

NORTH DAKOTA STATE UNIVERSITY

2007 ANNUAL REPORT



**Department of Veterinary Diagnostic
Services**

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Department of Veterinary Diagnostic Services (VDS)

Faculty:

Barigye, R, BVM, MSc, PhD, (Pathologist)
Dyer NW, DVM, MS, Diplomate ACVP (Pathologist; Lab Director)
Freeman DA DVM, MS, PhD, Diplomate ACT (Head of Department)
Gibbs P, PhD, (Microbiologist)
Mostrom MS, DVM, MS, PhD, Diplomate ABT, ABVT (Toxicologist)
Newell TK, DVM, PhD, Diplomate ACVP (Pathologist)

Technical Staff:

BACTERIOLOGY:

Darlene Krogh - Medical Technologist, B.S., M.T. (ASCP)
Lynn Schaan – Medical Technologist, B.S., M.T. (ASCP)

MOLECULAR DIAGNOSTICS

Lisa Piche, Microbiologist, MS
Lynae Hansen-Lardy – Microbiologist, BS

CLINICAL PATHOLOGY:

Gail White - Veterinary Technologist, B.S., L.V.T.

HISTOLOGY:

Jessie Schultz – Histologic Technician, HT, (ASCP)
Kathy Fischer, - Medical Technologist, B.S., M.T. (A.S.C.P)

SEROLOGY:

Kathy Fischer, - Medical Technologist, B.S., M.T. (A.S.C.P)

PROSECTONIST:

Gail White - Veterinary Technologist, B.S., L.V.T.

TOXICOLOGY:

DeAnne Iverson – Chemist, B.S.
Kelly Benson – Chemist, B.S.
Beth Tacke, Chemist, B.A.

VIROLOGY:

Sharon Wilson, Microbiologist, BS, M.S.

INFORMATION SYSTEMS:

Kenfrey Mbuba

QUALITY ASSURANCE:

Dawn Walden

ADMINISTRATION:

Sandy Erickson - Administrative Assistant

Mary Finseth - Administrative Officer I
Ginny Levenson - Information Processing Specialist
Jerie Little – Administrative Secretary
Terry Robinson - Administrative Secretary

Personnel Changes:

a. New Employees

1. Lisa Piche
2. Jessie Schultz
3. Kenfrey Mbuba
4. Dawn Walden

b. Resigning or Retiring Employees

1. Mary Osenga
2. Justin Foster
3. Nancy Hergert
4. John Hergert

c. Contract Services

1. Kevin Soiseth – QA/QC Consultant
2. John Hergert - microbiologist
3. Ron Gerth – QA consultant

Mission Statement

The mission of the department reflects the historical, tripartite land grant philosophy of teaching, research and service. The department's primary function is animal disease investigation and surveillance which is accessible, accountable, vigilant and timely. The primary goals are to help reduce losses in North Dakota due to animal disease and assist in the teaching and research programs of NDSU. The mission extends beyond this primary emphasis to include zoonotic disease surveillance, collaboration with state and national biopreparedness efforts, and collaboration with state and national animal health and public health entities.

Service:

To provide quality, timely and current veterinary diagnostic support to veterinarians, animal owners and producers, and the public health sector, and function as an integral part of the local, regional, national and international biosurveillance network.

Teaching:

To provide quality, graduate and undergraduate animal disease instruction using laboratory case material and the training and expertise of diagnostic laboratory faculty and staff.

Research:

To focus research resources on the animal health problems of North Dakota and the region using modern technology, recognizing that addressing questions of a local and regional nature will also answer questions from the national and international community.

I. Goals and Accomplishments, 2007

The North Dakota/Minnesota veterinary profession and animal health communities depend on the lab, and these services certainly impact animal health, agricultural production, and the human/animal bond. Testing and diagnoses were performed in the sections of bacteriology, virology, serology, clinical pathology, histology, toxicology, molecular diagnostics and pathology. In some cases, such as toxicology, we provide a national/international level of diagnostic service. The toxicology section provided diagnostic evaluation and interpretation of toxicology cases for multiple constituents, including veterinarians, specialists, agri-business and NDSU researchers. Our total caseload has remained consistent.

In addition to routine case submissions, the Veterinary Diagnostic Lab (VDL) has collaborations with the ND Department of Health, serving as a Level A surge facility. The NDSU-VDL performs fluorescent antibody and histopathologic examination of non-human exposure rabies cases in North Dakota. The NDSU-VDL participates with the state board of animal health and USDA/APHIS in disease surveillance programs for Johnes disease, CWD, BSE, AI, WNV, and Scrapie.

Nationally, the NDSU-VDL is a member of the National Animal Health Laboratory Network (NAHLN) and participates in national disease surveillance and testing. Technicians are currently certified to perform rt-PCR for FMD, CSF, AI and END. A biosafety level 3 suite is utilized for handling high risk pathogens.

The NDSU-VDL has continued to upgrade equipment, facilities and services. The lab is expanding development and utilization of rapid, molecular diagnostic assays. In addition, a continuing emphasis is directed to improving QA/QC documentation for the entire laboratory.

Routine diagnostic work has also led to interesting professional reports and research collaborations, including *Salmonella* surveillance, antibiotic resistant *E. coli* calf scours, *Enterobacter* reservoir identification, and *Mycobacterium avium* subsp. *paratuberculosis* factors associated with Johnes Disease. The toxicology lab continued a USWBSI/ARS grant providing vomitoxin testing for research scientists in the region.

The lab participates in didactic teaching and serves as a valuable learning resource for students interested in veterinary medicine, microbiology and veterinary technology. Members of the VDL provide the major component of the advising for pre-veterinary medicine students. The VDL also hosted its annual continuing education program for regional veterinarians. These contributions to the teaching mission add to the educational opportunities for NDSU students and also for the community.

A. Instruction and Student Success

1. Courses Taught

SPRING SEMESTER 2007

COURSE #	TITLE	CREDIT	ENROLLMENT	INSTRUCTOR
MICR 363	Clinical Parasitology	2	43	NW. Dyer
VETS 491	Pathology Rounds	1	7	TK. Newell

FALL SEMESTER 2007

COURSE #	TITLE	CREDIT	ENROLLMENT	INSTRUCTOR
VETS 491	Pathology Rounds	1	5	TK Newell
MICR 785	Pathobiology	3	2	R. Barigye
MICR 798	Masters Thesis		4	R. Barigye
MICR 798R	Thesis Continued		3	R. Barigye

2. Advisors – Graduate and Undergraduate

Pre-Veterinary Medicine Program

N.W. Dyer (also Pre-Vet Club advisor)

D.A. Freeman

P. Gibbs

MS (Dyer)

Cheryl Brown

Grant Hertges

Kevin Pina

Rusty Rybolt

Shannon Gaukler

Jake Ihle

Tracy Solseng

Dawn Feltus

PhD (Dyer)

Mafany Mongoh

MS (Barigye)

Ablesh Gautam (major professor)

Kalpesh Parmar

Jake Ihle

3. Committee Activities / Professional Service

Professional associations and organizations.

R. Barigye

Charles Louis Davis, DVM Foundation for the advancement of Veterinary & Comparative Pathology

N W Dyer

American Association of Veterinary Laboratory Diagnosticians
American College of Veterinary Pathologists
American Veterinary Medical Association
North Dakota Veterinary Medical Association
North Central Chapter, Veterinary Laboratory Diagnosticians

D A Freeman

American Veterinary Medical Association
North Dakota Veterinary Medical Association
Minnesota Veterinary Medical Association
American College of Theriogenologists
Society for Theriogenology
Association of American Veterinary Medical Colleges

P Gibbs

Midwest Poultry Consortium, 2003 – present
American Association of Avian Pathologists, 2002 – present
American Association of Veterinary Laboratory Diagnosticians, 2004-present
American Veterinary Microbiologists, 2004-present
American Society for Microbiology, 2004-present
American Association for the Advancement of Science, 2004 – present

MS Mostrom

American Academy of Veterinary and Comparative Toxicology (AAVCT)
Secretary/Treasurer
American Association of Veterinary Laboratory Diagnosticians
American Board of Veterinary Toxicology

TK Newell

American Association of Veterinary Laboratory Diagnosticians
American College of Veterinary Pathologists
American Veterinary Medical Association

Selected Committees and Professional Service

N W Dyer

Executive council – AAVLD (North Central representative)
Secretary – North Central Conference of Veterinary Laboratory Diagnosticians
WICHE Regional Advisory Council on Veterinary Medicine

NDVMA auxiliary scholarship committee
Roger Meisner scholarship committee
North Dakota Veterinary Admissions Committee – Kansas State University
North Dakota Johnne’s advisory council
Non-traditional livestock advisory council
Disaster Resistant University planning committee
IACUC
VMS Departmental PTE committee

P Gibbs

American Association of Avian Pathologists, Committees:
1) Food Safety and Diseases of Public Health Significance
2) Biotechnology Committee (Vice-chair, becoming chair in 2007)
3) Epidemiology Committee
Institutional Animal Care and Use Committee
The Faculty Development Committee
The Great Plains Institute of Food Safety Committee
Women in Science, Mathematics, Engineering, and Technology (WISMET)

D A Freeman

Consultant to Wyeth Pharmaceuticals and Co-Chair, Equine Ranching Advisory Board.
Linwood Equine Ranch, Animal Care Committee
Institutional Representative, Association of American Veterinary Medical Colleges (AAVMC).
AAVMC, Public Health Task Force, Department Chairs, Heads and Directors Committee
USDA, North Central Advisory Committee NCAC-2, Animal Health Advisory (Chair)

M S Mostrom

ABVT (American Board of Veterinary Toxicology), member of Examination Committee on Section 1.
AAVCT/AAVLD – Mycotoxin subcommittee member
IACUC, North Dakota State University, voting member as a veterinarian
IACUC, USDA on NDSU campus, voting member
Attending veterinarian for USDA/ARS Zilpaterol study in equine.

B. Research / Scholarship

Publications in 2007

Barigye, R., Mostrom, M., Dyer, N.W., Newell, T., and Schamber, E. (2007). Ethylene glycol toxicosis in a herd of adult beef cattle. *Can Vet Journal*. (accepted).

Barigye R., Schaan L., Gibbs, P.S., Schamber, E.L., and Dyer, N.W. (2007). Diagnostic evidence of *Staphylococcus warneri* as a possible cause of bovine abortion *J. Vet Diagn Invest*. 19: 694-696.

Barigye, R., Dyer, N.W., Newell, T.K. (2007). Fatal myocardial degeneration in an adult Quarterhorse with vitamin E deficiency. *J of Equine Vet Sci* 27(9):405-408.

Barigye, R., Schamber, E.L., Newell, T.K., and Dyer, W.N. (2007). Hepatic lipidosis and other test findings in two captive adult porcupines (*Erethizon dorsatum*) dying from a “sudden death syndrome” *J. Vet Diagn Invest*. 19: 712-716.

Dyer, NW, Lynae Hansen-Lardy, Darlene Krogh, Lynn Schaan and Evelyn Schamber. An outbreak of chronic pneumonia and polyarthritis syndrome caused by *Mycoplasma bovis* in feedlot bison (*Bison bison*). *J. Vet. Diagn. Invest*. Vol. 20. Number 3, May 2008 (in press).

Mongoh, M. Ndiva, Khaita M.L., Dyer N.W. Environmental and ecological determinants of West Nile virus occurrence in horses in North Dakota, 2002. *Epidemiol. Infect.* 135:57-66, 2007

Mafany-Mongoh, N W Dyer, C L Stoltenow, M L Khaita. 2007. Characterization of an outbreak of anthrax in animals in North Dakota: 243 cases (2005). *The Bovine Practitioner*, 41:101-109.

Mafany-Mongoh, N W Dyer, Khaita, Stoltenow. Risk factors associated with anthrax outbreak in animals in North Dakota, 2005: A retrospective case control study. *Public Health Reports*, Vol 123, Number 3 (accepted)

J. Oloya, M. Theis, D. Doetkott, N W Dyer, P. Gibbs and M L Khaita. 2007. Evaluation of *Salmonella* Occurrence in Domestic Animals and Humans in North Dakota (2000-2005) *J Foodborne Pathogens and Disease*. Vol 4, Num 4, 551-563.

Gibbs, P.S., R. Kasa**, J. Newbrey, S. Petermann, R. Wooley, H. Vinson, and W. Reed. Identification of members of the Family *Enterobacteriaceae* from the gut flora of *Xanthocephalus xanthocephalus* (Yellow-headed blackbirds) in North Dakota. *Avian Dis*. 51:649-655, 2007

Uzoigwe, J.C.**, Khaita, M.L. and Gibbs, P.S.* Epidemiologic Evidence of *Mycobacterium avium* subspecies *paratuberculosis* as a Cause of Crohn’s Disease. *Epidemiol. Infect.* Epub pp. 1 – 12, Cambridge University Press, April 20, 2007; Journal article: *Epidemiol. Infect.* Oct. 135:1057-68. 2007.

Sarah Wagner, Michelle Mostrom, Carolyn Hammer, Jennifer Thorson, David Smith. Adverse effects of zilpaterol administration in horses: Three cases. *Journal Equine Veterinary Science* (accepted for publication).

Abstracts

Barigye, R., Khaita, M.K, Dyer, N.W., Newell, T.K. (2007). Immunohistochemical detection of *Giardia* spp in scouring neonatal calves with intestinal pathology (poster presentation). 2nd International *Giardia* and *Cryptosporidium* Conference (Morelia-Mexico), May 13-15, 2007.

Dyer, NW. Anthrax presentation for BEAR bioterrorism conference at the University of Wyoming in Laramie, Wyoming – 3/07

Dyer, NW. Tularemia in the badlands, NCCVLD annual meeting, Ames, IA, June 7-8, 2007

Mafany-Mongoh*, Khaita, M.L, N. Dyer and C. L. Stoltenow. 2007. Characterization of the 2005 Anthrax Outbreak among Animals in North Dakota. Poster presentation at the joint symposium of the Association of American Veterinary Medical Colleges (AAVMC) and the Association of Schools of Public Health (ASPH), April 23-24, 2007, Atlanta, GA.

Uzoigwe, J. C., M. L. Khaita, P.S. Gibbs. Epidemiologic Evidence of *Mycobacterium avium* subspecies *paratuberculosis* as a cause of Crohn's Disease. The proceedings of the joint symposium of the Association of American Veterinary Medical Colleges (AAVMC) and the Association of Schools of Public Health (ASPH), April 23-24, 2007, Atlanta, GA.

Parmar, K., H. Vinson, and P.S. Gibbs. Molecular analysis of multi-drug resistant *Escherichia coli* isolated from scouring calves in North Dakota. In: the Proceedings of the 107th American Society for Microbiology General Meeting, May 20 – May 25, 2007, Toronto, Ontario.

Ihle, J., H. Vinson, and P.S. Gibbs. Substrate Specificity of the Vacuolating Autotransporter Toxin from *Escherichia coli*. In: the Proceedings of the 107th American Society for Microbiology General Meeting, May 20 – May 25, 2007, Toronto, Ontario.

Non-refereed publications, newsletters, lay articles, etc.

Mostrom, MS and Raisbeck, M “Trichotheceles” and Mostrom, MS “Zearalenone” chapters in: *Veterinary Toxicology: Basic and Clinical Principles*, Ramesh C. Gupta (Editor), Elsevier.(published in February 2007).

Dyer, NW. February Fencepost column on Leptospirosis for North Dakota Stockman's Association

Manuscripts submitted:

R. Barigye, M.K. Khaita, E. Shamber, N.W. Dyer, T.K. Newell, M. Santin, J.M. Trout, and R. Fayer (2007). Molecular and immunohistochemical detection of Assemblage E *Giardia duodenalis* in scouring neonatal calves with intestinal lesions. *Vet Pathol.* (*submitted*).

Mafany-Mongoh, N W Dyer, C L Stoltenow, M L Khaita. A review of management practices for the control of anthrax in animals: The 2005 outbreak in North Dakota – case study. *Zoonoses and Public Health* (in revision).

Manuscripts in preparation:

Barigye, R., Dyer, N.W., Newell, T.K. (2007). Outbreak of papillomatous digital dermatitis in a North Dakota dairy herd. *J of Bov. Pract.* (manuscript in preparation).

N W Dyer, “Uterine adenocarcinoma in an African Lion”

Petermann, S. R., E. A. M. Tron, J. El Attrache, R. E. Wooley, E. Daninger, J. I. Ihle, and P.S. Gibbs*. Analysis of *Escherichia coli* isolates from a chicken flock affected with colibacillosis.

Gibbs, P.S., H. Wilke, M. Ingolfsland, L. Presser, T. Buechler, K. Haid, N. Dyer, and S. R. Petermann. ECOR grouping virulence factors of clinical bovine *Escherichia coli* isolates from the North Dakota Veterinary Diagnostic Laboratory, 2003-2004. *In preparation for submission to The Journal of Veterinary Diagnostic Investigations.*

Gibbs, P.S., S. R. Petermann, H. Wilke, L. Presser, T. Buechler, K. Haid, J. R. Foster, and N. Dyer. Analysis of ECOR grouping and virulence factors in clinical *Escherichia coli* isolates taken from multiple host species from the North Dakota Veterinary Diagnostic Laboratory, 2003-2004. *In preparation for submission to The Journal of Veterinary Diagnostic Investigations.*

Nangoh, Lilian**, H. Vinson, M. Khaita and P.S. Gibbs*. Identification and characterization of *Enterobacter sakazakii* from bovine and bison fecal samples. *To be submitted to the International Journal of Food Protection.*

Parmar, Kalpesh**, H. Vinson, and P.S. Gibbs*. Characterization of virulent, multidrug resistant *Escherichia coli* from calf scours in North Dakota. *In preparation for submission to Veterinary Microbiology.*

Presentations in 2007

Barigye, R., Poster presentation: “*Molecular and immunohistochemical detection of Assemblage E Giardia duodenalis in scouring neonatal calves with intestinal lesions*”, the 2nd International *Giardia* and *Cryptosporidium* Conference, Michoacan, Mexico; May 13th-18th.

Barigye, R., Oral presentation: “*Molecular and immunohistochemical detection of Assemblage E Giardia duodenalis in scouring neonatal calves with intestinal lesions*”; NDSU Annual Diagnostic Laboratory Continuous Education Seminar-May 17th 2007.

Gibbs, P., “Treatment of antibiotic resistant infections topically with Tricide™.” NDSU Annual Diagnostic Laboratory Continuous Education Seminar-May 17th 2007.

Mostrom, MS, Mycotoxins in Swine. Presented at a Swine Nutrition Focus meeting in Des Moines, Iowa. Sept. 2007.

Newell TK,– Abortion diagnosis tips. NDSU Annual Diagnostic Laboratory Continuous Education Seminar-May 17th 2007.

Grants/Contracts

1. Proposals funded in 2007.

Barigye, R., and Gibbs, P. (2007). Project: “Antigenic characterization of multi-drug resistant *Escherichia coli* isolates from scouring calves”; April, 2008-July, 2009. Gordon A. Larson Agricultural Fund, NDSU Development Foundation Grant Award; \$5000.00.

Barigye, R., Dyer, W.N, Newell, T., and Khaitisa, L.M. A study on the role of *Giardia spp* in neonatal calf scours in North Dakota livestock, ". North Dakota State board of Agricultural Research & Education (SBARE). \$16,528.00. June, 2007 -June 2008.

Barigye, R., and Gibbs, P. (2007). Antigenic characterization of multi-drug resistant *Esherechia coli* isolates from scouring calves. April-June, 2007, North Dakota State University EPISCoR Program \$ 2,500.00.

Barigye, R., and Gibbs, P. (2007). Antigenic characterization of multi-drug resistant *Escherichia coli* isolates from scouring calves. April, 2007-July, 2008. \$4000.00. NDSU Development Foundation Grant Award.

Dyer, NW, NDSU-DCE course development grant; 5/07; \$3900.00; 5 on-line courses towards the development of a “Livestock Health Management” certificate.

Dyer, NW, CDC Bioterrorism preparedness, with the NDDoH, \$15,000.00, 12/07

Mostrom, MS, Diagnostic Services for Vomitoxin (DON) in Wheat, to the USWBSI/USDA-ARS, \$68,775.

Wendy Reed, Penelope Gibbs, and Stephen Foster. “Influence of maternal steroid and carotenoid investments on offspring performance in Japanese quail (*Coturnix coturnix japonica.*) Submitted to AES/CSM Small Award, NDSU, Amount requested: \$10,000. Duration of project: October 1, 2007 – September 30, 2008

Principle Investigator: Dr. Finny Mathew, Research Scientist, RapidBiosense, LLC
Co-principle investigator: Dr. Penelope S. Gibbs. “Low-cost conductimetric biosensor for detection of multiple bioterrorism agents.” Submitted to USDA-CSREES, SBIR Award
Amount Requested and received for Dr. Gibbs: \$6,040. Duration of project: June 2007 – June 2009

2. Proposals submitted with decisions pending in 2007.

Mostrom, MS, Diagnostic Services for Vomitoxin (DON) in Wheat, to the USWBSI/USDA-ARS, \$79,097

Penelope Gibbs; Co-principle investigators: Dr. Larry McDougald, Dr. Lorraine Fuller (Both from the Department of Poultry Science, University of Georgia, Athens, GA). “Coccidiosis in Game Birds: A proposal for research on the disease agents, their control by existing drugs, and control by immunization.” Submitted to the Midwest Poultry Consortium
Amount requested (including industry match): \$21,875

Jing Shi; Co-Principle Investigators: Chao You, Penelope S. Gibbs, Margaret Khaita
“Multi-Function Food Defense System for Cold Chain Using Integrated Predictive Microbiology with RFID/Sensor/Wireless-Communication Technologies.” Submitted to USDA Food Safety Program,
Amount requested: \$600,000

Peter G. Oduor; Co-Principle Investigator: Penelope Gibbs. “Research on Numerical Modeling of Hyperfiltration-Induced Biostimulated Degradation of TCE on a Homoionic Geomembrane and its Retention Mechanisms.” Submitted to: The Department of Defense / Department of Army; Amount requested: \$424,385

3. Reports to Granting Agencies

Mostrom, MS, Final report to the USWBSI FY06 Diagnostic Services for Vomitoxin (DON) in Wheat.

C. VETERINARY DIAGNOSTIC SERVICE

Summary

The primary service mission of VDS is to 1) provide quality, timely and current veterinary diagnostic support to veterinarians, animal owners and producers, and the public health sector; and 2) function as an integral part of the local, regional, national and international biosurveillance network.

In 2007, 9839 cases were processed by the North Dakota Veterinary Diagnostic Laboratory (NDSU-VDL) at North Dakota State University. Approximately 28% of the cases were equine, 21% bovine, 22% canine, 7% feline, 3% ovine, 2% porcine, 1% chicken and 0.5% caprine. Approximately 9% of the cases were feed. Most cases were submitted from North Dakota (68%) and Minnesota (24%). Testing and diagnosis were performed in the sections of bacteriology, virology, serology, clinical pathology, histology, toxicology, and pathology. The NDSU-VDL continues to perform fluorescent antibody and histopathologic examination of all non-human exposure rabies cases in North Dakota. Of 347 rabies submissions, 30 were positive (11 skunks, 2 bats, 2 cows, 7 dogs, 4 cats, 2 horses, 1 goat, 1 racoon). The NDSU-VDL is also involved in surveillance networks, including chronic wasting disease (elk, deer), bovine spongiform encephalopathy, West Nile virus, Avian Influenza and Mycobacterium avium subsp. paratuberculosis.

**Veterinary Diagnostic
Laboratory
2007 Accessions By
Species**

<u>Species</u>	<u>Number of Cases</u>	<u>Number of Specimens</u>	<u>Number of Tests</u>
African Lion	1	1	1
Alpaca	4	11	15
Bat	14	15	23
Bearded Dragon	1	1	4
Beauty Rat Snake	2	4	6
Bighorn Sheep	2	15	32
Birds - Miscellaneous	174	1693	2183
Bovine	2092	23126	27491
Buffalo	11	121	255
Canada Goose	2	8	8
Cat	650	797	839
Chicken	103	1036	1026
Chipmunk	1	1	2
Conure	1	1	1
Coyote	2	2	4
Crane	1	6	5
Crow	6	7	7
Dog	2208	2542	2943
Donkey	4	4	4
Elk	23	248	505
Feed	927	2379	28113
Ferret	9	9	9
Fossa	1	1	1
Fox	5	10	14
Frog	1	1	1
Gecko	1	1	2
Gerbil	1	5	4
Goat	45	216	260
Golden Eagle	1	1	1
Goose	1	13	7
Gray Squirrel	1	2	1
Guinea Pig	3	12	10
Hamster	1	1	1
Hawk	2	2	2
Hedgehog	2	2	3
Horse	2743	5867	5939
Horsefly	2	5	5
House Mouse	3	9	7

Species	Number of Cases	Number of Specimens	Number of Tests
Lemur	1	1	1
Leopard	1	2	2
Llama	5	14	14
Miniature Donkey	1	2	2
Mink	20	198	237
Moose	5	19	31
Mountain Lion	1	2	2
Mule	8	10	10
Mule Deer	2	23	21
Muskrat	1	1	2
Mute Swan	1	6	5
Non-Living	148	148	148
Onager	1	1	1
Panda	3	3	3
Panther	1	2	2
Peregrine Falcon	2	2	2
Pigeon	4	16	12
Porcine	169	1601	1062
Porcupine	5	17	15
Quail	1	3	2
Rabbit	11	40	34
Raccoon	17	33	49
Rat	1	1	1
Reindeer	6	20	26
Ring-Billed Gull	1	1	1
Ring-Necked Pheasant	1	30	30
River Otter	1	2	2
Sharp-Shinned Hawk	1	1	1
Sheep	267	1297	1103
Skunk	16	16	32
Snow Goose	1	7	5
Snow Leopard	2	5	7
Species Not Reported	12	162	175
Starling	7	29	29
Turkey	19	343	115
Wallabies	1	4	4
Water	18	24	88
White-Tailed Deer	25	203	184
Woodchuck	1	1	2
TOTAL	9839	42465	73196

2007 Accession Frequency by State

State	Number of Occurrences
Alabama	2
Arizona	20
Arkansas	1
California	3
Colorado	2
Connecticut	1
Delaware	1
Florida	2
Georgia	2
Idaho	10
Illinois	5
Indiana	23
Iowa	21
Kansas	6
Kentucky	21
Michigan	29
Minnesota	2320
Missouri	45
Montana	38
Nebraska	19
New Jersey	1
North Carolina	1
North Dakota	6723
Ohio	13
Oklahoma	8
Oregon	5
Pennsylvania	9
South Carolina	1
South Dakota	143
Tennessee	21
Texas	9
Utah	26
Washington	16
Wisconsin	230
Wyoming	4
Canada	58

2007 North Dakota Rabies

SPECIES	NUMBER NEGATIVE	NUMBER POSITIVE
Bats	12	2
Bovine	37	2
Canine	75	7
Caprine	2	1
Equine	9	2
Feline	149	4
Racoon	16	1
Rodent/Other	13	0
Skunk	4	11
Totals	317	30

Based on results from the ND Veterinary Diagnostic Laboratory and the North Dakota of Health of Bismarck

MICROBIOLOGY

2007 Examinations Performed

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Mycoplasma Culture	13	8	8	16	13	10	14	22	3	26	18	18	169
Trichomonas Culture	1	2	16	7	26	14	3	3	6	5	6	10	99
Campylobacter Culture				1									1
Anthrax Culture ID		2					7	16	6	4	1		34
Aerobic Culture	310	359	501	551	329	212	232	238	133	251	214	192	3522
Anaerobic Culture	1		1	1		2	1			2			8
Anaerobic/Aerobic Culture													
Johne's Culture	144	148	161	34	41	66	139	10	4	10	13	26	796
Milk Culture	1	2	1	13	1	31	2	21	6	36		2	116
Mycoplasma Milk Culture	2		1	2	1	5		5	5	11		1	33
Bulk Tank Plate Count			9			1		11		6		4	31
Fungal Culture	1	1	9	4	2	2	3	4	18	4	4	1	53
Ear Swab Culture	13	3	26	9	15	9	13	10	17	21	13	11	160
Feed Plate Count			29	118	9	5	1		6				168
Total	486	525	762	756	437	357	415	349	204	376	269	265	5201

MICROBIOLOGY

2007 MICROBIOLOGICAL EXAMINATIONS BY SPECIES

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Birds	44	35	16	6	15	12	13	3	6	2	10	9	171
Sheep	7	17	15	13	3	6	4	6	1	15	1	0	88
Equine	34	12	28	34	20	11	12	20	12	15	8	8	214
Dog	39	27	46	31	33	49	54	53	73	42	48	44	539
Cat	13	13	22	9	21	17	17	28	14	24	13	18	209
Goat	0	4	6	14	3	2	7	6	7	3	5	4	61
Porcine	33	33	8	34	12	21	6	23	4	36	9	2	221
Mink	0	5	5	17	29	13	34	1	24	5	0	16	149
Bovine	266	237	448	436	243	263	120	152	98	153	156	171	2743
Other	12	7	21	19	13	6	12	15	8	52	4	2	171
Total	448	390	615	613	392	400	279	307	247	347	254	274	4566

2007 SUSCEPTIBILITIES

AS PERFORMED USING TREK SENSITITER SYSTEM

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Large Animal	47	52	80	125	61	27	41	35	9	37	27	35	576
Equine/Small Animal	33	26	34	33	41	46	47	53	58	51	35	38	495
Avian	12	9	7	2	5	9	7	2	1	1	3	2	60
Mastitis	2	1	0	7	1	12	2	8	2	4	2	1	42
Identification	77	36	24	53	67	60	69	62	49	67	47	65	676
Total	171	124	145	220	175	154	166	160	119	160	114	141	1849

**2007 MICROBIOLOGY
SIGNIFICANT PATHOGENS ISOLATED**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Achromobacter sp.													
Actinobacillus equuli													
Actinobacillus pleuropneumoniae			2										2
Actinobacillus sp.	5	5		2	5					3		1	21
Actinobacillus suis	1	7						1		1			10
Actinomyces								1	1				2
alpha Streptococcus		2	4	8	1	3			1		1		20
Arcanobacterium pyogenes	22	7	18	7	11	5	6	14	2	3	3	4	102
Bacteriodes fragilis					1								1
Beta streptococcus						3	2						5
Bordetella		4	2	1		1		2		4	4	2	20
Branhamella												1	1
Branhamella catarrhalis													
Branhamella ovis		1		3	1	2	2	8			1	5	23
Campylobacter coli			2		2								4
Campylobacter jejuni	2		2				3				1		8
Campylobacter sp.		1							1			2	4
Candida				1									1
Clostridium perfringens	11	9	21	23	16	6	5	8	3	6	9	8	125
Corynebacterium									1				1
Corynebacterium pseudotuberculosis							2			3			5
E. coli	46	100	155	212	132	71	67	44	28	38	89	36	1018
Enterobacter									1	1			2
Enterobacter cloacae		1				1		1	1				4
Enterococcus faecalis	1	1		1	1		1	3	2	5	2	23	40
Enterococcus faecium			1				1	1		2	1		6
Erysipelothrix rhusiopathiae											2		2
Flavobacterium sp.													
Fungus	1		1	1		1							4

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Fusobacterium	1												1
Gamma Streptococcus			1				2						3
Gram-negative bacteria										1			1
Haemophilus sp.	1												1
Haemophilus parasuis				3									3
Hemolytic E. coli													
Hemolytic Staphylococcus		1	3	1		3	1	3	1			1	14
Histophilus somnii	1	1	2		3	1	2	1			12	4	27
Klebsiella sp.							2						2
Klebsiella oxytoca					1			1			3		5
Klebsiella pneumoniae	1				1		2						4
Listeria monocytogenes					1		1						2
Malassezia pachydermatis	1									1			2
Mannheimia haemolytica	6	10	3	25	3	2	5	7		11	10	11	93
Micrococcus sp.						1				1			2
Moraxella bovis												1	1
Morganella sp.											1		1
Mycobacterium paratuberculosis	34	28	40	13	26	1	1	0	2	5	6	3	
Mycobacterium sp.													
Mycoplasma sp.						1			3			1	5
Pantoea agglomerans								1					1
Pasteurella canis		2	1	1	1	1	2	2	4	3	1	2	20
Pasteurella dagmatis		1	1					1		2			5
Pasteurella multocida	8	7	7	19	9	1	7	7	1	8	6	9	89
Pasteurella sp.	1			1		3	2	1	4			1	13
Pasteurella trehalosi	1		6	3		2	1	2		5	1		21
Prevotella													
Proteus mirabilis		3		1				1	1	1		1	8

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Providencia sp.										1			1
Pseudomonas sp.		1			3	2	3			1		1	11
Pseudomonas aeruginosa	1	1			1	2	2	1	3	2	1	1	15
Rhodococcus equi										1			1
Salmonella arizona		2									1		3
Salmonella sp.	14	13	4	5	7	4	7	2	3	10	11	5	85
Staphylococcus sp.			3			5		3	1		1		13
Staphylococcus aureus	1		1				2	1	1	2	2	2	12
Staphylococcus hyicus	1		1		1			2		2			7
Staphylococcus intermedius	2	5		4	1	8	6	5	4	7	2	5	49
Streptococcus canis	1	2		2	1	7		2	1	4	2	2	24
Streptococcus equi	6					1				2			9
Streptococcus equisimilis	1			1			1	1		1			5
Streptococcus pneumoniae													
Streptococcus sp.	1					1						2	4
Streptococcus suis	4	2	2	7	6		2	3	1	2	4		33
Streptococcus uberis			11										11
Streptococcus zooepidemicus	2	2	5	5	3	2	3	5	40	4	2		73
Weeksella sp.									1				1
Yeast	1				1							2	4
Total	179	219	299	350	239	141	143	135	112	143	179	136	2116

2007 Clinical Pathology Examinations

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CBC	3	5	7	2	5	7	6	10	5	2	1	3	56
Cortisol				2		1		2		2			7
Electrolyte Profile								1				4	5
Fecal Flotation	18	15	20	32	31	11	20	12	8	25	15	16	223
Fecal Occult Blood												1	1
Fibrinogen							1						1
General Health Profile	4	4		5	4	1	3	10	3	1	1	1	37
Lg. Anim. General Health Profile	6	2	2	2	6	14	7	7	3	2		1	52
Misc. Individual Blood Chem. Tests	1		13	2	7			3	2		11	8	47
Parasite ID			1										1
Rumen pH	1		2	4	1	3	1					1	13
T4	1	3	1	1	4	14	32	37	18	27	30	31	199
Urinalysis	1		2		2		1	2	3	4	2	1	18
Total	35	29	48	50	60	51	71	84	42	63	60	67	660

2007 Bovine E. coli Virulence Factor Testing

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
K99 Pos	1	2	2	4	3	0	0	0	0	0	0	0	12
K99 Neg	11	17	54	65	37	7	11	8	2	2	4	7	225
F41 Pos	1	3	2	4	3	0	1	0	0	0	0	0	14
F41 Neg	11	16	54	65	37	7	10	8	2	2	4	7	223
Sta Pos	1	2	2	5	3	0	0	0	0	0	0	1	14
Sta Neg	11	17	54	64	37	7	11	8	2	2	4	6	223
Intimin Pos	0	0	2	2	1	1	0	0	0	0	0	1	7
Intimin Neg	12	19	54	67	39	6	11	8	2	2	4	6	230
Stx-I Pos	0	1	2	5	1	2	0	0	0	0	0	0	11
Stx-I Neg	12	18	54	64	39	5	11	8	2	2	4	7	226
Stx-II Pos	0	0	1	2	0	1	0	0	0	0	0	0	4
Stx-II Neg	12	19	55	67	40	6	11	8	2	2	4	7	233

2007 Porcine E. coli Virulence Factor Testing

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
K88 Pos	0	0	0	0	0	0	0	0	0	1	0	0	1
K88 Neg	1	0	1	2	2	1	0	1	0	0	1	0	9
K99 Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
K99 Neg	1	0	1	2	2	1	0	1	0	1	1	0	10
F41 Pos	1	0	0	0	0	0	0	0	0	0	0	0	1
F41 Neg	0	0	1	2	2	1	0	1	0	1	1	0	9
F18 Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
F18 Neg	1	0	1	2	2	1	0	1	0	1	1	0	10
987P Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
987P Neg	1	0	1	2	2	1	0	1	0	1	1	0	10
Sta Pos	0	0	0	0	0	0	0	1	0	1	0	0	2
Sta Neg	1	0	1	2	2	1	0	0	0	0	1	0	8
Stb Pos	0	0	0	0	0	0	0	0	0	1	0	0	1
Sta Neg	1	0	1	2	2	1	0	1	0	0	1	0	9
LT Pos	0	0	0	0	0	0	0	1	0	0	0	0	1
LT Neg	1	0	1	2	2	1	0	0	0	1	1	0	9
Stx2e Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
Stx2e Neg	1	0	1	2	2	1	0	1	0	1	1	0	10

2007 Clostridium perfringens PCR Typing

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Type A Pos	0	0	6	8	9	4	3	1	0	2	2	1	36
Type A Neg	0	0	1	0	1	0	0	0	0	0	0	0	2
Type B Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
Type B Neg	0	0	7	8	10	4	3	1	0	2	2	1	38
Type C Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
Type C Neg	0	0	7	8	10	4	3	1	0	2	2	1	38
Type D Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
Type D Neg	0	0	7	8	10	4	3	1	0	2	2	1	38
Type E Pos	0	0	1	1	0	0	0	0	0	0	0	0	2
Type E Neg	0	0	6	8	10	4	3	1	0	2	2	1	37

SALMONELLA 2007
As Identified by NVSL, Ames, Iowa

SPECIES	BOV	CAN	CHK	EQU	FEL	MISC	MINK	OVN	POR	REP	AVIAN	TOT
S.agona											1	1
S. arizona								5				5
S. bardo												0
S. blockley												0
S.cerro												0
S. derby	1								1			2
S.dublin	3											3
S.hadar											4	4
S. heidelberg	1											1
S. kentucky						1						1
S. kiambu												0
S. livingstone												0
S. mbandaka	1											1
S. muenster	11											11
S. newport	2										1	3
S. reading												0
S. rubislaw												0
S. saint-paul												0
S. senftenberg											1	1
S. species				1		1						2
S. thompson												0
S. typhimurium	6					2			1			9
S. typhimurium var copenhagen												0
S. montevideo			1									1
S. rissen												0
S. muenchen												0
S. lagensalza												0
S. braenderup												0
S. enteritidis	1				1	2						4
S. anatum	1								2		4	7
S. litchfield	1					1						2

SPECIES	BOV	CAN	CHK	EQU	FEL	MISC	MINK	OVN	POR	REP	AVIAN	TOT
S. cholerasuis									1			1
S. infantis						3						3
S. oranienburg	2											2
S. brandenburg		1										1
S. schwarzengrund						1						1
S. ohio						1						1
TOTAL	30	1	1	1	1	12	0	5	5	0	11	67

2007 Serology Examinations

<u>Test</u>	<u>Cases</u>	<u>Samples</u>	<u>Positive</u>	<u>Other</u>
Anaplasmosis (c-ELISA)	77	1175	101	31 Borderline
Brucellosis (SPT)	103	579	1	0
Brucellosis (Card)	14	278	0	0
Brucellosis (Rivanol)	11	174	0	0
Brucellosis (BAPA)	10	58	0	0
Brucellosis (CF)	8	140	0	34 Anticomplementary
Brucella canis (RSAT)	53	59	1	0
Brucella ovis (ELISA)	109	778	3	16 Indeterminate
Bovine Leukemia (AGID)	7	153	32	0
Bovine Leukemia (ELISA)	120	2076	492	0
Bluetongue (c-ELISA)	17	132	5	0
BVD ELISA	8	890	0	14 Suspect
Caprine Arthritis Encephalitis (AGID)	4	18	0	0
Clostridium chauvoei FA	23	31	4	0
Clostridium novyi FA	23	31	1	0
Clostridium septicum FA	23	31	4	0
Clostridium sordelli FA	23	31	2	0
EIA (AGID)	4	23	0	0
EIA (ELISA)	2371	5284	1	0
Feline Leukemia (RIA)	12	12	2	0
Feline Immunodeficiency Virus (RIA)	12	12	2	0
Feline Infectious Peritonitis (c-ELISA)	18	18	13	0
Giardia (Fecal RIA)	227	281	19	0
IgG (Radial Immunodiffusion)	4	7		
Johne's (ELISA)	531	12250	601	124 Suspect
Leptospira (Darkfield)	69	83	2	0
Leptospira (FA)	109	134	11	0
Leptospira bratislava (MAT)	121	203	27	0
Leptospira canicola (MAT)	121	203	14	0
Leptospira grippotyphosa (MAT)	121	203	17	0
Leptospira hardjo (MAT)	122	205	21	0
Leptospira icterohemorrhagiae (MAT)	121	203	63	0
Leptospira pomona (MAT)	121	203	17	0
Neospora (c-ELISA)	37	83	2	0
Ovine Progressive Pneumonia (AGID)	10	46	3	0
PRRS (ELISA)	9	49	6	0
Pseudorabies (c-ELISA)	22	368	0	0
Small Animal 4DX (RID)				
Anaplasma	41	42	3	0
Ehrlichia	41	42	2	0
Lyme Disease	41	42	1	0
Heartworm	41	42	2	0

Electron Microscopy		JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC		TOTALS		
Virus	Species	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
Adenovirus																												
	Duck																									0	0	
	Equine					2	0																			2	0	
	Avian													1	0											1	0	
	WT Deer																									0	0	
	TOTAL	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	
Coronavirus																												
	Bovine	17	0	20	1	78	1	96	8	57	1	14	0	19	0	11	0	5	0	3	0	14	1	14	0	348	12	
	Buffalo																								1	0	1	0
	Canine	1	0	3	0	2	0			1	0	1	0	1	0									2	0	11	0	
	Caprine															1	0							1	0	2	0	
	Caribou																									0	0	
	Elk																									0	0	
	Equine									2	0	1	0	1	0											4	0	
	Feline	1	0													1	0	1	0	2	0					5	0	
	Fox																	1	0							1	0	
	Hedgehog																									0	0	
	Mink																									0	0	
	Ovine																									0	0	
	Porcine			1	0	1	0			2	0	3	0			2	0			1	0	3	0			13	0	
	Rabbit																									0	0	
	WT Deer																									0	0	
	TOTAL	19	0	24	1	81	1	96	8	62	1	19	0	21	0	15	0	7	0	6	0	17	1	18	0	385	12	
Feline Calicivirus																												
	Feline																										0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Parvovirus																												
	Bovine																										0	0
	Canine	1	0	2	0	2	2	2	0	1	0	1	0	3	0										6	1	18	3
	Equine																										0	0
	Feline									1	0	1	0			1	0	1	0					1	0	5	0	
	Fox																	1	0							1	0	
	Mink													1	0											1	0	
	Panda																									0	0	
	Porcine																										0	0
	Raccoon	1	0																								1	0
	Other							1	0																		1	0
	TOTAL	2	0	2	0	2	2	3	0	2	0	2	0	4	0	1	0	2	0	0	0	0	0	7	1	27	3	
Poxvirus																												
	Bovine																										0	0
	Ovine																										0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rotavirus																												
	Bovine	16	2	16	2	77	15	95	10	57	5	14	1	13	2	8	0	5	0	4	0	9	0	11	2	325	39	
	Buffalo																								1	0	1	0
	Canine																										0	0
	Caprine									1	0					2	0					1	0	1	0	5	0	
	Caribou																										0	0
	Elk																										0	0
	Equine					2	0	1	0	2	0	1	0	1	0							1	0			8	0	
	Fox																										0	0
	Hedgehog																										0	0
	Marmoset																										0	0
	Mink																										0	0
	Ovine											1	0	1	0												2	0
	Pheasant																										0	0
	Porcine			1	0	1	0			2	0	2	0			2	0			1	0	3	0			12	0	
	Rabbit																										0	0
	WT Deer																										0	0
	Other							2	0																		2	0
	TOTAL	16	2	17	2	80	15	98	10	62	5	18	1	15	2	12	0	5	0	5	0	14	0	13	2	355	39	
OTHER																												
	Feline																										0	0
	Equine									1	0																0	0
	Lovebird																										0	0
	Marmoset																										0	0
	Mink																										0	0
	Parakeet																										0	0
	Wallabi							1	0																		1	0
	TOTAL	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Total Samples		772																										
Total Positives		54																										

Virus Isolation																												
2007																												
Species	JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC		Annual Tot			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
Bovine	9	0*	4	0	4	0	10	0	7	0	5	0	2	0	19	5#*			5	0*	1	0*	1	0*	67	5		
Buffalo																										0	0	
Canine															1	0	1	0									2	0
Caprine							2	0																			2	0
Equine					2	0			1	0					1	0											4	0
Feline					2	1																					2	1
Ovine																											0	0
Mink																											0	0
Muntjac																											0	0
Porcine			1	0			1	0					1	0	1	0											4	0
Porcupine																											0	0
Rabbit																											0	0
WT Deer																											0	0
TOTAL	9	0	5	0	8	1	13	0	8	0	5	0	3	0	22	5	1	0	5	0	1	0	1	0	81	6		

	^EMC	*BVD
	\$ herpes	#IBR

Rabies FA		S= SAMPLE																									
2007		P= POSITIVE																									
Species	JAN		FEB		MARCH		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC		TT/SPC		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
Alpaca													1	0												1	0
Badger																										0	0
Bat											2	0	1	0	5	0			2	0			1	1	11	1	
Beaver																									0	0	
Bighorn																									0	0	
Bovine	4	0	1	0	2	0	3	0	8	2	2	0	3	0	1	0			3	0	4	0	4	0	35	2	
Canine	2	0	1	0	4	0	6	0	8	1	5	0	6	1	12	0	5	0	2	0	2	0	2	0	55	2	
Caprine									2	1	1	0									1	0	1	0	5	1	
Coyote			1	0			1	0																	2	0	
Deer																									0	0	
Donkey																									0	0	
Elk																									0	0	
Equine					1	0	1	0	1	0	2	0	1	0	1	0			1	0					8	0	
Feline	5	0	4	1	1	0	3	0	9	0	15	0	11	0	5	0	6	0	5	0	12	0	8	0	84	1	
Feline(ex)																									0	0	
Ferret																									0	0	
Fox							1	0																	3	0	
Goat													2	0							1	0	1	0	2	0	
Gopher																									0	0	
Hamster																									0	0	
Mink																									0	0	
Moose									1	0															1	0	
Mountain Lion																									0	0	
Mouse																									0	0	
Muskrat																									1	0	
Otter																									0	0	
Ovine											1	0													1	0	
Porcine																									0	0	
Porcupine																									0	0	
Raccoon	1	0			2	0			1	0	2	0	2	0	1	0	1	0			3	0			13	0	
Shrew																									0	0	
Skunk	1	0	1	1	2	0			1	0	2	0	2	1			4	3	1	0			1	1	15	6	
Squirrel													1	0											1	0	
Weasel																									0	0	
Woodchuck													1	0											1	0	
TOTAL	13	0	8	2	12	0	15	0	31	4	32	0	31	2	25	0	17	3	14	0	23	0	18	2	238	13	
TOTAL SAMPLES	239																										
TOTAL POSITIVES	13																										

Histology Summary
2007 Cases, Slides and Sections

Month	Cases	Slides	Sections
Jan	271	444	1909
Feb	262	499	2317
March	351	601	2538
April	371	540	2318
May	342	557	2186
June	251	345	1205
July	222	354	1321
Aug	258	359	1295
Sept	210	319	1269
Oct	236	310	1110
Nov	219	360	1317
Dec	234	340	1204
TOTAL	3,227	5,028	19,989

2007 Sections

Month	R. Barigye	N.Dyer	T. Newell	Total
Jan	483	470	956	1909
Feb	651	744	922	2317
March	1256	233	1049	2538
April	934	424	960	2318
May	536	407	1243	2186
June	430	129	646	1205
July	459	235	627	1321
Aug	172	490	633	1295
Sept	0	408	861	1269
Oct	421	266	423	1110
Nov	498	194	625	1317
Dec	309	513	382	1204
TOTAL	6149	4513	9327	19989

Histology

2007 Special Stains	Requests
AFB	31
Alcian Blue	0
Argent Affin	0
BB	10
BRSV	4
BVD Ears	3590 Ears
BVD Tissues	24
CD3	6
CD79A	6
CDV	0
Congo Red	2
Coronoa	0
Cytokeratin	13
Cryptosporidia	321
Desmin	3
Diastase Digest	0
Dieterles	10
DifQuick (Converslipped only)	196 slides
DifQuick (stained)	138 slides
EHV	9
Factor VIII	4
Giardia	6
Gimenez	0
GMS	18
Goldman	0
GFAP	3
HMB45	0
IgG	0
Von Kossa	0
Luxol Fast Blue	4
Mucicarmine	0
Melanin Bleach	0
Melanin A	6
Myoglobin	1
Neospora	14
Oid Red O	0
Page Green	0
PAS	22
Pearls (iron)	7
Mycoplasma Bovis	6

(642 slides read)

2007 Special Stains	Requests
PCNA	0
PRRSV	27
Rhodanine O (copper)	1
Rota	0
S100	0
Schmorls	0
Toluidine Blue O	44
Toxoplasma G	2
One Step Trichrome	1
Van Giesen	0
Warthin Starry	0
West Nile Virus	17
Chlamydia	1
Lawsoni	1
Lepto	20
Neurofilament	0
Rabies	8
Grimelius	1
CWD Out	10
Scrapie Out	1
BSE	0

2007 Anthrax PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Anthrax Pos	0	0	0	0	0	1	0	0	0	0	0	0	1
Anthrax Neg	0	0	6	0	3	3	5	0	0	0	0	0	17
Total	0	0	6	0	3	4	5	0	0	0	0	0	18

2007 BVD PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
BVD Pos	0	1	0	0	0	0	0	0	1	0	0	0	2
BVD Neg	4	1	16	10	4	7	4	2	0	5	4	2	59
Total	4	2	16	10	4	7	4	2	1	5	4	2	61

2007 Lepto PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Lepto Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepto Neg	3	9	6	5	0	12	1	0	9	7	4	0	56
Total	3	9	6	5	0	12	0	0	9	7	4	0	56

2007 Ureaplasma PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ureaplas. Pos	0	1	0	0	0	0	0	0	0	0	0	0	1
Ureaplas. Neg	0	1	3	1	4	0	0	0	0	0	0	0	9
Total	0	2	3	1	4	0	0	0	0	0	0	0	10

2007 Avian Influenza Matrix PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AI Matrix Pos	0	0	0	0	0	0	0	0	0	185	68	6	259
AI Matrix Neg	62	172	262	96	116	21	7	23	84	605	704	30	2182
Total	62	172	262	96	116	0	0	0	0	790	772	36	2441

2007 Avian Influenza H5 and H7 PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
H5 Pos	0	0	0	0	0	0	0	0	0	2	4	1	7
H5 Neg	0	0	0	0	0	0	0	0	0	183	64	5	252
H7 Pos	0	0	0	0	0	0	0	0	0	0	0	0	0
H5 Neg	0	0	0	0	0	0	0	0	0	185	68	6	259

2007 Avian West Nile Virus PCR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
WNV Pos	0	0	0	0	0	2	6	2	0	0	0	0	10
WNV Neg	0	0	0	0	0	1	4	1	1	1	0	0	8
Total	0	0	0	0	0	3	10	3	1	1	0	0	18

2007 A 2007 Avian West Nile Virus ELISA

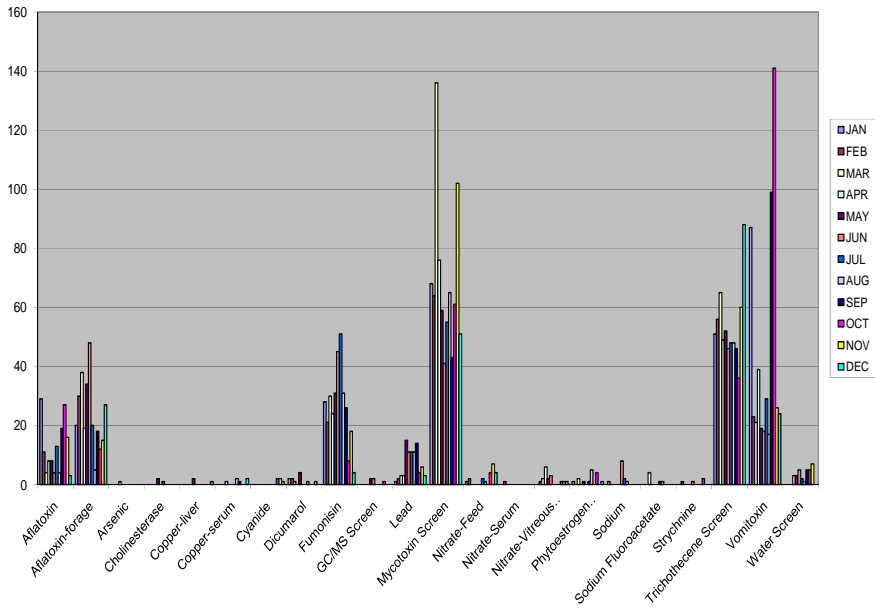
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
WNV Pos	0	0	0	0	0	0	1	6	0	0	0	0	7
WNV Neg	0	0	0	0	0	133	152	83	11	0	0	0	379
Total	0	0	0	0	0	133	153	89	11	0	0	0	386

2007 Equine West Nile Virus IgM ELISA

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
WNV Pos	0	0	0	0	0	0	4	5	0	0	0	0	9
WNV Neg	0	0	0	0	0	0	6	11	8	1	0	0	26
Total	0	0	0	0	0	0	10	16	8	1	0	0	35

2007 Toxicology Examinations

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Aflatoxin	29	11	4	8	8	4	13	4	19	27	16	3	146
Aflatoxin-forage	20	30	38	19	34	48	20	5	18	12	15	27	286
Arsenic				1									1
Cholinesterase					2		1						3
Copper-liver					2							1	3
Copper-serum				1				2	1			2	6
Cyanide										2	2	1	5
Dicumarol	2	2	1		4			1			1		11
Fumonisin	28	21	30	24	31	45	51	31	26	8	18	4	317
GC/MS Screen					2	2				1			5
Lead	1	2	3	3	15	11	11	11	14	4	6	3	84
Mycotoxin Screen	68	64	136	76	59	41	55	65	43	61	102	51	821
Nitrate-Feed	1	2					2	1		4	7	4	21
Nitrate-Serum		1											1
Nitrate-Vitreous Humor		1	2	6	2	3				1	1	1	17
Phytoestrogen Screen	1		2		1		1	5		4		1	15
Sodium	1					8	2	1					12
Sodium Fluoroacetate			4				1	1					6
Strychnine		1				1				2			4
Trichothecene Screen	51	56	65	49	52	46	48	48	46	36	60	88	645
Vomitoxin	87	23	21	39	19	18	29	17	99	141	26	24	543
Water Screen				3	3	5	2	1	5	5	7		31
Total	289	214	306	229	234	232	236	193	271	308	261	210	2983



II. Program Strengths, Challenges and Future Plans

VDS is fortunate to have a dedicated, highly-skilled technical staff, in the area of their specialty. Our major challenges continue to be the development of molecular diagnostics and meeting the needs for space, facilities and personnel. In addition, the lab will continue to improve the system for monitoring QA/QC procedures.

VDS has worked, and will continue to work, to enhance facilities and expand our programs in the state and region. In spite of staffing levels that are at an absolute minimum, VDS has addressed emerging opportunities for new or expanded services, facilities and equipment. The diagnostic lab is continuing to incorporate PCR diagnostics in areas relevant to regional and national needs. This has been facilitated by the appointment of two technicians. Updating equipment continued through 2006.

The NDSU-VDL is a member of the National Animal Health Laboratory Network (NAHLN) and will assume responsibility for federal testing as needed, initially for classical swine fever and avian influenza. The lab also serves as a Level A surge facility for the ND Department of Health. As part of a cooperative agreement with the North Dakota Department of Health, the lab performed West Nile Virus (WNV) serologic assays on equine samples from around the state and performed avian necropsies as part of routine WNV surveillance (PCR, immunohistochemistry). The VDL collaborated with the state health lab and NVSL in serotyping Salmonella isolates. Through an agreement with the ND Department of Agriculture, the NDSU-VDL participates in testing for *Mycobacterium avium* subsp. *paratuberculosis* as part of the state's Johnes Disease program.

The department has continued to participate in the biosecurity efforts of North Dakota. VDS collaborates in the state's biosecurity grant submission to the CDC. The lab has a significant role in NDSU's federally funded biosurveillance project, particularly in preparedness and rapid diagnostics. These projects help position the diagnostic lab to function as part of laboratory response and health alert networks on a state and national level.

State and national needs all demonstrate the impact and importance of the Department of Veterinary Diagnostic Services, and a veterinary diagnostic laboratory. In addition to the routine disease diagnostics, the potential introduction of foreign animal diseases, spread of zoonotic diseases, or weaponization of pathogens all support the critical role that the NDSU-Veterinary Diagnostic Laboratory maintains in the state and region. The NDSU-VDL has a significant impact on the state of North Dakota and the region in relation to both animal health and public health. The Department of Veterinary Diagnostic Services will continue to develop our service, teaching and research missions to provide rapid and accurate diagnostics, train students and the public in disease surveillance and prevention, and expand our knowledge of issues important to animal and human health.

Department of Veterinary Diagnostic Services Organizational Chart 2007

