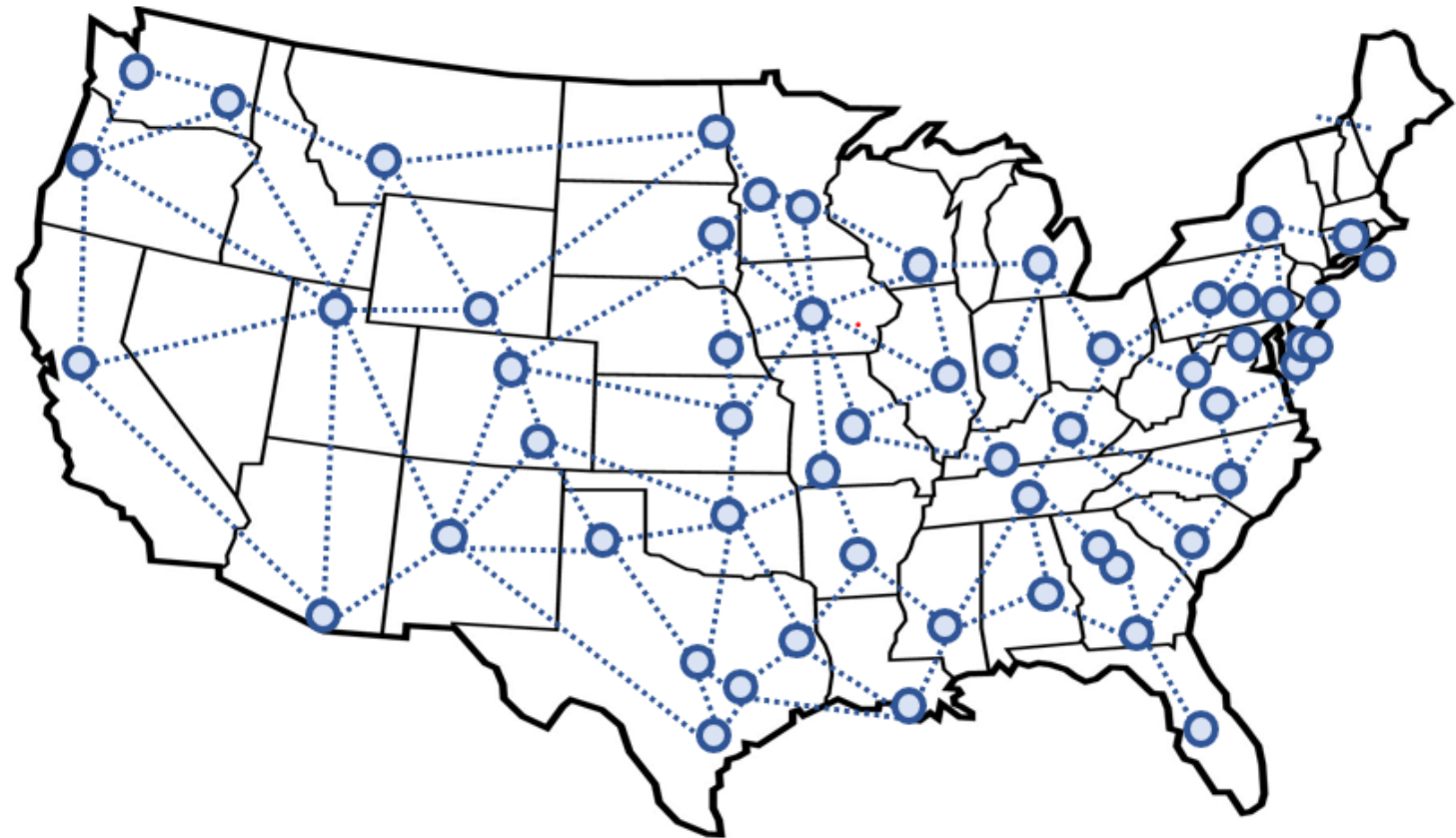


National Animal Health Laboratory Network (NAHLN)



Christina Loiacono, DVM, PhD, Dip. ACVP
NAHLN Coordinator
May 13, 2024

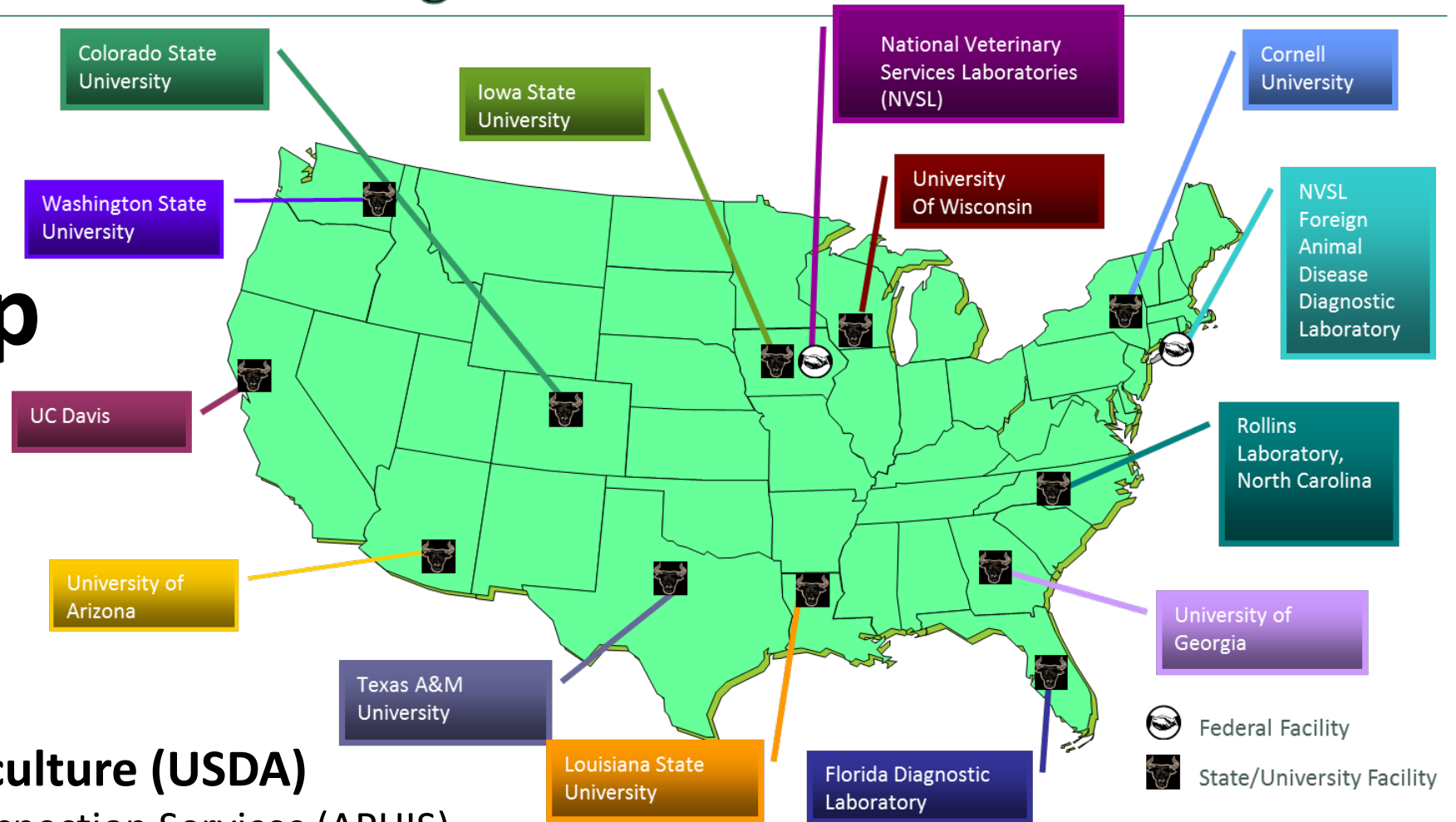


The original 12 NAHLN laboratories

Our Partnership Began in 2002

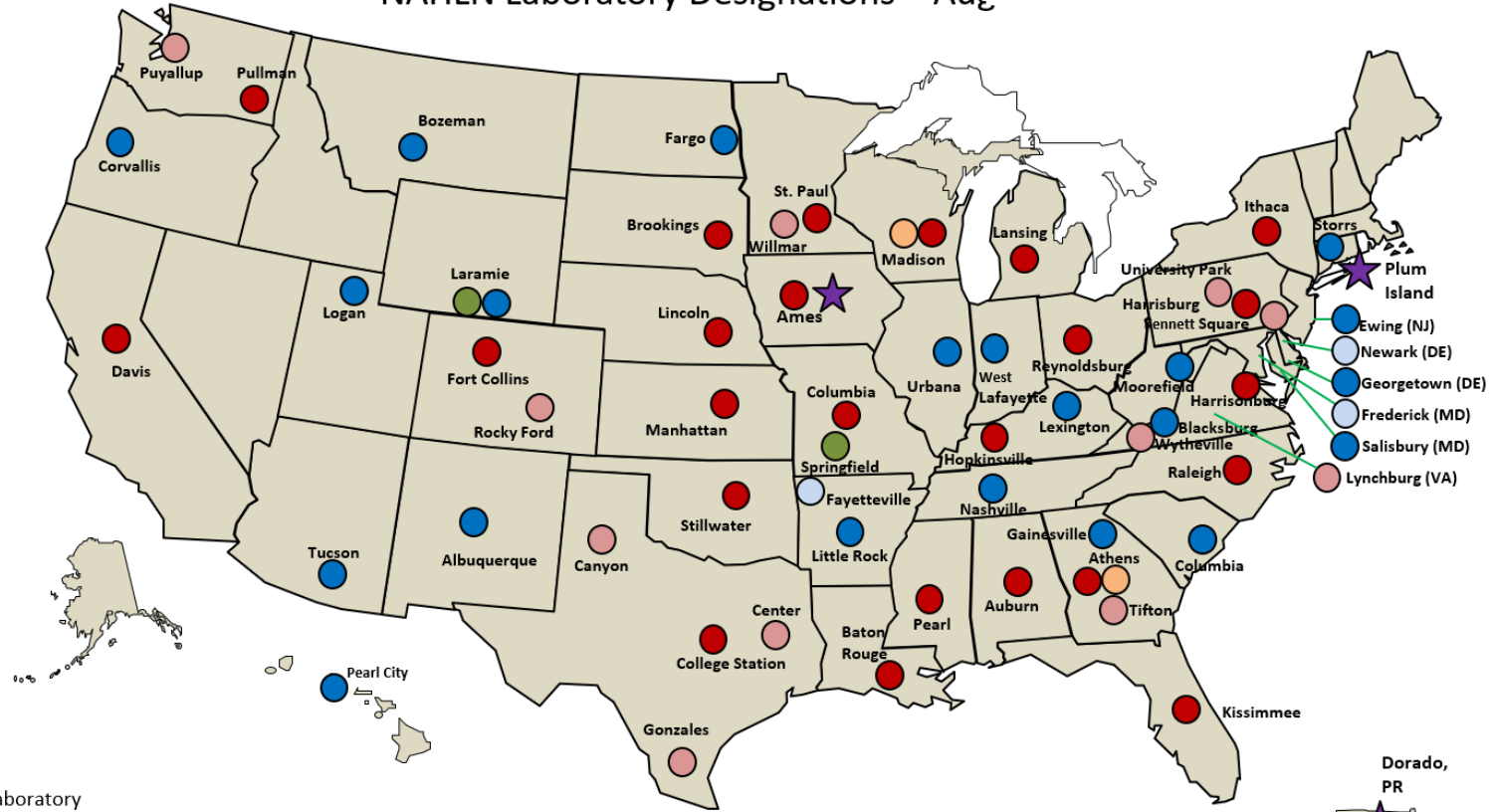
- **US Department of Agriculture (USDA)**
 - Animal and Plant Health Inspection Services (APHIS)
 - National Institute for Food and Agriculture (NIFA)

- **American Association of Veterinary Laboratory Diagnosticians (AAVLD)**





NAHLN Laboratory Designations – Aug



Currently there
are 63 NAHLN
laboratories
in 42 states.

- 35 Level 1 Labs
11 Branch Labs
- 24 Level 2 Labs
3 Branch Labs
- 2 Level 3 Labs
- 2 Affiliate Lab



NAHLN Laboratory Qualifying Requirements

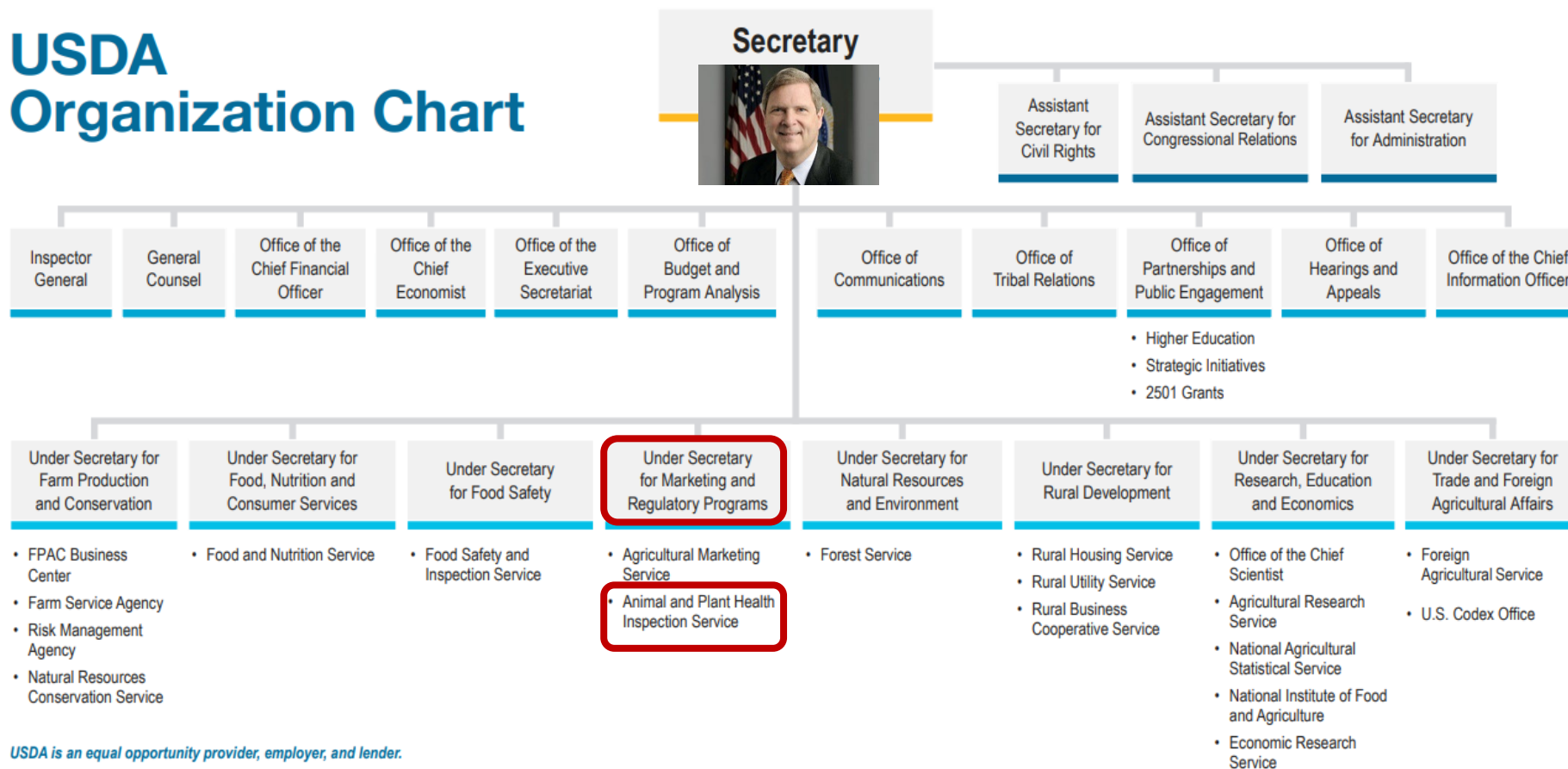
- Must be located in the U.S. or U.S. territories
- Functional Quality Management System
- Adequate facilities for working with infectious materials
- Must have a Laboratory Information Management System (LIMS)
- Adequate number of trained personnel and equipment for performing tests, using procedures supplied by the NAHLN.
- Must meet all federal and state biosafety and biosecurity requirements for hazardous materials and infectious diseases



NAHLN Laboratory Designations

- **Level 1:** Perform at highest standards of the NAHLN
 - Full Accreditation (AAVLD or ISO 17025)
 - Biosafety level 3 (BSL-3) facility
- **Level 2:** Surveillance/surge testing, support NAHLN as resources allow
 - Provisional or full accreditation (AAVLD or ISO 17025)
- **Level 3:** Participate primarily in surveillance testing activities.
 - Functional quality management system
 - Audits by NAHLN Program on a 3 year cycle if not accredited through a 3rd party
- **Affiliate:** Federal labs whose mission falls outside the scope of animal agriculture
 - Examples: US Geological Surveillance National Wildlife Health Center and Food Safety and Inspection Services Eastern Laboratory
- **Specialty:** Private labs that have a specific capability needed by the NAHLN
 - Example: No laboratories in this designation currently

USDA Organization Chart



USDA is an equal opportunity provider, employer, and lender.

UPDATED 10/19/21 This organization chart displays the names of USDA offices, agencies, and mission areas. Each office, agency, and mission area is placed within a cell connected by lines to show the structure and hierarchy (Under Secretary, Deputy Secretary, or Secretary) for which they fall under. An HTML version that lists [USDA Agencies and Offices](#) and [USDA Mission Areas](#) is also available on usda.gov. The [Secretary's Memorandum 1076-031](#) was signed August 12, 2019 effectuating a change to Rural Development.



Animal and Plant Health Inspection Services

APHIS Administrator

Animal Care (AC)

Biotechnology Regulatory
Services (BRS)

International Services (IS)

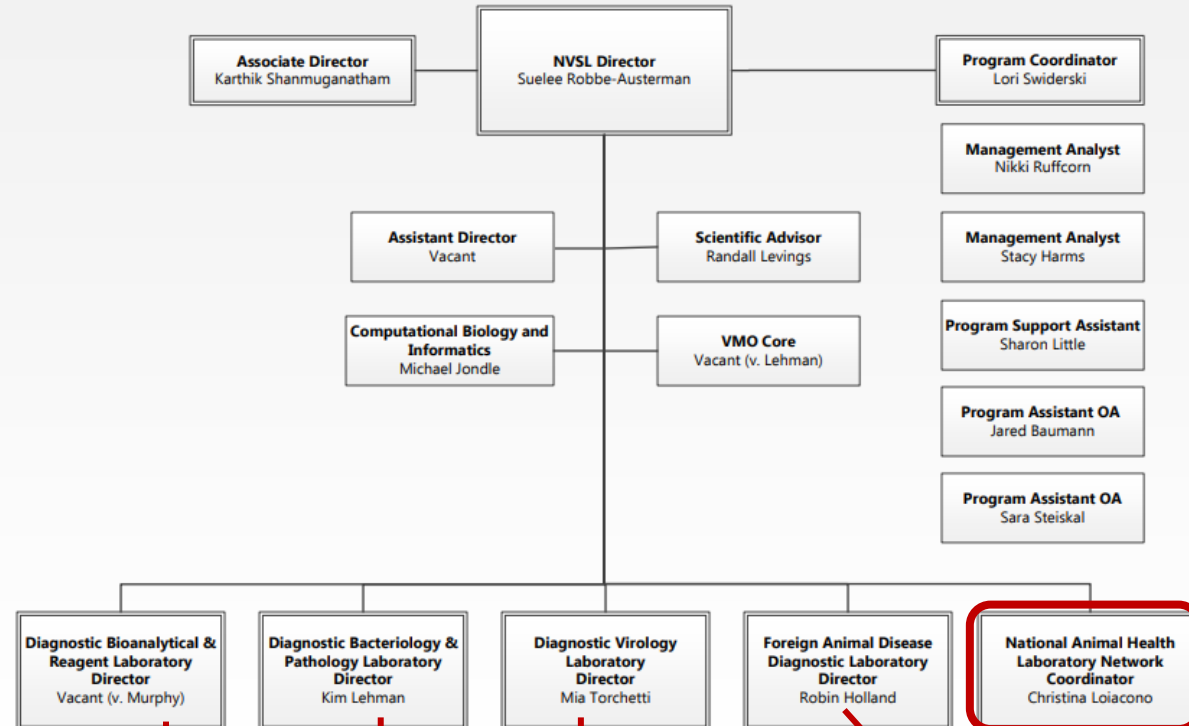
Plant Protection and
Quarantine (PPQ)

Veterinary Services (VS)

Wildlife Services (WS)

National Veterinary Services Laboratories

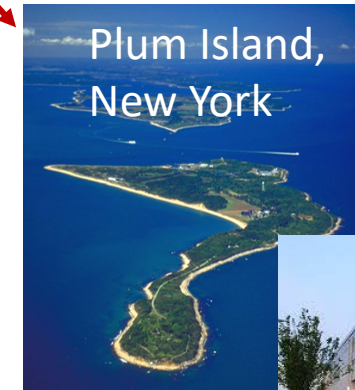
The National Veterinary Services Laboratories is responsible for safeguarding U.S. animal health and contributing to public health by ensuring that timely and accurate laboratory support is provided by a nationwide animal health diagnostic system.



Ames, Iowa



Plum Island,
New York



National Centers for Animal Health



NAHLN Supports APHIS-VS Initiatives

- Program Disease Preparedness
- Animal and Zoonotic Disease Outbreak Response
- Surveillance in wildlife
 - Avian influenza in wild birds, Chronic wasting disease in wild cervids
- Support testing of endemic diseases when necessary
 - Porcine epidemic diarrhea and delta coronavirus, Seneca valley A virus
- Support of the President's National Action Plan and USDA's Antimicrobial Resistance (AMR) Action Plan
- Implement laboratory piece of the National List of Reportable Animal Diseases (NLRAD) and emerging diseases
- Established the 2018 Farm Bill the opportunity for annual National Animal Health Laboratory Network (NAHLN) Enhancement funding.

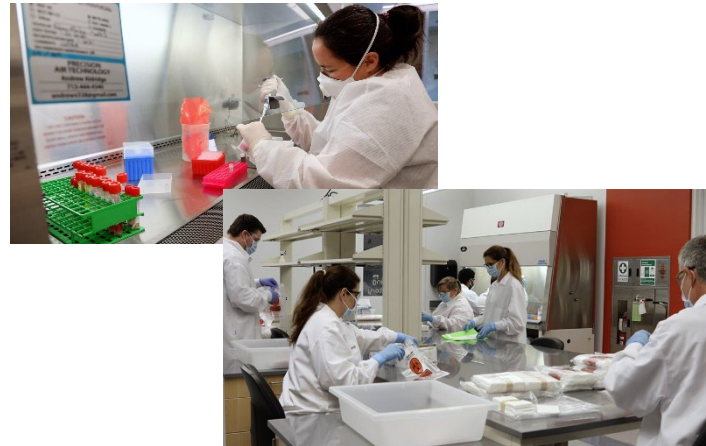


NAHLN Purpose

Early detection of high-consequence animal disease



Rapid response to an outbreak



Texas A&M Vet Med Diagnostic Laboratory

Appropriate recovery to prove disease freedom



Congress authorized USDA to coordinate the development, implementation, and enhancement of national veterinary diagnostic laboratory capabilities, with special emphasis on surveillance planning and vulnerability analysis, technology development and validation, training, and outreach.



Founding Principles of NAHLN

All NAHLN laboratories must agree to support these founding principles in order to ensure the integrity of the network and the credibility of test results coming from any one of the labs in the network.

- **Quality Standards**
 - Operate within a quality management system to provide *confidence in every aspect of how test is performed*
 - AAVLD, ISO 17025, NAHLN approval
- **Competency of Lab Personnel**
 - *Trained and tested laboratory personnel*
- **Standardized Protocols and Equipment**
 - Use standardized protocols, reference materials, and equipment to *ensure consistency among all labs*
- **Secure Electronic Communications and Reporting**
 - Provide communications and especially test results in a secure and confidential manner
- **Adequate Biosafety and Biosecurity**
 - Use facilities with biosafety/biosecurity levels requisite for testing performed
- **Assessment of Preparedness through Scenario Testing**
 - Evaluate preparedness, identify and prioritize gaps, *prepare for outbreak response and recovery*



Quality Management System Training

Based on AAVLD, ISO17025 standards

- Annual training has been conducted since 2010, except for 2020-2021
 - Annual training in Ames, Iowa for all NAHLN lab members
 - International diagnosticians included in trainings upon request
 - Regional training for NAHLN lab member at a NAHLN lab
 - Regional training for Aquatic pathogen diagnosticians
 - Individual NAHLN lab training offered upon request

Interactive learning environment

- Document control, records, internal auditing, management review, corrective actions, root cause analysis, equipment
- Workshops: Root cause analysis, SOP and associated document development, QMS Jeopardy game
- Mock audit: Application of skills- auditing, reporting, responding

Web-based QMS training available

- Developed through a collaboration between NAHLN and the Washington Animal Disease Diagnostic Lab (NAHLN lab)





Electronic Messaging of Test Results

- All NAHLN labs including NVSL send test results through secure electronic messages to USDA databases
 - Currently all NAHLN labs including NVSL have the capability to message
 - Electronic messages for eight of the 14 NAHLN scope disease can be received into the USDA databases
 - Exceptions: BSE, CWD, Scrapie, aquaculture diseases
 - Electronic messages provide results to decision makers in real-time
- Priorities for electronic messaging in NAHLN include:
 - Improve data quality coming into USDA databases
 - Standardizing the data moving out of USDA databases
 - Support efforts of the NAHLN labs to maintain messaging capabilities
 - Expand the ability to accept messages for all NAHLN scope diseases



NAHLN Methods Technical Working Group

NAHLN Exercises and Drills Working Group

NAHLN IT Committee

NAHLN Portal Working Group



How do NAHLN labs support our purpose?

NAHLN Labs provide the screening assays

All non-negative samples are confirmed at the NVSL Reference Laboratories

- Surveillance
 - Targeted surveillance
 - Reimbursable testing
 - Electronic real-time reporting through HL7 messaging
- Foreign animal disease investigation
 - Priority 1 (high suspect)
 - Priority A (interrupts commerce)
 - Priority 2 (moderate suspect)
 - Priority 3 (low suspect)



Current standardized methods and PTs provided by the National Veterinary Services Laboratories

- African Swine Fever
- Bovine Spongiform Encephalopathy
- Classical Swine Fever
- Chronic Wasting Disease
- Foot and Mouth Disease
- Influenza A Virus-Avian
- Influenza A Virus-Swine
- Infectious Salmon Anemia
- Newcastle Disease
- Pseudorabies
- Scrapie
- Spring Viremia of Carp
- Viral Hemorrhagic Septicemia
- Vesicular Stomatitis Virus
- Antimicrobial Resistance

NAHLN Surveillance and Response

- **Routine Surveillance for 9 diseases and AMR**

- African Swine Fever (ASF)
- Bovine Spongiform Encephalopathy (BSE)
- Chronic Wasting Disease (CWD)
- Classical Swine Fever (CSF)
- Infectious salmon anemia virus (ISA)
- Scrapie
- Spring viremia of carp (SVC)
- Swine Influenza (IAV-S)
- Viral hemorrhagic septicemia virus (VHS)
- Antimicrobial Resistance (AMR)

- **Prepared to respond for 5 diseases**

- Avian Influenza (IAV-A)
- Foot and Mouth disease (FMD)
- Newcastle Disease (APMV-1)
- Pseudorabies (PRV)
- Vesicular Stomatitis virus (VSV)

<i>Disease/Agent</i>	<i>FY22</i>	<i>FY23</i>	<i># of NAHLN Laboratories Currently Approved for Testing</i>
	<i>Samples or Animals Tested</i>		
ASF	10,879	10,426	49
AMR	5,422	4,087	35
BSE	23,199	23,276	4
CSF	10,274	10,298	49
FMD	3,421	2,098	47
IAV-A Wildbird	38,455	29,683	57
IAV-S	8,805	23,871	45
PRV	43,395	53,838	26
SCRAPIE	23,114	20,462	18
SVA	2,221	1,754	10
vND	7,067	7,461	56
HPAI/LPAI	195,562	183,211	57
VSV	0	0	6



NAHLN Outbreak Response



- 2002-2003: Exotic Newcastle
- 2003, 2005, 2006, 2012, 2017, 2018: BSE
- 2014-2015: HPAI- formerly known as the largest outbreak in US history
- 2016: Three LPAI outbreaks IN, MO, NY/NJ/PA
- 2015: VSV- regional AZ, CO, NE, NM, SD, TX, UT, WY
- 2015: SECD- multiple states across the U
- 2017: HPAI- regional AL, GA, KY, TN
- 2018-2020: vNDV - CA, AZ
- 2018-2019: LPAI- CA
- 2019:VSV- CO, KS, NE, NM, OK, TX, UT, W
- 2020: LPAI- NC, SC
- 2020: VSV- AZ, AR, KS, MO, NE, NM, OK, TX
- 2020-21: SARS-CoV-2 - AL, CA, CO, CT, DE, FL, GA, HI, IL, IN, IA, KS, KY, LA, MI, MN, MO, MS, NE, NY, ND, OH, OK, OR, PA, SC, SD, TN, TX, UT, WA, WI, WY
- 2022-23: HPAI – Commercial poultry detections in all states except HI wild bird detections in all states except HI - largest outbreak in US history (**on-going**)
- 2023 : VSV – CA, NV, TX
- 2024: HPAI- Dairy cattle CO, ID, KS, MI, NM, NC, OH, SD, TX (**on-going**)





Network Activities

- Regular communication among NAHLN laboratories and NVSL
 - Weekly NAHLN Laboratory Response Calls

- Capacity evaluation for a sustained
 - Capacity = equipment + personnel + materials + number of shifts
 - 3 Personnel (24 personnel hours)
 - 1 Kingfisher (KF), 2 thermocyclers
 - One 8-hour shift = 1 unit
 - 1 unit can provide 3-4 plates/ shift = approx. 300-400 tests / shift

Capacity Needs of the NAHLN - HPAI



Current Outbreak: 2022-2024 High-Path Avian Influenza

- 56 NAHLN laboratories activated
- Almost 307,000 PCR completed has identified 1134 commercial/BY flocks in 48 states
- Laboratory capacity has not been exceeded
- Excellent relationship with vendors supporting the outbreak

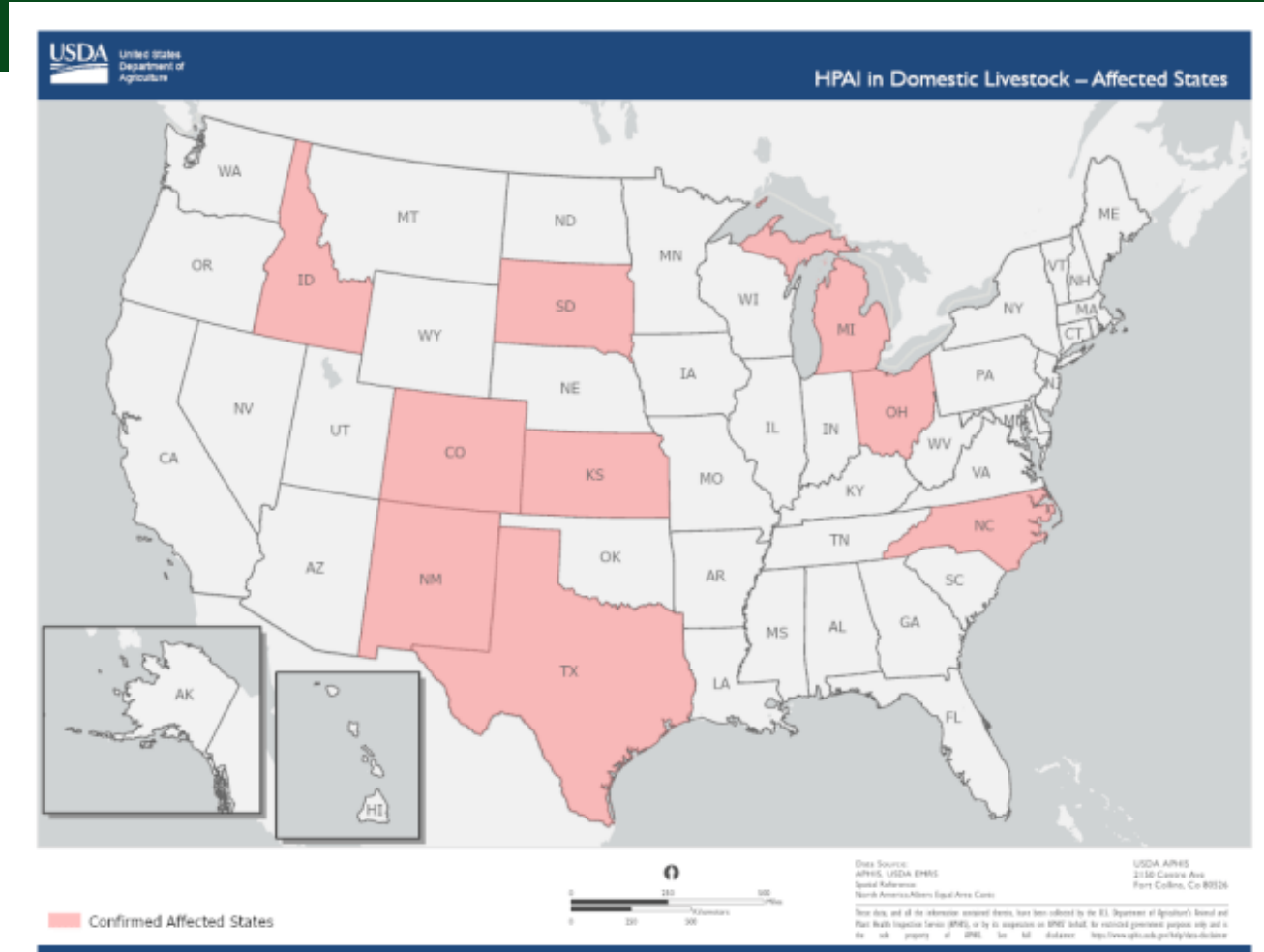
May 10, 2024

Capacity Needs of the NAHLN - HPAI



Current Outbreak: 2024 High-Path Avian Influenza in Dairy Cattle

- 56 NAHLN laboratories activated
- Almost 5000 PCR completed so far
- Laboratory capacity has not been exceeded but supplies and reagents are of concern given the short notice to our vendors



<https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/livestock>

Federal Order Requiring Testing for and Reporting of Highly Pathogenic Avian Influenza (HPAI) in Livestock

April 24, 2024

Mandatory Testing for Interstate Movement of Dairy Cattle

- Prior to interstate movement, dairy cattle are required to receive a negative test for Influenza A virus at an approved National Animal Health Laboratory Network (NAHLN) laboratory.
- Owners of herds in which dairy cattle test positive for interstate movement will be required to provide epidemiological information, including animal movement tracing.
- Dairy cattle moving interstate must adhere to conditions specified by APHIS.
- As will be described in forthcoming guidance, these steps will be immediately required for lactating dairy cattle, while these requirements for other classes of dairy cattle will be based on scientific factors concerning the virus and its evolving risk profile.

Mandatory Reporting

- Laboratories and state veterinarians must report positive Influenza A nucleic acid detection diagnostic results (e.g. PCR or genetic sequencing) in livestock to USDA APHIS.
- Laboratories and state veterinarians must report positive Influenza A serology diagnostic results in livestock to USDA APH



Testing Rabies Negative Cats for HPAI

Laboratory Submission Criteria

- Domestic cats submitted for rabies testing to state public health laboratories (PHL) or other state approved/contracted rabies labs:
 - Testing criteria – cat must test negative for rabies.
 - Brain swab or brain tissue.
 - A swab inserted in the brain tissue and then placed in viral transport media (i.e., BHI) is preferred for influenza testing.
 - State public health laboratories or state approved/contracted laboratories should forward samples to a state animal disease diagnostic laboratory, or a National Animal Health Laboratory Network (NAHLN) laboratory approved to test for avian influenza.
 - Any samples with non-negative influenza results must be submitted to NVSL for confirmation and sequencing.
 - Reimbursement for the testing will be provided by USDA if samples are tested at a NAHLN laboratory. Shipping costs are not included.

Public Health Criteria

- State Public Health should collect basic epidemiological information for cats to include:
 - Clinical signs/reason for rabies testing
 - Location of cat (county, state)
 - Age and sex of cat (if known)
 - Known cattle, raw milk, or poultry exposure

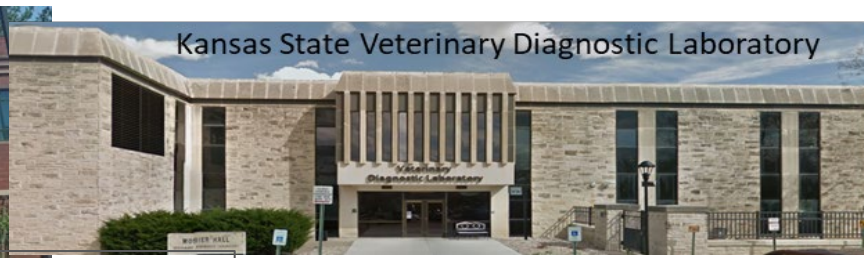


Georgia Poultry Laboratory Network



PENNSYLVANIA VETERINARY LABORATORY

2305



Kansas State Veterinary Diagnostic Laboratory



Bronson Animal Disease Diagnostic Laboratory



Colorado State University Veterinary Diagnostic Laboratory



University of Nebraska - University of Nebraska Veterinary



Virginia Tech Animal Laboratory Services



Alabama Department of Agriculture and Industries -
Thompson-Bishop-Sparks State Diagnostic



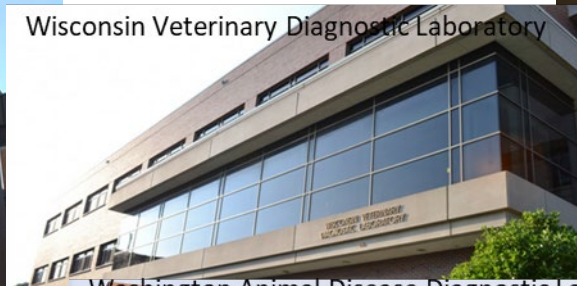
California Animal Health & Food Safety Laboratory University of California



Animal Health Diagnostic Center, Cornell University



Wyoming Game and Fish
Wildlife Health Laboratory



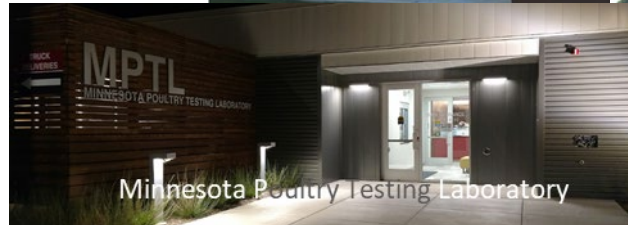
Wisconsin Veterinary Diagnostic Laboratory



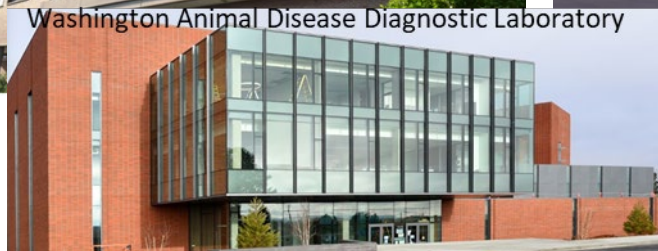
Texas A&M Veterinary Medical Diagnostic Laboratory - College Station



USGS National Wildlife Health Center



Minnesota Poultry Testing Laboratory



Washington Animal Disease Diagnostic Laboratory



South Dakota State University, Animal Disease Research
& Diagnostic Laboratory



Thank you!

**Christina Loiacono, DVM, PhD, Dip. ACVP
NAHLN Coordinator**

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