



OADDL
College of Veterinary Medicine

2022 ANNUAL REPORT



Diagnostic Excellence SINCE 1975

TABLE OF CONTENTS

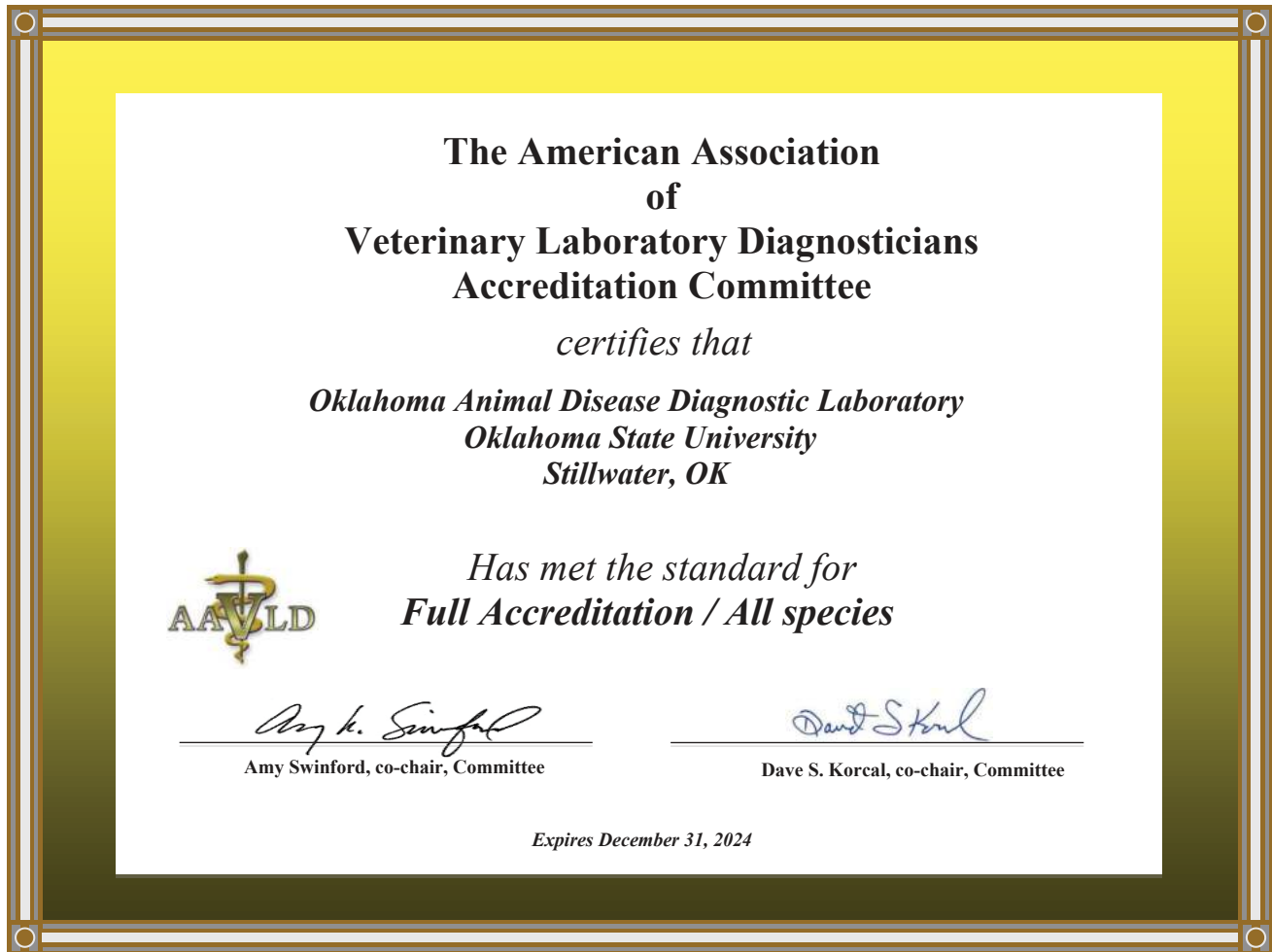
Accreditation; Mission Statement; Vision Statement	1
Message from the Director	2
What Our Stakeholders Say About Us	3
Services, Involvement and Resources	4
Client Service Beyond Business Hours: CY 2022	4
Counties of Oklahoma Served	5
States Served	6
NAHLN Membership and Vet-LIRN Participation	7
New Tests Introduced	8
Service to the Oklahoma Horse Racing Commission	9
Funding Sources	10
Funded Contracts and Grants	10
Quality System: Proficiency Testing	11
2022 Statistical Data	12
Surveillance and Reportable Disease Testing: 4-Year Trend	12
Prevalence of Major Disease Agents in Diagnostic Samples	16
Antimicrobial Susceptibility Profiles: Bovines and Canines	18
Accessions and General Testing: 5-Year Trend	20
Accessions by Species: 5-Year Trend	21
Accessions by Laboratory Unit: 5-Year Trend	22
Test Numbers by Laboratory Unit	23
Microbiology:	24
<i>Mycology and Mycoplasmaology: 5-Year Test Trend</i>	24
<i>Bacteriology Test Packages: 5-Year Test Trend</i>	25
<i>Bacteriology: 5-Year Test Trend</i>	26
Molecular Diagnostics:	27
<i>Panels: 4-Year Test Trend</i>	27
<i>Molecular Diagnostics: 5-Year Test Trend</i>	27
Parasitology: 2-Year Test Trend	30
Pathology	31
<i>Necropsy: 5-Year Test Trend</i>	31
<i>Miscellaneous Necropsy Data</i>	32
<i>Histology: 5-Year Test Trend</i>	33
<i>Miscellaneous Biopsy-Related Data</i>	34
Serology:	36
<i>Panels and Profiles: 5-Year Test Trend</i>	36
<i>Serology: 5-Year Test Trend</i>	37
<i>Rabies Testing: 5-Year Trend</i>	40
<i>Rabies Testing by Species: CY 2022</i>	41
Outsourced Testing: 4-Year Test Trend	42
Toxicology: 5-Year Test Trend	43
Test-Related Supplies Sent to Clients: 5-Year Trend	44
OADDL Board of Advisors	45
Personnel: OADDL Administration, Faculty, Pathology Residents and Staff	46
Instruction of Vet Med and OSU Students	48
Awards, Honors, Certifications	48
Outreach and Presentations to the Public and Clients	49
Attendance at Meetings	50
Posters, Scientific Presentations, Scientific Publications	51
Glossary	56

Cover photos courtesy of Oklahoma State University.

ACCREDITATION

The Oklahoma Animal Disease Diagnostic Laboratory is accredited as a full service laboratory for all species by the American Association of Veterinary Laboratory Diagnosticians (AAVLD).

Current certification expires December 31, 2024.



MISSION STATEMENT

The Oklahoma Animal Disease Diagnostic Laboratory promotes the overall well-being of animal health through diagnostic testing, instruction of professional veterinary students, and research in diseases of economic importance to Oklahoma and beyond.

VISION STATEMENT

The Oklahoma Animal Disease Diagnostic Laboratory will be recognized as a leader in veterinary diagnostics through excellence in diagnostic service, research efforts leading to improved animal disease testing and surveillance, and sustained accreditation by the American Association of Veterinary Laboratory Diagnosticians.

MESSAGE FROM THE DIRECTOR

We are pleased to share with you our 2022 annual report. Last year was another great year of productivity and expansion for OADDL and we remain in a strong position heading into 2023, despite headwinds from inflation and hiring/retention difficulties. We want to thank all our stakeholders – practitioners, animal owners, agriculture industries, teaching hospital clinicians, researchers, industry clients – for your continuous partnership with us as we work hard to maintain timely and accurate services to you. A special thanks to the hardworking staff and faculty of OADDL and the Department of Veterinary Pathobiology for your continuous diligence and client-focused services. Noteworthy activities and accomplishments in 2022 include:

- Implementation of automated reporting of Oklahoma reportable diseases to the State Veterinarian and State Public Health Veterinarian.
- OADDL was activated for HPAI testing and our ability to conduct same-day testing on index cases allowed for rapid diagnosis and remediation in

commercial flocks.

- Addition of FedEx as a carrier for our discounted pre-paid shipping method for sending samples to OADDL.
- Testing mosquito pools for surveillance of West Nile virus across the state, under the sponsorship of the Oklahoma State Department of Health.

We look forward to 2023 with excitement to continue to meet your needs by providing you with timely and accurate results. Once more, thank you for your continuous support. Enjoy the report!



**Jerry T. Saliki, DVM,
PhD, DACVM**

Professor and Director

WHAT OUR STAKEHOLDERS SAY ABOUT US

I apologize for my client's lack of preparation. You guys are awesome! Thank you so much.

– DR. CARLY TURNER,
LAZY E RANCH

I have the utmost esteem of OADDL. I practiced as it was being formed and benefited greatly from the services and the dedicated staff. I wish everyone the best and hope that you will be able to retire when you are ready as I have. My final wish is for continued robust funding.”

– DR. GARY DETRICH,
CIMARRON VALLEY ANIMAL CLINIC

I greatly appreciate all the work you, and the entire staff, do there at OADDL.

– JERROD DAVIS

The OADDL E-News was the best that I have ever read. Please let everyone know what a great job everyone is doing.

– DR. BARRY WHITWORTH

Happy 20th anniversary! We could not have done it without you all!”

– THE NATIONAL ANIMAL
HEALTH LABORATORY
NETWORK (NAHLN)
PROGRAM OFFICE

The owners were very grateful to receive her paw print in the mail. They said thank you for being able to get one made for them.

– PRECIOUS PETS

COMMENTS FROM MARCH 2022 CLIENT SURVEY

- Looks like **I need to explore their services again**. I changed labs many years ago for routine services because they were way more expensive than competitors. I haven't look at what is available/cost for routine services in a long time.
- Keep up the **great service**.
- **Wonderful service, personnel, results**.
- Thank you for your **constant attention to service**.
- OADDL personnel do a **great job of working with our vet clinic**. Much appreciated.
- Employees are great. **Friendly and always learn something**. Will keep coming back. Great service.
- I don't use your services often. Just for necropsy on occasion. Have **always had a good experience**.
- Turnaround time on results is **really good!**
- You guys are **awesome**.

ANONYMOUS COMMENTS

Thank you isn't enough. Please tell everyone who stayed late how much we appreciate them!

Thank you again for your help with this - your lab solved a big mystery that our local vets were not able to catch!

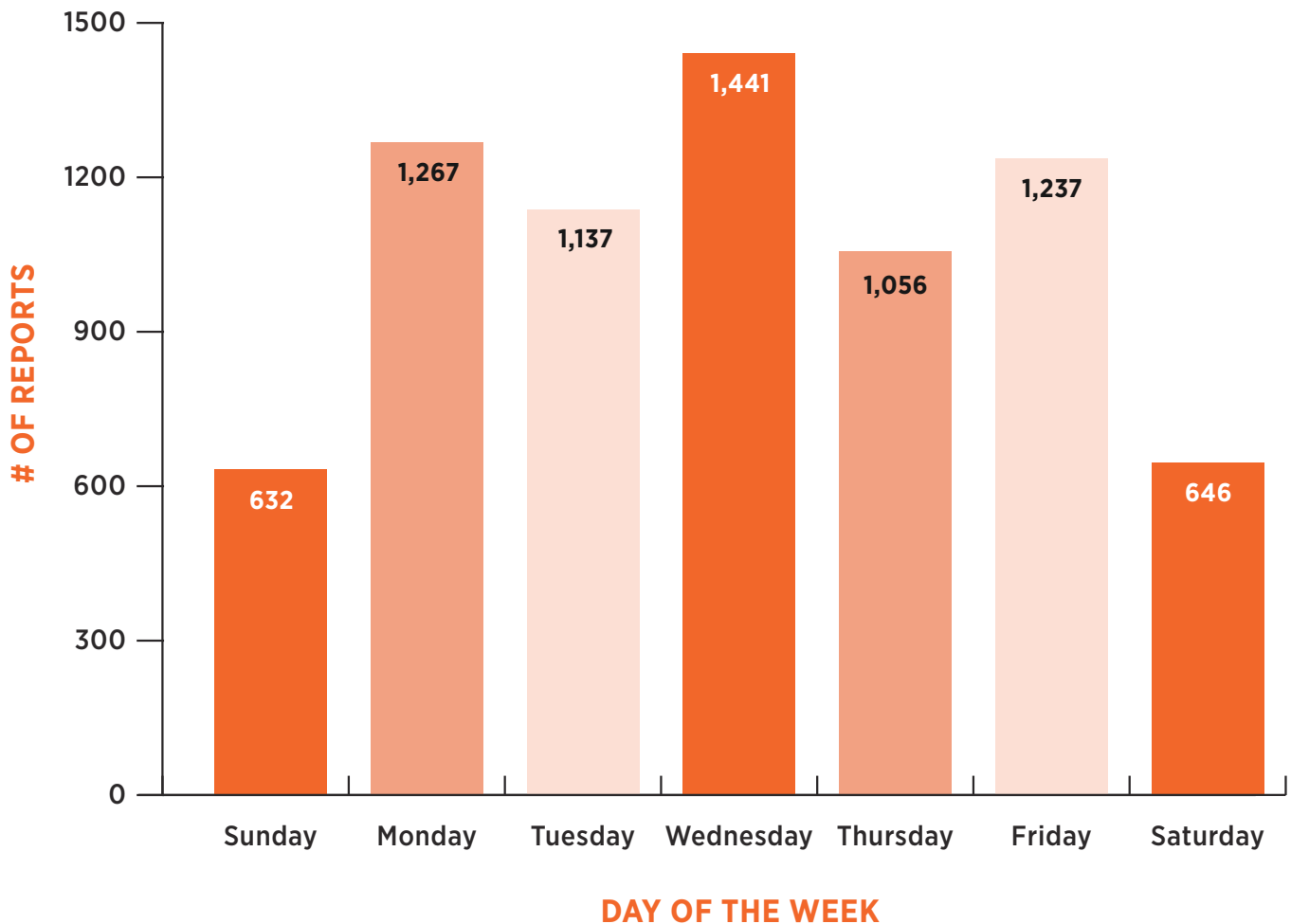
...working with XXX Lab, let me say Oklahoma really does have it together and you guys are truly amazing. We are so blessed to have such a great working relationship.

Thanks for all your work and I feel I should convey to any parties concerned, the professionalism and kind nature of everyone I have dealt with up there is second to none. Keep up the good work and thank you.

CLIENT SERVICE BEYOND BUSINESS HOURS

CY 2022

NUMBER OF AFTER-HOUR REPORTS



TOTAL NUMBER OF AFTER-HOUR REPORTS IN 2022: 7,416

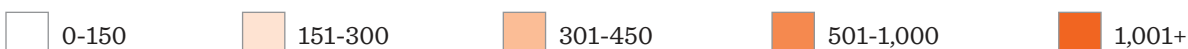
COUNTIES OF OKLAHOMA SERVED

CY 2022

COUNTY	# OF ACCESSIONS
Adair	143
Alfalfa	87
Atoka	117
Beaver	64
Beckham	222
Blaine	144
Bryan	271
Caddo	159
Canadian	317
Carter	291
Cherokee	102
Choctaw	190
Cimarron	2
Cleveland	623
Coal	58
Comanche	253
Cotton	97
Craig	61
Creek	332
Custer	109
Delaware	51
Dewey	137
Ellis	103
Garfield	1,325
Garvin	334
Grady	218
Grant	158
Greer	43
Harmon	153
Harper	75

COUNTY	# OF ACCESSIONS
Haskell	162
Hughes	538
Jackson	136
Jefferson	184
Johnston	41
Kay	339
Kingfisher	156
Kiowa	145
Latimer	215
Le Flore	201
Lincoln	1,019
Logan	587
Love	42
Major	102
Marshall	145
Mayes	192
McClain	675
McCurtain	139
McIntosh	131
Murray	92
Muskogee	207
Noble	383
Nowata	50
Okfuskee	111
Oklahoma	2,297
Okmulgee	303
Osage	187
Ottawa	140
Pawnee	207
Payne	5,981

COUNTY	# OF ACCESSIONS
Pittsburg	235
Pontatoc	191
Pottawatomie	287
Pushmataha	35
Roger Mills	80
Rogers	442
Seminole	84
Sequoyah	608
Stephens	453
Texas	559
Tillman	15
Tulsa	989
Wagoner	387
Washington	192
Washita	65
Woods	35
Woodward	46



STATES SERVED

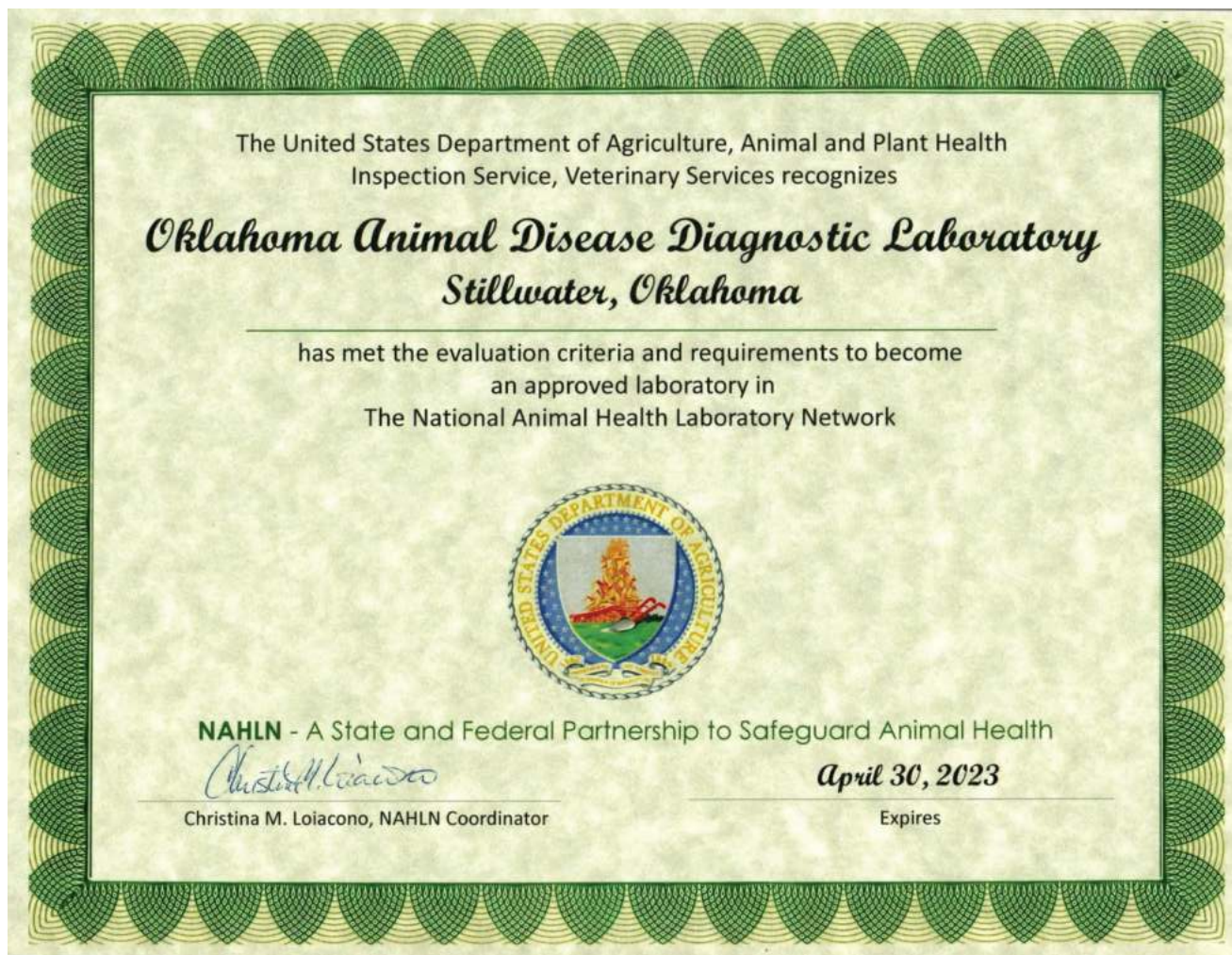
CY 2022

STATE	# OF ACCESSIONS
AL	6
AR	1,263
AZ	17
CA	34
CO	96
CT	12
FL	236
GA	1
IA	71
ID	6
IL	34
IN	2
KS	275
KY	8
LA	2
MD	20
MI	5
MN	89
MO	195
MS	3
MT	1
NC	53
ND	5
NE	8

STATE	# OF ACCESSIONS
NM	18
NV	1
NY	9
OH	83
OK	19,640
OR	1
PA	35
SC	7
SD	6
TN	11
TX	1,351
UT	4
VA	19
VT	1
WA	11
WI	2
WY	2



NAHLN MEMBERSHIP AND VET-LIRN PARTICIPATION



NAHLN MEMBERSHIP

In 2022, OADDL undertook the following activities in support of the NAHLN's missions:

- Participated in 2022 Foreign Animal Disease Investigation (FADI) in the Laboratory Exercise.

VET-LIRN MEMBERSHIP

OADDL participates in the Veterinary Laboratory Investigation and Response Network (Vet-LIRN) - a network of animal health diagnostic laboratories that assist the U.S. Food and Drug Administration (FDA) in investigating potential problems with regulated animal feeds and drugs. OADDL is currently in the second year of a 5-Year cooperative grant in support of the lab's participation in Vet-LIRN. Activities in support of Vet-LIRN in 2022 include:

- Submission of bacterial isolates for FDA antimicrobial resistance study.
- Participation in a collaborative genome sequencing project.

NEW TESTS INTRODUCED

CY 2022

MOLECULAR DIAGNOSTICS

Mosquito Identification and WNV PCR

Samples: mosquitoes

Test Fee: \$85.00

TAT: Samples are batched; testing occurs every 1-2 weeks

PARASITOLOGY

Mini-FLOTAC/Fecal Egg Count

Samples: 4 grams fresh feces each animal

Test Fee: \$20.00

TAT: Same business day

SERVICE TO THE OKLAHOMA HORSE RACING COMMISSION



OADDL maintains an annually renewable service contract with the Oklahoma Horse Racing Commission (OHRC).

The service provided is to conduct complete necropsies of all horses that die or are euthanized at OHRC-licensed racetracks: Remington Park, Will Rogers Downs, and Fair Meadows. Additionally, drug screens are pursued when indicated. This service falls under the recommendation of the American Association of Equine Practitioners (AAEP) to not only detail the pathologic findings in each case but to provide a database for epidemiological studies.

The data is used in part to identify the catastrophic musculoskeletal injury (CMI) index, a number representing the rate of fatal musculoskeletal injuries to the number of horses that race. This Oklahoma-specific CMI can then be compared to the national rate of fatal injuries. Forty-five horses were submitted to OADDL for necropsy during calendar year 2022. This is similar to the number of horses submitted each year for the past four years. The specifics for each case are compiled to describe the injuries, both musculoskeletal and non-musculoskeletal. From this data,



Photos By: Dustin Orona Photography

attempts can be made to determine the cause of the injuries and possibly develop prevention strategies. Additionally, injury and fatality patterns may be detected that could prompt more thorough investigation by the OHRC. This collaboration between OADDL and OHRC helps enhance Oklahoma's equine racing industry, while assuring continual improvement in equine welfare.

FUNDING SOURCES

STATE FUNDING

\$1,498,031

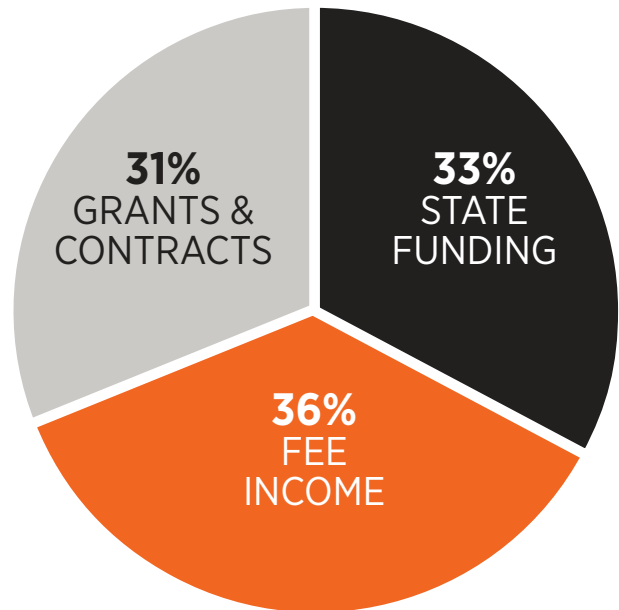
FEE INCOME

\$1,632,305

GRANTS & CONTRACTS

\$1,376,111

TOTAL: \$4,506,448



OADDL FUNDED CONTRACTS AND GRANTS

- NAHLN Level 1 Laboratory funding, OADDL: \$250,000
- Oklahoma Horse Racing Commission-renewed annual contract; fee-for-service
- Oklahoma State Department of Health: animal rabies testing for the state of Oklahoma FY23 - \$107,646.
- VET-LIRN FDA 5-Year Grant Award: \$ 190,570 (FY 2023: \$55,160); **Ramachandran, A**
- Development of a molecular point-of-care diagnostic test and a mapping platform for Foot and mouth disease (FMD) detection and tracking (FY22-24: \$440,289); **Ramachandran A.**
- Increasing capacity to handle surge samples through online submissions and elimination of the manual sample data entry step in the laboratory (FY22-24: \$360,078); **Saliki J.**

QUALITY SYSTEM: PROFICIENCY TESTING

CY 2022 PROFICIENCY TEST	AGENCY	LAB SECTION*
IBQAS **	AAVLD	Bacteriology (Lab-wide)
African Swine Fever (ASF) Real-Time PCR	NAHLN	Molecular Diagnostics (5)
Anaplasmosis ELISA	USDA	Serology (Lab-wide)
Antimicrobial Susceptibility Proficiency Test	NAHLN	Bacteriology (Lab-wide)
Avian Influenza AGID	USDA	results pending
Avian Influenza ELISA	USDA	results pending
Avian Influenza (AIV) Real-Time PCR	NAHLN	Molecular Diagnostics (6)
Avian Paramyxovirus Type 1 Real-Time PCR	NAHLN	Molecular Diagnostics (6)
Brucella abortus Card	USDA	Serology (4)
Brucella abortus FPA	USDA	Serology (4)
<i>Classic Swine Fever (CSF) Real-Time PCR</i>	NAHLN	Molecular Diagnostics (7)
<i>Equine Infectious Anemia (EIA) ELISA</i>	USDA	Serology (Lab-wide)
Foot and Mouth Disease Virus Real-Time PCR	NAHLN	Molecular Diagnostics (7)
Johne's Disease ELISA	USDA	Serology (Lab-wide)
Johne's Real-Time Direct PCR	USDA	Molecular Diagnostics (Lab-wide)
Johne's Real-Time Pooled Direct PCR	USDA	Molecular Diagnostics (Lab-wide)
Lepto MAT	USDA	Serology (3)
MS/MG ELISA ***	PDRC****	Serology (Lab-wide)
MS/MG PCR ***	PDRC****	Molecular Diagnostics (Lab-wide)
NPIP Salmonella Group D Culture	NPIP	Bacteriology (Lab-wide)
Pseudorabies gB ELISA	USDA	Serology (5)
Rabies Direct Fluorescent Antibody (DFA)	WSLH ‡	Serology (4)
Swine Influenza Virus (SIV) Real-Time PCR	NAHLN	Molecular Diagnostics (6)

* (Lab-wide) indicates the laboratory is certified. (#) indicates the number of individuals authorized.

** Internal Bacteriology Quality Assurance Survey

*** *Mycoplasma synoviae* and *Mycoplasma gallisepticum*

**** Poultry Diagnostic and Research Center

‡ Wisconsin State Laboratory of Hygiene

SURVEILLANCE AND REPORTABLE DISEASE TESTING

4-YEAR TREND

SURVEILLANCE AND REPORTABLE DISEASE TESTING	CALENDAR YEAR			
	2019	2020	2021	2022
African Swine Fever (ASF) PCR ‡	4	7	0	0
Avian Influenza				
Avian Influenza ELISA	1,995	2,610	2,734	2,731
Avian Influenza PCR ‡	183	196	243	763
Avian Influenza Agar Gel Immunodiffusion (AGID) *	11	6	2	2
Avian Paramyxovirus-1 (END) PCR ‡	223	119	62	80
<i>Bacillus anthracis</i> Culture	7	4	29	2
Bluetongue Disease				
Bluetongue c-ELISA	33	38	140	138
Bluetongue AGID *	13	45	1	0
Bluetongue Virus PCR *	91	48	33	59
Bluetongue Virus VI *	11	0	0	0
<i>Brucella</i> spp.				
<i>Brucella abortus</i> BAPA *	22	58	154	23
<i>Brucella abortus</i> Card Agglutination Test	4,399	4,327	5,297	5,012
<i>Brucella abortus</i> Complement Fixation (CF) *	33	12	0	0
<i>Brucella abortus</i> RAP *	4	0	0	0
<i>Brucella abortus</i> Standard Plate *	4	9	4	2
<i>Brucella abortus</i> Fluorescent Polarization Assay (FPA)	1	1,665	3,441	3,668
<i>Brucella canis</i> AGID *	1	2	0	25
<i>Brucella canis</i> Card Test	251	234	261	24
<i>Brucella canis</i> IFA	19	37	36	395
<i>Brucella canis</i> 2-Mercaptoethanol Tube Agglutination *	1	2	0	11
<i>Brucella melitensis</i> Card Test *	19	20	5	34
<i>Brucella ovis</i> ELISA *	20	17	11	31
<i>Brucella</i> spp. Culture	76	59	57	66
<i>Brucella</i> spp. PCR *	3	2	1	0
Chronic Wasting Disease (CWD) IHC PrP *	8	3	0	0
Classical Swine Fever (CSF) PCR ‡	4	7	0	0

* Includes In-house and Referral Laboratory testing
‡ NAHLN Messaging Testing

SURVEILLANCE AND REPORTABLE DISEASE TESTING (CONTINUED)

4-YEAR TREND

SURVEILLANCE AND REPORTABLE DISEASE TESTING	CALENDAR YEAR			
	2019	2020	2021	2022
<i>Coxiella burnetii</i> (Q-Fever)				
<i>Coxiella burnetii</i> (Q-Fever) Complement Fixation (CF) *	10	1	0	15
<i>Coxiella burnetii</i> (Q-Fever) c-ELISA *	12	2	4	6
<i>Coxiella burnetii</i> (Q-Fever) IFA *	0	1	0	0
<i>Coxiella burnetii</i> (Q-Fever) PCR *	17	7	2	24
Eastern Equine Encephalomyelitis (EEE) IgM Capture ELISA *	28	16	24	33
Equine Infectious Anemia (EIA)				
Equine Infectious Anemia c-ELISA	2,155	1,994	2,436	2,787
Equine Infectious Anemia AGID			1	0
Equine Infectious Anemia PCR *	1	0	0	0
Epizootic Hemorrhagic Disease (EHD) PCR *	21	1	0	7
Equine Herpesvirus				
Equine Herpesvirus 1 (EHV-1) Real-Time PCR	1,189	211	84	100
Equine Herpesvirus 4 (EHV-4) PCR	6	4	8	15
Equine Herpesvirus SN and VN *	1	5	4	7
Equine Piroplasmiasis				
<i>Babesia caballi</i> c-ELISA	200	259	289	516
<i>Theileria (Babesia) equi</i> c-ELISA	264	400	505	1,365
Equine Viral Arteritis (EVA) Virus				
Equine Viral Arteritis (EVA) PCR *	15	19	16	16
Equine Viral Arteritis (EVA) Virus Isolation *	16	2	0	0
Equine Viral Arteritis (EVA) SN and VN *	72	64	41	39
<i>Francisella tularensis</i> (Tularemia)				
Tularemia PCR	6	3	21	9
Tularemia Plate Agglutination Test *	6		4	48
Foot & Mouth Disease Virus Real-Time PCR ‡	10	6	2	0
Infectious Laryngotracheitis (ILT)				
Infectious Laryngotracheitis ELISA *	1	0	0	0
Infectious Laryngotracheitis Real-Time PCR *		3	1	2

* Includes In-house and Referral Laboratory testing
‡ NAHLN Messaging Testing

SURVEILLANCE AND REPORTABLE DISEASE TESTING (CONTINUED)

4-YEAR TREND

SURVEILLANCE AND REPORTABLE DISEASE TESTING	CALENDAR YEAR			
	2019	2020	2021	2022
Johne's Disease				
Johne's Disease Complement Fixation (CF) *	13	3	0	0
Johne's Direct Fecal Real-Time PCR (single and pooled)	267	328	172	106
Johne's Disease ELISA	2,354	2,704	2,673	1,935
Leptospirosis-canine				
<i>Leptospira</i> Microscopic Agglutination Test (canine)	53	25	32	19
<i>Leptospira</i> sp. Real-Time PCR (canine) *	19	9	10	4
Mycoplasma spp. (avian)				
<i>Mycoplasma gallisepticum</i> / <i>Mycoplasma synoviae</i> ELISA	18,445	21,599	23,705	24,712
<i>Mycoplasma gallisepticum</i> / <i>Mycoplasma synoviae</i> PCR (single)	11	8	8	11
<i>Mycoplasma gallisepticum</i> / <i>Mycoplasma synoviae</i> PCR (pooled)	33	43	1	0
<i>Mycoplasma gallisepticum</i> Hemagglutination Inhibition	318	216	161	161
<i>Mycoplasma synoviae</i> Hemagglutination Inhibition	318	216	161	161
Porcine Reproductive and Respiratory Syndrome Virus (PRRSV)				
PRRSV ELISA *	49	1,676	3,637	3,441
PRRSV Real-Time PCR (single and pooled samples) *	7,524	10,016	7,009	7,886
Pseudorabies Virus				
Pseudorabies gB and g1 ELISA *‡	3,647	5,462	7,958	8,313
Pseudorabies PCR *	4	7	4	2
Rabies dFA *				
	59	53	250	717
Salmonella spp.				
<i>Salmonella</i> spp. Culture	268	222	198	296
<i>Salmonella pullorum</i> Agglutination-Rapid Serum Test	1	0	0	0
<i>Salmonella pullorum</i> Microagglutination Titer	2	0	6	8
<i>Salmonella pullorum/typhoid</i> Microagglutination Screen	18,302	21,957	23,700	25,200
<i>Salmonella pullorum</i> Screening (NPIP culture)	32	6	5	33
SARS (CoV-2) N1 and N2 Gene Real-Time PCR ‡		22	44	12

* Includes In-house and Referral Laboratory testing

‡ NAHLN Messaging Testing

SURVEILLANCE AND REPORTABLE DISEASE TESTING (CONTINUED)

4-YEAR TREND

SURVEILLANCE AND REPORTABLE DISEASE TESTING	CALENDAR YEAR			
	2019	2020	2021	2022
<i>Streptococcus equi</i> PCR	40	20	42	45
Swine Influenza Virus (SIV)				
Swine Influenza Virus (SIV) PCR-Domestic Swine ‡	3	4	0	1
Swine Influenza Virus (SIV) PCR (single and pooled samples) *	3,303	3,093	1,589	753
<i>Tritrichomonas foetus</i>				
<i>T. foetus</i> Real-Time PCR (single and pooled samples)	7,517	6,597	6,525	6,344
<i>Tritrichomonas foetus</i> Culture	6	46	2	0
Vesicular Stomatitis Virus				
Vesicular Stomatitis Virus Neutralization-Indiana *	42	37	14	28
Vesicular Stomatitis Virus Neutralization-New Jersey *	42	37	14	28
West Nile Virus				
West Nile Virus IgM Capture ELISA *	37	23	43	41
West Nile Virus PCR *	2	1	0	4
Total Number of Tests	74,177	86,955	93,916	98,316

* Includes In-house and Referral Laboratory testing

‡ NAHLN Messaging Testing

PREVALENCE OF MAJOR DISEASE AGENTS IN DIAGNOSTIC SAMPLES

CY 2022

DISEASE PREVALENCE BY SPECIES

INTERPRETIVE NOTES:

1. This data includes only agent detection or antibody test results that indicate current infection with the disease agent as opposed to any antibody tests, which simply indicate exposure to the disease agent or vaccination.
2. The prevalence numbers shown here indicate only the prevalence in the diagnostic samples tested and not prevalence of the diseases in the general animal population.

EQUINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
Equine Herpesvirus Type-1 PCR	82	0%
Leptospirosis MAT	57	67%
Leptospirosis PCR	6	0%
Rabies Direct FA	30	10%
<i>Salmonella</i> spp. Culture	49	22%

CAPRINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
BRSV PCR	0	N/A
BVDV ELISA	0	N/A
BVDV PCR	22	0%
CAE ELISA	522	4%
Johne's Disease ELISA	735	1%
Johne's Disease PCR	9	44%
Leptospirosis MAT	34	0%
Leptospirosis PCR	2	0%
Rabies Direct FA	5	0%

OVINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
BVDV ELISA	2	0%
BVDV PCR	6	0%
CAE cELISA	45	4%
Johne's Disease ELISA	221	2%
Johne's Disease PCR	4	25%
Rabies Direct FA	1	0%

CANINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
Canine Distemper Virus PCR	29	52%
Leptospirosis MAT	18	56%
Leptospirosis PCR	4	0%
Parvovirus PCR	138	20%
Rabies Direct FA	291	1%

FELINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
Cytauxzoonosis	16	44%
Rabies Direct FA	165	1%
Tritrichomoniasis PCR	8	0%

PREVALENCE OF MAJOR DISEASE AGENTS IN DIAGNOSTIC SAMPLES (CONTINUED)

CY 2022

BOVINE DISEASES

DISEASE	# OF TESTS	% POSITIVE
Anaplasmosis cELISA	548	34%
Anaplasmosis PCR	77	38%
<i>Bibersteinia trehalosi</i> Culture	118	6%
BLV PCR	1	100%
BRSV PCR	71	23%
BVDV ELISA	2,515	1%
BVDV PCR	71	15%
Coronavirus PCR	97	3%
<i>Histophilus somni</i> Culture	118	21%
IBR PCR	72	2%
Johne's Disease ELISA	1,081	7%
Johne's Disease PCR	100	34%
Leptospirosis MAT	186	65%
Leptospirosis PCR	11	0%
<i>Mannheimia haemolytica</i> Culture	118	25%
<i>Mycoplasma bovis</i> PCR	72	60%
<i>Pasteurella multocida</i> Culture	118	10%
Rabies Direct FA	36	8%
<i>Salmonella</i> spp. Culture	42	5%
Trichostrongylosis PCR	12,219	0.3%
<i>Trueperella pyogenes</i> Culture	118	8%

AVIAN DISEASES

DISEASE	# OF TESTS	% POSITIVE
Avian Influenza ELISA	82	0%
Avian Influenza PCR	763	0.3%
<i>Mycoplasma gallisepticum</i> / <i>Mycoplasma synoviae</i> ELISA	24,712	N/A
<i>Mycoplasma gallisepticum</i> Hemagglutination Inhibition Test	161	0%
<i>Mycoplasma gallisepticum</i> PCR	11	0%
<i>Mycoplasma synoviae</i> Hemagglutination Inhibition Test	161	0%
<i>Mycoplasma synoviae</i> PCR	11	0%
<i>Salmonella</i> spp. Culture	154	0%
<i>Salmonella pullorum</i> Microagglutination Titer	8	25%
<i>Salmonella pullorum/typhoid</i> Microagglutination Screen	25,200	N/A

ANTIMICROBIAL SUSCEPTIBILITY PROFILES: BOVINES AND CANINES

CY 2022

NOTE: Data reported as: % susceptible (# isolates tested)

BOVINES

ANTIBIOTIC	<i>Mannheimia haemolytica</i>	<i>Histophilus somni</i>	<i>Pasteurella multocida</i>
Ceftiofur	100% (18)	100% (18)	100% (8)
Danofloxacin	56% (18)	67% (18)	100% (8)
Enrofloxacin	44% (18)	67% (18)	100% (8)
Florfenicol	83% (18)	72% (18)	75% (8)
Gamithromycin	45% (11)	50% (14)	50% (6)
Penicillin	67% (18)	78% (18)	88% (8)
Spectinomycin	67% (18)	39% (18)	50% (8)
Tetracycline	27% (11)	43% (14)	50% (6)
Tildipirosin	82% (11)	100% (14)	83% (6)
Tilmicosin	44% (18)	33% (18)	50% (8)
Tulathromycin	50% (18)	50% (18)	63% (8)

CANINES

ANTIBIOTIC	URINE		EARS		SKIN & WOUNDS
	<i>Escherichia coli</i>	<i>Staph. pseudintermedius</i>	<i>Pseudomonas aeruginosa</i>	<i>Staph. pseudintermedius</i>	<i>Staph. pseudintermedius</i>
Amikacin	100% (44)	100% (15)	69% (13)	100% (21)	100% (16)
Amoxicillin/ Clavulanic Acid	89% (44)	87% (15)	0% (13)	81% (21)	50% (16)
Ampicillin	75% (44)	33% (15)	0% (13)	29% (21)	25% (16)
Cefalexin	89% (44)				
Cefazolin	86% (44)	87% (15)	0% (13)	81% (21)	50% (16)
Cefovecin	86% (44)	87% (15)		81% (21)	50% (16)
Cefpodoxime	89% (44)	87% (15)		81% (21)	50% (16)
Ceftazidime	91% (44)		92% (13)		
Cephalothin		87% (15)		81% (21)	50% (16)
Chloramphenicol	82% (44)	93% (15)	0% (13)	86% (21)	50% (16)

ANTIMICROBIAL SUSCEPTIBILITY PROFILES: BOVINES AND CANINES (CONTINUED)

CY 2022

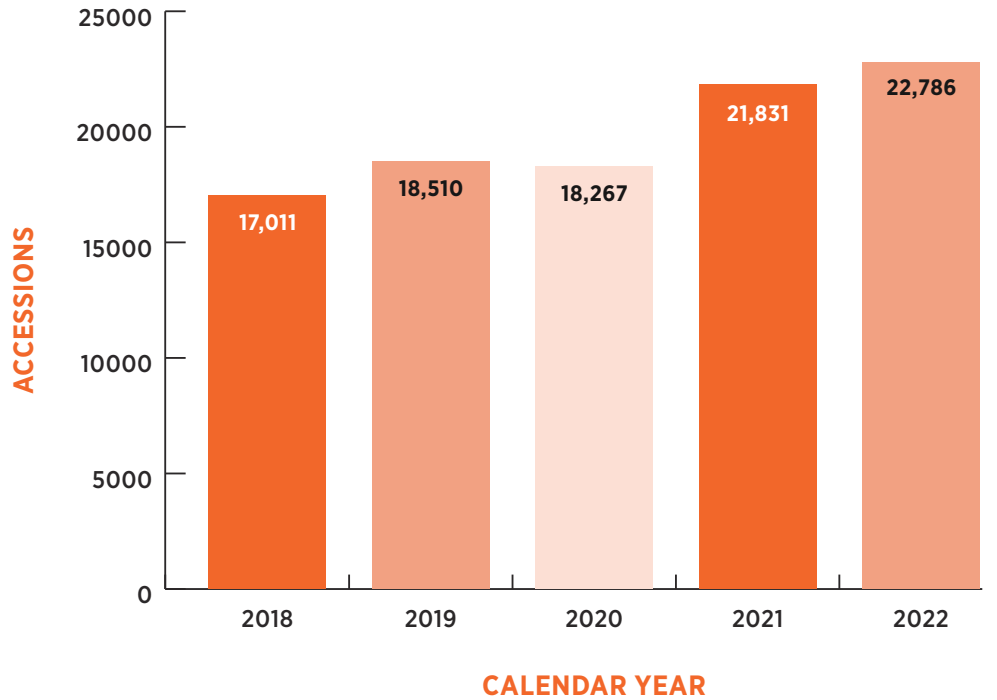
CANINES (CONTINUED)

ANTIBIOTIC	URINE		EARS		SKIN & WOUNDS
	<i>Escherichia coli</i>	<i>Staph. pseudintermedius</i>	<i>Pseudomonas aeruginosa</i>	<i>Staph. pseudintermedius</i>	<i>Staph. pseudintermedius</i>
Clindamycin		87% (15)		76% (21)	44% (16)
Doxycycline	84% (44)		0% (13)		
Enrofloxacin	86% (44)	73% (15)		57% (21)	44% (16)
Erythromycin		87% (15)		76% (21)	44% (16)
Gentamicin	93% (44)	80% (15)	69% (13)	71% (21)	44% (16)
Imipenem	100% (44)	87% (15)	77% (13)	81% (21)	50% (16)
Marbofloxacin	89% (44)	87% (15)		62% (21)	50% (16)
Minocycline		60% (15)		48% (21)	50% (16)
Nitrofurantoin		100% (15)		95% (21)	100% (16)
Orbifloxacin	86% (44)				
Oxacillin + 2% NaCl		87% (15)		81% (21)	50% (16)
Penicillin		27% (15)		29% (21)	25% (16)
Piperacillin/ Tazobactam	98% (44)		77% (13)		
Pradofloxacin	89% (44)	33% (15)		29% (21)	31% (16)
Rifampin		100% (15)		100% (21)	94% (16)
Tetracycline	84% (44)	67% (15)	0% (13)	48% (21)	44% (16)
Trimethoprim/ Sulfamethoxazole	89% (44)	87% (15)	0% (13)	62% (21)	50% (16)
Vancomycin		100% (15)		100% (21)	100% (16)

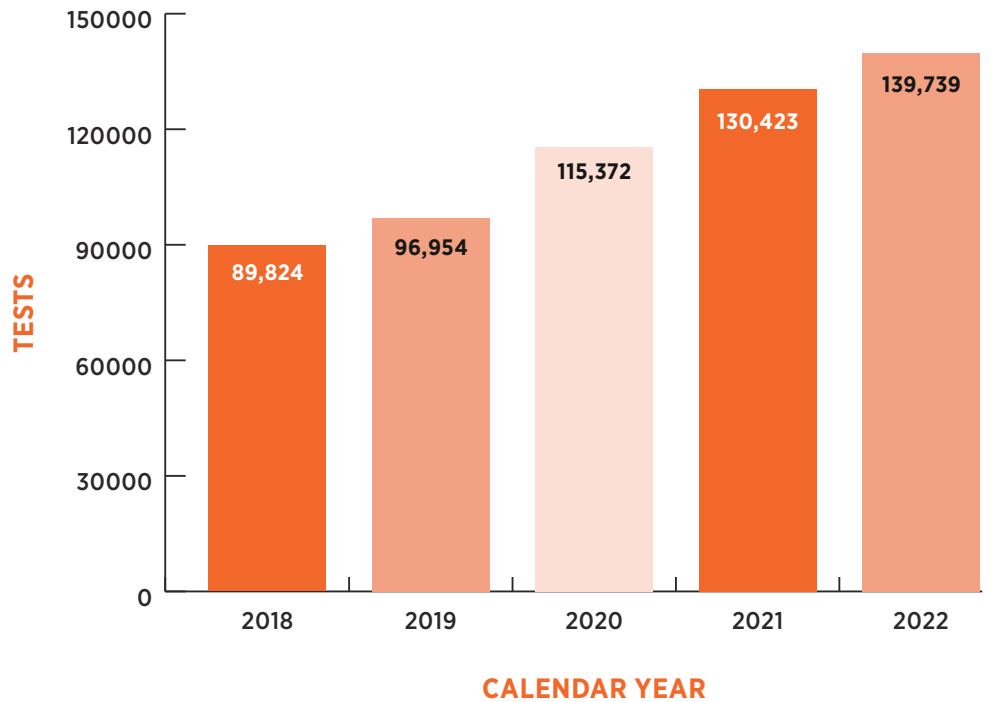
ACCESSIONS AND GENERAL TESTING

5-YEAR TREND

5-YEAR ACCESSION TREND



5-YEAR TEST TREND

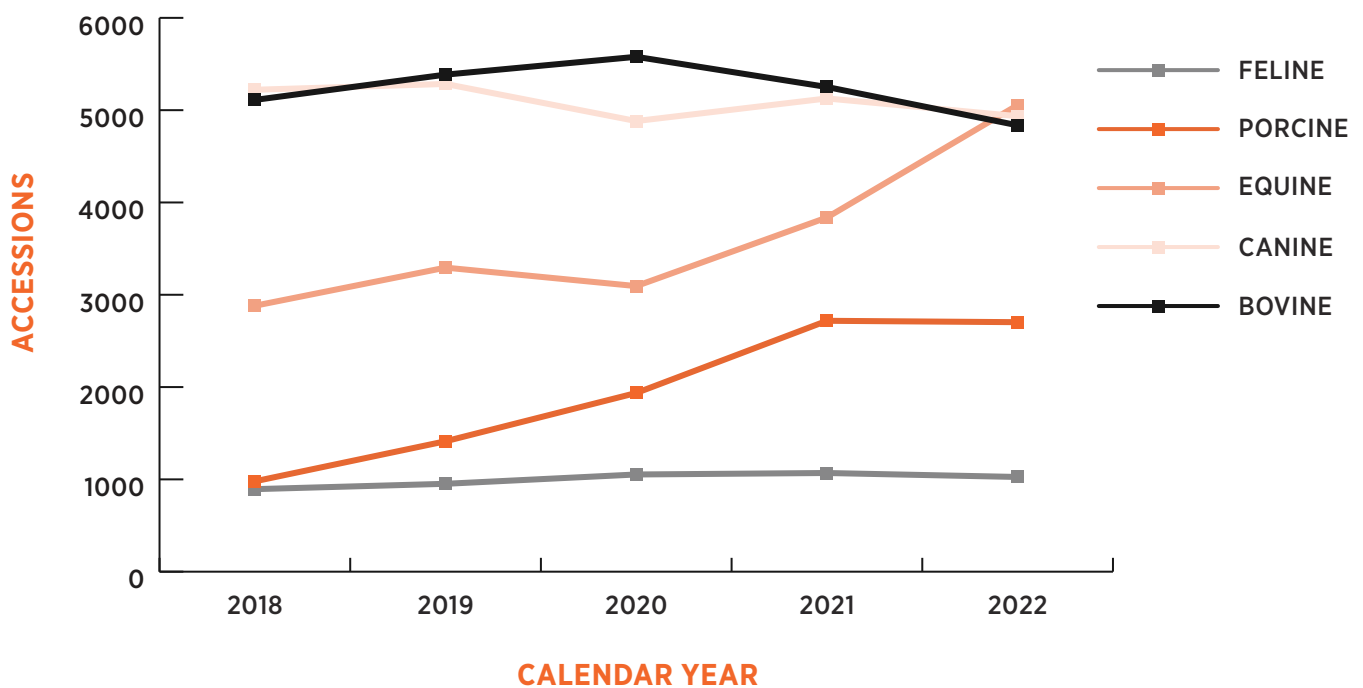


ACCESSIONS BY SPECIES

5-YEAR TREND

SPECIES	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Equine	2,881	3,294	3,094	3,837	5,055	32%
Canine	5,221	5,284	4,882	5,127	4,935	-4%
Bovine	5,111	5,385	5,578	5,251	4,836	-8%
Porcine	979	1,413	1,936	2,718	2,703	-1%
Feline	894	952	1,053	1,069	1,026	-4%
Avian	554	637	436	520	696	34%
Small Animal Other	343	350	280	344	499	45%
Caprine	315	391	322	435	469	8%
Ovine	73	81	81	115	138	20%
Alpaca/Llama	41	54	50	54	46	-15%
Large Animal Other	40	61	49	53	35	-34%
Multiple Species	34	40	27	38	35	-8%
Camelid	10	16	11	16	12	-25%
Caged Pet Mammal	8	14	13	7	4	-43%

5-YEAR ACCESSION TREND: TOP 5 SPECIES



ACCESSIONS BY LABORATORY UNIT

5-YEAR TREND

YEAR	MICRO-BIOLOGY*	MOLECULAR DIAGNOSTICS	OUTSOURCED TESTING	PARASITOLOGY	PATHOLOGY**	SEROLOGY	TOXICOLOGY	TOTAL # OF ACCESSIONS
2022	1,906	5,763	47	1,570	5,286	7,916	298	22,786
2021	2,260	5,885	70	1,809	5,329	6,234	244	21,831
2020	2,200	5,317	43		5,093	5,353	261	18,267
2019	2,456	4,800	17		5,755	5,131	351	18,510
2018	2,178	4,219			5,716	4,544	354	17,011

* Includes Bacteriology, Mycology and Mycoplasmaology

** Includes Necropsy and Histology



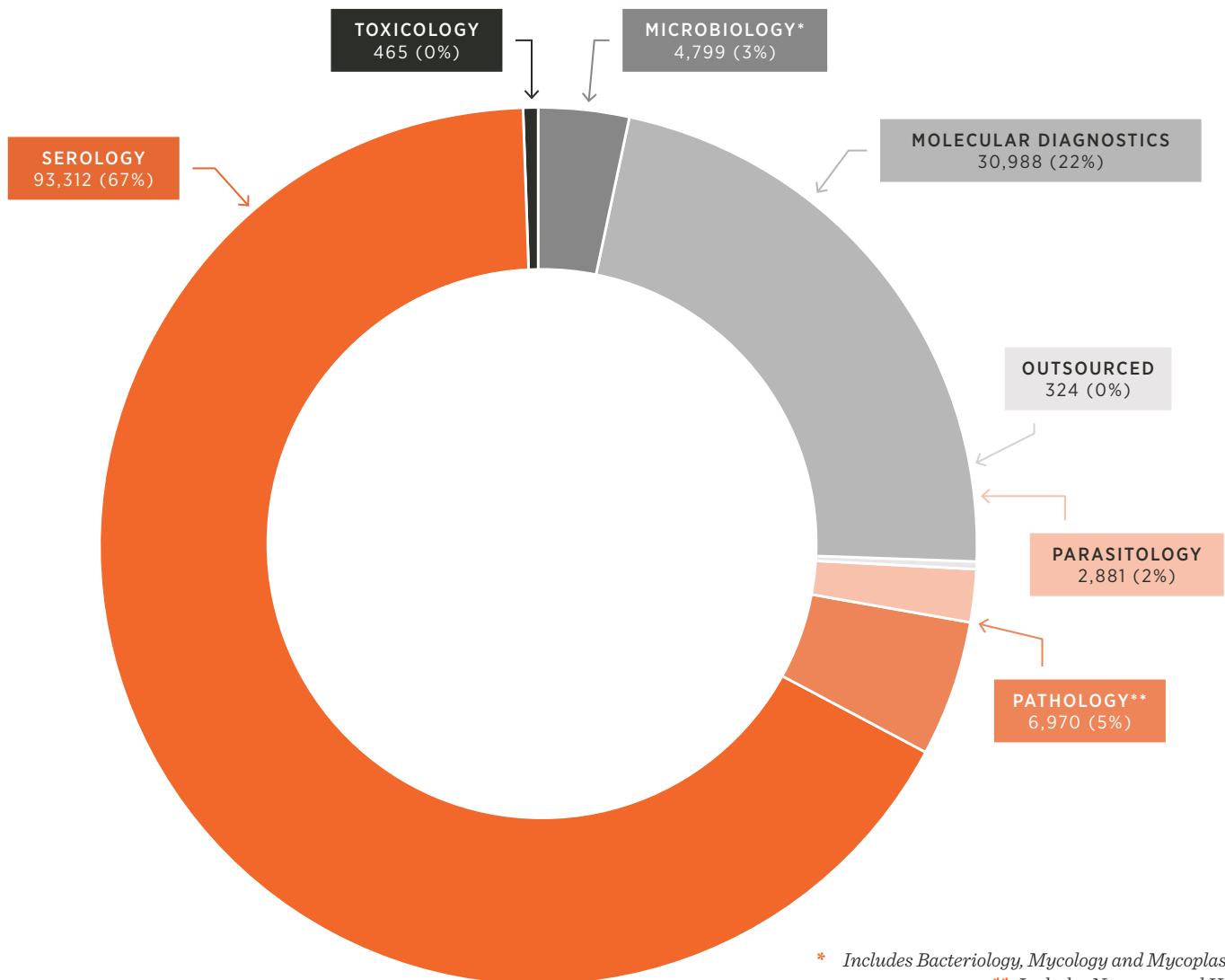
Photo By: Emily Cooper

TEST NUMBERS BY LABORATORY UNIT

5-YEAR TREND

YEAR	MICROBIOLOGY*	MOLECULAR DIAGNOSTICS	OUTSOURCED TESTING	PARASITOLOGY	PATHOLOGY**	SEROLOGY	TOXICOLOGY
2022	4,799	30,988	324	2881	6,970	93,312	465
2021	5,565	22,573	420	2484	7,474	89,467	419
2020	4,866	26,708	466		6,663	76,170	499
2019	4,082	22,260	318		7,921	61,688	685
2018	5,155	16,237			7,259	60,489	684

NUMBER OF TESTS PER LAB UNIT: CY 2022



MICROBIOLOGY

MYCOLOGY AND MYCOPLASMOLOGY

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Fungal Culture *	111	124	117	106	105	-1%
Histoplasma Enzyme Immunoassay **			6	53	0	-100%
Referral Lab Fungal Testing				1	0	N/A
Research Fungal Testing	30	12	8	0	0	N/A
<i>Mycoplasma</i> spp. Culture	26	11	8	15	7	-53%
Total Tests Per Year	167	147	139	175	112	-36%

* Includes individual testing from Test Package

** In-house and Referral Laboratory Testing

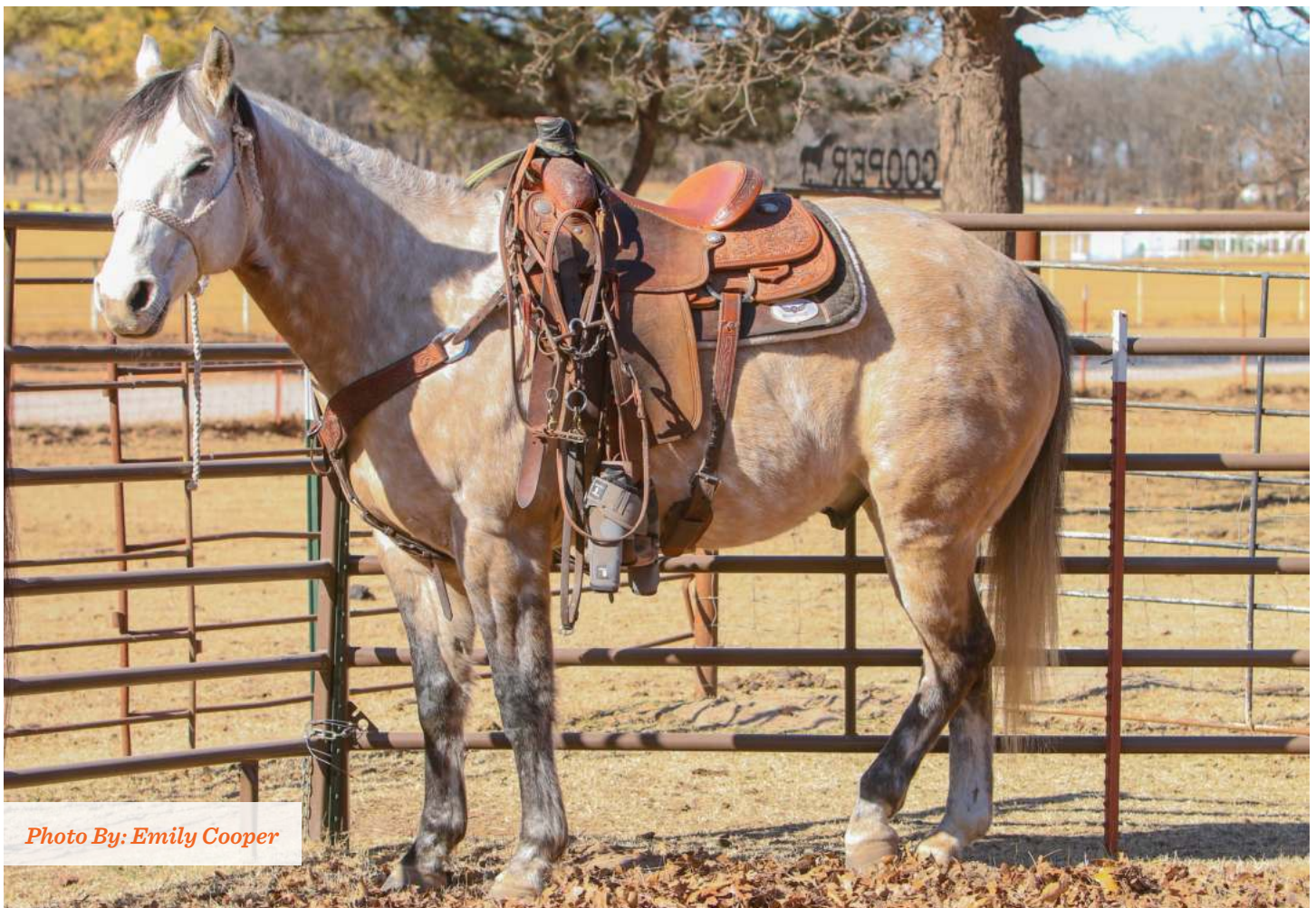


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BACTERIOLOGY TEST PACKAGES

5-YEAR TEST TREND

TEST PACKAGE	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Anaerobic Culture, Aerobic Culture and up to 2 Antibiotic Susceptibilities	392	464	385	480	445	-7%
Aerobic Culture and up to 2 Antibiotic Susceptibilities	492	498	374	409	389	-5%
Urine Culture and up to 2 Antibiotic Susceptibilities	448	398	329	334	221	-34%
Fungal Culture, Aerobic Culture and up to 2 Antibiotic Susceptibilities	53	13	58	62	48	-23%
Salmonella Culture with Antibiotic Susceptibility	12	61	29	34	36	6%
Total Test Packages Per Year	1,005	1,434	1,175	1,319	1,139	-14%



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MICROBIOLOGY (CONTINUED)

BACTERIOLOGY

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Aerobic Culture ‡	2,074	2,264	1,733	1,957	1,727	-12%
Antibiotic Susceptibility Test ‡	1,233	1,179	1,050	1,196	1,097	-8%
Anaerobic Culture ‡	453	552	545	554	508	-8%
Research Testing	209	97	636	597	437	-27%
<i>Salmonella</i> spp. Culture ‡	165	181	168	149	246	65%
<i>Clostridium perfringens</i> Culture	121	157	119	213	204	-4%
<i>Campylobacter jejuni</i> Culture	33	36	39	48	152	217%
<i>Campylobacter fetus</i> Culture	238	244	228	162	87	-46%
Milk Culture	130	98	107	94	87	-7%
<i>Brucella</i> spp. Culture	73	76	59	57	66	16%
Blue Green Algae-Microscopic Screening	33	40	25	50	58	16%
Salmonella Culture (Environmental Sample)	77	87	54	49	50	2%
<i>Salmonella pullorum</i> Screening	7	32	6	5	33	560%
<i>Clostridium</i> sp. Culture	28	40	26	35	31	-11%
All Other Tests	113	27	71	225	16	-93%
Total Tests Per Year	4,987	5,112	4,866	5,391	4,799	-11%

‡ Includes individual tests from Test Packages

MOLECULAR DIAGNOSTICS

PANELS

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Bovine Respiratory Disease PCR Panel-Comprehensive *	18	43	49	71	71	N/A
Bovine Viral Respiratory PCR Panel-Basic **	1	3	0	3	0	-100%
Total Panels Per Year	19	46	49	74	71	-4%

* Includes Bovine Viral Diarrhea Virus (BVDV), Bovine Respiratory Syncytial Virus (BRSV), Infectious Bovine Rhinotracheitis Virus (IBR), Bovine Coronavirus (BCV), and *Mycoplasma bovis*

** Includes BVDV, BRSV, and IBR

MOLECULAR DIAGNOSTICS

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Porcine Coronavirus Multiplex PCR (single and pooled)	778	2,114	4,625	4,781	11,742	146%
PRRS Virus Real-Time PCR (single and pooled) §	5,537	7,517	10,094	7,009	7,886	13%
<i>Tritrichomonas foetus</i> Real-Time PCR	5,183	4,922	5,107	5,009	4,586	-8%
<i>Tritrichomonas foetus</i> Real-Time PCR (pooled)	1,600	1,288	1,490	1,516	1,758	16%
Avian Influenza PCR	184	183	196	243	763	214%
Swine Influenza Virus PCR (single and pooled) §	1,251	3,303	3,110	1,589	753	-53%
Porcine <i>Mycoplasma hyopneumoniae</i> Real Time PCR (single and pooled)			5	412	677	64%
Molecular Research (PCR and Extraction)					630	N/A
Mosquito Identification and WNV PCR					370	N/A
Bovine Viral Diarrhea Virus PCR *	139	191	146	166	165	-1%
Canine Parvovirus PCR	30	44	53	50	139	178%
Infectious Bovine Rhinotracheitis (IBR) Virus PCR *	84	112	91	110	111	1%

§ In-house and/or Referral Laboratory Testing

* Includes individual testing from Molecular Diagnostics Panels

MOLECULAR DIAGNOSTICS (CONTINUED)

MOLECULAR DIAGNOSTICS (CONTINUED)

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Johne's Direct Fecal Real-Time PCR (single and pooled)	265	267	328	172	106	-38%
Bovine Coronavirus PCR *	54	104	93	90	101	12%
Equine Herpesvirus 1 (EHV-1) Real-Time PCR	61	1,189	211	84	100	19%
Avian Paramyxovirus-1 (END) PCR	122	223	119	62	80	29%
<i>Anaplasma marginale</i> PCR	71	147	95	122	78	-36%
<i>Mycoplasma bovis</i> PCR *	47	49	55	83	72	-13%
BRSV PCR *	25	52	57	205	71	-65%
<i>Clostridium perfringens</i> Multiplex PCR	56	56	56	44	65	48%
Bluetongue Virus PCR	20	82	48	33	59	79%
Canine Distemper Virus PCR	266	66	31	46	50	9%
<i>Streptococcus equi</i> PCR	7	40	20	42	45	7%
Canine Respiratory Panel (qPCR) §			56	78	42	-46%
COVID-19 PCR (non-human) §			11	35	30	-14%
<i>Leptospira</i> sp. Real-Time PCR	62	46	36	29	30	3%
16S Sequencing	35	18	35	30	28	-7%
Canine Herpesvirus PCR		3	15	29	27	-7%
Rickettsia				3	27	800%
Feline Respiratory Panel (qPCR) §			24	8	25	213%
Q-Fever				2	24	1100%
Canine PCR Testing §				6	23	283%
Rotavirus Antigen ELISA	48	55	42	30	21	-30%
Bovine Respiratory (Viral and Bacterial) Panel (qPCR)				18	19	6%
<i>Chlamydophila</i> spp. PCR §			7	7	18	N/A
<i>Cytauxzoon felis</i> PCR	11	13	8	16	17	6%
Equine Viral Arteritis PCR §			19	16	16	0%
Equine Herpesvirus 4 (EHV-4) PCR	18	6	4	8	15	88%

§ In-house and/or Referral Laboratory Testing

* Includes individual testing from Molecular Diagnostics Panels

MOLECULAR DIAGNOSTICS (CONTINUED)

MOLECULAR DIAGNOSTICS (CONTINUED)

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
PRRS Virus PCR Sequencing §			16	0	14	N/A
SARS (CoV-2) N1 and N2 Gene Real Time PCR			22	44	12	N/A
Feline Parvovirus PCR	2	6	7	3	12	300%
Canine Influenza PCR	6	6	3	1	11	1000%
<i>Mycoplasma gallisepticum</i> / <i>M. synoviae</i> PCR (single and pooled)	78	44	51	9	11	22%
All Other Tests	197	114	322	333	159	-52%
Total Tests Per Year	16,237	22,260	26,708	22,573	30,988	37%

§ In-house and/or Referral Laboratory Testing

* Includes individual testing from Molecular Diagnostics Panels



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PARASITOLOGY

PARASITOLOGY

2-YEAR TEST TREND

TEST	CALENDAR YEAR		% CHANGE
	2021	2022	
Centrifugal Flotation/Direct Smear	798	651	-18%
Fecal Egg Count	380	453	19%
Centrifugal Fecal Flotation	336	514	53%
Fecal Egg Count-McMaster Method	20	268	1240%
Canine Heartworm Antigen Test	319	219	-31%
Parasitology Research	62	219	253%
Modified Knott's	252	126	-50%
Fecal Culture/ID	2	119	5850%
Fecal Sedimentation	63	88	40%
Fecal Egg Count-Wisconsin Method	45	62	38%
Giardia Antigen	39	41	5%
Gross Parasite Identification	71	39	-45%
Fecal Egg Count-McMaster Method/Sedimentation	2	26	1200%
Baermann Method	34	21	-38%
Feline Post Heat Treatment Heartworm Antigen	13	19	46%
Centrifugal Fecal Flotation/Sedimentation	5	8	60%
All Other Tests	43	8	-81%
Total Tests Per Year	2,484	2,881	16%

PATHOLOGY

NECROPSY

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Gross Necropsy	916	953	757	876	843	-4%
Spinal Examination	29	14	10	6	21	250%
Tissue Preparation	7	7	4	2	16	700%
Small Animal Limb Examination with Disposal	4	6	0	1	2	100%
Research/Special Studies Necropsy	45	37	0	0	0	N/A
Chronic Wasting Disease	6	7	3	0	1	N/A
Total Tests Per Year	1,080	1,096	827	1,135	883	-22%



Photo By: Emily Cooper

MISCELLANEOUS NECROPSY DATA

CY 2022

NECROPSY ACCESSIONS BY SPECIES

SPECIES	# OF ACCESSIONS
Canine	214
Bovine	146
Equine	128
Avian	108
Caprine	69
Small Animal Other	54
Feline	52
Ovine	24
Porcine	23
Alpaca	10
Caged Pet Mammal	4
Large Animal Other	5
Camel	2
Llama	2
Non-Human Primate	2

NECROPSY ACCESSIONS BY TEST TYPE

TEST TYPE	# OF ACCESSIONS
Necropsy only	52
Necropsy + Histology only	322
Necropsy + Histology + Other Testing	459
Necropsy + Other Testing (no Histology)	10

NECROPSY ACCESSIONS BY CLIENT

CLIENT	# OF ACCESSIONS
Total # of Necropsy Accessions	843
VTH * Accessions	210
Client Accessions (not VTH)	633

* Veterinary Teaching Hospital

PATHOLOGY (CONTINUED)

HISTOLOGY

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Histo-Short Report	3,283	3,480	2,950	2,818	2,425	-14%
Special Stains	1,056	1,465	1,177	1,456	1,556	7%
Histo Necropsy Workload	741	785	644	747	723	-3%
Slide Preparation-No Interpretation	4	1	232	350	584	67%
Histo-Long (Detailed) Report	274	233	195	231	174	-25%
Additional Biopsy > 3 Tissues Submitted	148	140	71	105	104	-1%
Zoo Pathology Surveillance	124	131	88	113	104	-8%
H & E Recut	17	38	65	76	92	21%
Decalcification	88	157	141	138	87	-37%
H & E Slide for Research	93	111	74	41	67	63%
Immunohistochemistry (IHC) §	129	138	83	113	60	-47%
Poultry Histopathology	62	43	20	53	49	-8%
Unstained Sections for Research	6	13	30	19	20	5%
Special Stains for Research	4	6	7	16	16	0%
Duplicate H & E	2	1	6	5	9	80%
Paraffin Scrolls For PCR	12	27	25	26	6	-77%
All Other Tests	136	53	28	32	11	-66%
Total Tests Per Year	6,179	6,822	5,836	6,339	6,087	-4%

§ Referral laboratory testing

PATHOLOGY (CONTINUED)

MICELLANEOUS BIOPSY-RELATED DATA

5-YEAR TREND

SPECIAL STAIN	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
GMS	372	473	357	413	429	4%
Gram's	160	287	321	346	392	13%
Fite's Acid Fast	57	79	73	83	139	67%
PAS	40	37	48	104	114	10%
Acid Fast (Ziehl-Neelsen)	210	236	148	137	99	-28%
Giemsa	32	30	37	93	75	-19%
Trichrome	18	52	27	40	58	45%
Toluidine Blue	46	44	39	51	46	-10%
Iron (Prussian Blue)	18	40	27	42	38	-10%
Congo Red	23	27	19	33	33	N/A
Copper (Rhodanine)	11	24	19	25	27	8%
Melanin-Bleach	8	21	16	26	27	4%
Von Kossa	3	26	13	13	21	62%
Fontana-Masson	9	17	10	18	16	-11%
PTAH	2	4	0	12	12	0%
PAS without Diatase	2	0	0	0	12	N/A
Steiner	36	55	14	15	11	-27%
Bile/Bilirubin (Hall's)	2	11	9	5	7	40%
Alcian Blue 2.5	6	1	0	0	0	N/A
Luxol Fast Blue	0	1	0	0	0	N/A
Total Stains	1,055	1,465	1,177	1,456	1,556	7%

PATHOLOGY (CONTINUED)

MICELLANEOUS BIOPSY-RELATED DATA (CONTINUED)

5-YEAR TREND

BIOPSY SLIDES	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Total Number of Biopsy Slides	20,388	18,233	14,039	14,720	13,166	-11%
H&E Stains						
Total Number of H&E Slides	17,172	15,902	12,253	12,312	11,095	-10%
H & E From Biopsy	8,487	9,503	7,144	6,353	5,102	-20%
H & E From Necropsy	5,441	5,132	3,634	4,382	3,780	-14%
H & E - Research	776	499	457	249	1,155	364%
H & E - Teaching	9	206	170	216	68	-69%
IHC Stains						
IHC Slides for BVDV PI (Ear Notch)	102	36	8	6	0	-100%
IHC Slides (not including BVDV PI)	474	343	69	69	82	19%
Special Stains						
Total Number of Special Stains Slides	1,350	1,465	1,177	1,456	1,556	7%

BIOPSY DATA	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Biopsy Only Accessions	3,203	3,221	2,758	2,643	2,425	-8%
Biopsy + Other Testing (except Necropsy) Accessions	74	74	135	128	119	-7%
Number of Short-Format Reports	3,283	3,480	2,950	2,818	2,627	-7%
Number of Detailed-Format Reports	274	233	195	231	174	-25%

SEROLOGY

PANELS AND PROFILES

5-YEAR TEST TREND

PANEL/ PROFILE	TESTS	CALENDAR YEAR					% CHANGE
		2018	2019	2020	2021	2022	
Pseudorabies gB ELISA & Brucella	Pseudorabies gB ELISA, <i>B. abortus</i> Card Test	3,377	3,646	3,773	4,466	4,596	3%
Swine Serology Panel 1 **	Brucella Fluorescence Polarization Assay (FPA), Pseudorabies gB ELISA, PRRSV ELISA			1,665	3,029	3,365	11%
Bovine Serum ELISA Panel	BVDV Antigen Capture ELISA, BLV ELISA, Johnes ELISA	871	255	300	261	385	48%
Abortion Panel Bovine	BVDV Antigen Capture ELISA, BVD Type 1 SN, IBR SN, Lepto MAT, Neospora ELISA, <i>B. abortus</i>	261	306	224	185	161	-13%
Bovine Respiratory SN Profile 2 *	IBR, BVDV Type 1, BVDV Type 2, PI-3, BRSV				179	183	2%
Small Ruminant Biosecurity Panel *	CAE/OPP cELISA, Johnes ELISA				68	200	194%
Swine Serology Panel 2 *	Pseudorabies gB ELISA, <i>B. abortus</i> FPA				54	303	461%
Canine Tick Profile	<i>E. canis</i> SNAP, RMSF IFA, Lyme, <i>Anaplasma phagocytophilum</i> / <i>A. platys</i>	44	43	46	28	40	43%
Bovine Respiratory SN Profile 1 *	IBR, BVDV Type 1, PI-3, BRSV				11	290	2536%
Tick Panel ELISA	<i>Anaplasma phagocytophilum</i> / <i>A. platys</i> , <i>Ehrlichia canis</i> / <i>E. ewingii</i> , <i>Borrelia burgdorferi</i>	0	0	2	1	0	-100%
Goat Abortion Panel **	Bluetongue Virus AGID, <i>B. abortus</i> AGGL, Q-Fever ELISA, Toxoplasma IgG IFA, Leptospira MAT			3	1	1	N/A

* Panel introduced in CY 2021

** Panel introduced in CY 2020

SEROLOGY (CONTINUED)

PANELS AND PROFILES (CONTINUED)

5-YEAR TEST TREND

PANEL/ PROFILE	TESTS	CALENDAR YEAR					% CHANGE
		2018	2019	2020	2021	2022	
Bovine Respiratory Panel **	BRSV VN, BVDV-1a VN, BVDV-1b VN, BVDV-2 VN, IBR VN, <i>H. somni</i> AGGL, <i>M. haemolytica</i> AGGL, PI-3 VN			10	0	0	N/A
Total Panels/Profiles Per Year		4,553	4,250	6,023	8,283	9,524	15%

* Panel introduced in CY 2021

** Panel introduced in CY 2020

SEROLOGY

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
<i>Salmonella pullorum/typhoid</i> Microagglutination Screen	10,199	18,302	21,957	23,700	25,200	6%
<i>Mycoplasma gallisepticum/ Mycoplasma synoviae</i> ELISA	18,008	18,445	21,599	23,705	24,712	4%
<i>Brucella abortus</i> BAPA, Card, CF, FPA and STP § *	3,906	4,370	6,065	9,081	8,705	-4%
Pseudorabies (PRV) gB and g1 ELISA § *	3,390	3,647	5,462	7,958	8,313	4%
PRRS ELISA *			1,676	3,637	3,441	-5%
Equine Infectious Anemia (EIA) ELISA and AGID §	1,787	2,155	1,994	2,437	2,787	14%
Avian Influenza ELISA	1,802	1,995	2,610	2,734	2,731	N/A
BVDV Antigen Capture ELISA *	4,284	3,295	3,446	2,829	2,558	-10%
Johne's Disease ELISA and CF § *	2,602	2,354	2,707	2,673	1,935	-28%
Bovine Pregnancy ELISA	609	737	1,406	1,676	1,880	12%
Bovine Leukemia Virus (BLV) ELISA and AGID § *	2,018	1,507	1,754	1,580	1,425	-10%
<i>Theileria (Babesia) equi</i> c-ELISA §	215	264	400	505	1,365	170%
BVDV Type I Serum Neutralization SN and VN § *	387	465	446	824	860	4%

§ In-house and/or Referral Laboratory Testing

* Includes individual tests from Serology Panels and Profiles

SEROLOGY (CONTINUED)

SEROLOGY (CONTINUED)

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Infectious Bovine Rhinotracheitis (IBR) SN *	344	309	284	786	803	2%
Rabies dFA Test					717	N/A
CAE c-ELISA / OPP c-ELISA	401	533	422	555	566	2%
Anaplasma c-ELISA *	437	546	563	805	561	-30%
<i>Brucella canis</i> Card Test, AGID, IFA and Tube Agglutination § *	421	270	279	307	533	74%
<i>Babesia caballi</i> c-ELISA §	130	200	259	289	516	79%
BRSV SN and VN § *	0	0	31	249	496	99%
Parainfluenza 3 SN and VN § *	48	166	144	204	473	132%
<i>Neospora</i> c-ELISA § *	283	330	239	448	403	-10%
BVDV Type II Serum Neutralization SN and VN § *	0	0	11	404	377	-7%
Goat and Sheep Pregnancy ELISA	214	548	523	509	350	-31%
<i>Leptospira</i> Microscopic Agglutination (MAT) *	502	665	542	389	242	-38%
Caseous Lymphadenitis SHI §			160	173	231	34%
<i>Mycoplasma gallisepticum</i> Hemagglutination Inhibition §	117	156	216	161	161	0%
<i>Mycoplasma synoviae</i> Hemagglutination Inhibition §	117	156	216	161	161	0%
Bluetongue c-ELISA and AGID § *			86	141	138	-2%
Rocky Mountain Spotted Fever (RMSF) IFA *	94	82	107	95	110	16%
Equine Protozoal Myeloencephalitis (EPM) IFAT §			40	72	69	-4%
Vesicular Stomatitis Virus VN (Indiana and New Jersey) §			74	28	56	100%
Tularemia (<i>Francisella tularensis</i>) Plate Agglutination §			3	4	48	1100%
West Nile Virus (WNV) IgM ELISA §			23	43	41	-5%
Lyme Disease SNAP *	44	43	48	29	40	38%
<i>E. canis</i> / <i>E. ewingii</i> SNAP *	44	43	48	29	40	38%
<i>Anaplasma phagocytophilum</i> / <i>A. platys</i> SNAP *	44	43	48	29	40	38%
Heartworm ELISA *	1	13	46	28	40	43%
Equine Viral Arteritis (EVA) SN and VN § *			64	41	39	-5%

§ In-house and/or Referral Laboratory Testing

* Includes individual tests from Serology Panels and Profiles

SEROLOGY (CONTINUED)

SEROLOGY (CONTINUED)

5-YEAR TEST TREND

TEST	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
<i>Brucella melitensis</i> Card Test	12	9	20	5	34	580%
Eastern Equine Encephalitis (EEE) IgM ELISA §			16	24	33	38%
<i>Brucella ovis</i> ELISA §			17	11	31	182%
Q-Fever (<i>Coxiella burnetii</i>) c-ELISA, CF and IFA §			11	4	22	450%
All Other Tests	8,029	40	108	105	29	-72%
Total Tests Per Year	60,489	61,688	76,170	89,467	93,312	4%

§ In-house and/or Referral Laboratory Testing

* Includes individual tests from Serology Panels and Profiles



Photo By: Emily Cooper

SEROLOGY (CONTINUED)

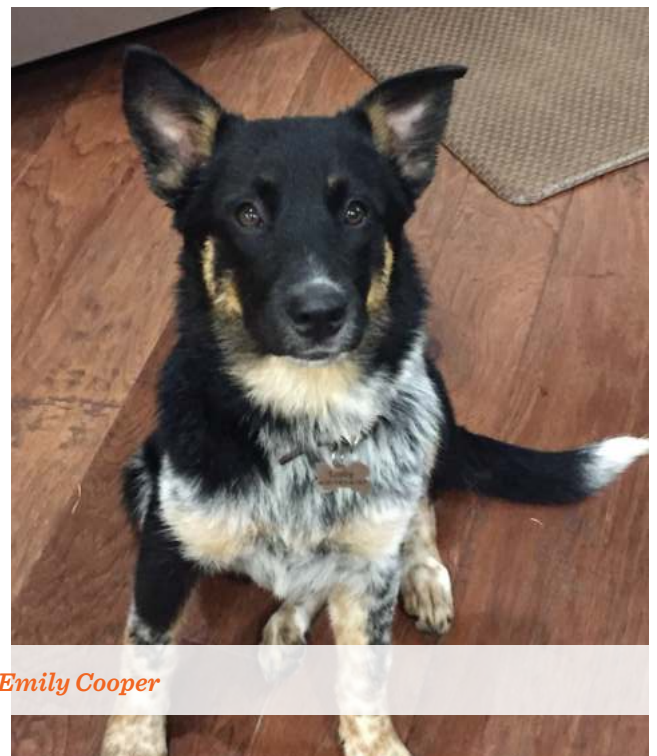
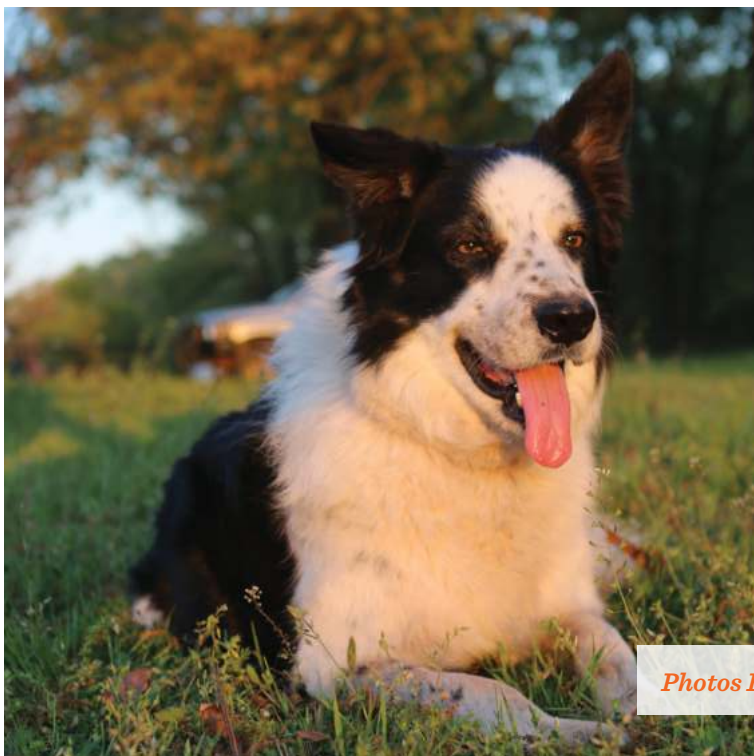
RABIES TESTING

5-YEAR TREND

SPECIES	CALENDAR YEAR					% CHANGE
	2018	2019	2020	2021	2022	
Canine	13	20	12	98	304	210%
Feline	11	8	10	70	168	140%
Small Animal Other *	18	12	15	41	162	295%
Bovine	8	8	11	19	36	89%
Equine	9	5	3	12	30	150%
Large Animal Other **	0	0	1	3	9	200%
Caprine	0	4	1	6	5	-17%
Alpaca	0	1	0	0	1	N/A
Ovine	1	0	0	0	1	N/A
Porcine	0	1	0	1	1	N/A
Total Tests Per Year	60	59	53	250	717	187%

* CY 2022 Small Animal Other: bat (69), skunk (53), raccoon (26), squirrel (6), rodent (3), rabbit (2), armadillo (1), gopher (1), opossum (1)

** CY 2022 Large Animal Other: beaver (2), deer (2), wolf/wolf hybrid (2), bobcat (1), coyote (1), fox (1)



Photos By: Emily Cooper

SEROLOGY (CONTINUED)

RABIES TESTING BY SPECIES

CY 2022

SPECIES	TOTAL # OF TESTS	POSITIVE RESULT	NEGATIVE RESULT	NO RESULT †
Canine	304	2	289	13
Feline	168	2	163	3
Bat	69	1	65	3
Skunk	53	30	19	4
Bovine	36	3	33	0
Equine	30	3	27	0
Raccoon	26	0	24	2
Squirrel	6	0	5	1
Caprine	5	0	5	0
Beaver	2	0	2	0
Rabbit	2	0	2	0
Rodent	3	0	2	1
Wolf/Wolf Hybrid	2	0	2	0
Alpaca	1	0	1	0
Armadillo	1	0	1	0
Bobcat	1	0	1	0
Coyote	1	0	1	0
Deer	2	1	1	0
Fox	1	0	1	0
Gopher	1	0	1	0
Opossum	1	0	1	0
Ovine	1	0	1	0
Porcine	1	0	1	0
Total	717	42	648	27

† Unsatisfactory sample per OSDH

OUTSOURCED TESTING

4-YEAR TEST TREND

NOTE: Outsourced Testing is testing not affiliated with one of the primary laboratory units of OADDL. All Outsourced Testing is performed at referral laboratories.

TEST	CALENDAR YEAR				% CHANGE
	2019	2020	2021	2022	
Cytology (only, slides)	119	246	107	107	N/A
Thyroid Testing (T3, T4, Panel)	19	10	27	32	16%
CBC and Blood Chemistry Panel	36	36	32	22	-45%
Equine Blood Chemistry Panel	12	2	23	20	-15%
Complete Blood Count (CBC only/CBC with Path Review)	17	29	65	17	-282%
Fluid Analysis with Cytology		11	7	16	56%
Urinalysis	15	8	17	14	-21%
Phenobarbital Level	6	1	4	13	69%
Urinary Calculi Analysis		15	25	11	-127%
Progesterone Level	15	18	18	8	-125%
Fructosamine	13	24	17	7	-143%
Cortisol Level	4	11	8	5	-60%
Potassium Bromide Level	5	8	8	5	-60%
Testosterone level	3	6	2	5	60%
Genetic Testing	9	0	0	5	100%
All Other Testing	45	41	60	37	-62%
Total Tests Per Year	318	466	420	420	-30%

TOXICOLOGY

5-YEAR TEST TREND

NOTE: Except where indicated as In-house all Toxicology testing is performed at a referral laboratory.

TEST	CALENDAR YEAR: JAN-DEC					% CHANGE
	2018	2019	2020	2021	2022	
Mineral Panel *	72	116	98	92	110	20%
Nitrate Quantitation-Aqueous Fluid	116	120	72	55	76	38%
Cyanide (In-house)	15	5	8	9	48	433%
Nitrate Quantitation-Forage	35	27	11	25	40	60%
Water Quality	61	55	98	63	32	-49%
Drug Screen/Quantitation	26	17	24	17	22	29%
Trace Mineral-Lead	19	30	17	20	15	-25%
Bone Marrow Fat Analysis		7	11	7	15	114%
GC/MS Toxicant Screen			7	17	14	-18%
Mycotoxin Screen	18	17	10	17	11	-35%
Ionophore Screen	4	4	3	1	9	800%
Toxicology-Special Testing ‡	44	14	12	14	8	-43%
Forage Analysis	12	7	5	16	7	-56%
Mass Spectrometry Toxicant Screen					7	N/A
Anticoagulant/Rodenticides	16	6	11	10	6	-40%
Nitrate Quantitation-Serum	3	8	0	0	6	N/A
Sulfate/Sulfur	2	1	0	0	5	N/A
All Other Testing	241	251	112	56	34	-39%
Total Tests Per Year	684	685	499	419	465	11%

* **Mineral Panel** includes Mineral Panels, Metal and Mineral Panels and Heavy Metal and Mineral Panels

‡ **Special Testing** includes Toxic Element Panel, Proximate Analysis, Gossypol, Fenbendazole Drug Screen, Vitamin D, Carbon Monoxide, Bile Acids, Pyrrolizidine Alkaloids, Bromide, Urea

TEST RELATED SUPPLIES SENT TO CLIENTS

5-YEAR TREND

TEST	CALENDAR YEAR: JAN-DEC					% CHANGE
	2018	2019	2020	2021	2022	
<i>Tritrichomonas foetus</i> PBS Transport Tube	1,689	9,157	11,028	11,339	12,319	9%
3 oz. 10% Buffered Formalin Jar	851	722	720	954	850	-11%
Histo Mailers				111	303	173%
BHI Broth Media	271	130	35	32	134	319%
Molecular Avian Influenza Swabs	270	141	62	34	129	279%
Bacterial Culturette w/o Charcoal	24	208	52	104	93	-11%
<i>Campylobacter fetus</i> Media	212	207	228	106	69	-35%
Barrel				20	8	-60%
<i>Tritrichomonas foetus</i> Transport Medium Pouch	6,357	2,315	28	0	0	N/A
Total Supplies	9,133	12,609	12,153	12,680	13,905	10%



Photo By: Emily Cooper

OADDL BOARD OF ADVISORS

BOARD MEMBER

Dr. K. Shawn Blood

Dr. Becky Brewer

Dr. Fawn Reely

Dr. Rod Hall

Dr. Steve Hart (Board Chair)

Dr. Michael Johnston

Dr. Rosslyn Biggs

Dr. W. H. Mitchell (Vice Chair/Secretary)

Dr. Ken Powell

Dr. Carlos Risco

Dr. Donna Slater

Mr. Stan Stromberg

Dr. Michael Tripp (Past Chair)

Dr. Bret White

Dr. Barry Whitworth

GROUP REPRESENTED

Pharmaceutical Industry

USDA APHIS Area Veterinarian in Charge (AVIC)

OVMA Member, Sr. Territory Sales Manager at Boehringer-Ingelheim Animal Health

State Veterinarian

Small Ruminant Industry

Equine Industry

Oklahoma Cattleman's Association Member, Vice Chair Beef Production Committee

Mixed Animal Practice

Poultry Industry

Dean, College of Veterinary Medicine

Small Animal Practice

Director of Food Safety Services

Swine Industry

Food Animal Practice

Oklahoma Cooperative Extension

PERSONNEL: ADMINISTRATION, FACULTY, PATHOLOGY RESIDENTS AND STAFF

CY 2022

ADMINISTRATION

POSITION

Jerry Saliki	Professor OADDL Director Section Head: Serology
Emily Cooper	Assistant Director/Quality Manager Section Head: Receiving Office
Ryan Van Fleet	Coordinator of Business Office Coordinator of Human Resources Section Head: General Office
Janisue Coleman **	Associate Quality Manager & Biosafety Officer

FACULTY

POSITION

AREAS OF INTEREST

Giselle Cino	Assistant Professor Anatomic Pathologist Section Head: Pathology Services	Infectious Disease Swine Diseases Emerging and Transboundary Diseases Ocular Pathology
Anthony Confer	Emeritus Professor, Pathologist	Infectious Disease Respiratory Disease
Alexandra Ford **	Assistant Professor Pathologist	Infectious Disease Exotics
Valerie McElliott	Assistant Professor Pathologist	Musculoskeletal Pathology Neuropathology Electron Microscopy
Craig Miller	Assistant Professor Pathologist	Infectious Disease Neoplastic Disease Immunopathology
Sunil More	Assistant Professor Pathologist	Respiratory Disease Infectious Disease
Akhilesh Ramachandran	Associate Professor Section Head: Microbiology Section Head: Molecular Diagnostics	Bacteriology Molecular Diagnostics
Jerry Ritchey*	Professor Pathologist	Infectious Disease Cardiopathology Central Nervous System
Ruth Scimeca	Assistant Professor Clinical Parasitologist Section Head: Parasitology Diagnostics	Host-response to Parasitic Diseases Tick-borne Pathogens Parasitology Diagnostics
Tim Snider	Professor Pathologist	Gastrointestinal Disease Reproductive Pathology Infectious Pathology
Brianne Taylor	Assistant Professor Pathologist	Infectious Disease Equine Pathology

* Left OADDL in CY 2022

** Joined OADDL in CY 2022

PERSONNEL: ADMINISTRATION, FACULTY, PATHOLOGY RESIDENTS AND STAFF (CONTINUED)

CY 2022

PATHOLOGY RESIDENTS

Dah-Jiun Fu *
Alexa Hunter
Scott Mitchell
Sai Narayanan

STAFF

Allen, Noah
Bircher, Noelle *
Caseltine, Shannon
Crockett, Taytum **
Deal, Clay **
Gupta, Sushim **
Hahn, Raina **
Hamilton, Brianne
Hergenreder, Katie
Hoyt, Amy
Johns, Carolyn
Lau, Emily
Loane, Megan **
Looper, Emily
Madden, Robin
Maloney, Shannon
Medellin, Alejandra
Patil, Girish *
Pettit, Dustin *
Rowden, Michele
Shore, Eleanor *
Smith, Sara **
Stair, Eron
Stanley, Crystal
Talent, Scott
Taylor, Stephanie
Whisman, Emily *
Windiate, Victoria

LABORATORY UNIT

Microbiology
Microbiology
Rabies
Serology
Microbiology
Microbiology
Molecular Diagnostics
Histology
Molecular Diagnostics
Serology
Receiving Office; Necropsy
Histology
Receiving Office; Necropsy
Parasitology
Molecular Diagnostics
General Office
Molecular Diagnostics
Molecular Diagnostics
Histology
Accounting
Molecular Diagnostics
Molecular Diagnostics
Histology
Serology
Microbiology
General Office
Histology
OADDL Informatics;
CVM Laboratory Safety

POSITION

Senior Laboratory Technologist
Senior Laboratory Technologist
Laboratory Supervisor
Senior Laboratory Technologist
Senior Laboratory Technologist
Post Doctoral Fellow
Senior Laboratory Technologist
Laboratory Manager
Senior Laboratory Technologist
Laboratory Manager
Receiving Office and Necropsy Supervisor
Senior Laboratory Technologist
Laboratory Manager
Laboratory Technologist
Laboratory Manager
Medical Records Technician
Laboratory Supervisor
Post-Doctoral Fellow
Laboratory Manager
Accounting Specialist
Senior Laboratory Technologist
Senior Laboratory Technologist
Senior Laboratory Technologist
Senior Laboratory Technologist
Laboratory Manager
Medical Records Data Entry Technician
Senior Laboratory Technologist
Coordinator

*Left OADDL in CY 2022

** Joined OADDL in CY 2022

INSTRUCTION OF VET MED AND OSU STUDENTS

- CBSC 5023 – Veterinary Biomedical Sciences II, Pathobiology/**Miller C (IOR)**
- HONR 1000 – Honors Course: The Future of Veterinary Medicine/**Taylor B (IOR)**
- VBSC 5000 – Master’s Research and Thesis/**Miller C (IOR)**
- VBSC 6000 – PhD Research and Dissertation/**Miller C (IOR)**
- VCS 7072 – Veterinary Diagnostics/**Cino, G, Ford A, McElliott, M (IOR), Miller C, More S, Snider T, Taylor B**
- VCS 7532 – Applied Diagnostics Elective Rotation/**Cino, G, Ford A, McElliott, M, Miller C, More S, Snider T, Taylor B (IOR)**
- VCS 7912 – Grand Rounds (co-moderator)/**Taylor B**
- VMED 7264 – General Pathology/**Snider T (IOR), More S, Taylor B**
- VMED 7354 – Bacteriology/**Snider T**
- VMED 7413 – Food Safety and Public Health/**Snider T**
- VMED 7454 – Veterinary Virology/ **Miller C, More S, McElliott V**
- VMED 7563 – Musculoskeletal system/**McElliott V**
- VMED 7564 – Alimentary System Pathology/**Cino, G**
- VMED 7612 – Clinical Neurology/**Snider T**
- VMED 7614 – Cardiopulmonary System/**Miller C**
- VMED 7631 – History of Veterinary Medicine/**Snider T**
- VMED 7662 – Urinary System/**Taylor B**
- VMED 7674 – Theriogenology/**Snider T**

AWARDS, HONORS, CERTIFICATIONS

- **Ramachandran, A:** OSU Regents Distinguished Research Award, 2022
- **Ramachandran, A:** OSU Presidents Fellow, 2022
- **Narayanan S, DVM,** completed PhD in Veterinary Biomedical Sciences and Pathobiology, Oklahoma State University. Fall 2022
- **Scimeca, RC:** OSU annual app competition / OSU App Center. First place. Authors: Students Shubham Trehan and Udhav Ramachandran and Drs. Sathya Aakur and Ruth Scimeca. The Bug Scope-App
- **Ford, A:** Achieved diplomate status ACVP 2022
- **Taylor, B:** OADDL Employee of the Month, November 2022
- **Taylor, B:** Cover photograph winner, Davis-Thompson Foundation monthly newsletter, March 2022

AWARDS, HONORS, CERTIFICATIONS (CONTINUED)

- **Snider, T:** Year 1 DVM Class Teaching Award
- **Snider, T:** University Wide “Excellence in Advising” Award
- **Snider, T:** Completion: Integrated Beef Cattle Program, Class I
- **Snider, T:** USDA APHIS Level 2 Renewed Accreditation
- **Miller, C:** Wendy Coe Leadership Award, American College of Veterinary Pathologists
- **Narayanan S:** AAVLD Trainee travel award - American Association of Veterinary Laboratory Diagnosticians (AAVLD) 2022. Poster title: Development and evaluation of MG2Vec: A Transformer Neural network for metagenomic shotgun sequencing based BRD pathogen detection. **Sai Narayanan**, Sathyanarayanan Aakur Narashimhan, Arunkumar Bagavathi, **Akhilesh Ramachandran**
- **Narayanan S. J.** Lindsay Oaks best student Molecular biology award- American Association of Veterinary Laboratory Diagnosticians (AAVLD) 2022. Poster title: Development and evaluation of MG2Vec: A Transformer Neural network for metagenomic shotgun sequencing based BRD pathogen detection. **Sai Narayanan**, Sathyanarayanan Aakur Narashimhan, Arunkumar Bagavathi, **Akhilesh Ramachandran**

OUTREACH AND PRESENTATIONS TO THE PUBLIC AND CLIENTS

- **Scimeca, RC:** Interview for KFOR news @ 4:30 on May the 10th/ related to parasites and pets
- **Windiate, V:** Packaging and Shipping Diagnostic Specimens; Zoom presentation to students, Tulsa Community Veterinary Technology Program; March 23, 2022
- **Taylor, B:** Bartonella-associated pancarditis in a dog. OADDL E-News. Winter 2022
- **S. Talent, A. Ramachandran,** Antimicrobial Susceptibility Profile of *Manheimia haemolytica* Isolates at OADDL: 2021 – 2022, OADDL E-News, Summer 2022, Vol. 29
- **Taylor, B:** Infectious Disease in Oklahoma Shelter Dogs: 2011-2021. Northeastern OVMA monthly meeting. Claremore, OK. October 2022.
- **Taylor, B:** Veterinary Medicine oral presentation to high school students with STEM interests. OSU Medicine Pre-Health Roundup, Tulsa, OK. September 2022 (with **Miller C**)
- **Taylor, B:** Good enough to drink? (co-author with Dr. Rosslyn Biggs). Feedlot Magazine, Wyoming Livestock Roundup; Cowman, Oklahoma Cattlemen’s Association. June 2022
- **Taylor, B:** Annual OADDL Summary Report. Oklahoma Horse Racing Commission. May 2022

OUTREACH AND PRESENTATIONS TO THE PUBLIC AND CLIENTS *(CONTINUED)*

- **Taylor, B:** OSU CVM Ambassador at Recruitment Day. University of Central Oklahoma. March 2022
- **Snider, T:** Tulsa County VMA – Small Animal Zoonoses Update
- **Miller, C:** “So you want to be a Veterinarian?” Oral presentation at 2022 OSU Medicine Pre-Health Round Up; September 30, 2022; Audience: High school students with STEM interests
- **Miller, C:** “So you want to be a Veterinarian?” Oral presentation at 2021 Stillwater Middle School Career Day; December 16, 2022; Audience: Middle school students with career interests in veterinary medicine
- **Miller, C:** Member of the Advocacy and Policy Committee in the American College of Veterinary Pathologists; Subcommittee Chair tasked with addressing pathologic errors in scientific publications

ATTENDANCE AT MEETINGS

- **Cooper, E, Saliki, J:** OVMA Conference, Norman, OK, January 2022
- **Miller, C:** OSU CVM 2022 Phi Zeta Research Day, April 2021
- **Miller, C:** 9th Annual OCRID Symposium, April 2022
- **Scimeca, RC:** AAVP: Snowbird, Utah. June 25-28, 2022
- **Cooper, E, Taylor, B:** Oklahoma Cattleman’s Association Convention, Norman, OK July 2022
- **Miller, C:** 2022 National Veterinary Scholars Symposium, August 2022
- **Smiceca, RC:** American Heartworm Triennial Symposium: New Orleans September 7-11 2022
- **Miller, C:** 2022 ISCAID symposium, Glasgow, Scotland, September 2022; Oral Presentation
- **Cino, G, Windiate, V:** 2022 AAVLD Annual Meeting; October, 2022; Virtual
- **Hoyt, A, Saliki, J, Scimeca RC:** AAVLD Annual Meeting, Minneapolis, MN October 2022; in person
- **Snider T, Windiate, V:** 2022 OSU CVM Fall Conference for Veterinarians; November 3-4, 2022
- **Ford, A, McElliott, V, Miller C (Invited Speaker):** 2022 ACVP/ASVCP Annual Meeting; Boston, MA; November 12-15, 2022
- **Snider, T:** Integrated Beef Cattle Program, Class I

POSTERS, SCIENTIFIC PRESENTATIONS, SCIENTIFIC PUBLICATIONS

PUBLICATIONS:

- Babesiosis and Theileriosis in North America. *Review*. Almazan C, **Scimeca RC**, Reichard MV and Mosqueda J. 2022. *Pathogens* 11:168; (1-21)
- BinXi Wu, Brandy Kastl, **Ada G. Cino-Ozuna**, Nora L. Springer, David Biller, William Whitehouse, Loren Easterwood, Thu Annelise Nguyen. Feline sarcomatoid renal cell carcinoma (sRCCs) with peritoneal carcinomatosis and ascites. *Journal of Veterinary Diagnostic Investigation*. 2022;34(1):153-159. <https://doi.org/10.1177/10406387211054826>
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- **Ford AK**, Palinski RM, Lubbers BV, Tokach L, **Cino-Ozuna AG***. Placentitis and abortion in domestic pigs (*Sus scrofa domestica*) associated with *Trueperella abortusuis* on US swine farms. *J Swine Health Prod.* 2022;30(2):95-100. <https://doi.org/10.54846/jshap/1258>
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ORAL PRESENTATIONS:

- **G. Cino**: Invited speaker. 2022 Animal Science Veterinary Medicine, Tokyo, Japan. April 28-30, 2022
- Miruthula Tamil Selvan, Sachithra Gunasekara, Shannon Cowan, Ping Xiao, Darren Hagan, Jerry W. Ritchey, Jennifer M. Rudd, **Craig A. Miller**. SARS CoV-2 (delta variant) infection kinetics and immunopathogenesis in domestic cats. Oral presentation at the 2022 Phi Zeta Research Day, April 2022
- Weerarathne P, Sanders TL, Kao YF, Cotey SR, Place JD, Fairbanks WS, **Miller CA**, Reichard MV. Prevalence and distribution of Cytauxzoon felis in bobcats (*Lynx rufus*) from Oklahoma and north-western Texas. Oral presentation at the 2022 Phi Zeta Research Day, April 2022
- Miruthula Tamil Selvan, Sachithra Gunasekara, Shannon Cowan, Ping Xiao, Darren Hagan, Jerry W. Ritchey, Jennifer M. Rudd, **Craig A. Miller**. SARS CoV-2 (delta variant) infection kinetics and immunopathogenesis in domestic cats. Oral presentation at the 9th Annual OCRID Symposium, April 2022
- Matthew Rochowski, WMN K. Jayathilake, A. Campolo, J. Balcerak, M. Tamil Selvan, S. Gunasekara, J. Rudd, **C. Miller**, VA. Lacombe. Alterations of Whole-Body Glucose Metabolism in a feline SARS-CoV-2 infection model. Oral presentation at the 9th Annual OCRID Symposium, April 2022
- Allen A. Kalantari, **Akhilesh Ramachandran**, Cindy Watson, Lisa Whittington, Hemant K. Naikare. Characterization of Salmonella spp. isolated from food-producing animals in Oklahoma. Annual ASM conference, June 2022, Washington, DC
- Rebekah Maker, Pabasara Weerarathne, Shannon Cowan, Mason Reichard, and **Craig Miller**. Antibody response to a novel adenovirus-vector vaccine to cytauxzoonosis in domestic cats. Poster presentation at the 2022 National Veterinary Scholar Symposium, August 2022

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- Pabasara Weeraratne*, Shannon Cowan, Mason Reichard, **Ruth Scimeca, Craig Miller**. An Innovative Approach to Replicate *Cytauxzoon felis* Infection in-vitro. Oral presentation at the 2022 ISCAID symposium, September 2022
- Miruthula Tamil Selvan, Sachithra Gunasekara, Ping Xiao, Kristen Griffin, Shannon Cowan, Darren Hagan, Jerry W. Ritchey, Jennifer M. Rudd, **Craig A. Miller**. SARS-CoV-2 (Delta Variant) Infection Kinetics and Immunopathogenesis In Domestic Cats. Oral presentation at the 2022 ISCAID symposium, September 2022
- **Brianne Taylor, Craig Miller**. Pathological Survey of Respiratory Infectious Disease in Oklahoma Shelter Dogs. Poster presentation at the 2022 ISCAID symposium, September 2022
- Yun-Fan Kao, Rebecca Spainhour, Shannon R. Cowan, Laura Nafe, Adam Birkenheuer, Mason Reichard, and **Craig A. Miller**. A Novel IgM ELISA To Detect Acute *Cytauxzoonosis*. Oral presentation at the 2022 ISCAID symposium, September 2022.
- **Scott C. Mitchell, A. Giselle Cino Ozuna, A. Hanzlicek, Aline Rodrigues Hoffman, L Sypniewski, Brianne Taylor**. Disseminated fungal disease in a cat caused by *Cystofilobasidium macerans* (*Cryptococcus macerans*). Poster and oral presentation submitted to the 2022 AAVLD/USAHA Annual Meeting. October 06-12, 2022
- **Giselle Cino Ozuna***, **Alexandra Ford**, Lisa Tokach, Rachel Palinski, Brian Lubbers. Isolation of *Trueperella abortusis* in swine herd abortions. Is this an emerging pathogen? 2022 AAVLD/USAHA Annual Meeting. October 06-12, 2022
- **Sai Narayanan**, Sathyanarayanan Aakur Narasimhan, Arunkumar Bagavathi, **Akhilesh Ramachandran**, Development and evaluation of MG2Vec: A Transformer Neural network for metagenomic shotgun sequencing based BRD pathogen detection, AAVLD, October 6-12, Minneapolis, MN
- Matthew Rochowski, WMN K. Jayathilake, A. Campolo, J. Balcerak, M. Tamil Selvan, S. Gunasekara, J. Rudd, **C. Miller**, VA. Lacombe. SARS-CoV-2 infection induces alteration of cardiac glucose metabolism in a feline model. Oral presentation at the 19th Annual Scientific Sessions-Society for Heart and Vascular Metabolism, October 2022
- **Taylor B.** Neuropathology Mystery Slide Session: Case 4 (Eastern Equine Encephalitis). American College of Veterinary Pathologists Annual Meeting, Boston, MA. November 2022
- **Craig Miller**. Comparative Pathology of SARS-CoV-2 Across the Animal Kingdom. Invited Speaker. ACVP and ASVCP Joint Plenary Session: Pathology of One Health. 2022 ACVP Annual Meeting, Nov 12-Nov 15, 2022
- Axin1: A novel scaffold protein joins the antiviral network of interferon. Yujie Guo, Gayan Bamunuarachchi, Kishore Vaddadi, Zhengyu Zhu, Chaitanya Gandikota, Kainat Ahmed, Samuel Pushparaj, **Sunil More**, Xiao Xiao, Xiaoyun Yang, Yurong Liang, Sanjay Mukherjee, Pradyumna Baviskar, Chaoqun Huang, Shitao Li, Antonius GP Oomens, Jordan Patrick Metcalf, Lin Liu. *Molecular Microbiology* 118 (6), 731-743
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- Development and evaluation of MG2Vec: A Transformer Neural network for metagenomic shotgun sequencing based BRD pathogen detection. **Sai Narayanan**, Sathyanarayanan Aakur Narashimhan, Arunkumar Bagavathi, **Akhilesh Ramachandran**. AAVLD, October 2022
- Cotey S, **Scimeca RC**, Chang L, Will E and Reichard MV. *Toxoplasma gondii* Prevalence and Partial Genotypes in North American River Otters (*Lontra canadensis*) from the Upper Peninsula of Michigan. Wildlife Society Annual Meeting. Nov 6-10, 2022. (Oral presentation by Cotey S)
- Alys Harshbarger, **Ruth Scimeca**, **Akhilesh Ramachandran**, Michael Yabsley, Patrick Grogan, Theresa Rizzi Case report: *Nasal Entamoeba* sp. infection in a dog. ACVP and ASVCP Annual Meeting. November 12-15. 2022. Boston, Massachusetts
- **Hunter AL**, Sanders TL, Storm A, **Taylor BM**, **Scimeca RC**, Reichard MV, **Cino-Ozuna G**. Trichinellosis in a domestic cat in Oklahoma with concurrent fungal cellulitis. ACVP and ASVCP Annual Meeting. November 12-15. 2022. Boston, Massachusetts
- **Mitchell S**, **Scimeca RC**, Yabsley M, Garrett K, **Madden R**, **Ramachandran A**, Kadhim S, **Taylor B**. Necrotizing meningoencephalitis in a binturong (*Arctictis binturong*) caused by *Balamuthia mandrillaris*. ACVP and ASVCP Annual Meeting. November 12-15. 2022. Boston, Massachusetts
- Sanders T, **Hunter A**, **Cino G**, **Taylor B**, **Scimeca RC**, Reichard M. Natural infection of *Trichinella* sp. in a domestic cat from Oklahoma. American Association of Veterinary Parasitologists, Annual Meeting. June 24-28 2022, Snowbird Utah
- **Scimeca RC**, Duncan K, Little S, Sundstrom K and Lineberry M. Cytokine levels in dogs during *Dirofilaria immitis* infection and treatment. American Association of Veterinary Parasitologists, Annual Meeting. June 24-28 2022, Snowbird Utah
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- **Alexandra K Ford**, Brian V. Lubbers, Lisa Tokach, A. **Giselle Cino-Ozuna***(corresponding author). Placentitis and abortion in domestic pigs (*Sus scrofa domesticus*) associated with *Trueperella abortusuis*, an emerging pathogen of swine in US. *J of Swine Health Prod.* 2022;30(2)
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- **Taylor B**. Infectious Disease in Oklahoma Shelter Dogs: 2011-2021. International Society for Companion Animal Infectious Disease Annual Meeting. Glasgow, Scotland, UK. September 2022.
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GLOSSARY

AGGL	Agglutination Test	IgM	Immunoglobulin M
AGID	Agar Gel Immunodiffusion Assay	IHC	Immunochemistry
AIV	Avian Influenza Virus	ILT	Infectious Laryngotracheitis
ASF	African Swine Fever	IOR	Instructor of Record
BAPA	Buffered Acidified Plate Antigen	MAT	Microscopic Agglutination Test
BCV	Bovine Coronavirus	MS/MG	<i>Mycoplasma synoviae</i> / <i>Mycoplasma gallisepticum</i>
BHI	Brain Heart Infusion Medium	NPIP	National Poultry Improvement Plan
BLV	Bovine Leukemia Virus	OHRC	Oklahoma Horse Racing Commission
BRSV	Bovine Respiratory Syncytial Virus	OSDH	Oklahoma State Department of Health
BVD/BVDV	Bovine Viral Diarrhea/BVD Virus	OPP/OPPV	Ovine Progressive Pneumonia/OPP Virus
c-ELISA	Competitive (blocking) ELISA	OVMA	Oklahoma Veterinary Medical Association
CAE	Caprine Arteritis Encephalitis	PAS	Periodic Acid-Schiff stain
CBC	Complete Blood Count	PBS	Phosphate-buffered Saline
CF	Compliment Fixation	PCR	Polymerase Chain Reaction
CSF	Classical Swine Fever	PI-3	Parainfluenza-3 Virus
CVM	College of Veterinary Medicine	PrP	Protease resistant Protein
CY	Calendar Year (January –December)	PRRS/PRRSV	Porcine Reproductive and Respiratory Syndrome/ PRRS Virus
dFA	direct Fluorescent Antibody	PRV	Pseudorabies Virus
EEE	Eastern Equine Encephalitis	PTAH	Phosphotungstic Acid Hematoxylin stain
EHD	Epizootic Hemorrhagic Disease	qPCR	quantitative Polymerase Chain Reaction
EHV	Equine Herpesvirus	RAP	Rapid Automated Presumptive
EIA	Equine Infectious Anemia	RMSF	Rocky Mountain Spotted Fever
ELISA	Enzyme-Linked Immunosorbent Assay	SARS	Severe Acute Respiratory Syndrome
END	Exotic Newcastle Disease	SHI	Synergistic Hemolysin Inhibition
EVA	Equine Viral Arteritis	SIV	Swine Influenza Virus
FA	Fluorescent Antibody	SN	Serum Neutralization
FPA	Fluorescence Polarization Assay	sp./spp.	specie/species
GC/MS	Gas Chromatography/Mass Spectrometry	STP	Standard Plate Test
GMS	Grocott's Methenamine Silver stain	TAT	Turnaround Time
H&E	Hematoxylin and Eosin stain	VMH/VTH	OSU CVM Veterinary Medical Hospital
HI	Hemagglutination Inhibition	VN	Virus Neutralization
HPAI	Highly Pathogenic Avian Influenza	WNV	West Nile Virus
IBR	Infectious Bovine Rhinotracheitis		
IFA/IFAT	Indirect Fluorescent Antibody/IFA Test		
IgG	Immunoglobulin G		