

SCHOOL OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

ACADEMIC PROGRAM REVIEW

20
22

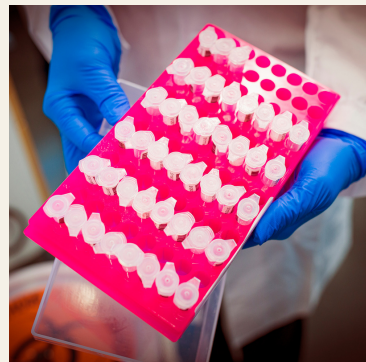


TABLE OF CONTENTS

Review Schedule.....	2
Review Team	4
Glossary of Acronyms	5
Institutional Overview	6
Self-Study Scope and Organization.....	10
SVMBS Overview	10
Strategic Topics, Opportunities, and Key Questions for Consideration.....	17
SVMBS Academic Programs and Units	
Undergraduate Degree Programs	19
Professional Program in Veterinary Medicine	24
Graduate Program	27
Nebraska Veterinary Diagnostic Center and Extension.....	30
UNL Great Plains Veterinary Educational Center	34
Research Programs.....	35
Nebraska Center for Virology.....	37
Conclusions.....	38
Appendices.....	39

2022 REVIEW SCHEDULE

Monday, October 3, 2022			
Time	Event	Location	Leader
5:30 PM	SVMBS APR Charge Dinner	The Scarlet Hotel	
Tuesday, October 4, 2022			
Morning			
	Breakfast on your own		
7:45 AM	Travel to campus		
8:00 – 8:45	Welcome and overview with Director Scott McVey	124 VBS	
9:00 – 9:45	Undergraduate Curriculum Committee	124 VBS	
10:00 – 10:30	Break		
10:30 – 11:15	Graduate Committee	124 VBS	
11:30 – 1:00	Lunch with SVMBS Leadership Team	124 VBS	Bruce Brodersen, Renee McFee, David Steffen, Roberto Cortinas, Brian Vander
Afternoon			
1:00 – 1:45	PPVM with Renee McFee	124 VBS	
2:00 – 2:45	PPVM with Iowa State University	124 VBS	
3:00 – 3:45	Teaching faculty	124 VBS	
4:00 – 4:45	Reception with SVMBS faculty, staff and students (graduate, undergraduate, PPVM)	Boesiger Family Learning Center (NVDC)	
5:00	Travel to hotel		
6:00	Review team dinner and working session		
Wednesday, October 5, 2022			
Morning			
6:45	Depart for breakfast		
7:00 – 8:00	Breakfast with Deans	City Campus Union	
8:00 – 9:00	Tour of East Campus		
9:00	Depart for Clay Center		

Thursday, October 6, 2022**Morning**

	Breakfast on your own		
8:00	Travel to Nebraska Veterinary Diagnostic Center		
8:30 – 9:15	Bruce Brodersen, Director NVDC		
9:30 – 10:15	NVDC Faculty		
10:30 – 11:30	Walking tour NVDC and School facilities		
11:45 – 12:45	Lunch		

Afternoon

1:00 – 2:00	Research faculty		
2:00 – 2:30	Break		
2:30 – 3:15	Peer Review Committee		
3:30 – 4:00	Recruiting Session with Taylor Nielsen		
4:00 – 5:00	Open individual appointments		
5:00	Return to hotel		
6:00	Working team dinner		

Friday, October 7, 2022**Morning**

	Breakfast on your own		
7:45	Travel to East Campus		
8:00 – 9:00	Exit meeting with IANR administration		
9:15 – 9:45	Break		
10:00 – 11:00	Exit meeting with SVMBS faculty, staff and graduate assistants		

REVIEW TEAM

Kimberly Dodd, DVM, PhD, MS (Chair)
Director, Veterinary Diagnostic Laboratory
Michigan State University
Veterinary Diagnostic Laboratory
4125 Beaumont RD BLDG 0215, Room 201H
Lansing, MI 48910
Phone: 517-353-1683
Email: doddkimb@msu.edu
Area of Expertise: Infectious Diseases and
Diagnostic Medicine
Website: [Profile](#)

Guy H. Loneragan, BVSc, PhD
Dean and Professor
Texas Tech University
School of Veterinary Medicine
7671 Evans Drive, Amarillo, Texas 79106
Phone: 806-742-3200
Email: guy.loneragan@ttu.edu
Area of Expertise: Epidemiology and Public Health
Website: [Profile](#)

**Amanda Fales-Williams, DVM, PhD, Diplomate
ACVP**
Professor and Chair
Tyrone D. Artz, M.D. Chair for Teaching Excellence
and Morrill Professor
Iowa State University
College of Veterinary Medicine
Department of Veterinary Pathology
2764 Veterinary Medicine
1800 Christensen Drive
Ames, Iowa 50011-1134
Phone: 515-294-7445
Email: afales@iastate.edu
Website: [Profile](#)

**Alejandro “Alex” Ramirez, DVM, MPH, PhD,
DACVPM**
Senior Associate Dean for Academic Programs &
Faculty Affairs, Interim Associate Dean for Research
& Graduate Studies, and Professor
University of Arizona College of Veterinary
Medicine
1580 E. Hanley Blvd – A112
Oro Valley, AZ 85737

Phone: 520-626-5342
Email: alexramirez@arizona.edu
Website: [Profile](#)

Jessica Robb, DVM, Veterinarian and Stakeholder
Overton Veterinary Services
75348 Road 440
Lexington, NE 68850
Phone: 308-324-7202
Email: jrobb@overtonvet.com
Website: [Overton Veterinary Services](#)

**Ruth Woiwode AAS, BS, MS, PhD (IANR Faculty
Representative)**
Assistant Professor, Animal Behavior & Well-Being
Animal Science Department
University of Nebraska–Lincoln
P.O. Box 830908
C203 ANSC
Lincoln, NE 68583-0908
Phone: 402-472-3571
Fax: 402-472-6362
Email: ruth.woiwode@unl.edu
Website: [Profile](#)

SVMBS Student Representatives:

- Undergraduate Student: Ranger Gunville
(VTAD from NECC, Vet Tech/Pre-Vet
student)
- PPVM Student: Francine Watkins
- Graduate Student: Jaden Carlson, PhD
candidate at GPVEC, Clay Center

GLOSSARY OF ACRONYMS

ARD	Agricultural Research Division	NVDC	Nebraska Veterinary Diagnostic Center
AVMA COE	American Veterinary Medical Association Council on Education	NVMA	Nebraska Veterinary Medical Association
CASNR	College of Agricultural Sciences and Natural Resources	NU	University of Nebraska System
CCPE	Nebraska Coordinating Commission for Postsecondary Education	OGS	Office of Graduate Studies
CEHS	College of Education and Human Sciences	PPVM	Professional Program in Veterinary Medicine
GPVEC	Great Plains Veterinary Education Center	SVMBS	School of Veterinary Medicine and Biomedical Sciences
IANR	Institute of Agriculture and Natural Resources	UCC	Undergraduate Curriculum Committee
ISU-CVM	Iowa State University College of Veterinary Medicine	UNK	University of Nebraska at Kearney
NCTA	Nebraska College of Technical Agriculture	UNL	University of Nebraska–Lincoln
NCV	Nebraska Center for Virology	UNMC	University of Nebraska Medical Center
		USMARC	U.S. Meat Animal Research Center
		VBS	Veterinary Medicine and Biomedical Sciences Hall

INSTITUTIONAL OVERVIEW

The University of Nebraska–Lincoln (UNL) is a comprehensive research land-grant university with enrollment of 24,431 students (fall 2021). Founded in 1869, it serves as the flagship institution for the University of Nebraska’s five campuses and is part of the state’s broader higher education system that includes six community colleges and three state colleges.

The UNL Institute of Agriculture and Natural Resources (IANR) was created by the Nebraska Legislature in 1973 to ensure that agriculture would be appropriately resourced within UNL, given the supreme importance of agriculture and natural resources to the state’s economy and success. IANR is composed of the College of Agricultural Sciences and Natural Resources (CASNR), the Agricultural Research Division (ARD), Nebraska Extension and the ARD and Extension components of three departments in the College of Education and Human

Sciences (CEHS). ARD is the only public entity in Nebraska charged with conducting agricultural research vital to Nebraska. And Nebraska Extension boasts the nation’s highest per capita involvement in 4-H with approximately 144,000 Nebraska youth representing one in three age eligible youth enrolled in Nebraska Extension’s 4-H program.

The School of Veterinary Medicine and Biomedical Sciences (SVMBS) is an academic unit within IANR and CASNR. SVMBS was formerly the Department of Veterinary Science until 2006, when the department was recognized as a school after the Professional Program for Veterinary Medicine (PPVM) was established with Iowa State University College of Veterinary Medicine (ISU-CVM). SVMBS faculty and staff strive to ensure all programs and processes align within the framework of UNL’s N2025 Strategic Plan “where every person and every interaction matters.”

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES UNIVERSITY OF NEBRASKA

ORGANIZATIONAL CHART

NU VICE PRESIDENT
IANR VICE CHANCELLOR
Mike Boehm

VICE CHANCELLOR’S OFFICE

SENIOR ASSOCIATE
VICE CHANCELLOR
Ron Yoder

ASSOCIATE
VICE CHANCELLOR
Rich Bischoff

ASSISTANT VICE
CHANCELLOR
For Business & Finance
Jeff Basford

DEANS

AGRICULTURAL
RESEARCH DIVISION
Archie Clutter

COLLEGE OF
AGRICULTURAL SCIENCES
& NATURAL RESOURCES
Tiffany Heng-Moss

NEBRASKA EXTENSION
Charles Stoltenow

COLLEGE OF EDUCATION
& HUMAN SCIENCES
Sherri Jones

NEBRASKA COLLEGE
OF TECHNICAL
AGRICULTURE
Larry Gossen

IANR ADMINISTRATIVE UNITS

AGRICULTURE AND NATURAL RESOURCES ACADEMIC UNITS

AGRICULTURAL ECONOMICS

Larry Van Tassell

AGRICULTURAL LEADERSHIP, EDUCATION &
COMMUNICATION

Mark Balschweid

AGRONOMY AND HORTICULTURE

Martha Mamo

ANIMAL SCIENCE

Clinton Krehbiel

BIOCHEMISTRY

Donald Becker

BIOLOGICAL SYSTEMS ENGINEERING

David Jones

ENTOMOLOGY

John Ruberson

FOOD SCIENCE AND TECHNOLOGY

Curt Weller

PLANT PATHOLOGY

Loren Giesler

SCHOOL OF NATURAL RESOURCES

John Carroll

SCHOOL OF VETERINARY MEDICINE &
BIOMEDICAL SCIENCES

Scott McVey

STATISTICS

Bertrand Clarke

EDUCATION AND HUMAN SCIENCES ACADEMIC UNITS

CHILD, YOUTH, AND FAMILY STUDIES

Michael Merten

NUTRITION AND HEALTH SCIENCES

Mary Ann Johnson

TEXTILES, MERCHANDISING, AND FASHION
DESIGN

Maria de Guzman

IANR PROGRAM UNITS

4-H YOUTH DEVELOPMENT

Kathleen Lodi

ENGLER AGRIBUSINESS ENTREPRENEURSHIP
PROGRAM

Tom Field

NEBRASKA FOREST SERVICE

John Erixson

NEBRASKA LEAD PROGRAM

Terry Hejny

NEBRASKA MANUFACTURING EXTENSION
PARTNERSHIP

Matthew Allmand

YEUTTER INSTITUTE

Jill O'Donnell

Institutional Overview, cont.

OTHER ORGANIZATIONAL UNITS

CENTERS

CENTER FOR ADVANCED LAND MANAGEMENT
INFORMATION TECHNOLOGIES

Brian Wardlow

CENTER FOR BIOLOGICAL CHEMISTRY

Donald Becker

CENTER FOR BIOTECHNOLOGY

Daniel Schachtman

CENTER FOR PLANT SCIENCE INNOVATION

Edgar Cahoon

CENTER FOR GRASSLAND STUDIES

Jerry Volesky*

CENTER FOR RESILIENCY IN AGRICULTURAL
WORKING LANDSCAPES

Craig Allen

CONSERVATION SURVEY DIVISION

Matt Joeckel

FOOD PROCESSING CENTER

Terry Howell

FOUNDATION SEED FARM

Jeff Noel

GREAT PLAINS COOPERATIVE ECOSYSTEM
STUDY UNIT

Larkin Powell

GREAT PLAINS VETERINARY EDUCATIONAL
CENTER

Scott McVey (Interim)

Brian Vander Ley (Associate)

***Interim**

HIGH PLAINS REGIONAL CLIMATE CENTER

Rezaul Mahmood

INDUSTRIAL AGRICULTURAL PRODUCTS
CENTER

Mark Wilkins

NATIONAL DROUGHT MITIGATION CENTER

Mark Svoboda

NEBRASKA CENTER FOR VIROLOGY

Eric Weaver

NEBRASKA CENTER FOR PREVENTION OF
OBESITY DISEASES

Janos Zempleni

NEBRASKA COOPERATIVE FISH & WILDLIFE
RESEARCH UNIT

Kevin Pope

NEBRASKA FOOD FOR HEALTH CENTER

Andrew Benson

NEBRASKA REDOX BIOLOGY CENTER

Oleh Khalimonchuk*

NEBRASKA STATE CLIMATE OFFICE

Martha Shulski

NEBRASKA WATER CENTER

Chittaranjan Ray

NEBRASKA VETERINARY DIAGNOSTIC CENTER

Bruce Brodersen

QUANTITATIVE LIFE SCIENCES INITIATIVE

Jennifer Clark

DISTRICT CENTERS

EASTERN RESEARCH, EXTENSION, &
EDUCATION CENTER

Doug Zalesky

PANHANDLE RESEARCH, EXTENSION &
EDUCATION CENTER (SCOTTSBLUFF)

Mitch Stephenson*

WEST CENTRAL RESEARCH, EXTENSION &
EDUCATION CENTER (NORTH PLATTE)

Kelly Bruns

**RESEARCH, EXTENSION & ENGAGEMENT
LOCATIONS AND CENTERS**

BARTA BROTHERS RANCH (AINSWORTH)

TBD

GUDMUNDSEN SANDHILLS LABORATORY
(WHITMAN)

Andy Applegarth,
Operations Manager

HASKELL AGRICULTURAL LABORATORY
(CONCORD)

TBD, Professor in Charge

HIGH PLAINS AGRICULTURAL LABORATORY
(SIDNEY)

Jacob Hansen, Farm Manager

HORNING FORESTRY FARM

John Erixson

KIMMEL EXTENSION & EDUCATION CENTER
(NEBRASKA CITY)

Tiffany Heng-Moss,
Dave Varner

SOUTH CENTRAL AGRICULTURAL LABORATORY
(CLAY CENTER)

Michael Schlick,
Research Farm Manager

STUMPF INTERNATIONAL WHEAT CENTER

Kelly Bruns

EXTENSION PROGRAM LEADS

4-H YOUTH DEVELOPMENT

Kathleen Lodi

AGRICULTURAL ECONOMICS

John Westra

BEEF SYSTEMS

Rick Rasby

COMMUNITY ENVIRONMENT

TBD

FOOD, NUTRITION & HEALTH

Jean Ann Fischer

NU WIDE INSTITUTIONS

DAUGHERTY WATER FOR FOOD INSTITUTE

Peter McCornick

RURAL PROSPERITY NEBRASKA

Mary Emery

LIVESTOCK HEALTH

GPVEC Director—TBD

EARLY CHILDHOOD DEVELOPMENT

Holly Hatton-Bowers*

URBAN EXTENSION

Cynthia Zluticky

WATER & INTEGRATED CROPPING SYSTEMS

Daran Rudnick

***Interim**

Self-Study Scope and Organization

The first section of this document is a preliminary overview of the School of Veterinary Medicine and Biomedical Sciences (SVMBS) with a section describing critical and strategic questions. A section with a more detailed discussion of SVMBS mission areas follows. These descriptions are focused on the activities of the units and programs of SVMBS with discussion of missions and associated

challenges and opportunities. The last section of the self-study contains a brief conclusion statement and a list of key strategic topics with questions intended to focus reporting and subsequent strategic planning and action.

SVMBS Overview

The School of Veterinary Medicine and Biomedical Sciences is Nebraska's principle institution for education, research, and outreach related to veterinary medicine as well as veterinary and biomedical sciences.

MISSION

The School of Veterinary Medicine and Biomedical Sciences advances animal health and well-being and the One Health concept through discovery by innovative research; timely extension and outreach; accredited diagnostic services; high quality, affordable and accessible education to undergraduate, graduate, and professional students. SVMBS addresses the needs of Nebraskans, the region, the nation, and the world through all these services.

This mission has been accomplished and the following strengths have been observed through the history of the program:

1. The undergraduate programs offer a strong basic education to pre-veterinary and animal science students, with several courses led by DVM instructors.
2. SVMBS has always had a strong research program that has addressed a broad array of stakeholder needs and interests. Graduate students from the program have been very successful and have made important contributions to veterinary and biomedical sciences.

3. The Nebraska Veterinary Diagnostic Center (NVDC) has provided excellent and efficient service for the state and veterinarians. The diagnostic services have been a scientific and technical anchor for the School and offer a great resource for future research and graduate/resident training.
4. SVMBS collaboratively established the Professional Program for Veterinary Medicine (PPVM) in 2006 with the Iowa State University College of Veterinary Medicine (ISU-CVM). The DVM graduates of this program have become successful professionals across Nebraska, the region, and the United States.

VISION

SVMBS will be known for high quality, innovative research and service, and affordable and accessible student-focused education in veterinary medicine and biomedical sciences.

ADMINISTRATIVE STRUCTURE

The SVMBS director reports to and is evaluated by the IANR senior associate vice chancellor, Ron Yoder, as well as a collaborative matrix including the deans of the Agricultural Research Division (ARD), the College of Agricultural Sciences and Natural Resources (CASNR), and Nebraska Extension. The School director is responsible for the programs and budgets allocated to SVMBS.

The NVDC and the Great Plains Veterinary

Educational Center (GPVEC) are each managed by directors who report to the SVMBS director. (Currently, Dr. McVey is the acting director of GPVEC, and Dr. Brian Vander Ley is the associate director.)

SVMBS shares a business center with the Department of Animal Science. The AVE Business Center provides accounting and personnel services for both departments. The SVMBS director and the Animal Science department head jointly supervise the AVE Business Center manager.

FACULTY

At the time of this report (July 2022), SVMBS has a total of 34 faculty members. There are 24 tenure track faculty members, with two members planning to retire in 2023. There are three associate professors of practice and three assistant professors of practice. All the professors of practice have a DVM degree. There are two lecturers within the faculty. Two of the tenure-track faculty have split appointments with other IANR units, and one faculty member is temporarily assigned to another administrative unit. The School is currently (summer 2022) recruiting a replacement lecturer (clinical instructor) and a new, additional assistant professor of practice (pathobiology). The duty assignments for both positions will be at GPVEC in Clay Center, Nebraska.

Faculty appointments, expressed as full-time equivalents (FTE), are divided between research, teaching, extension, and service. There are 32 faculty members who provide 12.33 FTE in research, 31 who provide 12.30 FTE in teaching, five who provide 1.60 FTE in extension, and 10 who provide 5.79 FTE in directed and/or scholarly service (clinical or diagnostic). Drs. McVey and Brodersen provide 1.0 FTE administrative service each, and Dr. Vander ley provides 0.1 FTE of administrative service.

There have been two recent retirements among tenure track faculty (2020-2021). We are currently planning to replace one lecturer position at GPVEC that was vacated in January 2022. A second position in pathobiology/diagnostics as well as clinical teaching (professor of practice) will be added at GPVEC by fall 2022. There is a need for at least

two additional faculty members to enhance clinical teaching and diagnostic services at the NVDC and GPVEC. SVMBS is exploring filling these openings as non-tenure track positions (professors of practice), but it would be preferable to create tenure track positions for these faculty since professors of practice are 90% or more dedicated to teaching.

Faculty apportionments, biographies, peer faculty salary comparisons, SVMBS committee appointments, graduate faculty information, and adjunct/courtesy appointments are listed in detail in **Appendices 1-5**.

PROGRAM STRUCTURE

The School of Veterinary Medicine and Biomedical Sciences is organized into six functional areas that serve IANR's multiple and integrated missions of teaching, research, clinical/diagnostic services, and extension:

- Undergraduate studies
- Research and graduate programs
- Professional Program in Veterinary Medicine
- Great Plains Veterinary Educational Center
- Nebraska Veterinary Diagnostic Center
- Integrated extension programs

SVMBS receives funding from three IANR divisions—College of Agricultural Sciences and Natural Resources (teaching budget), Agricultural Research Division (research and diagnostic service budgets), and Nebraska Extension (extension budget)—and most SVMBS faculty members have appointments in at least two of these divisions. While teaching and research activities bridge the entire faculty, subsets of faculty primarily work in one principle area—either the undergraduate program, the research/graduate program, clinical teaching at GPVEC, or preclinical teaching in the PPVM.

Most faculty members are located on the UNL East Campus within the Veterinary Medicine and Biomedical Sciences Building (VBS) or the

SVMBS Overview, cont.

Nebraska Veterinary Diagnostic Center. Others are in the Animal Science Complex or the Nebraska Center for Virology (Morrison Life Sciences Research Center). Some faculty are assigned to and located at the Great Plains Veterinary Educational Center on the campus of the USDA Meat Animal Research Center (USMARC) near Clay Center, Nebraska.

TEACHING

SVMBS teaches undergraduate, professional, and graduate courses that cover a broad array of subjects such as livestock diseases, anatomy, biochemistry, histology, immunology, microbiology, molecular biology, pathology, pharmacology, toxicology, and virology as they relate to diverse animal species, human beings, and biological systems.

The Professional Program in Veterinary Medicine was established in 2006 as a cooperative program between the UNL College of Agricultural Sciences and Natural Resources (CASNR) and

the Iowa State University College of Veterinary Medicine. The UNL PPVM resides in SVMBS. It is structured so Nebraska students study two years at UNL followed by two years at ISU to finish the DVM degree. Students receive the DVM degree from ISU (with seals from both ISU and UNL on the diploma). The UNL PPVM is accredited by the American Veterinary Medical Association Council on Education (AVMA COE) as part of the ISU-CVM accreditation process.

The importance of all educational programs is reflected in Figures 1 and 2, reflecting recent trends in hours taught and degrees awarded.

SVMBS educational goals support the UNL and IANR goals of increasing enrollment and offering affordable, accessible, and innovative education. SVMBS goals focus on providing students at all levels broader learning experiences.

RESEARCH

Research disciplines of faculty members include bacteriology, biochemistry, epidemiology,

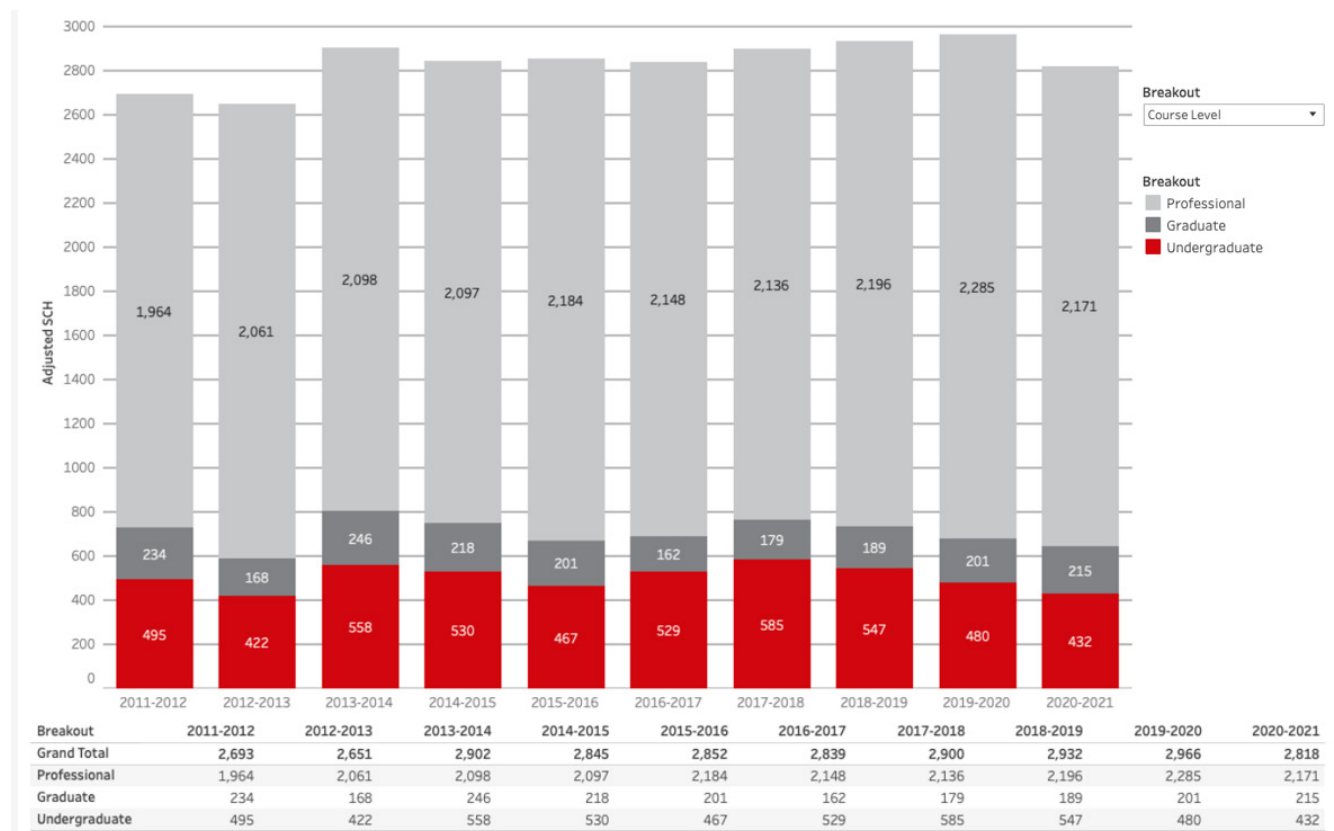


Figure 1. Fall and spring student credit hours delivered by term and academic year for SVMBS.

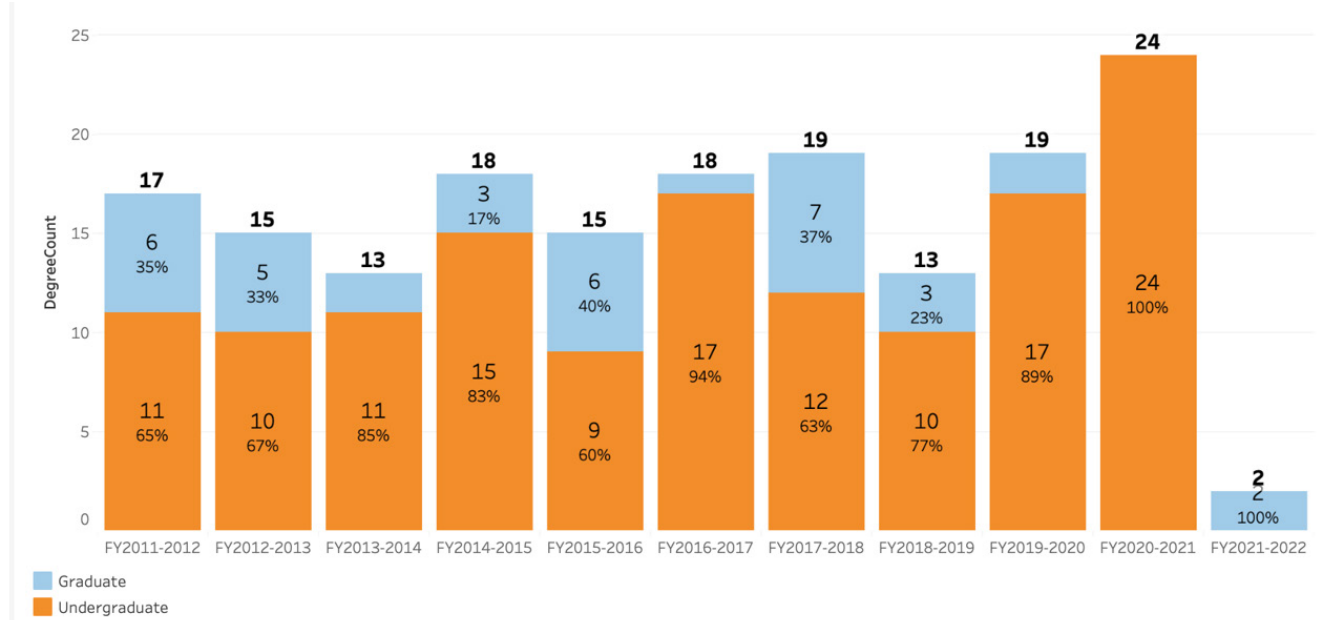


Figure 2. SVMBS degrees awarded. Fiscal Year is summer-leading and includes summer (August), fall (December), and spring (May) graduates.

immunology, molecular biology, neurobiology, pathology, virology, and clinical veterinary medicine. Research projects are of both basic and applied nature and address disease pathogenesis, virulence mechanisms of pathogens, host responses, defense mechanisms, vaccine development, antibiotic mechanisms of action and resistance, diagnostic test development, and pathogen/host genomics in diverse hosts including livestock, poultry, and model species.

The UNL community has created a set of Grand Challenge objectives for responsible research (UNL | Grand Challenges). Three of these objectives are addressed by SVMBS research programs:

1. Sustainable food and water security
2. Health equity
3. Climate resilience

SVMBS has strong programs in STEC food safety; molecular virology (cell biology, pathogenesis, immunology, and vaccinology); mycobacterial infections of ruminants, emerging and re-emerging viral diseases of swine (PRRS, ASFV);

bovine respiratory disease and congestive heart failure; poultry pathology and medicine; as well as diagnostic pathology. These research programs are described within faculty biographic descriptions in **Appendix 2**.

EXTENSION

SVMBS contributes to UNL extension through programs offered through Nebraska Extension. This includes programming at the Nebraska State Fair and multiple activities for secondary school students (Veterinary Extension at SVMBS). Even though most NVDC faculty do not have extension appointments, they provide significant outreach through consultations and diagnostic services offered to veterinarians and livestock producers. Continuing education/consultation for practicing veterinarians are offered through the Great Plains Veterinary Educational Center and are prominent parts of SVMBS outreach but are not considered formal extension programming. The NVDC and the associated poultry extension veterinarian (Dr. Don Reynolds) contributed significant diagnostic, epidemiological, and management advice to large

SVMBS Overview, cont.

and small poultry producers (as well as wildlife agencies) as part of the currently ongoing high-path avian influenza virus outbreak.

SVMBS extension faculty participate in formal extension activities such as the beef interest group, beef extension programming, interaction as specialists with educators and other extension specialists, as well as delivery of extension sponsored programming (e.g., feedlot roundtables, stocker/yearling field days, etc.). Also, these extension/outreach activities extend beyond Nebraska to national and likely international audiences. SVMBS faculty actively present research and continuing education programming at national veterinary and producer conferences.

NEBRASKA VETERINARY DIAGNOSTIC CENTER

The Nebraska Veterinary Diagnostic Center provides veterinary diagnostic services to Nebraska's livestock industry and serves as a resource for veterinarians. It offers necropsy, histopathology, virology, bacteriology, serology, molecular diagnostic, and limited clinical pathology services. Additionally, NVDC serves as a service center providing support and consultation on animal diseases for research faculty throughout the university and state. The NVDC is fully accredited by the American Association of Veterinary Laboratory Diagnosticians. The NVDC is a Level I member laboratory of the National Animal Health Laboratory Network (under USDA APHIS VS). NVDC is approved to conduct surveillance testing for numerous high consequence pathogens of livestock, horses, and poultry. The NVDC is a member of the FDA CVM's VET-LIRN Network. The One Health mission is a critical component of NVDC's mission, and the diagnosticians collaborate with the Nebraska Department of Health and Human Services (DHHS) for rabies, SARS-COV2, and zoonotic pathogen surveillance in animals in the state. A CLIA- licensed human testing laboratory was established in 2021 to support SARS-COV2 surveillance for the campus community to assure a safe environment. To date, over 300,000 tests have been performed.

GREAT PLAINS VETERINARY EDUCATIONAL CENTER

The Great Plains Veterinary Educational Center is located near Clay Center, Nebraska, at USMARC. USMARC is a federal facility as part of the USDA ARS; GPVEC is a University of Nebraska facility within SVMBS. GPVEC was established in 1986 as part of a Cooperative Agreement for Veterinary Medical Education between UNL and Kansas State University. Over the years, GPVEC has developed as a nationally recognized center that provides training for veterinary students from across the U.S. GPVEC also provides consultation and support for practicing veterinarians and livestock specialists. A large part of the SVMBS veterinary extension effort is provided by GPVEC veterinary staff, and these faculty collectively support an active applied research effort in collaboration with USMARC (USDA ARS).

BUDGET AND PROGRAM SUPPORT

The budget for SVMBS comes from multiple sources, primarily the State of Nebraska and USDA (via Hatch funds). Resources are allocated by the IANR deans and directors of the teaching (CASNR), research (ARD) and extension (Nebraska Extension) divisions.

Research grants and service contracts are a major contributor to the School's overall research budget. Extension budgets are primarily supported by state and USDA funds and, to a lesser extent, fee income and grants. The teaching program budget is primarily from state appropriations. The director of SVMBS is responsible for maintaining appropriate distribution of teaching, research, and extension funds as part of operational and discretionary support.

The NVDC budget is maintained separately from the teaching, research and extension budgets. NVDC receives appropriated funds for faculty salaries and a portion of the technical staff. Fees charged for laboratory services provided to extramural clientele helps pay additional salaries and operating expenses. Services provided to SVMBS and other units for teaching and research

activities at UNL are provided at cost. Research grants and contracts contribute significantly to the NVDC budget. The NVDC director is responsible for managing the budget under the authority of the SVMBS director. Fee income from diagnostic services goes into a single revolving account which is administered by the NVDC director.

The director of GPVEC is responsible for managing the GPVEC budget in collaboration with the director of SVMBS. The budget is divided into teaching, research, and extension appointments. GPVEC is responsible for funding its own building maintenance, utilities, and custodial services, unlike units on the Lincoln campus, where facilities are supported centrally.

The SVMBS research support budget includes state appropriations and USDA Hatch funding. These funds are treated as a pool and are used to support individual faculty members and provide a central research support fund. Allocations to faculty members are under the control of the SVMBS director. Some research faculty members receive an annual allocation which they can use toward a research technician, a post-doc, a grad student, operating, travel or equipment. Individual research projects also may be funded as needed. General research support funds are used to support shared-use research equipment and facilities. Approximately 11% of the total facilities and administrative (F&A) fees charged to SVMBS grants are returned to the School. Eighty-five percent of the F&A dollars returned to the School are returned to the faculty member whose grant(s) generated the funds. This provides a substantial incentive and reward to faculty members who are successful in obtaining grants. Fifteen percent of the F&A cost return is administered by the SVMBS director to support the SVMBS seminar program and other central research needs.

Administrative support for SVMBS and PPVM currently consists of one administrative associate, one administrative support associate, and one communications specialist. Administrative support for GPVEC consists of one administrative support associate and one office associate. IANR provides business support to the School, PPVM, and GPVEC through the AVE Business Center. The AVE Business Center, which also manages business

affairs for the Department of Animal Science, has a business manager, finance associate, finance coordinator, assistant business manager and finance/grants specialist-Lead, finance/grants coordinator, and personnel coordinator. Administrative support for the NVDC consists of the business manager, an accounting assistant, an office supervisor, two transcription/medical records specialists, and a reception/medical records specialist.

FACILITIES

SVMBS has faculty members and facilities at multiple sites in Nebraska, including the Veterinary Science Complex buildings and the Nebraska Center for Virology (Morrison Center) on the UNL East Campus, and GPVEC at Clay Center, Nebraska (East Campus Map). There are additional facilities available to SVMBS on an as-needed basis that include the Animal Science Complex, the Life Sciences Annex, and laboratories within the NVDC facilities and the Morrison Center.

The Veterinary Science Complex consists of the Veterinary Medicine and Biomedical Sciences Hall and Annex, the Nebraska Veterinary Diagnostic Center, a Clinical Skills Laboratory, and the Biosafety Level 3 Core Facility (constructed in 2006). Building diagrams and maps are in **Appendix 6A – D**.

VETERINARY MEDICINE AND BIOMEDICAL SCIENCES HALL AND ANNEX

The VBS Hall building (**Appendix 5**) has over 33,000 sq. ft. of useable space that houses research laboratories, several shared-equipment rooms, walk-in coolers, a glassware preparation area and offices for faculty, post-doctorates, graduate students, and staff. VBS also houses the administrative office for the School including staff offices, a conference room, study spaces, and storeroom. It has two large classrooms. The VBS building complex also includes an Annex with 15,000 sq ft for offices, study spaces, clinical teaching laboratories, and storage.

NEBRASKA VETERINARY DIAGNOSTIC CENTER

The physical space, including all laboratories,

SVMBS Overview, cont.

offices, corridors, lavatories, necropsy, and support space consists of 34,927 sq. ft. and was completed in 2017 (Figure 3). The laboratories consist of six different sections: sample receiving, necropsy, bacteriology, virology/serology, molecular diagnostics, and histology. The molecular section consists of a suite of three clean rooms with isolated access from a separate hallway. Thermocyclers are in their own amplification laboratory. There are three separate extraction rooms in their own respective hallway. In addition, there is an animal BSL-3 suite of approximately 2,125 sq. ft. and teaching space of 1,700 sq. ft. for clinical microbiology and an interaction space of approximately 2,430 sq. ft. Combined, there is a total of 40,582 net sq. ft. and 65,624 gross sq. ft.

VETERINARY CLINICAL SKILLS LABORATORY

The Veterinary Clinical Skills Laboratory was originally used to house/isolate large animal research subjects. It was renovated to provide teaching space for the Professional Program in Veterinary Medicine. It is a small building of approximately 2,300 sq. ft. The building provides storage areas for lab supplies, a restroom, and a garage area.

BSL-3 FACILITY

The Animal Bio-safety Level 3 (ABSL-3) laboratory in the NVDC allows work with biological hazards and small animals. This laboratory consists of a clean change space, dirty change space, tissue culture laboratory, air-lock waste handling room, decontamination room, common hallway, two holding rooms, and two procedure rooms.

There is an additional 1,500 sq. ft. BSL3 facility that includes an entry room, an anteroom, shower and changing room, a restroom, two inner laboratory rooms, and a separate mechanical room. Selected room doors require card access credentials. This facility supports *in vitro* laboratory work.

SVMBS is a long-standing program within IANR and CASNR. The core missions have been research, undergraduate and graduate teaching, the PPVM, extension, and operation of the state of Nebraska's accredited veterinary diagnostic laboratory.

The GPVEC mission was developed in the 1990s and the PPVM was established in 2006.

SVMBS is managing through multiple transitions. Among them are a steady reduction in the number of faculty and support staff, evolving budget structures, evolving research foci and mechanisms of support, and the necessity to develop strategies to ensure diversity, equity, and inclusivity.



Figure 3. Nebraska Diagnostic Center provides laboratory and research facilities, learning spaces for students, and offices for faculty and staff. Designed for growth, unfinished space was quickly outfitted into a COVID-19 testing lab in 2020.

Strategic Topics, Opportunities, and Key Questions for Consideration

Over the course of the School's history and into the present, there have been (and will continue to be) significant shifts in stakeholders, clientele, students, the collective sciences of veterinary medicine and animal health, as well as the relevant standards of practice. These changes require attention, with a renewed urgency, to both scientific and social needs. There are needs for veterinarians, veterinary technicians, animal health research scientists, as well as many allied professionals. Nearly 60% of all biomedical investments in research and development are focused on vaccines, diagnostics, and therapeutics. A large majority of this investment is focused on zoonotic infectious diseases. Maintaining educational programs to meet these demands will require attention to diversity of the students and professionals.

There is now significant academic attention on not only direct animal health, but also the general well-being of the animals and their caretakers. The diversity of the caretakers, in the broadest sense, will continue to increase. Clearly, all of these interactions are important and deserve full attention. And, sustained delivery of One Health medicine requires consideration of the global ecology.

SVMBS and IANR have demonstrated an ability to respond to critical evaluations and recommendations. From the 2015 APR, the NVDC added depth and expertise. Also, IANR, CASNR, and SVMBS have invested in maintaining operations and teaching/research programs at GPVEC. There have been successful research initiatives to address very specific needs related to stakeholders (livestock) and One Health (epidemiology of zoonotic diseases). Consistent with this approach, an SVMBS senior leadership team will lead the development of responses to these external review team and institutional leadership reviews and recommendations. This will be translated to strategic and tactical planning for SVMBS.

KEY TOPICS

Several key topics and related questions have emerged throughout discussions and preparation of this self-study report:

1. The basis for growth and effectiveness of our educational programming is a diverse, talented,

and motivated pool of students. These students will eventually become the people that enter critical sectors of the Nebraska economy such as food and animal agriculture and the regional One Health biomedical system as workers, educators, veterinarians, technicians, and research scientists.

Question 1a. How do we develop effective outreach and recruiting systems for Nebraska to identify a strong pool of students and ensure diversity, equity, and inclusivity? (Note: one of the objectives of the UNL community's Grand Challenges is anti-racism and racial equity (UNL | Theme descriptions | Grand Challenges).

Question 1b. Are there strategic gaps in content and/or delivery in the educational programming for undergraduate students in the pre-veterinary or veterinary technology programs that enhance student success? Can the length of time required for the pre-veterinary program be reduced, reducing time and costs to acquire a D.V.M. degree? The rising financial burden on professional students is significant. Some specific examples of targeted recruitment programs could include urban high schools, community colleges, and students from rural regions of Nebraska.

Question 1c. What internal and external partnerships would enhance these efforts?

2. The PPVM and graduate degree programs are key components of the mission of SVMBS and there is demand for these graduates.

Question 2a. What is the appropriate structure and approach for the M.S. degree program(s) for SVMBS? One possible approach to continue an M.S. program would include using the CASNR-managed Master of Applied Science degree program to re-establish the program within SVMBS. As the School includes many missions and teams, the M.S. program needs to provide the flexibility to support students with diverse educational goals.

Strategic Topics..., cont.

Question 2b. What possible novel and unique mechanisms of support for graduate students and veterinary residents can be developed (in addition to grant funding) to support and sustain growth?

Question 2c. For the PPVM program, what is the appropriate strategy to realize supported growth? There is currently sufficient demand and a number of well-qualified students to support expansion of the class size (by approximately 10 to 20 students). This will require additional and new professional program partners for the third and fourth year training opportunities.

Question 2d. What internal and external partnerships would enhance these efforts? (This could include development of unique clinical training programs, such as rotations/clerkships, etc., utilizing resources across Nebraska. And, such programs can be coupled with efforts to recruit veterinarians to underserved counties in Nebraska.)

Question 2e. Can such programs be used to leverage partnerships with other veterinary colleges to increase and enhance both the numbers of and diversity of PPVM-trained veterinarians for the unique veterinary service needs of this region?

3. There are multiple drivers of success for numbers 1 and 2 above. These questions address issues associated with these critical resources. A diverse, talented, and motivated faculty will be essential for the success of the SVMBS.

Question 3a. Assuming increased needs to recruit faculty after attrition and to support new programs, what is the best model for critical succession planning for both faculty and staff for SVMBS? How can we train, recruit, retain faculty and staff in a highly competitive environment for veterinarians that may have to realize significant opportunity cost? These efforts must realize critical needs among disciplines as well as needs for essential multiple accreditation and certification processes.

Question 3b. How best should inclusivity and a supported sense of belonging be purposefully included in this planning effort (and eventual recruitment actions)? This will be an important topic for the senior leadership team, and this may require establishment of a recruitment committee.

Question 3c. What other needs exist for facility and infrastructure improvements?

4. To achieve operational success and efficiency, program integration and coordination is a subject of interest to clients and stakeholders.

Question 4a. How might integration between units/areas within and outside the school be leveraged (such as resident training positions involved in teaching and GPVEC program integration with undergraduate programs as examples)?

Question 4b. Would there be advantages in better integration of research, diagnostic service, and extension programming in key areas (cow/calf-feedlot management, related infectious diseases of livestock, and infectious disease/livestock ecology; as an example).

Question 4c. Relative to efficient uses of resources and succession planning, should SVMBS define two to three core areas of research strengths?

SVMBS Academic Program Reviews

The School of Veterinary Medicine and Biomedical Sciences is the center of education in veterinary medicine and biomedical sciences in Nebraska. This section describes in more detail each program (teaching, research, extension) and unit (Nebraska Veterinary Diagnostic Center, Great Plains Veterinary Educational Center) within the School.

Providing high quality undergraduate, graduate and professional education that is affordable, accessible, and prepares graduates for a variety of careers related to animal health and veterinary medicine is among the leading priorities of the School. Complementary and equally important are the service and outreach missions of the NVDC and Nebraska Extension. SVMBS research programs also are essential and provide basic science scholarship as well as applied science relevant to all SVMBS missions. These mission areas are consistent with the principles and goals of the University of Nebraska, UNL and IANR.

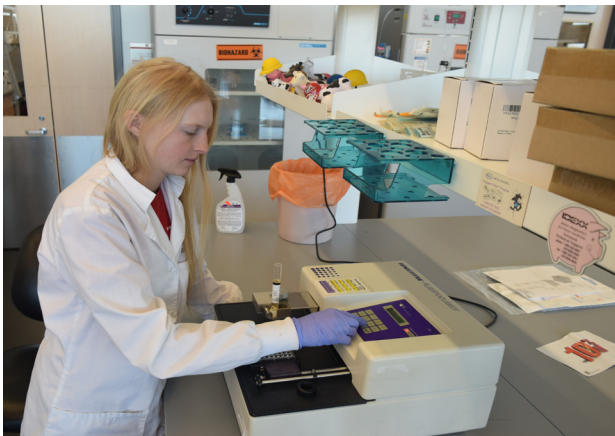


Figure 4. Undergraduate students have opportunities to work in labs at the Nebraska Veterinary Diagnostic Center.

UNDERGRADUATE DEGREE PROGRAMS

Program Coordinator: Roberto Cortinas

VISION

The SVMBS undergraduate program will be the comprehensive center of exceptional educational preparation in Nebraska, the region and across the U.S. for a career in veterinary medicine and biomedical sciences.

DESCRIPTION

Two undergraduate majors—veterinary science and veterinary technology—lead to a Bachelor of Science degree in veterinary science and in veterinary technology, respectively. A third non-degree major, pre-veterinary medicine, is offered by CASNR and managed by faculty and academic staff housed in SVMBS and the Department of Animal Science. SVMBS offers 19 undergraduate courses, seven of which are cross listed with other programs including the Pre-Vet program, biology, and other CASNR degree programs. Eight of the courses are 400/800-level courses. A 12-hour minor in veterinary science is also available.

MAJORS

Veterinary Science Major

The veterinary science major focuses on animal health. Students may choose the biomedical sciences or a veterinary medicine (“3 + 2”) option. Most students declare the biomedical sciences option but the few undergraduates who are accepted into a veterinary program early in their academic careers switch to the veterinary medicine option and complete the degree by the second year of veterinary school. Most students who major in veterinary science want to become veterinarians but less than half will go on to a veterinary college. The remainder of students pursue other careers or graduate education.

The undergraduate curriculum committee (UCC) has reviewed and made several changes to the curriculum since 2014. Historically, the core of the veterinary science degree program has been based on the Nebraska resident veterinary school admission

SVMBS Academic Program Reviews, cont.

requirements. Prior to 2008, it was based on the KSU PPVM requirements, and currently it is based on the admission requirements for the ISU-UNL PPVM. As admission requirements have changed, so has the core. For example, second-semester organic chemistry and second-semester physics have been removed from the core and been placed in the options so that students applying to other PPVM programs that require those courses can receive credit towards graduation. Yet, the curriculum is also evaluated to ensure that undergraduates are prepared for upper-level VBMS courses as well as careers in the biomedical sciences.

A faculty retreat held in 2018 and a subsequent faculty survey in 2020 identified strengths and weaknesses of the undergraduate curriculum, resulting in the addition of cell biology and immunology to the core of the veterinary science degree. In 2020, the UCC reviewed campuswide courses and updated the courses that make up the biomedical component of the option. We have also worked with other departments and schools including the School of Biological Sciences (Immunology and Microbial Physiology) and the School of Natural Resources (Wildlife Medicine) to cross list courses to strengthen the undergraduate programs. We also have created placeholder courses for experimental courses to encourage faculty course development, and we created the first VBMS second-year course to begin to address issues of student retention in the program (see Program Challenges below).

Veterinary Technology Major

The veterinary technology major requires that students earn an associate of applied science degree (AAS) in veterinary technology from an American Veterinary Medical Association accredited program and pass the Veterinary Technician National Licensing Exam in addition to completing the other requirements of the program. The AAS degree is not offered at UNL. Students may complete the AAS degree before or after completing the baccalaureate requirements at UNL. This degree program offers a broader education than is available in an AAS degree program and attracts those who want additional education related to animal health, including technicians who want to apply to a professional

veterinary program.

The veterinary technology major has no options though it used to have three: 1) a business option, 2) a veterinary science option, and 3) a science option. The business option was discontinued because of lack of faculty focus/expertise/advising in veterinary business and a lack of foundational coursework in VBMS. The veterinary science option was also removed due to the changes in the ISU-UNL PPVM requirements, leaving only what was then known as the science option.

Pre-Veterinary Medicine Major

Pre-Veterinary (PVET) Medicine is a non-degree granting major that provides students interested in pursuing a D.V.M. the educational background needed to meet the application requirements of veterinary colleges. The program is maintained by CASNR and overseen by the Pre-Vet Coordinating Committee, made up of faculty and academic staff in SVMBS and the Department of Animal Science. The pre-vet designation is available to students interested in applying to any veterinary college. This major is maintained by CASNR. Pre-vet students are strongly encouraged to select a degree-granting major by the end of their second year of study. The most popular majors include animal science, fisheries and wildlife, and veterinary science, though a few students choose biochemistry or food science and technology.

RECRUITMENT

In 2012, SVMBS created a position for a recruiting/retention coordinator and hired an individual with a background in UNL admissions, and recruitment and advising experience. In 2013, an undergraduate program coordinator was appointed. Filled by a faculty member, this position coordinates undergraduate advising and works closely with the recruiting/retention coordinator on recruitment activities and new-student engagement.

In 2017, CASNR reorganized recruitment efforts for the pre-veterinary and animal science programs. The reason was to reduce conflicting pre-vet messaging to students and parents, as well as to focus recruitment, retention, advising efforts. The Pre-Veterinary Coordinating Committee was established, the previous recruiting/retention and advising positions changed into a Pre-Vet/SVMBS

SVMBS Academic Program Reviews, cont.

recruitment coordinator and a Pre-Vet advising/retention coordinator. The undergraduate program coordinator works with the Pre-Vet advisor and coordinates advising of SVMBS undergraduates. Any student who is planning to apply to a veterinary school is tagged as a PVET, regardless of department or college of major.

Recruitment messages are individualized to students by their state of residence and career interests. Because students who visit campus are more likely to attend UNL, special effort is focused on events that bring students to campus.

ENROLLMENT

Figure 5 illustrates enrollment trends from 2012 through 2021. The figures are six-day census numbers reported by UNL Institutional Research and Planning. An appreciable number of animal science students want a career in veterinary medicine so enrollment in that program is included (Figure 6).

ADVISING

Undergraduate students in SVMBS are assigned a faculty advisor, and those students who are also pre-vet students are co-advised by the pre-vet advisor. SVMBS faculty advisors play more of a mentoring role, whereas the lead advisor/program coordinator and the pre-vet advisor work with the students to ensure that graduation and veterinary school admission requirements are met.

Each student has a lead faculty adviser, with the recruit/retention coordinator and other faculty serving as additional advisers. New Student Enrollment (NSE) has become a subspecialty and focuses on the unique needs of students enrolling for the first time. Measures are taken to equitably distribute students between advisers; however, as undergraduate enrollment grows, so will the need for advisers. A unique aspect of advising SVMBS pre-vet students is helping them migrate to a degree-specific adviser after they choose a major.

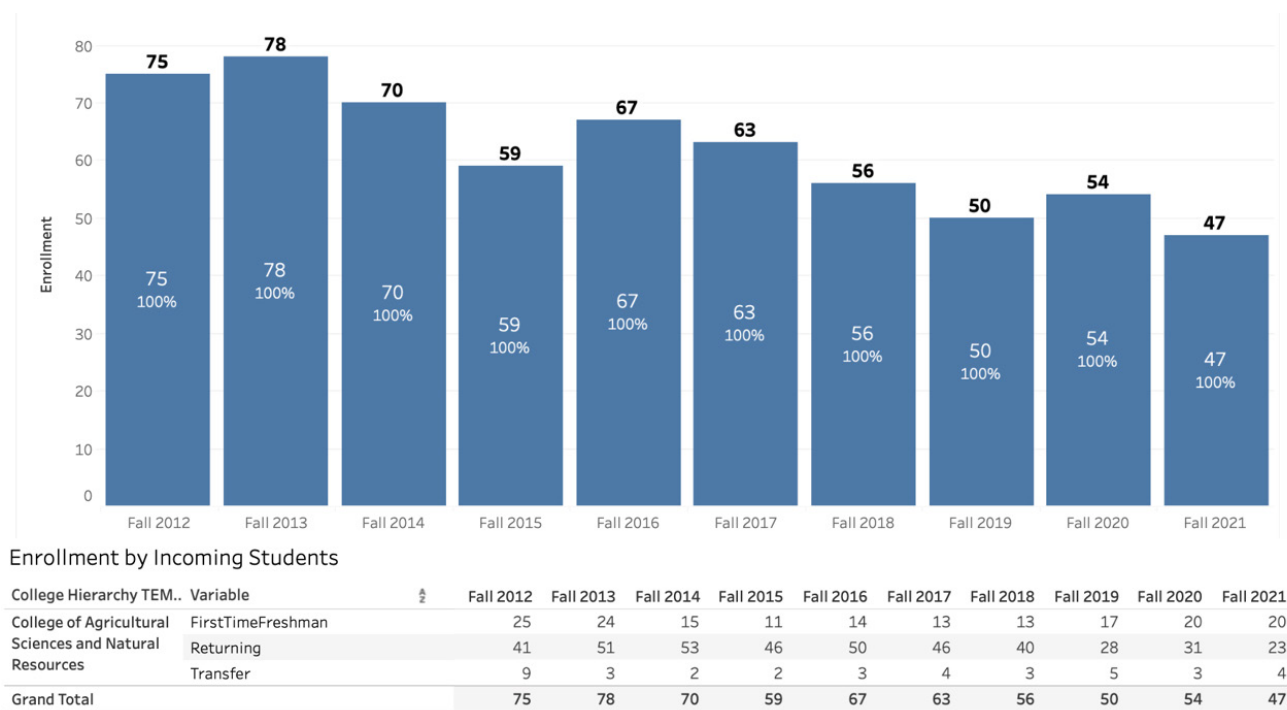


Figure 5. Total undergraduate enrollment in veterinary sciences.

SVMBS Academic Program Reviews, cont.

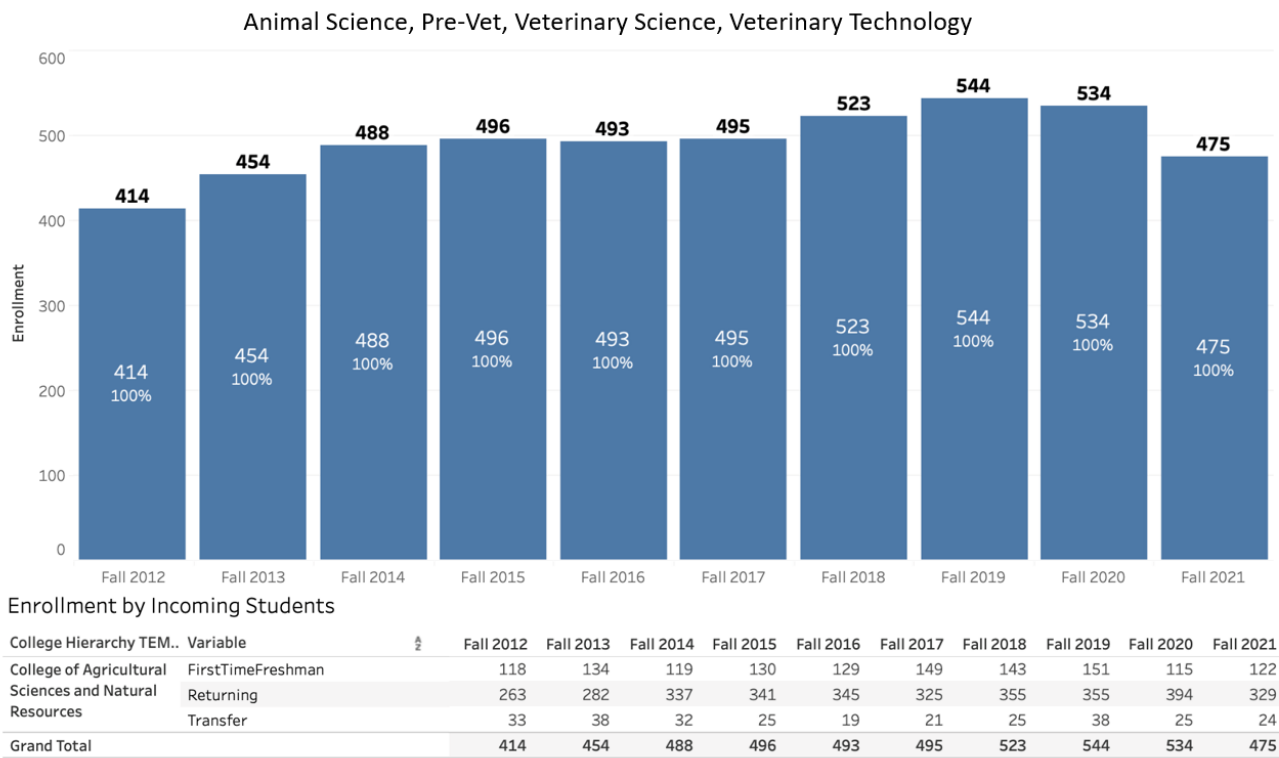


Figure 6. Total undergraduate enrollment in animal science, pre-vet, and veterinary sciences.

PROGRAM STRENGTHS AND OPPORTUNITIES

Undergraduate education is a main priority at UNL and in CASNR, and SVMBS recruiting efforts are supported at both levels. UNL admissions and CASNR recruiters represent the pre-veterinary program in many venues, including out-of-state markets. Additionally, SVMBS has used several targeted campaigns to contact potential students and invite them to visit campus and attend recruiting events.

The pre-vet major and the fact that upper-division undergraduate veterinary science courses are taught by PPVM faculty are very strong selling points for prospective students and their parents. SVMBS is positioned to use existing resources to develop additional learning opportunities not often found in undergraduate programs:

- Experiential learning with large animals at the Great Plains Veterinary and Educational Center
- Student employment at the Nebraska Veterinary Diagnostic Center, the

Agricultural Research Division, or in SVMBS research laboratories

- Instruction from professional faculty, many of whom are veterinarians

Mentorship from advisors, many of whom have a professional veterinary background.

PROGRAM CHALLENGES

Incoming undergraduate students can matriculate at UNL as a pre-veterinary major. When that occurs, they are identified in the UNL student information management system (SIS) as a PVET major. After initial enrollment and completing VBMS 101 the fall semester of their freshman year, there is a communication gap with veterinary science students because they do not take another VBMS course until their junior or senior year. We have begun addressing this by creating experimental courses under the Special Topics (VBMS 291 and VBMS 391) designations so that faculty are encouraged to develop new courses targeted to students in their sophomore and junior years. Courses found to be of interest and that promote student learning and

SVMBS Academic Program Reviews, cont.

engagement with veterinary and biomedical studies will be converted to permanent course offerings in the VBMS core curriculum.

The current recruiting philosophy is “to be a vet, start with pre-vet.” The intent is to identify students wishing to be veterinarians before they declare a degree major. As a result, the pre-vet adviser, as well as advisers in SVMBS and the Department of Animal Science, provide pre-vet advising to any student, regardless of the student’s academic major, UNL college or post-secondary school of enrollment.

The pre-vet advisor provides pre-vet advising through completion of the undergraduate program. Any student in any major who is planning to apply to a professional veterinary program is advised by the pre-vet advising/retention coordinator. Students in SVMBS are advised by SVMBS faculty who serve as mentors. Faculty advisors are matched with students who share interests, such as pathology, microbiology, or wildlife health.

A significant reduction in the enrollment in pre-vet occurs for two reasons:

- Student self-selection away from pre-vet when the student decides veterinary medicine is not their professional goal. This can occur at any time during the undergraduate career but is most noticeable after the first academic year of enrollment.
- Pre-vet students are urged to declare a degree-granting major by the end of their sophomore year, even though they continue to aspire to a career in veterinary medicine. Many students migrate to a degree-granting program by the end of their first year of enrollment.

Anecdotally, some students avoid veterinary science as a degree-granting major because:

- It is perceived to be a more difficult curriculum than other majors.
- They do not understand what career opportunities are possible with a B.S. in veterinary science.

- Students seek programs that offer financial assistance to help fund their education, and SVMBS has a limited amount of scholarship money available to undergraduate students.

An increase in VBMS enrollment could be achieved with greater attention being paid to the needs of non-vet-school-bound students in the veterinary science major and with a greater amount of scholarship money to support them.

Although the pre-veterinary program helps qualify students to enroll at any veterinary college, prospective out-of-state students often lose interest in UNL for their undergraduate studies because they are not eligible to enroll in the UNL/ISU-CVM Professional Program in Veterinary Medicine.

Additional challenges include:

1. There is currently no mechanism within the School for connecting with SVMBS alumni.
2. Lack of an undergraduate home/space in VBS.
3. Lack of distinct identity beyond pre-vet/PPVM-prep.
4. Lack of emphasis on the biomedical science programs and opportunities.
5. Lack of partnerships with industry and government to create experiential activities, job opportunities, and internships.
6. Faculty buy-in to undergraduate teaching and advising, potentially creating a pipeline of students to the graduate program.
7. Insufficient opportunities for development of communication skills, both written and oral.

Experience is important in preparing students to enter a career or to apply to graduate or professional school. Currently, SVMBS undergraduate degree programs do not have degree-specific experiential learning opportunities such as an internship. Students intending to apply for admission to vet school are urged to explore veterinary medicine by volunteering or working in a veterinary clinic, but few use that experience to earn academic

SVMBS Academic Program Reviews, cont.

credit, such as could happen under VBMS 496 – Independent Study.

GOALS

- Add course and experience options in companion animal management, research animal management, and comparative biomedical sciences to the veterinary science major to expand the career options available to veterinary science graduates.
- Increase distance education opportunities that allow more students access to SVMBS undergraduate educational programs.
- Collaborate with the Nebraska College of Technical Agriculture, a two-year technical college within the University of Nebraska system, to deliver its AVMA-accredited AAS veterinary technician degree program.
- Provide undergraduate students with opportunities to gain veterinary related animal experience as part of the SVMBS undergraduate programs.
- Explore ways to make SVMBS programs more affordable and accessible to all students.
- Reach and maintain 2025 targets for a 4-year graduation rate of 55%, a 6-year graduation rate of 72%, a first-to-second-year retention of >85% — all while decreasing equity gaps.

PROFESSIONAL PROGRAM IN VETERINARY MEDICINE

Program Coordinator: Dr. Renee McFee

SVMBS is the home of the Professional Program in Veterinary Medicine, a cooperative program between UNL College of Agricultural Sciences and Natural Resources and Iowa State University College of Veterinary Medicine. The UNL PPVM is accredited by the American Veterinary Medical Association Council on Education (AVMA COE) as part of the ISU-CVM accreditation.

The PPVM was established in 2006 to provide education and training to Nebraska resident students who are accepted into the ISU D.V.M. program, and to provide an opportunity for both Nebraska and ISU-CVM students to experience enhanced clinical care in food-animal medicine at the Great Plains Veterinary Educational Center.

In general, years one and two of the curriculum are offered by UNL faculty and years three and four are offered at ISU. One first-year course is delivered to ISU students by UNL faculty and one second-year course is delivered to UNL students by ISU faculty. Fourth-year clinical rotations/preceptorships are offered in both states, including at GPVEC.

UNL and ISU are responsible for determining the outcomes and core competencies expected of entry level veterinarians, and each institution is responsible for ensuring their respective curricula results in students meeting those outcomes and competencies. A standardized instrument (the VEA) is administered to all UNL/ISU students during the third year of the program. Results are used to make adjustments in curriculum at both institutions.

The Veterinary Educational Assessment (VEA) is a comprehensive, independent assessment of knowledge in basic veterinary medical sciences. The five main content areas are anatomy, physiology, pharmacology, microbiology, and pathology. This standardized test allows schools to compare the performance of their students to that of students from other veterinary schools. Over the past five years, ISU students have earned significantly higher scores 10 times (Anatomy = 2016/2017/2021, Physiology = 2016, Pharmacology = N/A, Microbiology = 2016/2017/2021,

SVMBS Academic Program Reviews, cont.

Pathology = 2016/2017/2021) or 40 percent of the time.

ACADEMIC STANDARDS & STUDENT CODE OF CONDUCT

The UNL academic standards must meet or exceed those of the AVMA COE, and UNL's standards must meet or exceed those of ISU. Students are subject to the rules, regulations, and procedures of the institution where they are physically present. Any misconduct at UNL must be disclosed to ISU.

CURRICULUM

Year one and two core courses total 79 credit hours. UNL offers up to 14 credit hours of electives each year. Additional ISU electives are available remotely for Nebraska students.

ADMISSION

Over the last five years a mean of 74 applications from Nebraska residents were received, which is 2.9 applicants per each available position. ISU establishes:

- Admissions requirements (prerequisite coursework, CASPer situational judgement test)
- Admissions process (students apply via VMCAS)
- Academic evaluations (GPAs)
- Evaluation rubric for application review

All admissions requirements and processes are highly similar between UNL and ISU, with only minor differences: Nebraska applicants must submit a Nebraska Residency Application and complete two additional essay questions. The PPVM Admissions Committee is responsible for evaluating all applicants to the UNL/ISU 2+2 program and submitting their recommendations for admittance or denial. These recommendations are approved by both the CASNR dean and the ISU-CVM dean.

ENROLLMENT

The first class matriculated in fall 2007 and graduated in spring 2011. Under the joint agreement, ISU agrees to enroll no fewer than 25 qualified

School of Veterinary Medicine and Biomedical Sciences - PPVM

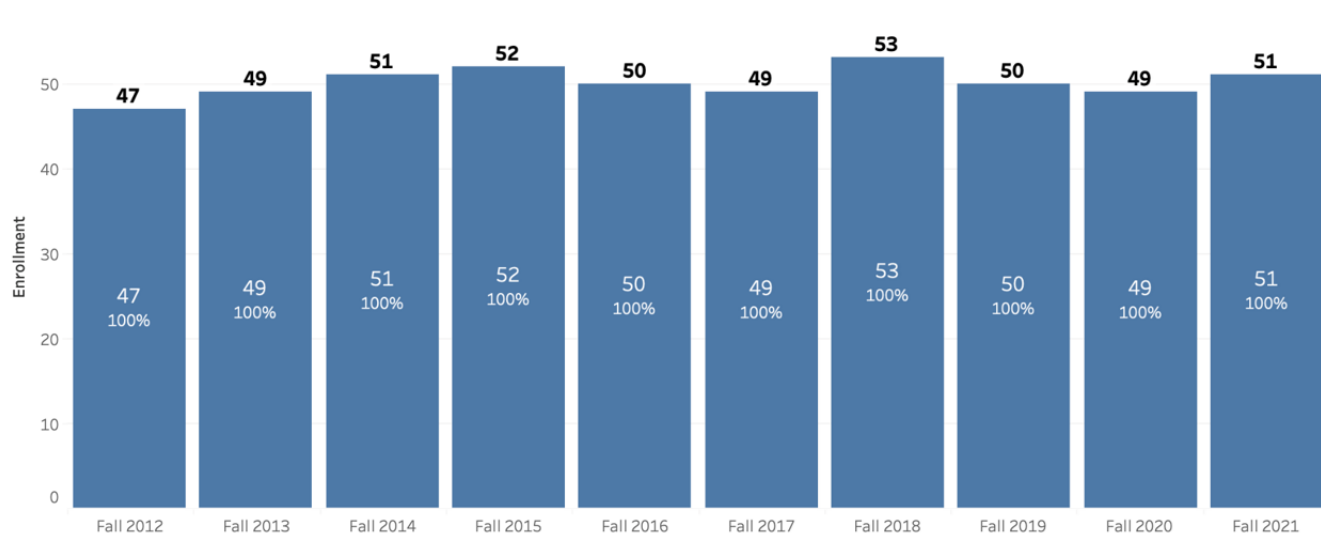


Figure 7. Enrollment trends in the SVMBS PPVM program.

SVMBS Academic Program Reviews, cont.

Nebraska resident students each year. The typical combined UNL and ISU class size is approximately 166 students. Recent enrollment totals are shown in Figure 7.

Since 2017, 133 Nebraska students have matriculated, 128 have graduated, 102 are currently enrolled and 7 have left the program. The primary reasons for attrition are withdrawal due to personal reasons (3 out of 7) and dismissal based on academic standards (4 out of 7).

PPVM TUITION AND FEES

As part of the joint agreement, UNL students are charged ISU resident tuition rates for all four years. ISU establishes the tuition rate. UNL pays ISU the difference between the resident and non-resident rate for students during their third and fourth years. While at UNL, students pay UNL student fees, and UNL bills and collects tuition. While at ISU, Nebraska students pay ISU student fees, and tuition is billed and collected by ISU.

FACULTY & STAFF

Currently 22 UNL faculty members (and one from ISU) contribute to the instruction of PPVM students during the first two years. One faculty member (PPVM coordinator) is also responsible for administrative oversight of the program. In addition, four staff members (administrative support associate, curriculum and student affairs specialist, teaching lab coordinator, and lab technologist) contribute to administrative functions and assist with instruction of PPVM students.

FACILITIES

The primary classrooms are VBS 103 (maximum seating 54), VBS 145 (maximum seating 66), and NVDC 101 (maximum seating 60). Animal Science D104 (maximum seating 32) is available as an overflow classroom. Laboratory space includes Animal Science D116 (anatomy lab, maximum seating 30 students) and NVDC 114 (biosecurity level 2 laboratory, maximum seating 32 students; Figure 8). The former is used for anatomy and neuroanatomy while the latter is used for histology, pathology, microbiology, and parasitology.

Clinical teaching spaces include rooms 117, 119, 123, and 129 in the VBS Annex. These spaces are

equipped and utilized for small animal examinations, medical procedures, radiology, ultrasonography, and surgery. These spaces also include a Clinical Skills Laboratory furnished with models and equipment used to train students in live animal, clinical skills techniques. Additional instruction with companion animals occurs in the medical and surgical facilities at the Capital Humane Society Admissions and Assessment Center. Instruction with food animals and horses occurs within the Animal Sciences Complex and at GPVEC.

PROGRAM STRENGTHS AND OPPORTUNITIES

The PPVM provides Nebraska residents access to an AVMA accredited veterinary educational program. Through the UNL/ISU CVM agreement, Nebraska students are able to pay ISU resident tuition. This, coupled with staying in Nebraska for the first two years of their education makes the program economical and convenient for the students, while also helping to keep state dollars in Nebraska. The small class sizes benefit student-faculty interactions, teaching methods and hands-on experiences. Furthermore, approximately two-thirds of PPVM alumni have returned to Nebraska to practice veterinary medicine (**Appendix 10**).

PROGRAM CHALLENGES

With enrollment limited to Nebraska residents, it is challenging to significantly grow the program and still maintain a high-quality cohort. While instructional depth has increased in certain content



Figure 8. A teaching lab at the NVDC serves veterinary students.

areas, a small number of faculty (7 of 22) is still responsible for delivering 62% (49 of 79 credit hours) of the instruction for the core curriculum. Staff teaching assistance is limited (one teaching assistant for anatomy laboratories, one teaching assistant for surgery and foundation of veterinary medicine laboratories) with most courses having no teaching assistance. Furthermore, administrative support is limited to two staff members. Since there are limited services provided to professional students on a university-level, most academic assistance is coordinated and provided by PPVM faculty and staff.

There's limited ability to develop the PPVM curriculum because the curriculum is governed by ISU. Since the degree is granted by ISU, not UNL, there's limited awareness that Nebraska has a professional program. Challenges exist for students interested in a dual degree program (e.g., MS, MPH, MBA). Other constraints are the admission requirements which are governed by ISU and the tuition and fees which are set by ISU.

VISION

To strengthen and enhance the PPVM by providing quality and affordable education that emphasizes animal and clinical experiences.

GOALS

- Optimize the use of the Great Plains Veterinary Educational Center, Nebraska Veterinary Diagnostic Center, and other resources to provide exceptional animal and veterinary experiences
- Explore partnering with additional veterinary colleges to allow growth from out-of-state students
- Establish a joint DVM degree with ISU in accordance with the original agreement to help increase the visibility of Nebraska's professional program, recognize the efforts of SVMBS faculty and staff, create D.V.M. UNL alumni and allow the potential for UNL to establish its own tuition rates. Graduate Program

GRADUATE PROGRAM

Program Coordinator/Graduate Committee Chair:

The SVMBS Graduate Program is an interdepartmental program governed by the UNL Office of Graduate Studies (OGS) and based in the School of Veterinary Medicine and Biomedical Sciences. Administrative support for the program is provided by SVMBS. There are 20 active graduate faculty (17 in SVMBS and three courtesy) with full graduate faculty status approved by OGS. Typically, these are tenure-track faculty. There are three faculty members with associate graduate faculty status.

The SVMBS Graduate Committee oversees the graduate program. The committee has the authority and responsibility to examine, study and establish procedures and policies for all matters regarding the curriculum, admissions, and academic standards/performance for the program. The committee chair provides guidance for issues that may arise and serves as the primary contact for graduate students and the Office of Graduate Studies.

DEGREE PROGRAMS

SVMBS offers an M.S. in veterinary sciences and a Ph.D. in integrative biomedical sciences.

M.S. in Veterinary Sciences

This degree prepares students for careers in the veterinary and biomedical fields. They can further focus the degree program by choosing from two options.

Option I — Provides postgraduate education in veterinary/biomedical disciplines and training in research technology and philosophy. Requirements include a research project, thesis, and minimum of 30 credit hours.

Option II — Broad-based program for students with special interest in diagnostic or clinical veterinary medicine, animal production or other interest with lesser research objectives. Requirements include a minimum of 36 credit hours and a creative component demonstrating scholarly accomplishment (case report, literature report or research project).

SVMBS Academic Program Reviews, cont.

Ph.D. in Integrative Biomedical Sciences

The Ph.D. program provides training in biomedical sciences with emphasis on veterinary sciences, human and/or animal health. Two major areas of emphasis currently exist in the program: 1) host-pathogen interactions and infectious diseases, and 2) pathogenesis of human disorders.

Students must pass a comprehensive exam for candidacy. A minimum of 90 credit hours are required, and students must register for the SVMBS seminar series each semester until the degree is completed. Other requirements include completing a dissertation and a final examination.

SEMINAR SERIES

SVMBS hosts a spring and fall seminar series featuring 15 speakers per series. Attention is given to inviting a mix of speakers from inside and outside the University of Nebraska. Typically, each series is composed of four speakers from outside the university, four to six SVMBS faculty and speakers from within the University of Nebraska system, and five or more graduate students and postdoctoral fellows. Graduate students are required to present their work as well as attend and participate in seminars.

RECRUITMENT

The graduate program has open enrollment at the beginning of fall semesters. There is not a formal recruitment program or process for interested students. Students applying are usually attracted based on the research programs described on the SVMBS website. Individual faculty also actively and independently recruit highly qualified applicants during visits to other institutions, research labs, and while attending recognized scientific conferences in their corresponding fields of research. The chair and/or personnel from the UNL Office of Graduate Studies attend recruitment events for biomedical sciences graduate programs to disseminate information regarding the program. Information is disseminated via fliers.

ADMISSION

While the School determines whether to accept a graduate student into its program, formal admission into the University of Nebraska Graduate College

is completed through the UNL Office of Graduate Studies. The Office of Graduate Studies ensures that all necessary application materials are submitted and provides formal notice of admission. Applications must be submitted by January 15 of the year prior to the semester in which a student plans to enroll. Additionally, rolling admission of graduate students can be expanded as requested by faculty members for students off-cycle to any period. Such students can be admitted on an exceptional case-by-case basis (such as when grant funding becomes available).

ENROLLMENT

Currently, 14 Ph.D. students (11 international) and two M.S. students (one international) are enrolled in the SVMBS graduate program. Recent trends in graduate program enrollment are shown in Figure 9.

PROGRAM STRENGTHS AND OPPORTUNITIES

The SVMBS graduate program provides opportunities for those wishing to earn an M.S. degree or Ph.D. Graduates are prepared for careers in academia and industry, with emphasis on biomedical fields (animal and/or human health). There is a strong framework of graduate courses offered within the department, and include advance training in virology, microbiology, immunology, and signal transduction/biomedical sciences. Traditionally the program's strength was in a robust animal-health focused research program that spanned basic and applied research and trained numerous animal health professionals throughout the United States. A historical listing of completed programs is included in **Appendix 10**. There were other PhD graduates in programs administered in partnership with UNMC (prior to the establishment of the Integrated Biomedical Sciences program of the SVMBS).

PROGRAM CHALLENGES

The SVMBS master's degree program (Master of Science in Veterinary Sciences) is currently under review by the Nebraska Coordinating Commission for Postsecondary Education because the numbers of enrollees and graduates have been below the Commission's standards for the degree

SVMBS Academic Program Reviews, cont.

School of Veterinary Medicine and Biomedical Sciences – MS and PhD

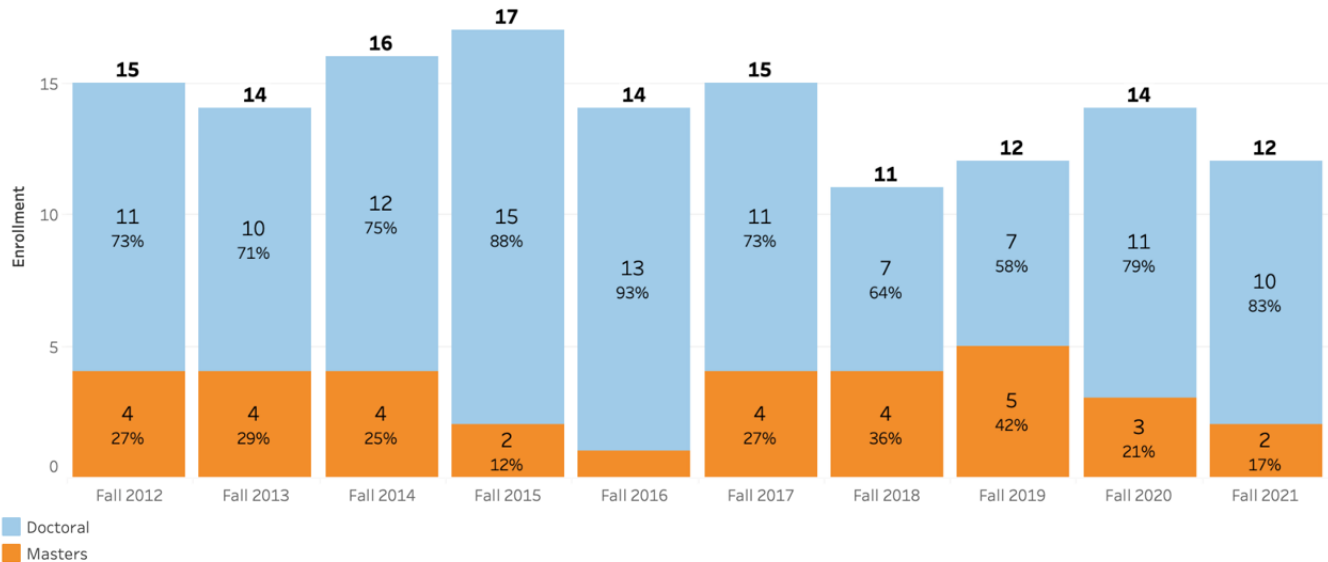


Figure 9. Graduate student enrollment.

(five graduates per year; see Figure 7). SVMBS is developing a plan to respond to the review and to continue training students in the School. This report will be drafted by December 2022 and presented to the Commission and Nebraska Board of Regents in early 2023.

There is currently no appropriated funding available for graduate assistantships in the SVMBS base budgets, and so the strength and number of graduate students is based on the graduate faculty's ability to secure external funding to support students, which is inherently variable. To compound this challenge, since the last Academic Program Review we have lost at least five full-time faculty with primary research appointments. External funding, and thus graduate student support, has been stable but insufficient to support increasing numbers of graduate students. Additionally, there is no formal student recruitment or retention plan. There are limited staffing resources to support graduate students, as a single staff member serves as both departmental and graduate secretary. To attract quality applicants, the program needs to expand and improve recruitment efforts. The SVMBS program needs to improve means to recruit and support graduate students. Options to achieve these goals are included in the Goals section.

VISION

The graduate program will provide quality training in biomedical sciences and animal health with an emphasis on host-pathogen interactions and infectious diseases.

GOALS

- Expand and diversify the M.S. degree options for professional residency programs
- Explore opportunities for students to pursue advanced graduate study to enhance their competitiveness for professional programs
- Explore potential to enhance accessibility to graduate training for off campus students.
- Enhance and improve recruitment efforts to attract quality students
- Develop alternative educational opportunities that could expand career paths for graduates
- Expand the number of graduate faculty that can participate in graduate education

SVMBS Academic Program Reviews, cont.

- Explore opportunities for professional students and practicing DVMs to receive specialty training (preventive medicine, epidemiology, etc.)
- Aggressively seek resources to strengthen the program
- Provide a more structured training for SVMBS graduates

NEBRASKA VETERINARY DIAGNOSTIC CENTER AND EXTENSION

DESCRIPTION

The Nebraska Veterinary Diagnostic Center (NVDC) is committed to serving the livestock and animal health industries in Nebraska and across the region. It's a mission the NVDC has successfully carried out since its inception in 1894 when the Department of Animal Pathology at the University of Nebraska (forerunner of the School of Veterinary Medicine and Biomedical Sciences) incorporated diagnostic services into its outreach activities. This legacy of service to Nebraskans is impressive and recognizes the importance that early constituents placed on the need for diagnostic facilities since Nebraska only was incorporated as a State in 1867 and the University was chartered in 1869.

The NVDC is a service unit that operates in a competitive diagnostic community to serve clients. Through the services provided to clientele, the NVDC generates revenue through fees. The NVDC must balance the concern of per test fee recovery with the need to remain competitive and innovative to realize total revenue growth. The NVDC recognizes and embraces the mission to protect public health and animal resources through disease diagnostics and surveillance. The impact of diagnostic work extends far beyond the individual case or client.

These realities require integration of IANR research investment directed towards contemporary and emerging animal health, public health, and production concerns unique to our region. Integration of outreach to identify these unique concerns is also critical. Diagnostic discovery and innovation impacts animal welfare, the economic viability of food production, and human well-being in the state. Investment in discovery also provides for detection and control of emerging pathogens and disease syndromes, and development of diagnostic tools for control. Expertise and equipment in the NVDC can be leveraged through expanded collaboration with scientists across campus and to other campuses through competitive grants to explore animal disease and comparative medical science more deeply.

The NVDC has had historic successes. The discovery of rotavirus, pseudorabies detection methods, vaccination improvements, BVDV detection technologies, PRRS virus detection and vaccine development, recognition of the nature of emerging inherited diseases of cattle are but a few examples of diagnostic research leveraged with extramural grant funding, that enhance diagnostic fee generation, and most importantly benefit animal health and the economic bottom line of Nebraska producers. Faculty expertise is leveraged in collaboration with biomedical researchers across campus, in areas of microbial pathogenesis, immunopathology, blast injury, vaccine development, and arthritis.

Current faculty members have recent history of participation in multidisciplinary research projects while also teaching veterinary students in the Professional Program in Veterinary Medicine and undergraduate students, training pathology residents, and delivering outreach activities that maintain and strengthen contact between the university and its stakeholders.

In September 2017 the NVDC moved into a new building that provided nearly four times the space and state-of-the-art equipment. The Nebraska Legislature, the university and private donors made the \$44.7 million commitment to the state's livestock, animal, public health, and biomedical research interests. The following objectives identify opportunities to strengthen the services provided by the NVDC, especially as relevant to AAFLD accreditation and NAHLN certification.

Objective 1: Innovative discovery to protect animal health, promote well-being and safeguard the food supply

Next generation advancements in science and medicine frequently occur when an interdisciplinary approach to research is taken and leading-edge technology is applied to improve scholarship and service output. There is tremendous potential to increase the scope and effectiveness of NVDC services through discovery and scholarship.

Potential Outcomes

- Increase engagement to conduct interdepartmental research, such as 1)

Animal Science Department: Porcine reproductive and respiratory disease, emerging genetic disorder of cattle, 2) Biological Systems Engineering: Composting swine carcasses infected with porcine epidemic diarrhea virus (PEDV), and PEDV survival in the environment, 3) Nebraska Center for Virology: Porcine reproductive and respiratory disease virus, Ebola virus, and Zika virus, 4) U.S. Meat Animal Research Center: Bovine respiratory disease and bovine keratoconjunctivitis, and 4) SVMBS: Autoimmunity, Johne's disease and MRSA, E. coli, and redox biology.

- Train more pathology and microbiology residents to prepare the next generation of researchers, diagnosticians, and teachers.
- Increase refereed journal articles and book chapters.
- Recruit staff member to clinical research lab.
- Further develop new technology applicable to both diagnostic service and research as is currently being employed in the VDC with MALDI-TOF mass spectrometry.

Objective 2: Expansion of services to safeguard animal and public health and well-being

Tests that serve the poultry industry emerged as a priority opportunity. The number of poultry flocks in the state is increasing rapidly due to the large-scale commercial investments made by Hendrix-ISA, which operates a 24-million-layer chick hatchery near Grand Island, and Lincoln Premium Poultry/Costco, which opened a plant in Fremont in 2020 to process an estimated 104 million broilers per year. It's expected that the need for diagnostic services related to poultry will increase substantially over the next several years. The swine industry is also a sector the NVDC must be able to assist more effectively. We must still work to sustain a high level of beef and companion animal service.

SVMBS Academic Program Reviews, cont.

Potential Outcomes

- Increase diagnostic technologies that serve the state's growing poultry industry (e.g., National Poultry Improvement Plan testing).
- Increase diagnostic service technologies needed to serve the large-scale swine industry and other sectors such as companion animal and beef.

No formally trained diagnostician in poultry diseases or management existed in the NVDC. The leadership positions currently filled by the fortuitous arrival of Dr. Don Reynolds into the NVDC has allowed substantial progress and growth in this area. Dr. Reynolds serves as an outreach veterinarian to the industry, consulting on biosecurity and disease management. He is a liaison with the industry and assesses needs and opportunities for both service and research. Staff have been added to assist with current growing test demands, particularly in sample receiving and molecular diagnostics. Rabies testing has also been a significant growth area in the new laboratory.

There is perceived opportunity to expand services for large-scale swine producers. To accomplish this the NVDC replaced its laboratory information management system – LIMS – with one compatible with those used by the major swine producers. LIMS has the ability to export data in formats that more easily can be input into customer databases. Information is shared directly with clientele who utilize diagnostic services for health monitoring and management, and with state and federal officials for regulatory purposes. The poultry growth could serve as a model for swine programs. We must restore swine outreach to support swine biosecurity programs and to identify emerging research needs. Currently, the NVDC diagnosticians are coordinating low volume testing and some viral research in swine but in a passive reactive manner. The industry is left to seek support out of state for much of its diagnostic and research needs.

Objective 3: Strategic engagement with veterinarians and other stakeholders

NVDC diagnosticians support a broad array of veterinarians in Nebraska and throughout the

central US. Diagnosticians in the NVDC are often the first to recognize an emerging trend or disease and are counted on to share the information with the veterinary community. Recent examples include trichomoniasis in cattle; porcine reproductive and respiratory syndrome, circovirus, and porcine epidemic diarrhea and coronavirus infections in swine; and avian influenza in commercial poultry flocks.

Diagnosticians are invited to present continuing education programs related to animal and human disease trends, NVDC activities, specific conditions, and emerging diseases. This interaction is an important component in safeguarding animal health in the state and reinforcing the need to maintain a strong diagnostic laboratory capable of providing timely and accurate results in the event of declaration of an animal or human health emergency. One example is the COVID-19 pandemic, as exemplified by the saliva-based PCR test Figure 10.

Potential Outcomes

- Utilize the new NVDC to increase frequency of continuing education opportunities for veterinarians.
- Increase presence with stakeholders (producer meetings, breed organizations, commodity groups, etc.).
- Extend the scope and range of information delivered to Nebraska stakeholders by effectively disseminating information to Nebraska veterinary practitioners, who in turn can share it with clients.

Objective 4: Integration of diagnostic and extension services

The impact of extension activities and NVDC outreach are greatest when there is ongoing collaboration and integration. Integrating extension into the NVDC creates the potential to deliver more programming focusing on animal health and emerging issues or disease. The integration of outreach in all objectives that tie to our constituents is essential.



Figure 10. Nebraska Diagnostic Center provided laboratory facilities to test saliva samples in support of UNL's COVID-19 testing procedures.

Potential Outcomes

- Develop a more integrated approach to health surveillance for beef production systems.
- Link extension veterinarians at Great Plains Veterinary Educational Center, West Central Research and Extension Center and East Campus to facilitate idea and information sharing.
- Improve linkages between extension veterinarians and diagnosticians to provide research-based results for clientele.
- Continue interdisciplinary collaboration with the Beef Systems Initiative Grazing Study utilizing the SVMBS cow herd at ENREC.
- Maintain the tremendous service provided by the UNL Birthing Pavilion and other activities at the Nebraska State Fair.
- Focus on meetings where engagement with stakeholders and producers is possible.
- Continue outreach to the poultry industry.
- Revitalize outreach to the beef and swine sectors while not ignoring companion animals.

NVDC SUMMARY

The NVDC is well resourced with facilities and equipment. The new facility is designed and equipped to increase its impact on animal health through discovery and expand its leadership profile through scholarly work and education. Outstanding facilities and technology, however, are not enough. The inability for faculty members to devote time to the objectives listed is the greatest that has ever been experienced by the current NVDC faculty. Without an increase in faculty FTE, the NVDC can only continue to provide diagnostic services, limited high-quality collaborative scholarly activity, and some teaching. Important outreach, research and growth in service areas will continue to be limited and might very well decline due to limited industry connection.

The NVDC has done exceptionally well in meeting the challenges that have arisen due to decreasing FTE over the last five years. NVDC faculty members have shown dedication and flexibility and have continued to lead the way in veterinary diagnostic medicine; however, the capacity to do even more is simply not there.

To achieve the objectives listed above, the NVDC needs to restore and maintain faculty FTE in pathology and virology. The laboratory must integrate two additional outreach and research faculty positions related to beef and swine sectors in

SVMBS Academic Program Reviews, cont.

the role of outreach and research veterinarians based in the Lincoln laboratory facility (Table 3). With these additions, service caseloads will be adjusted, allowing more time to participate in interdisciplinary scholarly activities and engage stakeholders through outreach, while continuing to make significant teaching contributions to veterinary students in the PPVM. Faculty members also will have more time to devote to resident training, an important activity to ensure the training of future pathologists and microbiologists.

Residents are graduate veterinarians who receive additional specialty training in their specific field of interest. In addition, their broad training as a veterinarian and the additional training received during their residency/graduate program makes them uniquely qualified to contribute across all the missions of the laboratory. Residents act as multipliers which allows the service and teaching workload to be spread among a greater number of individuals, thus increasing the potential for all the pathologists and the microbiologist to engage in other scholarly and teaching activities.

UNL GREAT PLAINS VETERINARY EDUCATIONAL CENTER

The University of Nebraska Great Plains Veterinary Educational Center (GPVEC; Figure 11) began in 1989 as part of a cooperative agreement for veterinary medical education between Kansas and Nebraska. Through this agreement, initiated in 1986, 25 academically qualified Nebraska residents were accepted at the KSU College of Veterinary Medicine at in-state tuition. KSU had a required core rotation as part of their curriculum and all seniors were to attend GPVEC for their core rotation. In 2008, the contract was awarded to Iowa State University, which was part of the 2+2 program that required that veterinary students enrolled in the Professional Program in Veterinary Medicine spend their first two years at the University of Nebraska and their final two years at Iowa State University. Although the ISU students did not have a required core curriculum at GPVEC, their senior students have the first opportunity to sign up for special electives. In return, 25 Nebraska residents are admitted to the College of Veterinary Medicine at ISU.

Figure 11. The Great Plains Veterinary Educational Center, located 1 1/2 hours west of Lincoln, provides veterinary students from across the country with hands-on experience working with large animals, primarily cattle.



A Food Animal Production Medicine Consortium was developed involving six universities (University of California-Davis, University of Florida, University of Illinois, Kansas State University, Michigan State University, and the University of Nebraska-Lincoln) and continuing during 1989-1998. The consortium students also attended GPVEC for special electives. The primary idea of the consortium was an exchange of veterinary students to provide in-depth education in species-specific production medicine and to develop collaborative programs with other colleges.

Since GPVEC's inception more than 4,000 students have walked through the doors seeking training in veterinary medicine in specific areas of interest such as calving, lambing, feedlot management, bull breeding soundness, pregnancy examination, bovine reproduction, equine dentistry, and gomer bull surgeries. GPVEC's recognition has been largely credited to its close proximity to the U.S. Meat Animal Research Center due to the large herds of animals to which the GPVEC assists in providing veterinary service. The USMARC is the third cooperating institution in the GPVEC program by providing access to these large herds for veterinary education.

In addition to training veterinary students, GPVEC has offered various continuing education seminars the past 25 years including the development of the Beef Cattle Production Management Series, which is nationally and internationally recognized. The program began in 1993 and continued through 2008 as a yearlong program for practicing veterinarians seeking an in-depth study course resulting in Certification in Beef Cattle Production Management. Since the beginning of the program, 158 practicing veterinarians from 25 states and Canada have participated. During the last few years of the program, it was established as credit courses that could be applied towards a master's degree in which several of the participants furthered their education to earn their degree.

What started out as a simple approach to making a veterinary education available to Nebraska residents has touched numerous students nationally and internationally over the past 25 years, not to mention the continuing education provided to practicing veterinarians.

RESEARCH PROGRAMS

The School of Veterinary Medicine and Biomedical Sciences is strong in the area of infectious diseases and neurobiology. It is becoming increasingly clear that to control the spread of infectious diseases, a greater understanding of the interactions between pathogen and host is needed:

- How does the host respond to pathogens?
- How do pathogens persist outside the host in the environment?
- How are pathogens transmitted to susceptible hosts?
- How are pathogens and host disease states identified?

The UNL community has created a set of Grand Challenge objectives for responsible research (UNL | Grand Challenges). Three of these objectives are addressed by SVMBS research programs:

1. Sustainable food and water security
2. Health equity
3. Climate resilience

The SVMBS has strong programs in STEC food safety; molecular virology (cell biology, pathogenesis, immunology, and vaccinology); mycobacterial infections of ruminants, emerging and re-emerging viral diseases of swine (PRRS, ASFV); bovine respiratory disease and congestive heart failure; poultry pathology and medicine; as well as diagnostic pathology. These research programs are described within faculty biographic descriptions in **Appendix 2**.

SVMBS also has a strong program in neurobiology (neurobiology, neurovirology and neurotoxicology), investigating the biology of circadian rhythms, the pathogenesis of neurodegenerative disorders, and infectious processes by which viruses affect the nervous system. This research extends from the molecular through the population level and addresses mechanisms of disease, population medicine and

SVMBS Academic Program Reviews, cont.

related topics in biomedical research.

In all aspects of our research, the program emphasizes collaborative efforts toward advancement of biomedical knowledge. The collective scientific knowledge and skills are used for the benefit of the society at large through the protection of human and animal health, the relief of animal suffering, the conservation of livestock resources, and the promotion of public health and a safe environment. Recent extramural funding has been reasonably successful (Figure 12 and

Appendix 7A and 7B).

The areas of study and the faculty who are conducting research in each area with additional detail can be found (organized by disciplines and scientists) at: Research | School of Veterinary Medicine and Biomedical Sciences (unl.edu). Also, pending and current grants and contracts are listed in **Appendix 7A and 7B.**

SVMBS Grants Summary - Fiscal Year End 2022

Includes submissions with SVMBS Faculty as lead PI
Period: 7/1/2021 - 7/12/2022

Internal Funding:

Fiscal Year	# Requests	\$ Requested	# New & Additional	
			Awards	\$ Awarded
2018	13	362,369	7	61,290
2019	8	934,449	8	773,707
2020	5	565,756	4	275,365
2021	2	44,000	10	494,672
FY2022 YTD	15	1,099,113	9	232,906

External Grants:

Fiscal Year	Submitted		Awarded	
	By Date Submitted		# New & Additional Awards	By Date Awarded Funding Rec'd
	Submitted #	Submitted \$\$		
2018	19	5,090,277	N/A	473,702
2019	20	5,406,972	N/A	791,508
2020	16	6,618,570	N/A	615,000
2021	24	6,831,286	15	698,534
Jul-21	2	2,176,468	1	250,000
Aug-21	5	400,557	2	62,500
Sep-21	3	834,017	3	305,200
Oct-21	1	100,000	1	5,000
Nov-21	2	10,000	0	-
Dec-21	2	52,220	1	217,570
Jan-22	1	1,000	2	27,600
Feb-22	4	580,890	3	12,750
Mar-22	3	138,000	3	225,071
Apr-22	3	405,121	2	30,945
May-22	4	92,545	3	49,721
Jun-22	7	879,753	3	172,989
FY 2021 YTD	37	5,670,571	24	1,359,346

External Grants Comparison to Last Year				
	FY21 Submissions		FY21 Awards	
Jul-20	6	648,677	0	-
Aug-20	3	910,411	4	312,400
Sep-20	0	-	1	58,169
Oct-20	0	-	1	27,911
Nov-20	4	1,842,933	3	72,865
Dec-20	2	51,690	1	27,600
Jan-21	0	-	0	-
Feb-21	1	398,597	0	-
Mar-21	0	-	0	-
Apr-21	3	183,222	2	84,579
May-21	4	964,416	1	50,000
Jun-21	1	1,831,340	2	65,010
FY21	24	6,831,286	15	698,534
Previous FY	24	6,831,286	15	698,534

FY21 to Date: External + Internal Awards **1,592,252**

Figure 12. Grants summary for SVMBS, 2021 - 2022.

NEBRASKA CENTER FOR VIROLOGY

An important collaborative support center at UNL is the Nebraska Center for Virology (NVC). Their mission statement follows:

- Established in the fall of 2000 under the NIH Institutional Development Award (IDeA) program.
- Combines the expertise of Nebraska's leading biomedical research institutions: University of Nebraska-Lincoln, University of Nebraska Medical Center, and Creighton University.
- Research programs focus on important viral diseases of humans, including HIV-1, Kaposi's Sarcoma and herpes, as well as viruses within plants and animals.
- Supported by the Center's four core facilities: Flow Cytometry, Proteomics, Microscopy, and Bioinformatics.
- Faculty engage in mentoring young scientists and students from the U.S. and abroad and seek to attract more researchers to Nebraska.

BACKGROUND

Viruses are the simplest of biological systems, consisting only of protein and nucleic acid and incapable of reproducing themselves without a host. Yet viruses have made a huge impact on 20th century life, from their role as infectious agents in devastating diseases like smallpox, influenza, human immunodeficiency virus, and coronaviruses (SARS-CoV2) to their use as one of the key tools in the quest to decipher the workings of the gene. Virology research in Nebraska ranges across disciplines and into the frontiers of research, exploring the basic nature of viruses and their potential applications for diagnosis and control of diseases in plants, animals, humans and the environment.

VISION

The NCV's aim is to establish a nationally recognized center for biomedical research excellence. The NCV will accomplish this by establishing an infrastructure that connects these three schools' (University of Nebraska-Lincoln, University of Nebraska Medical Center, and Creighton University) excellent virology programs and drawing bright new investigators with similar research interests to Nebraska.

PURPOSE

The NCV's overall goal is to increase competence in biomedical essential virology areas by:

- Creating a multi-disciplinary atmosphere that encourages cross-fertilization and the development of a new generation of inventive researchers with a thorough understanding of the entire subject of virology.
- Creating collaborations between basic and clinical researchers working with human, animal, and potentially crucial plant systems with the unifying goal of elucidating viral pathogenesis and replication mechanisms. Understanding these basic processes will allow for the development of new vaccinations and therapeutic ways to combat disease.
- Conducting ground-breaking research into infectious pathogens and the host responses that can result in pathological changes, particularly neuropathogenesis and apoptosis.

Conclusions

SVMBS is a long-standing program within IANR and CASNR. The core missions have been research, undergraduate and graduate teaching, the PPVM, extension, and operation of the state of Nebraska's accredited veterinary diagnostic laboratory. Over the course of the School's history and into the present, there have been (and will continue to be) significant shifts in stakeholders, clientele, students, the collective sciences of veterinary medicine and animal health, as well as the relevant standards of practice. These changes require attention, with a renewed urgency, to both the scientific and the social needs of Nebraska. The SVMBS must also recognize and serve our region and many global communities.

In summary, the mission of the SVMBS is to provide the educational and scientific discovery service to support animal health as well as the general well-being of the animals and their caretakers. The diversity of the caretakers, in the broadest sense, will continue to increase. Also, the needs of the food animal industry and society in general will continue to evolve. Clearly, all of these

interactions are important and deserve full attention. And, sustained delivery of One Health medicine requires consideration of the global ecology.

SVMBS, CASNR, and IANR have demonstrated an ability to respond to critical evaluations and recommendations. There have been successful mission-driven initiatives to address very specific needs related to stakeholders (food animal health and sustainable production) and One Health (epidemiology of zoonotic diseases). In order to continue this success, the SVMBS must address some key major challenges:

- Successful management of faculty succession—securing a diverse and talented faculty for the future.
- Recruiting and retaining a diverse and talented pool of students for all SVMBS educational programs.
- Identification of mechanisms and resources for sustainable and steady growth of SVMBS.

Appendices

1. SVMBS Faculty Apportionments, 2022
- 2A. SVMBS Faculty Bio
- 2B. Faculty Salaries Compared to Average of Peer Group
3. SVMBS Committees
- 4A. SVMBS Graduate Faculty
- 4B. Graduate Student List
5. SVMBS Adjunct and Courtesy Appointments
- 6A. VBS Floor Plan
- 6B. VBS Annex Floor Plan
- 6C. NVDC Floor Plan
- 6D. GPVEC Floor Plan
- 6E. East Campus Map
- 7A. SVMBS Grants Summary
- 7B. SVMBS Pending Grants
8. NVDC Data
9. Degree Requirements
- 10A. PPVM Alumni Data
- 10B. Graduate Degrees Completed, 1986-2022
- 11A. SVMBS Self-Study, 2015
- 11B. SVMBS 2015 Program Review Response to External Review Team Recommendations