologic materials to facilitate validation.