AVMA COE Accreditation 2014 Self-Study

2014 SELF STUDY

Mississippi State University
College of Veterinary Medicine

Glossary of Acronyms

ACR	Advanced clinical rotation
AERC	Animal Emergency and Referral Center, Flowood, MS.
AHC	Animal Health Center (veterinary teaching hospital in Starkville, MS)
AIF	Animals in Focus
CC	Clinical Competency
CEHS	Center for Environmental Health Sciences
COS	Mississippi State University, College of Veterinary Medicine, Clinical Outreach Services (not-for-profit corporation, 509(a)(2))
CPC	Clinicopathologic Conference (Year 4 capstone experience/required course)
CPE	Clinical Proficiency Exam
CTL	Center for Teaching and Learning (MSU)
CVS	Community Veterinary Services (Year 3 required rotation)
DAFVM	Division of Agriculture, Forestry and Veterinary Medicine
FTE	Full Time Equivalent
GCAFS	Global Center for Aquatic Food Security
IHL	Institutions of Higher Learning
LARAC	Laboratory Animal Resources and Care
MAFES	Mississippi Agriculture and Forestry Experiment Station
MDL	Multidisciplinary Laboratory
MSU	Mississippi State University
MVRDL	Mississippi Veterinary Research and Diagnostic Laboratory
ORC	Office for Regulatory Compliance and Safety (MSU)
ORED	Office of Research and Economic Development (MSU)
PRDL	Poultry Research and Diagnostic Laboratory
PTAP	Peer Tutoring and Assistance Program
SRE	Summer Research Experience
UN FAO	United Nations Food and Agriculture Organization
VOICE	Veterinary Students as One in Culture and Ethnicity
VMTP	Veterinary Medical Technology Program
VSC	Veterinary Specialty Center, Stark Road, Starkville, MS

Note: All links provided in the Self-Study Report may also be accessed via the CVM webpage established for the COE (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe**).**

OBJECTIVES AND EXECUTIVE SUMMARY

State the major goals and objectives of the college and comment on how they are being met.
Goals of the College of Veterinary Medicine (CVM) are to: (1) foster teaching and learning; (2) promote research and creativity; (3) expand outreach and engagement; (4) encourage globalization; (5) enhance institutional diversity, culture, and environment; and (6) maintain a stable financial base. Specific priorities for each goal are listed in the Strategic Plan (http://www.cvm.msstate.edu/images/pdfs/intranet-news/strategy-for-excellence.pdf)

The College has experienced significant growth in multiple areas since the last COE site visit in 2007 (Appendix, Executive Summary - Table A). The size of the applicant pool has nearly doubled. West Virginia has been added as a contract state with seven students per class. The student body in the DVM curriculum has increased 24% (328 from 264), while currently full-time faculty positions have increased 34.5% (113 from 84). The College has added clinical teaching programs in the Jackson area with the establishment of the Animal Emergency and Referral Center (AERC) and in Starkville with the Veterinary Specialty Center (VSC). The Two Phase curriculum with 2 full years of clinical instruction has added three new rotations, and additional materials have been added and sequencing improved in the preclinical years. The Mobile Shelter Program has been expanded. A combined DVM/PhD program was initiated in 2007, and a BS degree in veterinary medical technology, which integrates in the clinic with DVM education, was introduced in 2010. Clinical caseload (all locations) has increased 180%, and the ambulatory practice has increased farm visits 141%. In keeping with the University's goal of globalization, the College has increased international activities and has begun a study abroad program.

For FY 2014 (ended June 30, 2014) research expenditures from extramural sources were increased by 40.8% compared with FY 2007. Projected expenditures, based on the College's current grant portfolio for FY 2015, are approximately $8.5M or 85% above those at the time of the last site visit. During the period between site visits the College continued to invest internally in the research program, so that while extramural expenditures temporarily reflected a decrease during FY 2011-2013, total research expenditures (extramural and state appropriations) continued slight but steady growth through the period. This investment has resulted in graduate student enrollment increasing by 27.6%, and the average number of original (multiple CVM authors on same paper only counts as one paper) peer-reviewed papers for the 3 year period prior to the 2014 site-visit increasing by 153.7% (104 compared with an average of 41 for the 3 years before the 2007 site-visit). During the past year, young investigators in the College secured an NIH $10M (5-year) grant to study host-pathogen interactions. Several additional NIH research grants, one NIH facilities grant, one large USDA grant, and one large USAID grant have been received during the past 18 months. In January, 2014, the United Nations Food and Agriculture Organization (UN FAO) designated the College's Global Center for Aquatic Food Security (GCAFS) as a Center for Knowledge for Aquatic Health, the first such designation in the world for a college of veterinary medicine. From 2000 through 2014, 195 MSU-CVM students participated in the Summer Research Program.

Under the Board of the Mississippi Institutions of Higher Learning (IHL), the CVM is a separately funded unit, i.e., the legislature passes and the governor signs a separate, unique appropriation bill each year for the College. Since the last site visit, the College's appropriation from the state legislature has increased from $15.2M in 2007 to $18.2 M for FY 2015 (19.3% increase). Self-generated revenues (tuition, hospital, gifts, etc.) have increased so that total revenues (2007 compared with FY 2014) have increased from $31.3M to $49.1M (57% increase). During this period, the legislature also provided state-supported bond funding (approximately $24M) for building envelope renovations, replacing the necropsy laboratory, air conditioning cooling tower, and construction of new classrooms.

Describe the methods and/or tools used to measure outcomes of the total program of instruction, research, and service.
The Associate Dean for Administration is charged with monitoring progress on the Strategic Plan, and this information is reported at faculty meetings. The Dean meets with each department (faculty and staff) to discuss progress. The College compares, through the annual AAVMC Comparative Data Survey, select data (e.g., salaries, caseloads, research expenditures, hospital revenue, minorities among students and faculty, students, tuition) with CVMs of similar size and scope of activities. The Dean and CVM administration meet with the Provost and upper University administration each summer and provide a progress report on the strategic plan and academic programs. The Dean then presents this information with time for Q&A at a faculty meeting. Faculty and staff satisfaction surveys were conducted in 2011 and 2013. Student satisfaction surveys are conducted annually, and graduating student exit interviews are conducted each year just before graduation. Surveys of graduates 1-5 years post-

Organization

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graduation and employer and externship mentor surveys are conducted to assess the effectiveness of the DVM education program. The Animal Health Center (AHC) has conducted client and referring DVM satisfaction surveys on all cases for the past 3 years. Diagnostic laboratory satisfaction surveys are conducted also. Data collected from all surveys are brought to CVM administration, administrative Cabinet and, where applicable, to the Curriculum Committee, and used in the decision-making process. Additional outcomes information from direct and indirect measures, and the resulting actions or use of this information, is provided under Standard 11.

List major strengths and weaknesses of the college

Strengths:

- Productive and committed faculty and staff - The College has been able to recruit an exceptional group of young and also experienced faculty since the last site visit.
- A two-phase curriculum that provides students with strong core classes, extensive casework and surgical experiences, and the flexibility to choose a career path that meets individual student needs
- Supportive alumni, public, practitioners, and legislature
- A funding model and university structure that permits entrepreneurial endeavors and leveraging of state resources
- A robust case load consisting of a variety of domestic species

Challenges:

- Attracting students, staff, and faculty members who reflect the diversity of society so that teaching, research, and service activities can meet the needs of a diverse society.
- The need to expand services and revenue base while maintaining excellent relationships with core constituents across the state.
- The low population base and financial resources in Mississippi sometimes make it difficult to recruit and retain faculty and expand programs.
- The cultural and historical perceptions of Mississippi cause many MSU-CVM capabilities to be underestimated or unrecognized.

Recommendations

- Solicit the most qualified students, particularly nonresidents and impoverished students and provide scholarships.
- CVM programs led by endowed Chairs or Professors have achieved recognition and excellence. Continue to seek funding for such positions.
- Continue to provide excellent service and deliverables to constituents and stakeholder groups.
- Continue the same separate budget funding model.
- Continue to seek the most efficient use of available space to meet the College's needs. Construction of a new Animal & Dairy Sciences Building will free up classroom, office, and laboratory space on the 4th floor of the Wise Center.

STANDARD 1. ORGANIZATION

1.1 Provide a college mission statement for the program.

The College's mission is to protect and improve the health and quality of animal and human well-being while contributing to the economic development of Mississippi and surrounding regions by providing quality professional education, advancing research in veterinary and biomedical fields, and serving diverse communities through excellent diagnostic service, clinical care, and shared learning.

- The College will continue to maintain a flexible, two-phase curriculum, with 2 years of clinical experience that is responsive to the changing needs of veterinary medical (DVM curriculum) students, the veterinary profession, and the College's clientele.

- The College is committed to a teaching and clinical instruction program that results in veterinary medical graduates possessing the scientific knowledge, skills, and values necessary to practice entry-level veterinary medicine in a wide variety of domestic species, including food animals, equine, and companion animals in a variety of environments.

- The College is committed to excellence and continued improvement in the delivery of programs in teaching, research, and service (clinical service, diagnostic service, and outreach). The College's "Strategy for Excellence 2012-2018" states six major goals in addition to factors for success and challenges facing the College. (http://www.cvm.msstate.edu/images/pdfs/intranet-news/strategy-for-excellence.pdf)

1.2. Identify the body that accredits the university and the current status of accreditation.

Mississippi State University is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, masters, specialist, and doctorate degrees. The last reaffirmation was in 2003 and MSU is undergoing the affirmation process in 2014 (status will be formally announced December 2014).

1.3. Provide a flow chart indicating the position of the college of veterinary medicine in the university structure, lines of authority and responsibility, and names and titles of principal university administrative officers related to the College.

The MSU organizational flow chart is provided in Appendix Standard 1-A. The CVM is a college in the Division of Agriculture, Forestry and Veterinary Medicine (DAFVM) and reports on budgetary and most research matters to the Vice President, DAFVM, and on tenure issues, student issues, and some research matters to the Provost/Executive Vice President.

Principal University administrators are:

Mark E. Keenum, PhD, President of MSU
Jerome A. Gilbert, PhD, Provost and Executive Vice President
Gregory A. Bohach, PhD, Vice President for Agriculture, Forestry and Veterinary Medicine
David R. Shaw, PhD, Vice President for Research and Economic Development
William Broyles, PhD, Interim Vice President for Student Affairs

1.4. Provide a flow chart of the organizational design of the college listing names, titles, academic credentials, and assignments of the college administrators.

See Appendix Standard 1-B.

1.5. Describe the role of faculty, staff, and students in the governance of the college and list the major committees of the college and their appointment authority.

The Dean is the chief executive officer. The Dean is advised in this role by the Cabinet, whose 13 regular members (four of whom are women) meet three Thursday mornings a month.

The first Thursday of each month the Dean meets with an "Extended Cabinet" consisting of 20 faculty (including regular Cabinet members) and 16 staff members who hold CVM unit leadership positions. The purpose of Extended Cabinet is for staff and administrative faculty to share information on college issues, as well as relay information back to faculty and staff.

Departmental faculty meetings are held the third Thursday and all-college faculty meetings are held the fourth Thursday of each month. These meetings, and the Faculty Organization (FO) meeting described below, facilitate discussions among faculty and, at least 2 days a month, between Cabinet members and non-administrative faculty.

FO, which is comprised of non-administrative tenure and clinical track faculty members, meet monthly to discuss matters of interest to the faculty. This forum encourages open and thoughtful discussion. Ideas from the FO are then brought by the Chair (who is a Cabinet member) to the College Cabinet for discussion or clarification.

Standard 2.

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Finances

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Allegations of student professional misconduct are heard by a nine-member Student Professionalism Council and a four-member faculty Academic Standards and Professional Ethics Committee. The student Professionalism Council consists of two students elected from each of the four classes plus a chairperson. The faculty Academic Standards and Professional Ethics committee is made up of one person elected from each of the three academic departments plus one elected at-large member.

Students may comment on College activities in the annual Student Satisfaction Survey and through a "suggestion box" located outside the cafeteria that permits anonymous comment submission. As of August, 2014, no student comments had been received. The Dean meets at least once during the fall and spring semesters with Year 1 and 2 classes and is personally involved in the exit interviews with graduating seniors. The Assistant Dean for Admissions and Student Affairs meets with class officers on a periodic, as well as, on an as-needed basis.

College Cabinet and committees and their membership and appointment authority are listed in Appendix Standard 1-C.

Under the direction of the Dean, *ad hoc* task forces are established to study, analyze, and recommend potential changes in academic and business operational procedures. Faculty and staff are appointed to each task force. During recent years the following task forces provided reports and recommendations regarding College activities: (1) Cultural Competencies Task Force; (2) Efficiency Task Force (policy, operations, and coordination of function of hospital and diagnostic laboratory); (3) Library Visioning Task Force; (4) NAVLE Task Force; and (5) House Officer Task Force.

1.6. If the college plans to change its current organization, provide a summary of those plans.

No changes are planned.

STANDARD 2. FINANCES

Overview

The College has experienced strong financial growth since the last accreditation site visit. MSU-CVM Clinical Outreach Services (COS), a 509(a)(2) non-profit corporation, was established by the College (and controlled by the CVM) to operate satellite specialty/referral and emergency clinics. The two off-site clinics, AERC and VSC, provide students real-world experience in private practice settings, under the direct guidance of the CVM. Revenue generated by these clinics and tuition allocated based on student time spent in each location supports their operations, and excess revenue over expenditures and reserve may be returned to the College for faculty and clinical support. The College, through its Clinical Training Agreement executed with the University, pays the COS $977 per DVM student per rotation week at AERC and 50% of that amount at VSC (half of the rotation is located at the off-campus site). For FY 2014, this allocation to the COS totaled $246,424. The COS revenue reported in Appendix Standard 2, Table A, Supplemental Information does not include this tuition revenue transfer; only patient revenue is reported.

Other principal budget revenue streams (reported on Appendix Standard 2, Table B) are:

- General state appropriations – as a separately-budgeted unit, these funds come directly to the College.
- Tuition from DVM and Veterinary Technology (VMTP) students (and limited fee-based revenue) – all 4 years' tuition for DVM students, and the final 2 years' tuition for Veterinary Technology students, accrues to the College. (The University receives the fee revenue, $1,960.82/student/year, designed to support general campus functions for all students. The University also receives tuition from all graduate students.)
- Clinical revenue from clients of the teaching hospital (AHC).
- Diagnostic revenue from clients of the diagnostic laboratory system.
- Research grants and contracts – 100% of indirect cost recoveries accrue to the College.
- Gift and Endowment income.

Other financial arrangements of note:

- Whereas the College does receive all revenues outlined above, the CVM is responsible also for all expenses, direct and indirect, including employee benefits, utilities, facility operation and maintenance, and custodial

support. The College pays an annual assessment of $237,492 to the University for shared services such as registrar, landscape services, controller's office, and police support. The College receives an annual allotment of $70,173 from the Provost's office for partial academic appointments of two faculty members. In addition, the University pays approximately 12% of the electricity expense for the Wise Center, which represents the space occupied by Animal and Dairy Science, the University Television Center, and public areas of the building used occasionally for conferences and events.

- The College has autonomy in the management of positions. The tenure track faculty hiring process is completed after approval by the office of the Provost/Executive Vice President, whereas non-tenure faculty hiring is approved by the Vice President of the DAFVM. The College is not restricted to "faculty lines" and has the ability to create new faculty and staff positions at will, subject to availability of funds.
- COS pays monthly rent for the two satellite clinic facilities. The building housing the AERC is owned by a group of nine Jackson-area veterinarians, and the monthly rent for this facility is $16,200, based on a 15 year lease (currently year 4). VSC occupies space within the Premier Health complex, which is privately owned but leased by the MSU Office of Research. COS pays rent to the MSU Office of Research calculated as 12% of monthly VSC revenue, inclusive of utilities and building maintenance.
- The College assesses its financial position through annual comparison with other CVMs (AAVMC Comparative Data Survey), semi-annual collection of performance measure data as directed by the Mississippi Legislature, and annual reviews with the MSU Provost, VP DAFVM, and VP Finance. Results are communicated to faculty and staff on a regular basis, to include seeking input and feedback for improvement in benchmarks.

2.1 Complete Tables A and B for the past five years and analyze the trends for each category.

See Appendix Standard 2, Tables A and B, and Supplemental Information.

Trend Analysis of Expenditures by Category (for 2010-2014):
Instruction, academic, and student support expenditures -- Expenditures in this category increased 23%, or $1.25M, over the 5-year period. Faculty FTE committed to teaching in the DVM curriculum increased 33% during this interval. The salary and benefit allocation related to this increase in FTE accounts for a large portion of the expenditure growth. VSC faculty (3 FTE) and AERC faculty (6.5 FTE) provide instruction to DVM students rotating through those practices and are included in the numbers above.

Services of educational activity expenditures -- Total growth for this section over the period has been $6.6M, or 55.1%. The teaching hospital (AHC) at the CVM has increased expenditures (39.3%) and revenues (37.6%). New services (neurology, ophthalmology), increased emphasis on small animal wellness care, improvements in efficiency and delivery of care, and outreach efforts have all contributed to this growth. The diagnostic laboratory system experienced a modest expenditure increase and has demonstrated operational stability.

The satellite clinics, operated by COS, accounted for a large percentage of the increase in expenditures of this category. When expenditures for the CVM AHC are combined with those of the satellite clinics, the resulting increase for the teaching hospital category was 86.5% for the 2010-2014 period.

The Veterinary Medical Technology (VMTP) BS Degree program began in FY 2011. Current program costs of approximately $400K/year are expected to increase modestly over the next few years, if student enrollment remains at about the same level. VMTP tuition revenues (for the 2 clinical years at the CVM) are applied to program costs and, for FY 2014, the College provided an additional $214,203 from state appropriations to fully fund the program. Legislators support this program and the College administration believes that the benefits of the program and its integration with DVM instruction justifies the annual investment of additional funds and that it does not adversely affect delivery of the professional program.

Sponsored student aid expenditures – This category includes scholarships supported by gifts and endowments, minority scholarships funded through the IHL, tuition discounts for students in DVM-PhD combined degree program, and tuition contracts supported by West Virginia and South Carolina. Expenditures in this category have grown dramatically over the 5-year interval (94.5%) due primarily to added contracts and additional students in the DVM-PhD program.

Sponsored research and other sponsored activity expenditures -- Funding for sponsored research decreased 0.25% over the reporting period (though there was a significant dip in fiscal years 2012 and 2013). A substantial portion of this decrease is attributable to the departure of two research-intensive faculty members. During the past year, the College was awarded a 5-year, $10M grant from NIH's Centers of Biomedical Research Excellence (COBRE), as well as other large, competitive NIH and USDA funded grants. As a result of this new grant activity, expenditures increased $2.1M or 48% from FY 2013 to FY 2014. Based on current funded research portfolio, projected expenditures from extramural sources for FY 2015 are $8.5M.

Other sponsored activity includes research support from state appropriated funds, which has increased 16.6% for the period. For FY 2014, state appropriated funds represent 41.3% of all expenditures for research; of this $5.6M total, $4.9M supports personnel costs, with the remainder allocated competitively within the CVM. Expenditures for Laboratory Animal Resources and Care (LARAC) are included also in this category. The College provides an annual subsidy from State appropriated funds of approximately $545K which funds the care of the College's teaching and research animals. This, together with a subsidy from the MSU Office of Research, funds the care of other university laboratory animals. LARAC generates a portion (31.5%) of its support through *per diem* animal care fees.

Outreach & Extension expenditures -- Expenditures in this category increased 57.5% over the reporting period. Support includes portions of three faculty FTE and four staff FTE, that provide services to Mississippi food animal owners, extension programs such as 4-H and elementary/secondary school presentations, continuing education opportunities for alumni and the animal-owning public, and other outreach and engagement efforts.

2.2 Comment on the strengths and weaknesses in revenues over the past five years

State appropriations have increased 7.6% or $1.2 million over the reporting period. During the recession (FY 2009, 2010), American Recovery and Reinvestment Act (ARRA) funds were allocated to the College to replace decreased state appropriations. FY 2014 appropriations increased to $17.3M, representing significant growth of 6.7%. For FY2015, the College received a 5% increase ($864K), resulting in a total appropriation of $18,155,832.

Tuition revenue increased 31.8% or $2.4M from 2010 to 2014. Compared to 2010, the College now has 12 more students per class (48 more in the total student body). The College has received pre-approval through FY 2016 for annual rate increases of 3.7% in the resident (base) tuition, which translates to an overall increase of 1.6% for non-resident students, but decisions regarding these pre-approved increases will be made at the discretion of the College before each budget cycle. There are no plans to further increase class size.

Sponsored program revenue (primarily research-related) recorded a slight decline over the reporting period, with low points in FY 2012 and FY 2013. As indicated in section 2.1, the College has had recent success with several large grants, most notably the 5-year, $10 million NIH COBRE grant.

Revenues for the CVM AHC and the two satellite clinics experienced strong growth over the past several years. The AHC income increased almost 38% from 2010 to 2014, and COS contributed additional patient care revenues of $2.48M in 2014. All Year 4 students complete required rotations through the two satellite clinics.

2.3 Provide a comprehensive trend analysis of revenue sources that have supported the professional teaching program over the past five years.

Revenue sources, presented in the table below, have been grouped together for review and comparison. Each group represents a percentage of total revenue.

Revenues by Group as Percent of Total (not including Reserves or VMTP Tuition)						
Fiscal Year	**State Appr**	**Tuition**	**Self-Generated (Sales & Services)**	**Sponsored Programs, ICR, Other**	**Gifts**	**Total Revenue Less VMTP Less Reserves**
2010	41.6%	19.7%	16.1%	19.3%	3.3%	38,600,770
2011	39.4%	22.0%	18.5%	17.8%	2.3%	41,086,276

2012	38.4%	22.9%	22.9%	13.4%	2.4%	42,257,994
2013	37.4%	22.4%	22.9%	14.4%	2.9%	43,336,469
2014	36.3%	21.1%	22.0%	18.0%	2.6%	47,673,596

Revenue Table Examples:

- Other Sponsored Activity – MAFES herd support & Animal Health formula funds ($148K), faculty start-up fund expenditures (amount per year varies), LARAC operations and cost center revenues ($1.3M FY14), MSU Provost support (currently $70K), MSU Extension Service support (currently $85K)
- Other – College (non-departmental) overhead revenue, expenditures from residual funds
- Other Services of Educational Activity – Satellite clinic patient revenues (not including tuition revenue transfers from the College)
- Other Sources from Sales & Services – ECFVG fees ($200K-$240K per year), designated fund revenues for various clinical & diagnostic services, continuing education fees, tuition contracts ($956K FY14)
- Fund Balance Reserves – The College is permitted to carry-over any revenue surplus at the end of each year and maintains its own fund balance, an advantage of being separately-budgeted by the Legislature. In FY 2011, reserves were increased by $2.1M. Fund balance reserves were used to balance annual expenditures in years 2010, and 2012 through 2014, as shown above. This process allows the college to be thoughtful about expenditures and save funds for projects, rather than trying to spend an allotment just to prevent its loss.

2.4 Describe how revenues over the past 5 years have impacted the college's ability to provide a contemporary professional teaching program and ancillary support services.

The stability of state funding has provided important leverage opportunities for the College to increase self-generated revenues. Total tuition revenue ($10.0M in FY 2014) supports the professional teaching program and has enabled an increase of 23% in Instruction, Academic Support, and Student Services expenditures over the reporting period (student numbers have grown 24%). Also, State fund support has contributed to growth in College filled, full-time faculty positions from 84 in 2007 to 113 currently. Four years of salary increases (cumulative total of 12.08% in raises) have had a positive impact on recruitment and marked improvement in average salaries by rank relative to peers in other CVMs.

The teaching hospital (AHC) has experienced steady growth in caseload and revenue, providing new opportunities for student learning experiences and new service additions in critical care, behavior, ophthalmology, and exotic animal medicine. The satellite clinic operations now provide increased caseload for DVM and VMTP students in imaging and cancer therapy, neurology, ophthalmology, dermatology, dentistry, and emergency cases.

Through the support of gifts and endowment income, expansion of the Shelter Medicine program has enhanced primary care opportunities for students. Recent clinical rotation additions concentrate on "first opinion" wellness exams and disease control issues of animal shelter operations.

2.5 Compare the percentage of hospital income with total hospital operational costs.

Standard 3.

Physical Facilities & Equipment

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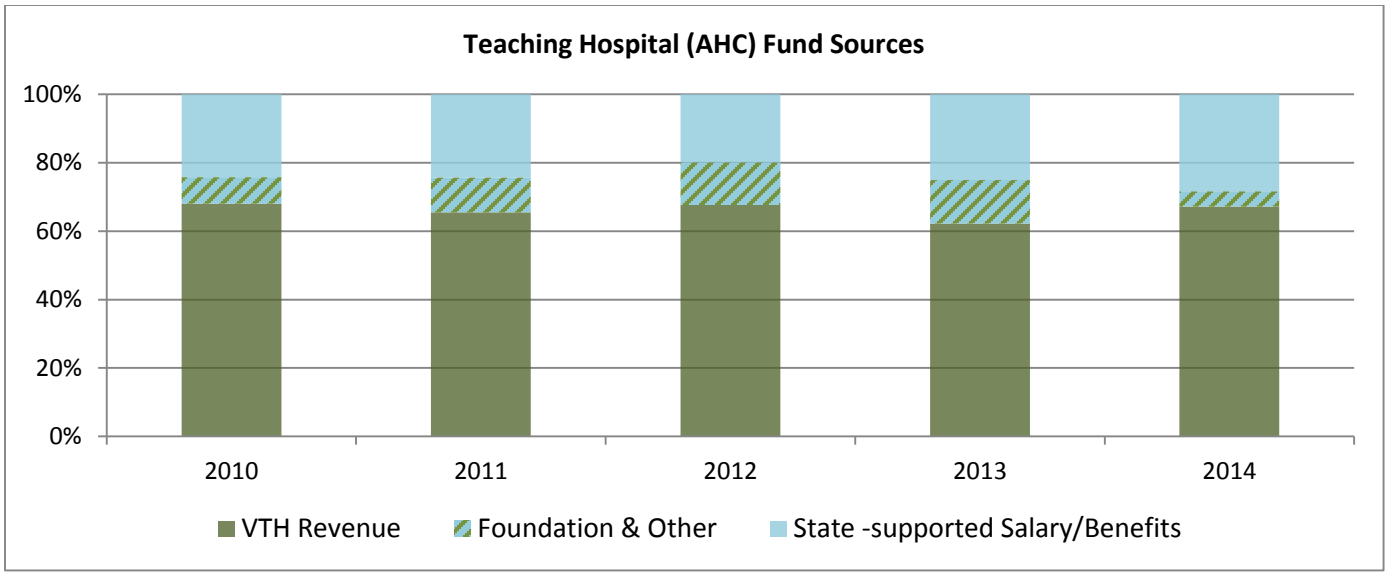

The graph represents 100% of annual hospital operating costs for the CVM AHC (does not include COS satellite clinics) over the reporting period, and the distribution of fund sources supporting that cost. State appropriations comprise 20-28% of total operational costs. Gifts to the MSU Foundation fund special projects, such as recent expansion and improvement of the physical therapy service and updates to client waiting areas.

2.6 Describe anticipated trends in future revenues and expenditures

The support the College receives from the Mississippi Legislature is expected to remain stable and perhaps grow over the next several years. FY 2015 appropriations were increased 5%.

The AHC has experienced steady revenue growth for the past 10 years, and that trend is expected to continue as the College focuses on adding high quality clinical experiences for students and excellent service for referring veterinarians and clients. The satellite clinics have offered new dimensions in enhanced teaching and student learning, increased caseload, and revenue generation.

Recent successes in the research grants and contracts arena assure strong growth over the next several years. Enhanced funds from indirect cost recoveries will enable expansion of the DVM-PhD program and the NIH-sponsored Summer Research Experience for students. These programs have had positive impacts on the College's ability to recruit top students on a national level. The College also serves as home base for a USDA-APHIS contract (Dr. Linda Detwiler) that encourages students at every US CVM to explore public practice careers in the profession.

The College's development goal is to increase support to $5.0M per year, with the major focus on endowed faculty positions (the CVM currently has two endowed chairs and two endowed professorships), faculty fellowships, and scholarships. The goal for the current capital campaign is $40M. The current value of endowments is $8.4M, and the College leads the University in documented planned gifts, with a total of $33.4M.

Tuition revenue is expected to grow only modestly. There are no plans to increase class size.

STANDARD 3. PHYSICAL FACILITIES AND EQUIPMENT

3.1. Provide a brief description of the major functions of, or activities that take place in the facilities used by the college in fulfilling its mission.

The main campus of CVM is located in Starkville adjacent to the 1,100 acre Mississippi Agricultural and Forestry Experiment Station (MAFES), with satellite facilities in Starkville, as well as the Mississippi cities of Flowood and Pearl in the Jackson area, and in Stoneville in the Mississippi Delta.

Mississippi State University Main Campus - The CVM complex consists of the Wise Center, the Dr. J. Gregg Boring Biomedical Research Building and Annex, Research and Equine Isolation, Morgan Freeman Equine Reproductive Research Unit, Bovine Working Facility, Aquatic Medicine Hatchery and Research Facility, Companion Animal Nutritional Research Facility, Poultry House (used for housing a variety of animals), support buildings, and the five Scales Research buildings.

Constructed originally in 1980 with major renovations to the roof and building envelope in 2010 and the necropsy area in 2013-14, the Wise Center (376,000 gsf) houses the majority of the College's instructional spaces, including two 90 seat classrooms, two multidisciplinary laboratories (MDL- 96 and 88 individual student desks), surgery teaching laboratories, library, administrative and faculty offices, veterinary teaching hospital (large and small animal clinics), cafeteria with dining area, research animal facility, research laboratories, and conference areas (365 seat auditorium and a 96 seat classroom). Numerous smaller conference rooms are located throughout the AHC and faculty office areas. An on-site unit of the MVRDL system serves as the diagnostic laboratory for the AHC and for veterinarians in the surrounding area. First and second year DVM student lectures are held in the classrooms, with gross anatomy and other laboratories taught in the MDLs. Second year small animal surgery instruction occurs in a dedicated surgery suite with adjacent animal holding areas. All animals used for teaching and research are under approved IACUC protocols. The CVM animal care and use program is AAALAC accredited.

The Dr. J. Gregg Boring Biomedical Research Building (8,645 gsf) was built in 1989 to accommodate translational biomedical research. A modular addition was constructed in 2000, adding an additional 1,736 gsf.

The Morgan Freeman Equine Reproductive Research Unit opened in 2004 following extensive renovations to an existing structure. This 6,700 gsf building houses the equine theriogenology service, some aquatic medicine research support, and a shop for the College's operations and maintenance. Immediately adjacent to this facility are support areas including open-air, covered bovine holding pens, and open-air, covered equine stalls.

The Bovine Working facility (1,548 gsf) was built in 1991 and is used as a haul-in, covered outdoor pen-and-chute area to support teaching bovine reproduction and for teaching minor surgery in cattle. The west end of this facility (painted orange) can be used as a bovine isolation facility.

The Aquatic Medicine Hatchery and Research facility (4,608 gsf) was constructed in 2000 to raise specific pathogen-free fish for research projects.

The Equine Isolation Unit (3,480 gsf) received major renovations in 2007 and a complete replacement of the heating/ventilation/air conditioning (HVAC) system in 2013. This building houses multistage, isolation preparatory areas such as men's and women's locker rooms, ante-rooms and hallways, four isolation stalls, and an access hall for cleaning contaminated stalls. A research isolation area is located in a separate part of this facility.

The Companion Animal Nutritional Research facility (3,000 gsf) was erected in 1995 and was designed to accommodate nutritional research in dogs. It serves currently as the long term housing for canine blood donors.

Currently housing animals on various projects, the renovated Poultry House (3,000 gsf) was constructed in 1977.

Scales research buildings (5) provide approximately 4,600 gsf space, and 1-4 were erected originally in 1970. They are currently or will soon be renovated. Scales Building 5 (1989) is used for housing of animals for research and teaching projects.

The C. Edward Couvillion Small Ruminant Research Facility (1,956 gsf) was built in 1993 to raise small ruminants but has since been adapted to provide bovine research space and a calf/small ruminant isolation room.

Starkville - The VSC, located in the Premier Health Complex building 4 miles northwest of the Wise Center, is operated by COS and houses the College's neurology, ophthalmology, and radiation oncology services. The Premier Health Complex is a joint collaboration between MSU and Premier Radiology Group (human medicine) of Tupelo, Mississippi, and has areas dedicated for veterinary use, human health care, and research (*J Vet Med Ed*, 41:90-95, 2014). The veterinary space (4,200 gsf) is occupied by VSC and includes examination rooms, offices, diagnostic

areas, a reception area, and animal housing space. The human health care facilities include a cancer care unit, full service laboratory, and a walk-in medical clinic. A 3-Tesla MRI, 4-D ultrasound, 64-slice CT, and Varian Linear Accelerator are available to support patient care and research.

Flowood - The AERC is operated by COS and is located in the Jackson suburb of Flowood, 122 miles from the CVM. The 5,200 gsf facility enables Year 4 DVM and VMTP students to participate in several referral services, such as ophthalmology, internal medicine, surgery, dentistry, and dermatology in a private clinical setting. During emergency service hours, students are introduced to the fast-pace of emergency veterinary procedures in a busy, urban setting. In-house diagnostic laboratory, digital radiology, and CT scanner are available to support patient care.

Pearl - The MVRDL's 40,822 gsf was completed in 2006 and is located in the Jackson suburb of Pearl (128 miles from CVM, 9.8 miles from AERC). The MVRDL houses a veterinary diagnostic laboratory and the PRDL. This laboratory has BSL-3 diagnostic workspace, research animal housing, public conference and training facilities, and an on-premise student dormitory (ADA accessible).

Stoneville - The Aquatic Research and Diagnostic Laboratory, part of the MVRDL system, is located at the Delta Research and Extension Center near Greenville, Mississippi (135 miles from CVM).

3.2. Provide an area map that indicates the principal facilities of the college and describe travel time to off-campus facilities.

A map of Mississippi showing CVM campuses and an aerial map of the main CVM Wise Center campus is provided in Appendix Standard 3: A. The CVM is housed primarily in the Wise Center Complex, within walking distance of the main MSU campus. The VSC is located in the Premier Imaging Complex, 10 minutes from CVM. The AERC and MVRDL are a 2 hour drive from the CVM. Lastly, the Aquatic Research and Diagnostic Laboratory is an estimated 2 hours and 20 minutes west of the CVM.

3.3. Describe the college's safety plan and facilities management plan including mechanisms for documenting compliance

The MSU Office for Environmental Health and Safety (EHS) ensures that the University and College comply with numerous agency mandates regarding safety of personnel and animals in activities for the pursuit of education and research. EHS provides the tools necessary to educate and train personnel and serves as a resource for the MSU community. EHS is responsible for risk management (accident prevention, accident reporting, and risk management resources), safety (biological, laboratory, chemical, fire and life, occupational, and radiation), and environmental concerns (spills, disposal, recycling, respiratory protection, and indoor air quality). Specifically, this office has oversight for biological, radiation, chemical, laboratory, and shop safety. For example, radiation dosimetry badges are required and monitored regularly for all students, faculty, and staff at CVM and AERC. Also, the MDL anatomy laboratory is monitored for formalin levels by the MSU Office of Environmental Health and Safety (a letter documenting that levels are far below OSHA permissible exposure limits is on-file) and hazard communication training is provided for instructors, staff and students who participate in laboratories using formalin-fixed samples. Other resources, such as the State Fire Marshall, provide inspection and recommendations for the College. Fire and building evacuation drills are conducted at least twice a year. The Campus Safety Committee, State Fire Marshall, and the IHL Safety Officer conducts site visits a minimum of once each year with follow up visits as needed to assure compliance with suggested improvements.

The MSU Dean of Students' office oversees campus safety for all MSU personnel (faculty, staff, and students) and has deployed a Maroon Alert system (http://maroonalert.msstate.edu) to disseminate conditions and information community-wide via websites, e-mail, radio, and text messaging. Through cooperation with police, fire, and other first responders, this system responds to emergency situations. Ongoing incident reporting monitors the campus, reports its findings, and recommends improvement.

The College's safety plan is managed by the Disaster and Emergency Response Committee. This committee reviews policies, protocols, and procedures pertaining to safety and surveys areas for improvement through the use of campus and state safety professionals, advisory task forces, and individuals' suggestions. The committee brings recommendations for improvement to the Dean's Cabinet. Committee responsibilities include risk assessment of

occupational safety, biosecurity, and health, with a review of safety management for emergency preparedness, security, biological safety, and hazardous materials. Additionally, within the College, the Biosecurity and Biosafety Committee, led by the AHC Director, consists of 10 faculty and staff representing each key administrative division. The committee leads efforts that ensure the Infection Control Manual (http://www.cvm.msstate.edu/intranet-policies/ahc_animalcare/pnp_ahc_animal_care55-6-3-04.pdf) mandates are supported and followed.

Several safety improvements have been made since 2007 and include:

- The College procured contractual services beginning July 2013 from a private security company to provide walking security guard coverage for the College after normal business hours.
- Installation of a wireless panic button system was completed in October 2013 and is distributed to key areas (Associate Dean for Academic Affairs office, Assistant Dean for Admissions and Student Affairs office, Academic Affairs Manager's office, AHC Admissions area, AHC Client Accounts and Administration office, and for the providers of counseling services). Activation of this system notifies MSU Police that a 911 emergency is occurring, provides the location, and alerts College administrators via text.
- The College's security camera system was upgraded in January 2014. This $72,645 project, which included the installation of 32 digital cameras and 41 exterior door alerts, permits monitoring of all exterior doors and audio/video recording of key areas throughout the CVM.
- Student safe zones are provided after hours in the MDLs (2), which may be accessed only by electronic key card. Security guards are available to escort students, faculty, and staff, as requested.

Facilities management plans are directed by the Cabinet. Numerous renovations and upgrades to the interior of the CVM have enhanced appearance and provided a safer, more effective workspace. Replacement of existing lighting with high efficiency fluorescent or LED fixtures is continuing and provides improved lighting and energy savings. Major projects completed since the 2007 site visit include:

- Construction of a new necropsy facility (completed August 2014) was funded by a $12.2M legislative bond bill.
- The 4.8-acre roof, portions of the building façade, doors, and windows of the CVM were replaced in 2009-10 at a cost of $6.79M funded by a legislative bond bill.
- The equine isolation air handling unit was replaced in 2013 at a cost of $27,000.
- The CVM fire alarm system was upgraded in 2009 at a cost of $590,000.
- Equine recovery stall and surgery suite were remodeled in 2013 to include a new surgery table, hoist system with transfer beam, and new rubberized flooring ($35,765).
- Construction is underway for two additional classrooms ($3.8M state funded bonds) with seating capacities of 134 standard/4 ADA and 114 standard/4 ADA. Completion is slated for 2015.
- A small animal physical therapy and rehabilitation service was created that includes an underwater treadmill, physiotherapy equipment, standard treadmill, and endless pool with overhead hoist system. Private donations in 2012 funded the $74,000 construction costs and equipment in this area.
- Office space for house officers and technicians was renovated in 2013 at a cost of $97,223.
- New HVAC system in the Dr. J. Gregg Boring Building at a cost of $27,000.
- NIH Facilities Improvement Grants (2009 and 2014) for $893,190 funded improvements in CVM research animal housing and support areas.

3.4. Describe the adequacy (pertains to all facilities used by the College whether on-campus or off-campus)

a. Classroom, laboratories and other instructional environments and related equipment

With a class size of 85 students, Years 1 and 2 classroom space is near capacity. The two additional classrooms currently under construction, although also for campus use, will permit existing CVM classrooms to be used to hold intermediate sized (35-80 seats), elective classes. A lecture-capture system has been added to both current classrooms whereby faculty may provide an electronic copy of the lecture's audio and projections for students to access and review through the campus BlackBoard® and MyMedia® web-based instructional software.

Laboratory spaces, including the MDLs and Year 2 surgical laboratories, are adequate and continue to provide an exceptional environment for learning. An upgrade in the audiovisual equipment utilized in the MDLs occurred in 2012 ($59,236).

Throughout the AHC, four conference rooms provide classroom space (30-35 seats each) for case rounds, small group discussions, and elective classes. Each conference room contains audiovisual equipment.

b. Teaching hospital, pharmacy, diagnostic imaging, diagnostic support services, isolation facilities, intensive/critical care necropsy, and related equipment

The AHC and satellite clinics are American Animal Hospital Association (AAHA) accredited and of adequate size for course rotations. Rotations at AERC, and VSC have been added since the last accreditation site visit and permit distribution of students away from the Wise Center enabling the maintenance of small group teaching in the rotations.

With the addition of neurology and ophthalmology services, there were substantial expenditures for surgical equipment, which included an ophthalmic microscope ($40,000) with dual head and video monitor for instructional purposes, a phacoemulsification unit ($79,440) for performing cataract surgery, and a Cavitron ultrasonic surgical aspirator for removing neurologic tumors ($119,000).

The AHC pharmacy is directed by a registered pharmacist and staffed by pharmacy technicians. A dispensing system (Cubex®) for after-hours access and control of pharmaceuticals was installed in 2009 in small animal internal medicine (ICU and emergency), anesthesia, and equine service areas ($112,793). Units were also installed at the VSC and AERC. In 2014, additional units were installed in the pharmacy, large animal area, and the theriogenology area. The Cubex® system integrates with the electronic medical record (UVIS) to improve compliance and inventory management. A "clean room" environment within the pharmacy for compounding of pharmaceutical preparations was completed in August 2014 ($61,700).

Since the last site visit, improvements in diagnostic imaging equipment included installation of a new AHC in-house CT unit, direct and indirect digital radiographic units, fluoroscopy unit, portable digital equine x-ray unit, three ultrasound machines, and a C-arm. The CT unit can accommodate both small and large animals. The large animal ambulatory trucks are equipped with new portable ultrasound units, and have shared use of a portable x-ray unit. Computer monitors have been added to the small animal examination rooms to allow clients to view diagnostic images obtained of their pet.

Diagnostic laboratory facilities are adequate to support the teaching operation of the hospital. The CVM diagnostic laboratory is one of the four laboratories that constitute the MVRDL system. As such, the laboratory is American Association of Veterinary Laboratory Diagnosticians (AAVLD) accredited. Additionally, an in-clinic laboratory area is located in the AHC to provide experience for students in performing typical diagnostic procedures after-hours. Samples are submitted to the CVM diagnostic laboratory for comparison and confirmation. An in-clinic laboratory is utilized also at AERC. A new necropsy laboratory was completed in 2014.

Isolation facilities in the AHC are adequate and continue to be monitored in order to improve processing and outcome assessment of cases. The small animal and equine isolation units are monitored by card scan access, and personnel entrants are logged. Isolation facilities are video and audio monitored by overnight technicians and students. Isolation facilities for small ruminants and cattle are located in the Couvillion building and at the bovine working facility.

The Joe Ann Ward Internal Medicine Critical Care Unit provides an adequate but sometimes crowded area for intensive care service for small animal patients. A board-eligible veterinary criticalist joined the faculty in 2014, along with the addition of extra support staff, to provide students and house officers assistance with patient care and client service.

c. Facilities for maintenance of teaching and research animals

Spaces (26,000 gsf) for holding animals for research or teaching have full AAALAC accreditation.

d. Research facilities and equipment

Facilities and equipment available for conducting research are currently adequate. Renovation ($688,000) funded by NIH COBRE grant) of the second floor of the research wing is currently underway. The College received a $287,832 Facilities Improvement Grant from the National Institutes of Health (NIH) in 2009 to install a new cage

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wash facility. A $605,358 grant from NIH was received in 2014 to improve the HVAC system in the research wing 3A animal facilities.

e. Administrative and faculty offices
Administrative and faculty offices remain adequate even with the increase in faculty numbers and house officers. Innovative solutions, such as subdividing several larger rooms, have allowed spaces to be utilized more efficiently and effectively.

f. Service areas for students (for example: lounges, cafeteria, etc.)
The Pegasus Dining Room and adjoining cafeteria received some refurbishing and repairs in 2010. Seating areas and tables are provided throughout the lobbies for use by individuals or groups of students for social interaction or studying. Wireless internet access to the CVM's computer network is available throughout the College.

g. Building infrastructure (for example: air handling, vent hoods, etc.)
The air handling units, motor control centers, and elevators are fully operational but remain a concern, as they are original to the 30-year-old CVM. Regular maintenance and repairs have maintained these units; however, replacements and upgrades are currently underway.

Current plans are being developed to replace the CVM's cooling tower. This approximately $1.5M project is fully funded and slated to be completed in 2015.

3.5. For safety and educational purposes, protocols must be posted in the isolation facilities and the facilities must be used for instruction in isolation procedures (biocontainment)

Protocols are posted in all isolation facilities, and student instruction begins during Year 3 orientation to clinics. All Year 3 students receive instruction via lecture and PowerPoint slide presentation on infection control and biocontainment. This instruction is emphasized further at the beginning of each CVS Year 3 rotation through small group (10-12 students) and roundtable discussion with slides. The instruction and its importance are stressed by having each student enter the small animal isolation appropriately and go through the step-by-step process of placing a patient into isolation. Isolation facilities are video monitored as well. An identical approach is taken with all Year 3 students donning personal protective clothing entering the equine rotation. Food animal and ambulatory students also are taught the steps of biocontainment and biosafety, and this is reinforced when each student visits a shower-in/shower-out commercial swine breeding facility, and on all poultry trips.

Students and staff are instructed that the College will compensate them for expenses related to confirming a definitive diagnosis of any suspected zoonotic disease, provided they report it to the AHC Director (self-reporting required due to Health Insurance Portability and Accountability Act). Once reported and confirmed, all students and staff involved in caring for the infectious patient are alerted to seek medical attention.

3.6. Describe the current plans for improvement

The College's facilities management plan has been supported over the years by the state legislature. The current $3.8M 10,000 gsf construction of two new classrooms with 118 and 138 seats is slated for completion in 2015.

Ongoing efforts to replace lighting with high efficient fixtures, renovate and remodel areas with paint, flooring and furniture will continue as funding permits.

STANDARD 4. CLINICAL RESOURCES

4.1 Complete Tables A, B, and C for the past years and analyze trends for each species

Tables A, B, and C are provided in Appendix - Standard 4.

Large Animal: Equine and food animal caseloads have increased in the AHC (equine +11%, food animal +33%) over the past 5 years. Case emphases in each section have become less primary care and more complex care

oriented. Consequently, activity intensity within each section, student involvement, and opportunities for learning have all increased. The equine caseload is composed predominately of Western performance and pleasure horses. The food animal caseload is heavily bovine. The swine in-house caseload is limited generally to 4-H project swine and miniature pigs. However, every student travels with an adjunct DVM faculty member to a large commercial swine breeding multiplier unit, located 21 miles from the CVM, to participate actively in artificial insemination, neonatal pig processing, biosecurity, and to observe management practices in a swine confinement unit.

Ambulatory: The ambulatory service to private owners began in 2007 to provide an opportunity for first opinion cases and herd health-oriented teaching. Since 2010, the service has increased the number of calls by 49%, added a faculty member (3 total), and initiated a residency program for pursuit of practitioner boards. The service has maintained approximately a 50% bovine, 50% equine call split. Despite the economic recession, the ambulatory equine calls increased 18%. Bovine calls increased 82.5%. The number of animals examined has doubled. The ambulatory service is providing increased service to larger farms that is reflected by an increase in on-farm time with students from 1,833 hours in 2010 to 2,903 hours in FY2014.

Small Animal: The total small animal caseload of canine and feline patients has increased dramatically over the last few years as a result of primarily, but not exclusively, the growth of the Shelter Medicine Program and expansion of CVM clinical facilities, including the VSC and AERC. The diversity of cases seen has increased as well.

Avian, Exotic Animals, and Wildlife: Maintaining an adequate AHC caseload for such exotic species such as caged birds and small mammals has been a challenge and, until recently, has been addressed primarily through externships. Recent efforts to enhance the teaching about avian species, exotic animals, and wildlife are described below in 4.8.

Necropsy: Within the 4 week diagnostic laboratory clinical rotation at the CVM, students serve on necropsy duty each working day, and are on call for after-hours and weekend duty. The necropsy, whole body, teaching caseload at the CVM is approximately 600 cases per year. While on the rotation, each student must demonstrate proficiency in performing a necropsy and in preparation of a written anatomic report describing the necropsy. Pathology general rounds are held weekly, with all CVM personnel invited.

4.2 Describe and analyze the adequacy of normal and clinically diseased animals (hospitalized, out-patient, field service/ambulatory and production medicine) and how they are used for the DVM teaching program.

The CVS rotation is a first-opinion, small animal practice, but student experiences go beyond standard wellness care. Each 6-week rotation of approximately ten students sees an average of 360 in-clinic cases. These cases include wellness examinations, sick animal cases, walk-in emergencies, boarding, dentistry, behavior, and exotic animals. Additionally, within the rotation, each student spends 3 days seeing cases in the dermatology specialty service. To complement the caseload, a 3-hour dental procedures laboratory is conducted in CVS. In addition, students participate in two exotic animal handling laboratories, visit the Cedarhill Animal Sanctuary with a CVS faculty member to handle and treat exotic birds and small mammals (elective opportunity), and have an elective opportunity to visit a local practice that manages a large number of exotic cases. Rounds sessions covering a variety of exotic animal topics are presented. (Appendix Standard 4: CVS Rotation Activities).During the CVS rotation, each student, accompanied by a faculty member, makes four visits to a local shelter as part of "shelter medicine day." This activity provides excellent opportunities to examine typical animals presented in general practice and enables students to practice general diagnostic procedures such as ear swabbing, skin scraping, fecal examination, and initiation of out-patient level treatment. In the past year, students completed 1,845 such procedures (Appendix. Standard 4 – Procedures Performed by DVM Students during CVS Medical Days at Area Shelters). On these visits, students also observe and review practical aspects of biosecurity and disease prevention in animal shelters. As a learning tool, students participate in a "Photo Scavenger Hunt" where they take photographs of good and bad biosecurity practices observed at the shelters. These photographs are then reviewed by students and faculty during a rounds presentation to discuss shelter biosecurity and disease prevention.

The CVS rotation includes eight, 1-hour client communication training sessions (including individual student summative and formative evaluations of videotaped student-client interactions in exam rooms; evaluation of students communication is performed by the CVM Director of Outreach and the CVM Director of Communications). Each rotation has six "Lunch and Learns," which enable students to interact with industry representatives or technical services veterinarians and also includes a session on communication and marketing

taught by the CVM Director of Outreach. Speakers at "Lunch and Learn" sessions (as well as all other outside speakers in the CVM) must be approved according to the Policy on Access to MSU-CVM Students by Outside Organizations. An MSU-CVM alumnus is hosted each rotation for a "boxed lunch" event in which students discuss pertinent topics, including business practices.

To complement the in-clinic large animal caseload, the CVM has for teaching use at all times nine horses and 6-20 cattle/calves. These animals are used for technique practice in the Year 2 DVM labs and for practice/ review in Year 3 clinical rotations. The College arranges to secure animals from the experiment station for specific teaching needs, when necessary. For example, the CVM borrows six to eight calves affected with chronic respiratory disease to provide opportunity to auscult abnormal lung fields in one Year 2 class. Typically, six pre-weaned "bottle" dairy calves are maintained for food animal rotation students to learn basic husbandry and practice physical examination techniques. The College maintains an excellent working relationship with MAFES and in turn provides routine care for the approximately 250 dairy and 800 beef animals in those units. Clinicians coordinate with individual stations to maximize the teaching value of routine veterinary care. For example, each year one production unit requires the preparation of "teaser" bulls (vasectomized with penile deviation). These surgeries are performed by students and interns during the Bovine Theriogenology (CVM 5774) elective course.

The ambulatory service makes more than 1,200 calls per year. Among these are a 700 cow private dairy, a 2,000 head (at any one time) beef stocker conditioner, numerous medium-sized beef herds (50-400 cows), and a large equine stable. The service provides herd health service to all experiment station locations (one dairy of 250 cows and four cow-calf units of about 200 cows each). Ambulatory provides herd health service approximately once every 6 weeks to the dairy, beef, and swine production facilities of the Arkansas Department of Corrections. Ambulatory also serves two local, weekly auction markets (sale barns). This activity enables students to participate in routine health and real-world regulatory procedures.

4.3 Describe unique clinical educational resources or programs that enhance the educational mission.

Aquatic Animal Medicine: Mississippi is the nation's largest aquaculture state. Within the pre-clinical years, DVM students have 3 contact hours of comparative anatomy and physiology of fish and 8 lecture hours on aquatic animal disease. As part of Year 3 Food Animal clinical rotation, students tour the Specific Pathogen Free fish hatchery located at the CVM and the world's largest catfish farm (Schlater, MS). Students also spend several hours discussing aquaculture in relation to global food production with DVM graduate students and visit the Aquatic Diagnostic Laboratory operated by the CVM at the Delta Research and Extension Center in Stoneville, MS. Diseases of catfish are reviewed, a case-based presentation made, and a hands-on workshop featuring anesthesia, physical examination, euthanasia, and necropsy is conducted by faculty and staff.

AERC and MVRDL: In 2008, the CVM was invited by local Jackson-area veterinarians to become partners in what resulted in the AERC. Year 4 DVM students have a core, 2-week rotation at AERC, with two working days spent on activities at the MVRDL. AERC is staffed by a full-time veterinarian-director, a full-time surgeon, a part-time surgeon, and four full-time and two part-time emergency clinicians. Numerous specialists have an agreement to use the facility once or twice per month (ophthalmology, dermatology, imaging, internal medicine, dentistry). In FY-2014, the AERC managed 6,573 cases. While at AERC, students are also involved intensely in the medical aspects of emergency cases. The emergency caseload (over 4,500 cases/year), creates the need to think horizontally and to move efficiently from case to case. Students work closely with doctors, technicians, and VMTP students to improve technical skills. Additionally, they witness communication with referring veterinarians and doctor-client discussions. There are no DVM interns or residents at AERC, thus students work directly with veterinarians and professional staff. The AERC experience can be intense and stimulates "thinking on one's feet" while developing efficient work habits to prepare a truly practice-ready DVM graduate.

Within the 2-week AERC experience, each student spends one day at the MVRDL and one day with a PRDL field specialist. The purpose of the MVRDL day is to gain an understanding of regulatory testing (e.g., EIA and AI), proper packaging and shipping of samples, importance of complete and accurate submission of forms, and testing methodologies available in veterinary diagnostic laboratories. Students may participate in necropsies but the primary necropsy instructional experience occurs in the Year 3 Lab Services rotation in Starkville. Depending on scheduling, the poultry field trip may visit a hatchery, production farm, or processing plant. This experience provides an understanding of the important role veterinarians play in food production systems, in this case using the

poultry industry as the example, with emphasis on biosecurity, population medicine, disease diagnosis, and disease prevention. A number of students elect to spend additional externship time in the poultry program and two students are enrolled currently in the dual DVM-MS poultry degree program.

While on the AERC rotation, interested students have elective opportunities, including spending more time at MVRDL, on additional field trips with poultry veterinarians, at a private equine practice, with a veterinarian at the Jackson Zoo, or with laboratory animal veterinarians at the University of Mississippi Medical Center.

Veterinary Specialty Center (VSC): The VSC, located at the Premier Heath Complex, is operated by COS and houses the College's neurology, ophthalmology, and radiation therapy services. These services managed 747 cases in FY 2014. The complex has an on-site linear accelerator and imaging center with advanced imaging capability (3-Tesla MRI, 64-slice CT). These technologies are used daily on human patients, and are available for use in animal cases. Faculty utilize the imaging center's technical expertise to operate equipment and obtain images. Consequently, VSC is an excellent example of a "One Health" endeavor using equipment and personnel resources to benefit both human and animal health.

The neurology service includes two boarded DVM neurologists and four residents. The ophthalmology service is comprised of one boarded DVM ophthalmologist and an intern. The radiation therapy service is managed by a boarded DVM radiologist. Students interact with cases at VSC as they do with referral cases presented to the AHC, obtaining history, conducting physical examinations, assisting in diagnostic and therapeutic procedures, and in most cases communicating with clients and referring veterinarians.

Shelter Medicine: The shelter medicine program uses two Dodgen Veterinary Mobile Units, which are environmentally controlled, customized, self- contained trailers, to travel an average of 4 days per week to regional animal shelters. The units serve also as mobile veterinary emergency units in times of natural disaster. The shelter medicine program cooperates with 20 shelters in north Mississippi to provide spays and neuters for animals in their care. Shelters enter into an MOU with CVM that outlines responsibilities for both entities. During the CVS rotation, each Year 3 student spends 2 days on the mobile unit and completes an average of 20-30 surgeries under the direct supervision of a faculty veterinarian. The student assumes the role of surgeon, while the faculty member scrubs in as surgeon's assistant, available if complications arise. In addition, under the supervision of CVS faculty, all students visit shelters to develop infectious disease and preventive medicine protocols.

Interested students may select a Year 4 Shelter Medicine elective, in which each student spends 2 weeks on the mobile units. Students act as solo surgeons during this time, with faculty available to answer questions and assist with complications. Students perform an average of 70 spay/neuters during this time. Approximately 70 students per class choose this elective. During 2013, 9,518 surgeries were completed in the mobile units. In 2014, 8,885 surgeries were completed. To ensure surgical care meets acceptable standards, the program maintains a system for monitoring surgical complications. For the past three years, a Shelter Medicine Advisory Committee comprised of seven private practitioners located in communities served by the mobile units has met once or twice per year with College administrators and CVM Shelter clinicians to provide input and advice regarding the program's policies and performance.

The Shelter Medicine program has an outreach program directed toward people of lower socioeconomic status in Mississippi, with the goal of improving the understanding of animals and their care. Animals in Focus (AIF) arranges monthly visits to three rural schools, directing programming for 4^{th}-6^{th} grade students. Currently, as an elective experience, Year 3 DVM students are able to participate in at least one AIF event in which animals are used to teach health related topics applicable to animals and humans. This program provides DVM students a cultural competency experience by exposure to diverse populations. Students apply active communication methods to improve animal and human well-being, and introduce children to careers in veterinary medicine and other STEM fields.

Advanced Equine Reproduction: A 4-week elective in Advanced Equine Reproduction for Year 4 students is offered during the equine breeding season (March – July). Each year, 15 to 20 students receive hands-on, clinical experience in mare management, including rectal palpation, ultrasound examination, artificial insemination, embryo transfer, and use of cooled as well as frozen semen. Also, students gain clinical experience in stallion management, including breeding soundness examination, semen collection, and semen preparation for artificial insemination,

shipment, and cryopreservation. The MAFES Horse Unit, located on the MSU South Farm, has an approximately 60-mare herd that provides ample, redundant palpation and breeding experiences. Additionally, students assist residents and graduate students with research projects focused on the foaling and periparturient period. Within this elective, each student routinely performs more than 150 rectal/ultrasound examinations and develops competence in equine reproductive health care.

4.4 If off-campus clinical instruction sites are used regularly by multiple students, complete Table D and describe the planning, supervision, and monitoring of students, and contracting arrangements for non-institutional based faculty.

Appendix Standard 4 – Tables D and E.

The CVM has core rotations using three off campus sites: AERC (a required externship), MVRDL, and VSC. As for all CVM rotations, the CVM Curriculum Committee has primary oversight on course planning and approval, with formal approval through the MSU University Committee on Courses and Curriculum. All rotations have an identified instructor of record with appropriate credentials and a course syllabus that includes clearly defined learning objectives and metrics for evaluation. For each of these three off-campus rotations, students are supervised by CVM faculty (MVRDL and VSC) or by adjunct faculty reporting only through COS (AERC). The COS is managed directly by and reports to CVM and MSU administrations.

4.5 Describe the involvement and responsibilities of professional students in the healthcare management of patients (and clients) in clinical programs of the college.

Within the AHC, ambulatory service, and satellite clinics, student responsibilities are similar. Students participate in client contact, collect signalment and history, and perform the initial physical examination. Students use a problem-oriented, medical approach to develop a problem list, differential diagnoses, and diagnostic plan. They are involved also in all aspects of diagnostics and therapies. Students are responsible for the primary care of hospitalized patients; work closely with technicians, VMTP students, house officers, and faculty; and are responsible for daily patient assessment and maintenance of a comprehensive medical record. Within the clinical program, students are exposed to financial aspects of veterinary medicine as they observe and assist with generation of patient charges. Depending on circumstances, students often maintain direct client communication with daily patient updates. Students draft discharge instructions and generally accompany the owner through the discharge activities, including bill payment.

4.6 Describe how subject-matter experts and clinical resources are integrated into clinical instruction.

Clinical subject matter experts (including boarded specialists) and patients/specimens are essential to student learning during the clinical experiences in the AHC, AERC, VSC, and the MVRDL system. Students on rotation work in small groups led by clinical specialists (assisted by residents and interns, except at AERC) to provide hands-on clinical case management. All rotations have active clinical cases that form the basis of clinical teaching. Clinical material is discussed in daily rounds, which may take place in the ward as the animal is observed or in rounds rooms in which the medical record and diagnostic images can be displayed via the Picture Archiving and Communication System (PACS). Pathology rounds are held once weekly, and all students and clinicians may attend. Clinical experts also deliver lecture and laboratory instruction throughout the 4-year program.

4.7 Describe the adequacy of the medical records system used for the hospital(s), including field service and/or ambulatory and population medicine. Records must be comprehensive and maintained in an effective retrieval system to support efficiently the teaching, research, and service programs of the college.

AHC and MVRDL: The AHC and MVRDL utilize the VetView (UVIS) electronic medical record system developed at the University of Georgia. For in-house AHC cases, records are maintained in electronic format. The diagnostic laboratory maintains a mixture of paper and electronic records. As a single system, the hospital module of VetView integrates with the diagnostic modules and supports delivery of requests and reports across services. In addition, the PACS integrates with VetView to allow diagnostic images to be associated with a case. The VetView database supports simple or complex searches, and medical records can be accessed anywhere within the AHC.

The ambulatory service produces a paper-based record at the point of care. When clinicians return from a call, activities are summarized and entered into DVM Max®, a practice-based software product that records and reports herd work. For billing purposes, client invoices are summarized monthly and charges posted to VetView, on which bills are generated and payments posted.

AERC and VSC: AERC and VSC use the ImproMed® practice management software system, a commercial veterinary records system with PACS capability. Records are cross- accessible between VSC and AERC, enabling seamless consultation and referral across sites. Images from AERC and VSC can be sent electronically via the PACS system to radiologists and other specialists at CVM for review and consultation. ImproMed® work stations are also available at the CVM.

4.8 Describe how the College has responded to increasing/decreasing clinical resources

The College has experienced an increased caseload in all major species since the last site visit, and therefore students have increased learning opportunities. When needed, the CVM has purposely sought partnership opportunities to enhance student learning. For example, to address the low number of exotics' cases, the College has taken steps to improve teaching of exotic animal medicine. First, a faculty member with experience in exotic animal private practice was hired in CVS, which has allowed the service to expand patient care for exotic species and increase caseload. The CVS rotation also conducts two exotic animal handling laboratories for students during each clinical rotation (1 hour for reptiles, 2 hours for small mammals and birds). Additionally, CVM has a contractual relationship with a local practitioner (former faculty member) who manages a large number of exotic animal cases. Under this relationship, the practitioner participates in teaching the animal handling laboratories, provides topic rounds on exotic animal medicine during each CVS and surgery rotation, and allows students interested in exotic animals to visit his practice to participate in their care. Also, the CVM has an MOU with Cedarhill Animal Sanctuary (located 40 miles from the CVM), a facility that houses exotic animals including exotic birds, tigers, and lions. The agreement allows interested veterinary students to visit the sanctuary 1-2 times per CVS rotation, with a CVM faculty member, to handle and provide medical care to exotic birds and small mammals.

Students gain experience also with exotic animal and wildlife medicine during their AERC rotation, where they may elect to spend Wednesdays with a veterinarian serving the Jackson Metro Zoological Park or at the University of Mississippi Medical Center's Laboratory Animal Program. Students may participate also in an externship experience at the Memphis Zoo (located 2.5 hours from campus) or in private practices, and other zoos/wildlife parks. In 2012, the CVM developed a formal MOU with the Institute for Marine Mammal Studies (IMMS) in Gulfport on the Mississippi Gulf Coast. Students may elect to spend externships at IMMS working with veterinarians and other scientists involved in research and the rescue/rehabilitation of endangered Kemp's Ridley sea turtles and bottlenose dolphins. Since 2012, 49 students have spent 130 weeks participating in exotic animal, aquatic animal, and laboratory animal externships.

4.9 Describe the means used to maximize the teaching value of each case across the curriculum.

Cases presented to the AHC or satellite clinics are used fully for teaching. In every rotation, students are active participants in case workup and management. At the AHC, students in all clinical rotations attend daily rounds to review and discuss case action plans and management. At AERC, students attend topic rounds to learn about common diseases and procedures. In most rotations, students are required to present a case or topic discussion.

Year 4 students are required to give a 20-minute oral presentation to the College as part of the Clinicopathologic Conference (CPC) course. This presentation reviews an actual clinical case or research project in which the student participated. A written paper approved by a faculty advisor is produced, using journal format, and is archived on the CVM intranet. CPCs occur every Friday morning and are presented to the entire College, including faculty, house officers, and students. Pathology rounds are held each Friday afternoon and feature actual gross specimens from necropsy cases conducted during the week. Students provide a signalment and history, a summary of ante-mortem medical management, gross findings, and postmortem laboratory work completed and pending. Pathology rounds are scheduled so all Year 1 students can attend, which complements the didactic pathology course offered in Year 1.

AVMA COE Accreditation 2014 Self-Study

Standard 5.

Information Resources

COLLEGE of VETERINARY MEDICINE
MISSISSIPPI STATE UNIVERSITY

STANDARD 5. INFORMATION RESOURCES

5.1. Describe and comment on the adequacy of information retrieval and learning resources.

As a branch of the Mississippi State University Libraries, the CVM library has access to all resources contained, owned, and subscribed to by MSU. Specifically, there are 106,018 current electronic journal and database resources available to all MSU faculty, staff, students, and alumni (45,259 resources not including open access databases). The CVM library currently holds 13,529 monographic volumes, 519 electronic book titles, 25 CVM paid print journal subscriptions, and 80 CVM paid electronic journal subscriptions. Thirty nine electronic journal titles are paid for by CVM, with additional electronic journals paid for by the MSU Libraries. An annual acquisitions budget is provided by the CVM ($140,000); and through these annual funds, information retrieval and learning resources are maintained and enhanced. Selections for new and additional materials are encouraged and are received from CVM faculty, staff, students, and individuals serving on the Library Committee.

Databases for the College budget, financial records, and contract/grant awards are readily retrievable and are maintained on the ITworks server. Information is backed-up locally and off-site (MVRDL).

Medical and client records are stored within the UVIS database. There are three Production UVIS databases (CVMHOSP, CVMLABS, MVRDL) running Oracle 11g Release 1 for Solaris. There are three Standby Production databases managed by Oracle Dataguard software. This provides a second, live, completely functional, updated, and stand-alone database server that could be used at any time as the Production UVIS database server. The databases are transferred nightly to a backup Oracle server at MVRDL. All external documents linked/associated with UVIS are stored on the VetView file share, which is backed up nightly through Backup Exec to a Dell DR4000s server.

5.2. Briefly describe the availability of learning and information technology resources support for faculty and students, including personnel and their qualifications.

CVM faculty, staff, and students have access to resources at the CVM branch library as well as those at the main MSU Library. These resources include not only the Research Services Department at the main library, but also those of the main library's Instructional Media Center, which offers professional consultations, a multimedia lab, and an environment for learning new technologies for teaching and research. Additional instructional support is provided by the CVM's Academic Affairs Office and Information Technology Services unit. Support is available also from the Office of Agricultural Communications on the MSU campus and from the College's Coordinator of Photographic Services.

The CVM library employs a faculty librarian, with the professorial rank of Assistant Professor, who holds a Master's degree in Library and Information Science and has 13 years of professional library experience. The librarian is supported by two full-time staff members - one with over 15 years library experience and one with 8 years library experience, a BS in Information Systems, and a Master's degree in Instructional Technology. The CVM Library faculty and staff are assisted by four to five student assistants. All staff members are available for impromptu research assistance. The librarian is available for in-depth research consultations, orientations, and library instructional sessions. Also, the main library's faculty and staff support workshops on research methods and their application to veterinary medicine.

The CVM Information Technology service is managed by Michael Dawkins (BS, MBA, Masters of Instructional Technology) supported by a staff of five. The AHC Medical Records office is managed by Susan McBride (RHIT) supported by a staff of three. The Academic Affairs Office is managed by the Associate Dean for Academic Affairs (Margaret Kern, DVM, Dipl. ACVIM) and supported by 10 staff members, including Susan Health, Academic Affairs Manager (Bachelor of Professional Accountancy), Cheron Snow, MDL Coordinator (BS -Nursing), and Jennifer Burns, Administrative Assistant (MS in Secondary Education, MS in Workforce Education Leadership).

5.3. Describe the methods of access to library information resources for faculty and student when they are on and off campus.

The CVM library is open 90 hours per week (Sunday 2:00 PM - 10:00 PM, Monday - Thursday 7:00 AM - 11:00 PM, Friday 7:00 AM - 5:00 PM, and Saturday 10:00 AM - 6:00 PM). Hours are expanded during final

examinations. The seating capacity of the library is 88. The library is located centrally on the 3rd floor of the Wise Center. Students have access to a computer lab (16 computers) that may be used for e-mailing, accessing course software (including videos), searching library resources, and printing to both black and white and color printers. The library offers five rooms equipped with network access and dry-erase boards for group study. Two of the study rooms have flat screen monitors installed to facilitate collaborative work and enable small group presentations. Students are able to use these monitors to view videos, practice presentations, create group projects, review class materials, and view case photos. There are approximately 40 seats for quiet, individual study located throughout the library, including study carrels, small tables, and armchairs.

Via the MSU Libraries' webpage, faculty, staff, and students can access the online catalog and all databases to search for and/or request materials. Other research services available on and off campus are: "Ask-a-Librarian," which allows faculty, staff, and students to obtain research assistance via email, telephone, online chat, or in person; library instruction classes, through which faculty can schedule a library instruction session; and technology classes at the Instructional Media Center. Customized, online research guides and workshops are available.

The CVM library participates in DocLine, the National Library of Medicine's interlibrary loan request system, which gives faculty, staff, and students access to journal holdings in over 3,000 medical libraries. In addition, MSU libraries have reciprocal borrowing agreements with IHL state-supported libraries as well as several libraries throughout the Association of Southeastern Research Libraries Consortium.

The main library's interlibrary loan service is yet another asset to acquiring resources not held by the CVM and main libraries. This service provides an immediate turn-around time for most requests – and often at no cost to individuals requesting the information/item. This provides further access to library information resources.

The CVM library publishes a monthly newsletter, distributed electronically to all faculty, staff, and students. This newsletter, in addition to the distribution of other printed and email notices, disseminates information on library activities and highlights upcoming library workshops and training opportunities available through the CVM library and the main library.

5.4. Describe the resources (training, support) available to students for improving their skills in accessing and evaluating information relevant to veterinary medicine for sources in any media.

Librarians are available for in-depth research consultations, orientations, and instructional sessions. Many online tutorials, research guides, and workshops are also available. Specifically, the Library Instructional Services Department provides workshops on topics related to research, scholarship, and academic integrity. Special workshops are available on using various databases and Survival Skills for Graduate Students, Databasics, Practical Professor, and EndNote.

5.5. Describe current plans for improvement.

A CVM Library Visioning Task Force was formed in 2013 to plan the library of the future and incorporate new technologies. Evaluation of the library's collection is underway with a focus on strengthening the collection with electronic monographs, electronic journals, and serials. Currently, a new online video library, *Veterinary Education in Video* by Alexander Street Press, is scheduled to be reviewed.

Library faculty and staff will continue training on new resources, databases, and current veterinary research methods. The librarian attends professional development meetings and workshops involving veterinary medicine and other relevant sciences. Recently, the librarian and Director of Communications developed a Podcast series for students, referring veterinarians and alumni. The Podcasts covered a variety of topics, including how best to utilize library resources.

An ongoing assessment of library services and access to information is surveyed continually through local and national survey programs such as the Association of Research Libraries' (ARL) LibQual Survey. Categories of questions related to the CVM library are included in these surveys. Results from these surveys are studied carefully and used to improve current programs and services.

Standard 6.

Students

COLLEGE of VETERINARY MEDICINE
MISSISSIPPI STATE UNIVERSITY

STANDARD 6. STUDENTS

6.1 Complete Tables A, B, C, and D, and analyze trends

A. Veterinary Medical Program

Class	2013-2014	2012-2013	2011-2012	2010-2011	2009-2010
First-year	86	85	85	85	80
Second-year	84	84	80	78	81
Third-year	81	81	78	77	77
Fourth-year	80	76	77	75	73
# Graduated	80 (2014)	76 (2013)	77 (2012)	74 (2011)	73 (2010)

The College accepts 40 Mississippi residents into the Year 1 class. Five South Carolina residents and five West Virginia residents have been admitted yearly as contract students since 2006 and 2009, respectively. Seven West Virginia contract students were admitted in 2014. The remaining admitted applicants are non-Mississippi residents. Transfer students in good academic standing who have met course requirements are accepted if a position is available in the Year 1 or 2 classes.

The number of Year 1 students admitted to the College increased from 80 in the 2009-2010 school year to 85 in the 2010-2011 and subsequent school years. Differences in students admitted to the Year 1 class and later years through graduation reflect students dismissed from the professional program, transfers into and out of the college, and students leaving the program for personal or health reasons.

B. Interns, Residents, and Graduate Students per year for last 5 years

	# Interns	# Residents	# Resident-MS	# Resident-PhD	MS	PhD
2013-2014	11	7	11	5	20	54
2012-2013	12	5	15	5	19	54
2011-2012	11	5	15	5	24	54
2010-2011	8	1	14	4	28	55
2009-2010	8	1	16	3	28	51

The Department of Clinical Sciences offers residencies in small animal medicine, small animal surgery, neurology, radiology, primary care, shelter medicine, equine internal medicine, equine surgery, behavior, and anesthesia. The department also offers MS and PhD degrees with a variety of emphases.

The Department of Pathobiology and Population Medicine offers residency programs in theriogenology, clinical pathology, poultry medicine, and anatomic pathology. Annually, the department offers internships in food animal medicine. The department is home to students pursuing an MS or PhD degree with emphases in theriogenology, aquaculture, epidemiology, food safety, and diagnostic/infectious diseases.

The College provides M.S. and Ph.D. programs in Veterinary Medical Sciences (VMS) and a Ph.D. in Environmental Toxicology (ENVT). These graduate programs provide advanced educational opportunities for students in a broad range of biomedical and veterinary sciences. Faculty in CVM's Department of Basic Sciences, Department of Clinical Sciences, and Department of Pathobiology & Population Medicine lead each student's graduate education. Involvement in ongoing research projects conducted by the faculty is an important part of each degree program. Students in the VMS program specialize in disciplines such as applied clinical research, biocomputing, epidemiology, health disparities, infectious diseases, and toxicology.

In addition to the traditional M.S. and Ph.D. programs in the College, there is a path within the DVM program in which students may pursue a DVM-Ph.D. or DVM-MS Dual Degree. Information concerning the DVM Dual Degree programs can be found on the Combined DVM-Graduate Degree Programs site at http://www.cvm.msstate.edu/index.php/academics/degree-programs-research/combined-dvm-graduate-degree-programs.

C. DVM Students per year for the last 5 years

Academic Year	DVM		
	Total	Minority	% Minority
2013-2014	328	20	6.0%
2012-2013	326	17	5.2%
2011-2012	320	20	6.3%
2010-2011	315	21	6.7%
2009-2010	311	19	6.1%

Increasing the diversity of the student body is a College priority and has led to the appointment of a diversity officer (Ms. Brandy VanOrmer). A VOICE chapter was formed at the College in 2013 and the student founding president is now president of the national organization. The College committed $7,000 to support the establishment of the local student-led organization. Also in 2013, the Dean formed the Cultural Competencies Task Force to find further ways to expose students, faculty, and staff to cultural differences, and to increase cultural diversity within the College. The task force has now been replaced by a Cultural Competencies Committee. Faculty members from the College regularly visit historically black universities to speak to students, and participate also with MSU groups that focus on cultural and racial diversity. A two-week enrichment program for Puerto Rican undergraduate students was initiated in the summer of 2014.

D. Other educational programs

Year	ACTIVITIES			
	Additional Clinical Year Students *Number enrolled*	Veterinary Technology Program *Number enrolled*	Undergraduate Programs *Number enrolled*	Other *Number enrolled*
2013-2014	0	32	0	0
2012-2013	0	43	0	0
2011-2012	0	35	0	0
2010-2011	0	12	0	0
2009-2010	0	--	0	0

The College entered into agreements to accept a limited number of students for clinical rotations with St. George's School of Veterinary Medicine (2002) and with St. Matthew's College of Veterinary Medicine (2013). However, for the years 2009-2013, no additional clinical year students were enrolled at the College.

A Bachelor of Science degree program in Veterinary Medical Technology was established in 2010, and the first class enrolled for the 2010-2011 academic year. Students apply to the program after completion of course prerequisites. Acceptance is determined by evaluation of the academic record, critique of the written application and references, and an interview. The Years 3 and 4 of the veterinary technology curriculum are taught at the CVM. One goal of the technology program is to build a team approach of veterinarians and veterinary technologists. Therefore, technology students are integrated into the veterinary clinical rotations with DVM students.

6.2 Provide a listing of student services. These services must include, but are not limited to, registration, testing, mentoring (advising), counseling, tutoring, peer assistance, and clubs and organizations.

Registration assistance is provided by the Academic Affairs Manager and the Admissions and Student Affairs Coordinator. Following acceptance into Year 1, students are granted access to a web-based site (MyCourses®) that provides information on registration, schedules, books and supplies, and links to the MSU Office of Financial Aid.

Students with self-identified learning and testing disabilities are referred to MSU Student Support Services. This office assists in determining accommodations based on documentation of disability, encourages communication with instructors regarding accommodations, and provides eligible students with notification letters.

Mentoring and academic/career counseling are provided by faculty advisors. Students in Years 3 and 4 select a faculty advisor. Advisors are responsible for counseling students on career opportunities, selection of elective

classes and off-site externships, and on veterinary ethical and professional issues. Academic counseling for at-risk students is required for all Years 1 and 2 students who have an exam grade and/or an average class grade below C in a Year 1 or 2 course. These students are notified of their performance by the course leader. The course leader also informs the Assistant Dean for Admissions and Student Affairs. The Assistant Dean or his/her designee then schedules a mandatory meeting with the student. The student is encouraged to seek advice from the course leader or instructors in the course(s) that he/she is at risk of failing, as well as given guidance for improving academic performance. Students are advised also of assistance available through the MSU Center for Teaching and Learning and/or MSU Student Support Services.

Professional psychological counseling services are available at the CVM through a cooperative agreement with MSU's Student Counseling Services. The licensed counselor is available to all students. Counselors see students by appointment, as walk-ins, and in emergency situations. In addition to counseling students with emotional and behavioral issues, the counselor also provides wellness seminars and participates in orientations of the incoming class and students entering clinics. Since inception in 2012, counselors have provided 442 (as of 6/30/14) individual counselling sessions and 12 group sessions.

Tutoring assistance is available through the Peer Tutoring and Assistance Program (PTAP), which is a program that connects Years 1 and 2 CVM students to peers who can provide academic support for veterinary education. PTAP is free to students in all years of the professional curriculum and is coordinated by the Office of Student Affairs. Tutors are peers who have completed the course successfully, are approved by the course leader, and agree to confidentiality. Interns and residents are encouraged to serve as tutors. Tutoring sessions may be one-on-one and/or group sessions as determined by the Office of Student Affairs. Tutors are compensated by the CVM for preparatory and tutoring time.

The CVM's Big Sib program matches Year 2 students with incoming students. Big Sibs are available to advise students on housing, recreational activities, classes, electives, and social activities. This relationship typically remains throughout the students' time in the College. The program is overseen by the Big Sib Coordinator (a Year 2 student) and the Admissions and Student Affairs Coordinator (Ms. Missy Hadaway).

Each year, SCAVMA produces the First-Year Survival Guide for the incoming class. Welcome letters from administrators, information on Year 1 courses and instructors, recreational opportunities, student organizations, community information, and student services are provided in the Guide. Year 1 students are also provided a printed copy of their photographs and biographies compiled by the Office of Admissions and Student Affairs.

The Office of Admissions and Student Affairs has oversight over the 21 professional student organizations and one professional fraternity. Each organization has one or more faulty advisors, and officers are required to maintain a minimum GPA of 2.5 to assume or remain in office. A list of active student organizations is provided in Appendix Standard 6-A.

Other student services and events provided or overseen by the Office of Admissions and Student Affairs are included in Appendix Standard 6-B.

Activities related to recruiting and admissions provided or overseen by the Office of Admissions and Student Affairs are included in Appendix Standard 6-C.

The College provides scholarships ($138,225 to 67 students in 2014) and provides financial assistance through tuition waivers to students enrolled in the DVM-PhD program (resident tuition minus $10,000/year).

6.3 Provide a summary of college activities in support of placement of graduates.

Current position listings, assistance in resume' preparation, and other resources are available at http://careers.cvm.msstate.edu/. The College's Director of Communications (Ms. Brandi Van Ormer) presents seminars on resume writing to all Year 3 students in the Community Veterinary Services rotation. She also coordinates CVM alumni activities. While on the CVS rotation, all students are required to complete the 13 modules on the web-based VetVance program sponsored by Zoetis. These modules teach important topics such as financial management, personal debt management, client communication, and practice management.

Standard 7.

Admissions

COLLEGE of VETERINARY MEDICINE
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Year 4 students enrolled in the Veterinary Practice Management elective create resumes and cover letters, and learn contract negotiations. Individual consultation and review of contracts is provided to all students by the AHC Director, AERC Practice Manager, and faculty advisors. The student chapter of the Veterinary Business Management Association also provides programs on career development and employment opportunities as part of their certificate program.

6.4 Provide academic catalogue(s) (or an electronic address for this resource) and freshman/upper-class orientation materials.

The academic catalog is available at http://www.catalog.msstate.edu/collegesanddegreeprograms/collegeofveterinarymedicine/. Information for Year 1/upperclass students is available on the CVM Intranet at http://www.cvm.msstate.edu/intranet.html and on MyCourses (secure log-in required).

6.5 Describe the system used on an ongoing basis to collect student suggestions, comments, and complaints related to the standards for accreditation.

A suggestion box is conveniently located at the cafeteria entrance for student feedback related to COE accreditation standards and any other issues. The COE standards are made available to students via the CVM intranet and students are invited to submit comments. As of August 2014, there were no student comments regarding accreditation standards. The Dean meets with Years 1 and 2 students each semester to discuss student concerns. Class officers meet regularly with the Assistant Dean for Admissions and Student Affairs to provide input into wellness programs, student activities, and policies. All graduating students are invited to meet with the Dean and other administrators for "exit interview dinners" to provide feedback regarding curriculum, facilities, and the College environment. Students are also encouraged to schedule individual meetings with the Dean, if they so desire.

6.6 Describe current plans for improvement in resources for students.

Improving students' mental and physical wellness, their understanding of personal finances and budgeting, and providing increased academic support are College priorities. Incorporation of on-site professional counselors has provided convenient access for students. Currently (August 2014) the CVM, in cooperation with MSU Counseling Services, is engaged in a national search to hire a counselor who will be paid by the CVM and embedded full-time in the College. Topics for wellness programs are submitted by students and presented by professional counselors or subject matter experts. More formal information on personal finance has been included in orientation of the incoming classes, during the Professional Development courses, and in the CVS rotation. The policy on Students at Academic Risk and the peer tutoring program (PTAP) provide early intervention for students with academic difficulty and individual aid in coursework. These programs continue to be refined and expanded.

CVM's intranet provides students with accurate and timely information and links to important resources and documents.

STANDARD 7. ADMISSION

7.1 State the minimum requirements for admission.

A minimum overall GPA of 2.8 on a 4.0 scale is required for admission. This minimum GPA must be maintained throughout the application process. At the time of application, no grade lower than a C- is acceptable in any required course. Remediated and repeated courses must be completed before the application is submitted. Courses that must be completed successfully before matriculation are listed in Appendix Standard 7.

Standardized examinations: The Graduate Record Exam (GRE©) General Test is required and due at the school by October 1. The GRE© General Test must have been taken within 3 years of the application deadline. The College calculates the total GRE© score based on the highest scores achieved for quantitative reasoning and verbal

reasoning. A Test of English as a Foreign Language (TOEFL©) score of 213 is required for applicants whose primary language is not English.

All applicants must apply through the Veterinary Medical College Application Service (VMCAS). In addition, a supplemental application and fee must be submitted directly to the College by October 1.

7.2 Describe the student selection process, including measures to increase diversity.

Upon receipt of the completed VMCAS application, GRE© scores, supplemental application, and application fee, the Office of Admissions and Student Affairs verifies that the applicant has met the minimum academic requirements. Applications meeting qualification standards are then evaluated by the Admissions Committee for academic and non-academic criteria. A 100-point scale is used to aid in the selection process.

Academic evaluation:	40 total points	
	5 points	Overall GPA
	8.33 points	Math and Sciences GPA
	8.33 points	Upper-level science GPA
	8.33 points	Last 45-semester hour GPA
	5 points	Total GRE© Score
	5 points	Assessment of academic program difficulty, course load, other factors as determined by Admissions Committee
Non-academic evaluation:	40 total points	
	15 points	Veterinary and animal experience
	3 points	Personal statement
	10 points	Letters of reference
	12 points	Extra-curricular and community service activities, diversity, area of professional need, outside employment
Interview:	20 total points	

The Assistant Dean for Admissions and Student Affairs chairs the Admissions Committee but does not evaluate candidates. Ten CVM faculty members make up the Admissions Committee. Two are elected by each of the three academic departments and four are elected as at-large members. Each serves a 3 year term and is eligible for reelection to a second consecutive term. Following one year off the committee, faculty members are eligible for election to additional terms. The Office of Admissions and Student Affairs provides administrative support to the committee. All members of the committee attend orientation and training before the admissions cycle in October. The full committee establishes the weight of evaluation criteria, rubrics, and evaluation methods. Every effort is made to standardize the process for all applicants. Applicant diversity is a consideration during all stages of the admissions process.

Each academically qualified application is reviewed by two members of the Admissions Committee and evaluated according to the rubrics listed above. The 2 person team then presents summaries of applicants' qualifications and its evaluations at the full committee's weekly meetings. The full committee may agree with or amend the team's assessments. The committee's evaluation scores are used to assist the committee's selection of candidates to be invited to interview at the College. Scores are only used as a guideline, and final decisions are based on the committee's review and discussion of each applicant's strengths and weaknesses.

Applicants selected are then invited for personal interviews at the College. Interviewees are placed in one of four pools: Mississippi resident, South Carolina resident, West Virginia resident, or at-large. Interviews are preceded by a reception for interviewees and their accompanying persons. An orientation session on the College's costs of attendance, financial aid information, professional and graduate programs, policies and procedures, clinical education, and the interview process is presented to applicants and those accompanying them.

The Assistant Dean for Admissions and Student Affairs conducts an in-depth training session for all interviewers each morning before that day's interviews. The 30-minute interviews are conducted by three-person teams composed of one member of the Admissions Committee, one College faculty member, and one private or public practitioner. Interviewers are given the applicant's personal statement before the interview. Lists of "do not ask"

questions and of suggested interview questions are provided. The interviews assess professionalism, behavioral characteristics, and knowledge of the veterinary profession and issues. Each interviewer independently evaluates the applicants, and the average interview score is combined with the applicants' academic and non-academic scores.

Following the completion of all interviews, the Admissions Committee meets to discuss and assign applicants from the four pools into one of the following categories: invited, alternate, or denied acceptance. Again, scores are used only as a general guideline, and all decisions are based on the committee's assessment of each applicant.

7.3 List factors other than academic achievement used as admissions criteria

Applicant diversity is a consideration during all stages of the admissions process. Using the scoring rubric, the committee provides extra consideration to students from various under-represented minorities, socio-economic backgrounds, career aspirations, and geographic regions. The Admissions Committee considers also the following criteria:

- Cultural background
- Understanding of the breadth of veterinary medicine, professional issues, and ethics of veterinary medicine
- Personal responsibility and commitment
- Interpersonal relationships
- Financial understanding
- Indicators of personal achievement
- Interpersonal skills and teamwork
- Leadership
- Areas of professional need
- Time management
- Stress management

7.4 Complete Table A

Table A#

Year	State Residents		Non-residents		Contract Students		Total	
	A/P*	O/A**	A/P*	O/A**	A/P*	O/A**	A/P*	O/A**
2014	92/40	40/40	795/33	80/33	101/12	18/12	988/85	138/85
2013	105/40	40/40	754/35	84/35	96/10	18/10	955/85	142/85
2012	96/40	42/40	785/35	82/35	83/10	19/10	964/85	143/85
2011	87/40	42/40	780/35	83/35	95/10	17/10	962/85	142/85
2010	78/40	40/40	752/35	75/35	53/10	17/10	883/85	132/85

*A/P = Applications/Positions Available
** O/A = Offer Made/Acceptances

Table A# includes also applicants to the Early Entry Program. This program is for high-achieving high school seniors with a minimum ACT score of 27 and a minimum high school grade of 90% or 3.6 on a 4.0 scale. Approximately 25 students are accepted into the Early Entry Program each year and begin undergraduate studies at Mississippi State University. They matriculate into the College following successful completion of all academic requirements and verified 480 hours of veterinary experience. Mississippi resident and non-resident students are eligible for the program.

7.5 Describe current plans for assessing the success of the selection process to meet the mission of the college.

The Admissions Committee meets before and after each application cycle to discuss criteria, weighting of criteria, and rubrics that will be used to evaluate applicants. The committee receives feedback from Years 1 and 2 (pre-clinical education) and Years 3 and 4 (clinical education) students. This feedback, together with comments from employers, peers, and internship/residency supervisors, aids in identifying traits that the committee considers during the review of files and interviews.

The Assistant Dean for Admissions and Student Affairs prepares reports at the end of each semester that compare CVM students' GPAs with GPA and GRE data at the time of acceptance. These reports are shared with the committee, aid in weighting GPA and GRE scores used in the academic evaluation, and identify undergraduate subjects beneficial to DVM students.

AVMA COE Accreditation 2014 Self-Study

Standard 8.

Faculty

COLLEGE of VETERINARY MEDICINE
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7.6 Describe your policies and procedures for admitting transfer students who will receive a degree from your institution, and state the number of transfer students admitted per year for the last 5 years.

The college accepts transfer students to fill vacancies in Years 1 or 2. Transfer guidelines are as follows:

- Applicants for transfer into the 2nd semester of Year 1 must have completed coursework equivalent to coursework taught in the 1st semester of Year 1 at MSU-CVM.
- Applicants for transfer into the 1st semester of Year 2 must have completed coursework equivalent to coursework taught in Year 1 at MSU-CVM.
- Applicants for transfer into the 2nd semester of Year 2 must have completed coursework equivalent to all coursework taught in the first three semesters at MSU-CVM plus have had equivalent surgery laboratories.

General:

- Applicants considered for transfer admission must be in good academic standing (defined as being eligible to continue at current college from current point in the curriculum), never have failed a course while in veterinary medical college, and have never been dismissed from a veterinary college.
- Applicants considered for transfer admission will be required to attend an interview with Admission's Committee members at MSU, by Skype®, videoconference, or teleconference.
- Typically, transfer applicants are not accepted into the program at a point later than 1st semester of Year 2. Accordingly, if a student should pursue application to MSU-CVM and be accepted, it is necessary for that student to complete at least 2 years at MSU-CVM to be eligible for a degree.

  To apply for admission as a transfer student to the MSU-CVM, an applicant must submit a completed application (found at www.cvm.msstate.edu/index.php/academics/prospective-students/transfer-students).

Upon receipt of this material, College personnel perform an analysis of the records, determine eligibility for transfer, and, if applicable, the appropriate entry point into the curriculum. An interview is required before acceptance into the program, and is conducted only when an opening exists.

Number of transfer students admitted during the last 5 years.

Year	Number of transfer students
2013-2014	0
2012-2013	1
2011-2012	2
2010-2011	4
2009-2010	0

STANDARD 8. FACULTY

8.1 Complete Tables A and B, and assess the strength of the faculty and support staff in fulfilling the college mission.

Tables A and B are provided in Appendix Standard 8. Full-time funded CVM faculty positions increased from 94 to 118 (25.5%) since the 2007 site visit (includes three positions from the VMTP). Additional faculty members have increased the teaching capacity of the College by adding faculty in existing areas including small animal internal medicine, small animal surgery, radiology, equine medicine and surgery, ambulatory, theriogenology, diagnostic medicine, emergency medicine, and basic sciences. Additional faculty have also provided new services and teaching programs in dermatology, ophthalmology, neurology, bovine and international epidemiology, and critical care. And, based on a recommendation provided during the last site visit, a DVM faculty member was hired as the permanent director of admissions in 2008 (Assistant Dean for Admissions and Student Affairs).

The College currently does not have a cardiologist on faculty; however, this subject is taught by the internal medicine faculty and through an elective cardiology course taught twice each academic year by a boarded

cardiologist (adjunct professor). The College lost three radiologists in the past 2 years and is currently recruiting to fill those positions. A new radiologist was hired in July and will join the faculty in October, 2014. These three radiologists are able to accommodate the teaching and clinical requirements of the service.

Support staff numbers are adequate to fulfill their component of the College's mission.

8.2 State the current number of academic faculty (head count) who possess credentials as listed in Tables C and D.

Tables C, D and E are provided in the Appendix Standard 8.

8.3 Assess the challenges for your college in maintaining faculty numbers and quality.

As with other colleges of veterinary medicine, the CVM competes with salaries offered in industry and private practice when recruiting and retaining faculty. To address this issue, the College has improved faculty salaries over the past 7 years so that CVM salaries are equivalent to those of peers at regional institutions at the full professor and associate professor tenure track ranks. CVM salaries are above the national average at the assistant professor (tenure track) and all clinical track faculty ranks. However, salaries are still lower than those paid to comparable persons in industry (e.g., poultry and pharmaceutical companies). The CVM is not in a large metropolitan area. When recruiting, the CVM is challenged by the need to place faculty spouses in positions at the University or in the local community.

In addition to improving salaries, the College has utilized creative hiring strategies to aid in faculty recruitment and retention. For example, in recent years the CVM has been challenged when recruiting oncologists. To address this issue, the CVM has contracted with Auburn University to provide oncology residency training for Dr. Taya Marquardt. She will join the faculty as an Assistant Professor upon completion of her training in July, 2016. In addition, the College recently hired a boarded oncologist who will join the faculty in March 2015. Another useful hiring strategy has been to offer year-long, clinical instructor positions to the most talented residents as means of attracting them to academic medicine. This position provides them with experience in academia while studying for their board examinations. Thus far, over 90% of the residents entering this program remained at CVM and most are current faculty members. Also, the College has been successful in establishing four endowed positions (small animal internal medicine, shelter medicine, equine, and beef cattle health and reproduction). These positions have attracted productive faculty members, and helped attract and retain other talented faculty building valuable programs.

8.4 Provide information on the loss (what discipline/specialty) and recruitment of faculty.

Table A is provided in the Appendix Standard 8.

8.5 Provide a concise summary of promotion and tenure policies, and the policy to assure stability for non-tenured, long-term faculty.

Faculty members are evaluated for promotion and tenure according to specific guidelines described in Departmental, College, and University Promotion and Tenure documents. (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe).

Non-tenure track faculty have all the rights of tenure track faculty except they cannot participate in tenure decisions. Non-tenure track faculty are evaluated for promotion according to the College's "Promotion Guidelines for Non-tenure Track Faculty." (http://www.cvm.msstate.edu/images/pdfs/ntt-promotion.pdf) The promotion process for non-tenure track faculty is parallel to that of tenure track faculty except that the faculty peer evaluation process is performed by a College committee consisting of non-tenure track faculty. Within the CVM average salary levels for non-tenure track faculty are equal or greater by rank than those of corresponding tenure track faculty.

8.6 Provide an estimate of the weight assigned to promotion/tenure and or compensation for teaching, research, service, or other scholarly activities.

Each faculty member receives an annual performance evaluation based on his or her individual FTE assignment in teaching, service, and research/scholarship. For new tenure track hires, the time available for research/scholarship is typically a minimum of 0.25 FTE. MSU policy requires that department heads inform faculty (in writing) of their progress toward promotion and tenure during every annual evaluation. All tenure track faculty members also receive a comprehensive, mid-tenure review during their third year of employment. Decisions made relative to performance compensation and promotion/tenure are made with consideration to the individual's FTE assignments.

From 2008 to 2014, 32 CVM faculty members applied for promotion or promotion with tenure (eleven to full professor, nine to associate professor with tenure, five to clinical professor, four to associate clinical professor, one to research professor, and two to research associate professor). One faculty member applied for tenure only. All were approved (except one application to full professor was denied but then granted 2 years later).

8.7 Briefly describe faculty professional development opportunities available in the college/university.

Numerous seminars are provided in the College and University. These include monthly departmental research seminars provided by graduate students and invited guest speakers, and monthly morbidity/mortality rounds. The Department of Clinical Sciences sponsors a "Staff/Faculty Professional Development Workshop" each semester with topics provided by guest speakers from the MSU Human Resources Management office. The Department also provides Frank Communication Training for faculty, staff, and house officers. The College provides travel funds for faculty to attend conferences and professional development courses. A portion of these funds is derived from income provided through administration of the ECFVG Examination. The MSU Center for Teaching and Learning provides numerous workshops and individual consultation sessions for faculty interested in improving teaching efforts (http://www.ctl.msstate.edu/). The MSU Provost's Office provides a year-long leadership training course for interested faculty. Several CVM faculty members have completed this training. During 2013-2015, three faculty members have participated in the AAVMC Leadership Academy. A comprehensive Grant Writer's Seminar and Workshop was provided by the DAFVM in 2011. Seven CVM faculty members participated.

Faculty mentoring programs are available in all three CVM departments and from the MSU Faculty Mentoring Program. Mentoring is also provided by the department heads. The mentoring process promotes faculty success, guides them through the promotion/tenure process, and encourages the development of future academic leaders.

During the past 2 years, two CVM faculty, Dr. Carla Huston and Dr. Bob Wills, have taken special research/career development assignments of 5 months and 3 months, respectively, with USDA in Vietnam and UN FAO in Rome.

8.8. Describe current plans or major changes in program direction that would be affected by faculty retirements, recruitment and retention.

One of the major benefits of the CVM budgeting system is that the College has great flexibility in internally allocating funds from all sources when creating faculty positions. In addition, the CVM has been fortunate in recent years as relative maintenance and even increases in legislative support have enabled replacement of most clinical instructor positions with professorial rank faculty. Also, the COS has enabled recruitment and retention of faculty.

A current plan that could be affected by faculty recruitment is the goal to fill new positions stemming from the recently achieved status as an UN FAO Center for Knowledge for Aquatic Health. Another is the plan to hire as a second ophthalmologist in spring of 2015, an MSU graduate currently completing a residency at Cornell.

8.9 Describe measures taken to attract and retain diverse faculty.

The College's hiring process includes collaboration with the MSU Office of Institutional Diversity and Inclusion (http://www.oidi.msstate.edu/. This office provides search committees with tools to reach a more diverse audience during the recruitment process, including a "Diversity Recruitment Marketing Best Practices Checklist." Hiring decisions are evaluated by HRM to ensure compliance with MSU diversity in hiring guidelines. Currently, 44% of CVM faculty members are female, four of 13 Cabinet members are female, and 6 of 13 Service Chiefs are female. Forty-seven percent of faculty members hired by the CVM from 2009 through June 2014 were women.

AVMA COE Accreditation 2014 Self-Study

Standard 9.

Curriculum

COLLEGE of VETERINARY MEDICINE
MISSISSIPPI STATE UNIVERSITY

8.10 Describe programs for on-campus delivery of curricular content by individuals not employed full time by the institution (other than occasional guest lecturers), including subjects taught. Estimate the percentage of core curricular content delivered in this way.

A small percentage of the core curriculum is taught by part-time instructors. Dr. Thomas Lenarduzzi (former faculty member) teaches 20% of the Special Species course and contributes to exotic animal instruction in the clinic by providing an animal handling laboratory and three topic rounds sessions each CVS rotation. Dr. Jim Wilson teaches approximately 90% of the Professional Development 4. Before 2012, Dr. Rick Tubbs provided the swine medicine lectures as part of the Food Animal Medicine course, but since 2012 those lectures have been given by a CVM faculty member.

8.11 Describe the role of interns, residents, and graduate students in teaching and evaluating veterinary students.

House officers and graduate students under direct supervision of faculty course leaders participate in the curriculum, including laboratories. The vast majority of didactic lectures are provided by faculty members, although house officers and graduate students may provide one or two lectures in a course to gain experience in the classroom. In AHC clinical rotations, interns and residents often work closely with students in patient care under faculty supervision and are expected to contribute to the clinical training of veterinary students. For both didactic and clinical courses, faculty members are responsible for grading students. Interns, residents, and graduate students often contribute to the grading process, although their input is weighted less than is faculty input. They receive instruction on grading students during their orientation (from a faculty member in the MSU College of Education) and from their faculty mentors.

Standard 9. Curriculum

9.1 State the overall objectives of the curriculum and describe how those objectives are integrated into individual courses.

The overall objectives of the curriculum are to create an educational environment that allows students to:

- Acquire the knowledge necessary to distinguish normal from abnormal states of health in a variety of species.
- Acquire a basic and applied knowledge base that integrates information from all relevant disciplines and apply appropriate interventions to address medical problems.
- Develop or enhance the interpersonal, oral, and written communication skills necessary to work well with others and communicate effectively with diverse populations and clientele.
- Understand and refine behaviors that are respectful and professional at all times in accordance with the principles of veterinary medical ethics.
- Acquire lifelong skills, behaviors, and attitudes to seek the appropriate resources and information needed to effectively resolve problems when confronted with a problem outside their immediate knowledge base.
- Acquire the technical, diagnostic, and analytical skills necessary to be well-prepared for entry-level practice.
- Become successful professionals in diverse careers in veterinary medicine.

Appendix Standard 9: A - Curriculum Overview

The MSU-CVM curriculum integrates didactic study of basic biological principles and mechanisms that occur during health and disease with clinical and experiential learning demonstrating these processes. The College's approach is based on a two-phase curriculum, which promotes an understanding of health and disease in multiple species and allows individual students to focus on developing additional expertise in self-selected disciplines. Years 1 and 2 of the curriculum consist of core courses. Year 3 consists primarily of core courses (seven clinical rotations, 36 credits) with the option to enroll in a maximum of 6 credit hours of elective courses. Year 4 consists of six core clinical rotations (20 credits) with opportunities to enroll in 26 credit hours of elective courses.

<u>Phase 1</u>

The fall semesters of both Years 1 and 2 are longer than traditional semesters. The fall semester in Year 1 is comprised of 21 weeks and the fall semester in Year 2 consists of 18 weeks. There are 29 core courses comprising 90 credit hours in Phase 1. To ensure that basic science course work is covered adequately and presented in a logical and organized manner, some courses are presented sequentially in a block fashion in which courses span half the semester. For example, one course in each semester starts at the beginning of the semester and ends mid-semester, then a second course starts mid-semester. These courses are identified numerically in the Curriculum Overview as (1) and (2).

The delivery of Phase 1 is primarily via didactic lecture and laboratory sessions, including survival surgery laboratories, which are introduced in Year 2. In Year 1, students acquire the knowledge to distinguish normal from abnormal by learning basic sciences in courses such as anatomy (CVM 5046 and CVM 5072), physiology (CVM 5036), infectious agents (CVM 5023 and CVM 5193), as well as introductory therapeutics (CVM 5023) and pathology (CVM 5044). The content in Year 2 builds on these basics by exploring disease conditions of specific animal species (CVM 5186, CVM 5196, CVM 5153, CVM 5173, CVM 5183, CVM 5175, CVM 5143), thereby challenging the student to resolve the case with expanded diagnostics (CVM 5162, CVM 5123, CVM 5152), management (CVM 5133), and therapeutics (CVM 5553). The courses in Years 1 and 2 enable students to acquire basic factual knowledge and comprehension of health and disease states and appropriate interventions. In addition to the foundation in biological principles, Phase 1 includes also Professional Development (CVM 5011, CVM 5021, CVM 5111, CVM 5121) courses that introduce students to alternative careers and important issues necessary for success in the curriculum and in the profession, such as jurisprudence, personal time management, and financial management of personal resources. One course, Professional Development 3, provides an overview of the role of One Health in the global environment emphasizing cultural competencies and the role of animal agriculture in international development, conservation, and disease control and prevention.

Phase 2

The final 2 years of the curriculum are comprised of core clinical experiences in 13 required rotations in the AHC, the diagnostic laboratories, and satellite clinics as well as extensive elective options beyond the core rotations. Students develop or enhance the interpersonal, oral, and written communication skills necessary to work well with others and communicate effectively. It is also during Phase 2 that students refine behaviors that are respectful and professional at all times in accordance with the principles of veterinary medicial professionalism and ethics. During Phase 2 students acquire the technical, diagnostic, and analytical skills necessary to be well-prepared for entry-level practice. The 2 years of clinical training, together with most rotations being 4-6 weeks in length, enable extensive use of topic rounds reinforcing learning material with actual cases. Required rotations focus on the acquisition of skills and understanding of syndromes and diseases that must be mastered during the rotation. In Year 3 students participate in the following seven required clinical rotations earning 36 credit hours: Laboratory Services CVM 5214 (includes clinical pathology and anatomic pathology) (4 weeks), Radiology CVM 5224 (4 weeks); Anesthesiology CVM 5234 (4 weeks); Community Veterinary Services CVM 5246 (6 weeks); Small Animal Surgery CVM 5256 (6 weeks); Equine Medicine and Surgery CVM 5266 (6 weeks); and Food Animal Practice CVM 5276 (6 Weeks).

Students must complete all Year 3 required rotations before enrolling in Year 4 rotations or externship experiences. In Year 4, students enroll in six required rotations for 20 credit hours: Ambulatory/Large Animal Primary Care CVM 5282 (2 weeks), Flowood/MVRDL Externship (2 weeks), Clinicopathologic Conference CVM 5302 (2 weeks), Small Animal Emergency and Critical Care Medicine CVM 5310 (4 weeks), Small Animal Internal Medicine CVM 5380 (6 weeks), and Veterinary Specialty Center Rotation CVM 5364 (neurology, ophthalmology, radiation oncology) (4 weeks). This permits 26 credits of elective experiences during Year 4. Included in the elective rotations are options for externships (experiences in private or institutional veterinary practice), MSU and non-MSU Advanced Clinical Rotations, Directed Individual Study (research or non-research based) and small-group or laboratory-based courses. The elective opportunities during Year 4 enable students to prepare for successful careers in clinical practice as well as a variety of other areas.

Specific curricular requirments (Standard 9 Objectives) identified in the Accreditation Policies and Procedures Manual, March 2014 (in the box under Standard 9) is available on the intranet (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe) and will be available as a hard copy at the time of the site visit.

9.2. Describe major curricular changes that have occurred since the last accreditation.

Substantive changes have occurred in Years 1, 2, and 4 of the professional curriculum since the last accreditation site visit. These changes were reported to the COE in yearly interim reports. In 2007 and 2008, the College's administration and general faculty participated in two curriculum retreats directed and led by the Curriculum Committee to discuss and design the current curriculum. The changes that occurred are described below in more detail. In addition to these changes to the professional curriculum, a dual degree DVM-PhD program was initiated in 2007.

Years 1 and 2 of the curriculum

Changes were made to improve the sequencing of courses during Years 1 and 2 to limit the number of courses students were taking at any given time and to add content to selected courses. Beginning in the 2010-2011 academic year, the Year 1 fall semester was lengthened by 5 weeks and the Year 2 fall semester by 2 weeks, with no additional tuition charges to students. In addition to lengthening the semester, several courses were converted to a half semester block format. These changes permitted additional credit hours in pharmacology, small animal medicine and surgery, equine medicine and surgery, and anesthesiology. The subject of cultural competency was introduced in Professional Development courses 1 and 2 in 2013. Two required courses (Professional Development 3 and Professional Development 4) were added to Year 2 in 2010. Professional Development 3 covers the role of the veterinarian in One Health from a global perspective and through legal, political, social, economic, technological, ethical, religious, and cultural frameworks. Professional Development 4 introduces students to jurisprudence involving the profession as well as financial and personal success.

Year 4 of the curriculum

Changes to Year 4 of the professional curriculum were designed to enhance and provide more structure to the educational experience. In April 2011, two clinical rotations, each 2 weeks in length, became required experiences for Year 4 students. Large Animal Ambulatory was moved from the Year 3 Food Animal/Theriogenology/Production Medicine rotation to become a stand-alone rotation. A required externship/rotation was also added, which consists of educational experiences at the AERC and the MVRDL. Students are required to rotate (one day) through sections of the MVRDL to understand better the function and interactions of a diagnostic laboratory with practicing veterinarians, such as specimen receiving and processing, biosecurity, and regulatory testing for disease prevention and control. Participation in poultry field trips with poultry veterinarians enables students to gain exposure to veterinary involvement in modern food production, applied food safety, and on-farm biosecurity. In May 2014, another required rotation, 4 weeks in length, was added to Year 4. Beginning with the current academic year, students now gain additional clinical experiences in veterinary neurology, ophthalmology, and radiation oncology through the VSC rotation. In addition to the required rotations described above, students in the bottom quartile (based on GPA) at the end of Year 2 are required to complete a 4 week review course in the fall of Year 4. The addition of this course, which is available as an elective to all Year 4 students, occurred in October 2009 following the recommendations to the Curriculum Committee and faculty from a task force that examined student data related to performance in the first 2 years of the curriculum and their eventual performance on the NAVLE.

DVM-PhD Program

The College's DVM-PhD program was initiated in 2007. The goal of the program is to prepare exceptional students for careers as veterinary scientists to meet the nation's critical needs in both animal and human health research. The program is designed to enable students to obtain both a DVM and PhD in 6-7 years. Currently, 11 students are enrolled in the program. Students enrolled in this program receive a tuition waiver and graduate stipend during their PhD study and pay resident tuition minus $10,000 per year when enrolled in the DVM curriculum.

9.3. Describe the process used for curriculum assessment (including course/instructor evaluation) and the process used to assess curricular overlaps, redundancies, and omissions.

Curriculum Committee Function

This committee meets at least monthly to review new course proposals and proposed modifications of existing courses. The Curriculum Committee also considers agenda items brought forth by committee members, other faculty, and students. The Curriculum Committee meets to review course syllabi and course, instructor, and rotation evaluations submitted by students. The Associate Dean for Academic Affairs and the Director of Clinical Education

may attend these meeting. Students have the opportunity to evaluate every course and every instructor at the completion of the course/rotation. The committee also reviews comments made by Year 4 students during exit interviews conducted just before graduation. This committee makes recommendations to the Dean, Department Heads, and the College's administration for their consideration. Recommendations that result in a significant change (i.e., those that affect the core curriculum) are voted on by the general faculty and, depending on the extent of modification, may require approval of the MSU University Committee on Courses and Curriculum.

Curriculum Assessment

In spring 2013, the curriculum was reviewed by a paid consultant (Dr. Rebecca Robichaux-Davis) in curriculum design and instruction from the MSU College of Education. The findings, which included potential areas for modification, were utilized during the second stage of the Curriculum Committee's internal review.

Briefly, the consultant made the following recommendations and assessments:

- Attendance should be mandatory in all Years 1 and 2 courses due to the level of rigor of the degree and the challenges of completing didactic course work within a condensed 2-year and 2-month time frame.
- Some courses did not administer cumulative examinations. In order to allow students multiple opportunities to demonstrate attainment of course goals and objectives, it was recommended that comprehensive exams become a part of student assessment in all Years 1 and 2 courses.
- Some syllabi were very detailed and included specific student learning objectives, or a detailed list of course content, and designated times to cover specific topics, while some did not. It was recommended that minimally all syllabi include specific learning objectives even if they are posted and available to the students elsewhere.
- Additional opportunities for problem-solving and critical thinking skills should be added in Years 1 and 2. This can be accomplished through modification of the currently administered examinations.
- Some courses in Years 1 and 2 include laboratory exercises. However, the method of evaluation was primarily based on written examinations. It was recommended to assess student achievement via a variety of methods, in addition to traditional examinations, when appropriate. This is applied extensively in clinical rotations.

The Curriculum Committee completed a comprehensive internal review of the curriculum that was implemented in 2010. This assessment began in January 2012 and was performed in two stages. During the first stage of the review, course leaders mapped the learning objectives of their courses and provided the delivery method, assessment method, learning domain, and pedagogy for each objective. E*Value™ software was utilized and mapping was completed in the spring of 2014. Stage 2 of the review consisted of individual course leaders meeting with the Curriculum Committee to discuss: course objectives, course maps, areas of potential overlap, course evaluations by students, and additional opportunities for problem-based learning activities in Years 1 and 2, and utilization of comprehensive examinations. The review process was completed in July 2014. During meetings with the Curriculum Committee, course leaders also offered two ideas for future improvements: (1) the College should identify laboratory courses that might benefit from an increased number of instructors. Once identified, Departments would develop ways to increase staffing to improve student learning. Mechanisms might include hiring additional faculty, incorporating house officers/graduate students as instructors, or offering multiple, smaller laboratory sessions. (2) With increasing use of on-line examinations in the curriculum, the College would identify ways to enhance the electronic examination process. Since all MSU-CVM students have laptop computers, mechanisms for improvement might include developing better software/computer uniformity, identification of software products that enhance on-line testing, or perhaps the development of a computer testing laboratory. A full report on the Curriculum Committee's comprehensive review is available. (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe)

Redundancy/Overlap

During the curricular review, the Curriculum Committee used two mechanisms to identify redundancy and overlap in the curriculum. Course mapping provided the most specific mechanism. For example, providing course leaders with access to the complete curricular map identified content redundancy in CVM 5223 Pharmacology I and CVM 5553 Pharmacology II. The course leaders and the Associate Dean for Academic Affairs met and responded to this redundancy by removing topics from Pharmacology I (Year 1) that were covered in Pharmacology II (Year 2). Resolution of this redundancy provides additional time for the instructor in Pharmacology I to cover other areas in more depth. Potential overlap was also identified in CVM 5073 Histology and CVM 5013 Neuroscience. The course leaders met to discuss the findings and it was determined that there really was no significant redundancy in these

two courses. Before course mapping, redundancy was primarily identified by student course evaluations. Based on the curriculum review, the Curriculum Committee concluded that the compressed nature of the first two years and the diligence of course leaders have prevented or corrected areas of redundancy during Years 1 and 2. However, the overlap that occurs when students enter Year 3 and apply the knowledge learned during Years 1 and 2 to clinical patients provides desirable and appropriate overlap that is beneficial to students.

Omissions
Omissions are identified by a variety of methods including course mapping, student exit interviews, employer satisfaction surveys, and student performance on the NAVLE. As an example, student performance in swine medicine and surgery on the NAVLE has been below the national average. The course leader for the Food Animal Medicine and Surgery course used these findings to make changes to the swine portion of the course. These changes were implemented in the fall of 2012 in this Year 2 course; therefore, the results of this modification cannot yet be measured. The results of past student exit interviews indicated that students would like more exposure to ophthalmology and emergency medicine. The addition of the required externship at the AERC satellite clinic has provided much greater exposure to small animal emergency patients. To address the need for more exposure to ophthalmology, the course leader for the Small Animal Medicine and Surgery course has increased the number of lectures in ophthalmology. The College was also able to recruit a full-time ophthalmologist, and students now gain additional exposure during the new VSC required rotation.

9.4 Describe the strengths and weaknesses of the curriculum as a whole.

Strengths:
- Two phase curriculum (2 years and 2 months preclinical and 2 years clinical) provides students with extensive hands-on experiences to improve their clinical skills.
- The Shelter Medicine Program provides numerous opportunities for students to develop surgery skills by performing elective castrations and spays.
- The curriculum offers flexibility for students to explore unique career opportunities before graduation.
- Postponing elective course work until Years 3 and 4 of the curriculum gives students the opportunity to make informed decisions regarding their careers and which elective courses and learning experiences most benefit them.
- Extensive use of topic rounds during clinical rotations augments the didactic curriculum.
- Successful placement of graduates into internship and residency training programs.
- Providing students the option of performing 12 weeks of externships enables them to begin networking early in their careers in the areas of their professional interests.
- The curriculum provides students with opportunities to initiate graduate work while concurrently completing the professional DVM curriculum.
- As a result of recent curriculum review, additional inclusion of case-based discussions and problem solving occurs: examples include Professional Development 2 and 3, Small Animal Medicine and Surgery 1 and 2, Clinical Pathology, Pharmacology 1, and Equine Medicine and Surgery 2 in Years 1 and 2.
- The implementation of direct and indirect measures of outcomes assessment including Threshold Events, Threshold Performances, and “CPE-like” competency examinations in clinical rotations to document clinical competencies and ensure that graduates are prepared for entry level practice at the time of graduation.
- Students participate in mini-clinical evaluation experiences (CEX) in multiple clinical rotations where students receive immediate direct feedback.

Weaknesses:
- The preclinical curriculum is appropriately challenging. The time required to maintain rigor in the preclinical curriculum was accommodated by increasing the length of fall semesters and improving the sequencing of courses. The CVM recognizes that the fall semesters of Years 1 and 2 are longer than traditional semesters and therefore scheduled Wednesday afternoons “off” for students.
- A currently limited case load of exotic species requires innovation in finding ways to provide students exposure in this discipline. The CVM is addressing this by contracting with a local practitioner (former faculty member) to provide lectures and laboratories involving exotic species. Opportunities are also available for students to visit this practice. Additionally, students may participate in externships in private practices and zoos for additional clinical experiences.

- Lack of available classroom space to offer multiple electives simultaneously throughout the year limits enrollment in some courses. New classroom construction began in summer 2014. In the meantime, rescheduling of electives throughout the year enabled offering Cardiology and Advanced Small Animal Surgery twice yearly.

9.5 Describe preceptor and externship programs (including the evaluation process).

All students are permitted to participate in up to 12 weeks of supervised externship or preceptorship-type experiences following Year 3. A summary of externship experiences is provided in Appendix Standard 9: B. Students can petition the Director of Clinical Education for additional weeks provided the experience will involve time at another veterinary teaching hospital or referral specialty practice and is deemed to be a valuable learning experience. Externships are only permitted for students who have successfully completed all Year 3 core rotations and are in good academic standing. Before a student can schedule an externship, the site must be approved by the Director of Clinical Education to help ensure the practice or facility meets certain minimal standards. Once externship practices and other off-campus learning experiences are approved, the practice sites are entered into a computer database that is accessible by students searching for potential externship sites. An externship approval form is included in Appendix Standard 9: C. Students schedule all Year 4 electives with the advice and approval of their faculty advisor whom they have selected. These faculty advisors provide mentorship and advice on selecting quality learning experiences that best suit the individual student and their career goals.

Student performance in externships is graded satisfactory/unsatisfactory by the externship mentor or supervising veterinarian using a rubric assessing 25 clinical competencies which includes technical skills, communication skills and professional behaviors/attributes. This rubric allows assessment of similar clinical competencies and skills as students who participate in clinical rotations. There is a mechanism for externship mentors to provide specific written feedback. Students are also required to submit a case log of each patient or herd with which they were involved and this log becomes part of the student's portfolio. This case log, as well as the externship mentor evaluation, is then reviewed by the Director of Clinical Education as part of the review of the experience.

9.6 Curriculum Digest

(http://www.cvm.msstate.edu/images/pdfs/intranet-news/Curriculum%20Digest_1.pdf) The Curriculum Digest will be available as a hard copy at the site visit.

9.7 Describe current plans for curricular revisions.

Based on the curriculum review conducted by the Curriculum Committee, as well as advice from the consultant from the MSU College of Education, the College has transitioned to giving comprehensive examinations in all Years 1 and 2 courses, with two exceptions: Diagnostic Imaging and Special Species. The subject matter in Diagnostic Imaging is best reinforced in practical ways in the Year 3 clinical rotation. The species covered in the Special Species course range from reptiles to domestic poultry making a comprehensive examination impractical. Whereas many course instructors were administering comprehensive exams, the inclusion of additional comprehensive exams will provide students with more than one opportunity to demonstrate mastery of subjects covered and should improve long-term retention of course content. In addition to research topics presented in Phase I, the College has integrated more formal exposure to research and the evaluation of scientific literature during clinical rotations in Years 3 and 4 of the curriculum. (Appendix Standard 9: D)

9.8. Provide a description of the testing/grading system (scoring range, pass levels, pass/fail) and the procedures for upholding academic standards.

Methods of evaluation to determine final grades include an "A-F" grading scale in all 4 years of the curriculum, including clinical rotations, except Small Animal Emergency and Critical Care which is graded as "Satisfactory" or "Unsatisfactory." Externships are graded as "Satisfactory" or "Unsatisfactory" and therefore do not contribute to students' GPA. Direct and indirect assessments, including "Threshold Events" and "Threshold Performances" in the clinical rotations are utilized to ensure that students are clinically competent at the time of graduation. A Threshold Event is a basic clinical skill or knowledge assessment expected of new graduates entering clinical practice. Threshold Performance is the minimal score a student must achieve to demonstrate clinical competency (CC) in a basic skill or knowledge assessment. For example, in the CVS clinical rotation, the following are determined to be

Threshold Events: working knowledge base as determined by a "NAVLE-like" examination (CC #1, 2, 3); patient care and treatment (CC # 2, 3); attendance and punctuality, and professional image (CC #8); and behavior and attitude (CC #8). A score of lower than 70% in any one of these areas indicates that a student has not demonstrated that he/she is clinically competent and ready to enter practice. As an example, while the overall numerical score for the entire CVS rotation could be 80% (equivalent to a letter grade of B), a student who fails to demonstrate clinical competency (i.e., Threshold Performance) in any of the Threshold Events would not pass this clinical rotation. As a result, remedial work may be assigned or the student may be required to repeat the entire clinical rotation. If a student fails to satisfactorily complete remedial work or demonstrate clinical competency after repeating the rotation, he/she would be dismissed from the curriculum. Feedback is provided to students in the form of formative mid-block evaluations and end of rotation evaluations. (Appendix Standard 9: E and F)

Exam Content

Exam content in Years 1 and 2 is linked to the learning objectives in each course. Exams are administered via a written (paper or electronic) examination or laboratory practical. Each exam question is used as an assessment method to evaluate student mastery of the courses' learning objectives. Including this assessment information in the curriculum map permits adjustments in exam content when necessary to cover all the objectives. The same information can be used to determine if modifications in learning objectives are needed to reflect more accurately what is being taught in a course. For example, if over a span of 3-4 years students have not been examined over a learning objective, modifications may be needed in either exam content or in the learning objectives for the course. (Appendix Standard 9: G)

Course leaders, the Associate Dean for Academic Affairs, and the Academic Standards and Professional Ethics Committee are responsible for upholding the academic standards for students as outlined in the College's Academic Affairs Policies and Procedures Manual (http://www.cvm.msstate.edu/policies-procedures)

9.9. Describe the opportunities for students to learn how different cultural and other influences (e.g., ethnic origin, socio-economic background, religious beliefs, educational level, disabilities and other factors) can impact the provision of veterinary medical services.

Recognizing and embracing the long standing, very evident, and rich cultural diversity of the MSU campus and surrounding area have been, and continue to be, a source of pride for faculty and students. Students have the opportunity to interact with virtually every population demographic without leaving the campus. In addition, there is currently a University mandate in the strategic plans for both the University and the College to increase the visibility of and engage the University globally. The CVM is currently a campus leader in this effort.

Throughout the curriculum students gain exposure to cultural diversity in lectures and interactions provided by international faculty, interns, residents, and graduate students. For example, in Year 1 of the curriculum, guest lecturers in Professional Development 1 and 2 discuss the basic principles of cultural competency and cultural, educational, and religious influences on veterinarian and client interactions. Professional Development 3 covers the role of the veterinarian in One Health from a global perspective and through legal, political, social, economic, technologic, cultural, religious, and ethical frameworks. Students receive a notebook containing a fact sheet about a foreign country and are required to evaluate that country's food supply. Interns and residents from other countries are invited to speak to students about their culture, ethnicity, religion, and educational backgrounds. The Associate Provost for the University speaks to Year 1 students about disabilities and how to seek accommodations, if needed. Domestic cultural differences are encountered when Year 3 students on the CVS rotation provide medical care to pets of women entering regional domestic violence shelters and meet with the pet owner at the time of discharge, through the Safe Haven Program (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe). Students also gain exposure to cultural diversity through the Veterinary Camp program and Open House. In its fourth year, Vet Camp is a student-led program in which teenagers get hands-on experience through overnight and day-camp sessions (and need-based scholarships are offered to teens from lower socio-economic backgrounds).
Open house is an interactive event held annually and managed by Year 2 students. The event draws 2-3,000 school children and their families to the CVM for tours and activities, allowing DVM and VMTP students to direct an outreach project that has solicited new students to the College's program.

Students also interact with a variety of different cultures as part of the Homeward Bound Project. The Homeward Bound Project of MS started in 2007 when three MSU-CVM students noticed the imbalance between the number of

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Standard 10.

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adoptable dogs in the South and the high demand in the Northeast. They created the first successful transport program developed, maintained, and operated by students at a veterinary school. The mission of Homeward Bound is to take adoptable puppies and young adult dogs from overcrowded shelters in the South, and transport them to adoption-guaranteed shelters in the Northeast. Today, the Homeward Bound Project is still run by veterinary students and has successfully transported 3,400 dogs.

Because the University is located in a rural and ethnically diverse area, students on the Large Animal Ambulatory rotation are routinely exposed to clients from different ethnic, economic, and social backgrounds. The College's rural location provides a diverse clientele allowing students to witness case management in which technologic and economic restraints influence the provision of veterinary services. The Shelter Medicine Program has initiated an "Animals-in-Focus" program, currently an elective experience, whereby students and faculty visit third through fifth grade students in several of Mississippi's economically challenged communities. DVM students present learning modules dealing with the role of animals in society to these students. The CVM has a goal for 25% of students to have an international veterinary experience during their 4 years in the DVM Program. Currently, the College offers a study abroad elective course in Tropical Veterinary Medicine and One Health, CVM 5990, in which CVM partially funds participating students. This course exposes students to veterinary medicine in Uganda and east central Africa. Emphasis is on One Health perspectives and cultural immersion in international animal production, animal health, disease surveillance, control of transboundary diseases, public health systems, and food safety.

Standard 10. Research Program

10.1. Describe up to five programs of research emphasis and excellence that integrate with and strengthen the professional program.

Translational Biomedical Research Center
The MSU-CVM Translational Biomedical Research center (TBRc) was established in 2011 to develop and coordinate translational research efforts in the College by identifying and investigating natural, spontaneously-occurring, complex animal diseases that emulate human disease. The TBRc is currently investigating asthma, personalized cardiovascular medicine, immunosuppressive disease, diabetes, osteoarthritis, cancer, and aging. The director is Dr. Ron McLaughlin, and faculty participants in the center are primarily in the Department of Clinical Sciences with active collaborations with the two other CVM departments.

Professional student, graduate student, and house officer involvement in much of the published research from the small animal medicine group has been extensive. DVM-PhD students have been first authors on three papers and co-authors on one, and DVM professional students have been first author on one paper and co-authors on three. In the large animal medicine group, veterinary student projects mentored by TBRc clinician scientists have supported three thesis MS and one PhD, yielding four peer reviewed manuscripts since 2012. Two of these publications are first author publications for DVM-PhD students in the large animal medicine program. TBRc faculty are active in the Summer Research Experience program, mentoring 13 students from 2011-2014.

The TBRc functions critically in integrating research instruction into the veterinary curriculum and improves students' clinical experiences. For example, the focus on pulmonary medicine in the large animal TBRc provides Year 3 DVM students in their clinical equine rotation consistent exposure to horses with pulmonary pathology. Students participate also in research techniques, including pulmonary function testing and methacholine challenge, which have been adapted to the diagnosis and grading of respiratory disease in clinical patients. TBRc research efforts have yielded a clinical focus in equine pulmonary medicine that has increased clinical caseload, directly benefiting student learning opportunities.

Center of Biomedical Research Excellence in Pathogen-Host Interactions
MSU-CVM's historical research strength in infectious disease research was recognized recently with the awarding of a NIH COBRE award to a group led by Dr. Stephen Pruett (2013-2018, 1P20GM103646-01A1, $10,088,641). Projects funded by the COBRE include: (1) Understanding the role of superantigens in immunomodulation in *Staphylococcus aureus* infections; (2) Understanding the role of host polyamines in the virulence of *Streptococcus pneumonia*; (3) Determining the glycan moieties that mediate differences in trophism for influenza viruses; (4) Determining the role of ubiquitin and deubiquitinases in *Shigella* and *Yersinia* infections; and (5) Determining mechanisms by which *Listeria monocytogenes* is able to survive exposure to bile. From 2011-2014, 21 veterinary

students in the MSU-CVM Summer Research Experience program conducted projects in infectious diseases. With the new NIH COBRE project, that number will likely increase. One of the current DVM-PhD students conducts influenza research with a COBRE-funded investigator, and one DVM-PhD student is conducting research with a COBRE co-director.

Food Safety and Security
These research topics range from the molecular level to population-based epidemiologic studies and from pre-harvest to post-harvest. CVM research on broilers has ranged from evaluation of risk factors associated with the occurrence of *Salmonella* and *Campylobacter* along the production and processing continuum, to the development of a system dynamics model of the immersion chill tank in the processing plant, to understanding the molecular mechanisms involved in attachment and invasion of *Salmonella* to skin and intestinal cells, respectively. Food safety research in cattle focuses on prevalence of shigatoxin producing *Escherichia coli* serotypes in cattle populations and in feedlot runoff. Other research work is directed towards *Listeria monocytogenes* effects in catfish and poultry.

Several faculty with expertise in epidemiology and preventive veterinary medicine participate in the Risk Project at MSU, an affiliation of faculty interested in applying risk-based strategies to solve everyday problems in animal agriculture and include work on the development of an efficient cattle health and production record keeping system, causes and determinants of pneumonia in pre-weaned beef cattle, stocker cattle receiving programs, and assessing risk factors associated with the occurrence of diseases in poultry, among others. From 2011-2014, six veterinary students in the Summer Research Experience program have been involved in food safety research.

Center for Environmental Health Sciences
The Center for Environmental Health Sciences (CEHS) is a multi-disciplinary research center housed in the CVM that focuses on the impact of environmental chemicals on the health of humans, animals, and the environment. Eleven CVM faculty participate in Center activities. The goal of the research is to determine which environmental chemicals do or do not pose a threat to health, with a primary focus on human health. Main areas of research interest are neurotoxicology, endocrine disruption, immunotoxicology, and health disparities. The CEHS is funded primarily by competitive federal grants from the NIH, the Department of Defense/Defense Threat Reduction Agency, and the Environmental Protection Agency. Competitive funding to the CEHS has totaled greater than $11 million over the last 5 years. In spring 2014, the Center received a 3-year $2.15 million NIH award to study antidotes for biowarfare neurotoxic agents. From 2011-2014, CEHS faculty served as mentors for 10 Summer Research Experience program students, and one current DVM-PhD student is mentored by a CEHS faculty member.

Global Center for Aquatic Food Security (GCAFS)
Channel catfish aquaculture is the largest aquaculture industry in the U.S. in terms of acreage, production, and dollar value. MSU-CVM has a very strong concentration of faculty expertise in aquatic animal health, including diagnostics, teaching, and research, particularly in warmwater aquaculture. In 2013, MSU formed the Global Center for Aquatic Food Security to stimulate interaction and collaboration among MSU faculty in aquatic animal health, aquaculture, and fisheries for development of scholarly activity, education of students, and submission of grant proposals. The GCAFS will collaborate also with the UN FAO to promote and engage MSU faculty in aquatic animal health, aquaculture, and fisheries in international activities in developing countries. These international activities will address sustainable aquaculture to reduce world hunger through capacity building, aquatic diagnostics, and investigative research. In January 2014, MSU President Keenum signed a MOU with the UN FAO in which the GCAFS was recognized as a UN FAO Center of Knowledge in Aquatic Animal Health, the first such designation to a veterinary college in the world. From 2011-2014, 10 veterinary students in the Summer Research Experience program have participated in aquatic animal health projects, and a graduate student, Stephen Reichley, DVM (OSU, 2013) currently pursuing a PhD in aquatic animal health is engaging with MSU Year 3 DVM students during their food animal rotation.

10.2. Provide evidence for the breadth and quality of the college research program.

10.2a. Faculty involvement in research
Overall faculty productivity in research in the period 2011-2014 showed a decline in 2011-2012 followed by a strong recovery in 2013-2014 (Table 2). The decrease in research awards in 2011-2012 was largely due to two factors: 1) departure of Dr. Shane Burgess and Dr. Fiona McCarthy, who had large federal grants (Dr. Burgess became Dean of Agriculture and Life Sciences at the University of Arizona in 2011, and Dr. McCarthy also

transferred to University of Arizona) and 2) a nationwide contraction in availability of competitive federal grants due to federal budget restrictions (decreased federal competitive grant funding rates). Our recovery has largely been due to recent successes in competitive NIH funding, most notably a five year Center of Biomedical Research Excellence in Pathogen-Host Interactions (Stephen Pruett, PI) that was funded in 2013. Besides this new center, individual investigators have had recent success with NIH awards, including R15 grants awarded to Dr. Andrea Varela-Stokes and Dr. Henry Wan. Dr. Jan Chambers was awarded a 3-year $2.15 NIH U01 grant in 2014 to test novel acetylcholinesterase reactivators developed in her laboratory, and Dr. Mark Lawrence received a 3-year $500,000 USDA AFRI grant in 2013 from the Animal Health Program.

Despite the short-term dip in awards, research expenditures and productivity remained steady. Research expenditures experienced a smaller decline than awards because faculty continued working on multi-year grants awarded prior to 2011-2012. In addition, the college invested more in research during this period to sustain productivity through the downturn in awards. Publications were steady in 2011-2012, but the recent increase in awards was reflected in increased publication numbers in 2013 (Table 1). Faculty have also been productive in other measures of research activity (Table 4). Veterinary student involvement in research includes students participating in our Summer Research Experience Program, students dual enrolled in M.S. or Ph.D. programs, and other students participating in short-term research projects (Table 3). Our dual D.V.M.-M.S. (Production Medicine Non-Thesis) program has had declining enrollment numbers until academic year 2013, but the program is undergoing new enrollment and faculty participation in 2014, particularly in poultry medicine. Enrollments in our D.V.M.-Ph.D. program continue to increase as the program matures.

Table 1. Research faculty and publications

Department by calendar year	Number of faculty*	Number of faculty involved in research	Number of research faculty involved in delivering the professional curriculum	Total research FTE	Number of original peer-reviewed publications+	Number of original book chapters
2011						
DBS	22	22	10	15.84	52	3
DCS	43	29	23	6.31	15	8
DPPM	39	31	15	6.73	32	4
College	104	82	48	28.9	99	15
2012						
DBS	22	22	11	14.92	40	6
DCS	42	30	23	6.61	25	2
DPPM	36	30	14	6.86	32	1
College	100	82	48	28.4	97	9
2013						
DBS	22	22	10	13.7	54	0
DCS	42	30	26	6.7	25	3
DPPM	37	27	18	6.5	37	6
College	101	79	54	27.1	116	9

*Does not include COS, VMTP, and administrators without research appointments.
+Publications with multiple CVM co-authors count as a single "original" publication.

Table 2. Extramural grants and patents

	Extramurally-funded federal grants		Extramurally-funded state grants		Extramurally-funded private contracts		Total Awards*	Total Expend.†	Patents
	Number	Value	Number	Value	Number	Value			No.
2010-2011									

DBS	24	2,665,807	0	0	3	80,095	2,745,902		
DCS	8	1,215,148	0	0	5	39,565	1,254,713		
DPPM	1	76,926	3	143,703	1	28,327	248,956		
College	33	3,957,881	3	143,703	9	147,987	4,249,571	5,603,310	
2011-2012									
DBS	22	1,537,657	0	0	3	24,000	1,561,657		1
DCS	0	0	0	0	0	0	0		
DPPM	5	253,190	2	130,914	5	61,647	445,751		
College	27	1,790,847	2	130,914	8	85,647	2,007,408	4,817,431	1
2012-2013									
DBS	21	3,149,470	0	0	4	458,904	3,608,374		
DCS	1	11,997	1	12,500	4	53,110	77,607		
DPPM	5	261,696	1	50,000	4	238,696	550,392		
College	27	3,423,163	2	62,500	12	750,710	4,236,373	4,372,775	
2013-2014									
DBS	23	5,146,465	6	75,350	6	589,793	5,811,608		1
DCS	1	11,697	12	93,080	5	26,311	131,088		
DPPM	8	1,349,038	4	131,038	2	118,566	1,598,642		
College	32	6,507,200	22	299,468	13	734,670	7,541,338	6,482,411	1

*Total awards are the total extramurally-funded grants and contracts awarded for the fiscal year.
†Total expenditures are the total research expenditures for the fiscal year (not including state-funded salaries). This total is also reported in Standard 2. Total awards and total expenditures are not the same within each fiscal year because many projects are funded over multiple years; therefore, the award will be reported in one year, but the expenditures occur over multiple years.

Table 3. Veterinary student involvement in research

Calendar year	Number of students in funded & unfunded research projects	Number of peer reviewed publications in which DVM students are authors/co-authors	Number of veterinary medical students in a joint DVM/graduate academic program*	
			PhD (or equivalent)	Master's (or equivalent)
2011	37	3	8	4
2012	28	7	9	2
2013	37	12	12	4

*Academic year (e.g., 2011 counts enrollment in fall 2011, spring 2012, and summer 2012 semesters)

10.2b. Other measures of faculty research activity

Table 4. Other measures of faculty research activity

Calendar year	Scientific presentations	Research review panels	Advisory boards and commissions	National & international research awards
2011	127	4	23	1
2012	129	9	16	7
2013	102	8	12	2

10.3. Describe the impact of the overall research program on the professional program and on professional students

10.3.a. Describe courses or portions of the curriculum where research-related topics are covered

The MSU-CVM professional curriculum during Years 1 and 2 includes instruction on literature review, research ethics, research methods, and experimental design. For example, in the Professional Development courses students receive instruction in research, including overview of the Summer Research Experience program, careers in research, ethical use of animals in research, and overview of the DVM-PhD graduate programs. In the Veterinary Epidemiology course in Year 1, students receive 4 hours of instruction on classifying, summarizing, and presenting data; descriptive and inferential statistics; study design with emphasis on observational studies; and interpretation of measures of association. In the Preventive Medicine course during Year 2, students receive instruction on the definition of peer-reviewed articles, pyramid of evidence (including meta-analysis), and how to read/interpret a scientific article. In other Year 1 courses, such as Immunology, original research findings are integrated into lectures to show how information was derived and to illustrate how principles of experimental design are applied to answer scientific questions. Research is either the presenter's original research or relevant research from the scientific literature. Each year an MSU-CVM faculty member is invited to present his or her original research for one lecture in immunology.

In Years 3 and 4, students receive additional instruction on research-related topics to reinforce learning objectives during clinical rotations. For example, in the Small Animal Surgery rotations research topics covered include searching and critical review of current scientific literature, basics of study design, application of research findings in development of best clinical practices, and the practice of evidence-based medicine. Students are also exposed to ongoing research within the small animal surgery service, and opportunities are made available for student participation. The Small Animal Internal Medicine rotation has a journal club meeting, which is evaluated and graded, in which each professional student must evaluate critically a clinically relevant research article. Food Animal Medicine and Surgery addresses scientific review in student rounds presentations.

For over 25 years, the Clinicopathologic Conference course has been required of all Year 4 students. This course requires each student to use scientific literature to assemble a written literature review and oral presentation. The literature review format fulfills the requirements for *JAVMA* so that a student can submit a paper for publication. The topic for the literature review can be clinical or research (subject to approval by the course leader), and each student works under the direction of a faculty mentor. Each student gives a presentation to the College, including faculty, house officers, and students during scheduled class time (8 AM Fridays). No classes are scheduled for Years 1 and 2 students at this time so they can attend. The College has established a web page in which, at any one point, literature reviews from the most recent 3 years are available for restricted access by MSU-CVM faculty and students. Based on faculty evaluations, three of these student presentations are also given at the annual MVMA winter meeting, one in food animal medicine/surgery, one in equine, and one in small animal.

A tabular summary of where research topics are integrated into professional curriculum is presented in Appendix Standard 9: D. A topic not specifically addressed in the professional curriculum is actual writing of research proposals, which is addressed in the Summer Research Experience program.

Students are invited to attend all thesis defense presentations by graduate students at CVM.

10.3.b. Describe/list the current or proposed opportunities for participation in research.

CVM has had a Summer Research Experience program funded continuously by Merial for the past 15 years (2000-2014). In 2002, MSU-CVM was awarded also an NIH T35 grant to support the SRE program, and the College has had continuous funding for this program since 2002. The college was awarded its third competitive 5-year T35 award in 2011, which ensures funding through summer 2016. In total, 125 veterinary students have received support by the NIH T35 grant to participate in the program, and 60 students have been funded by the Merial Veterinary Scholars Program. In addition, MSU-CVM has had eight veterinary students participate in the SRE program who were funded through the Morris Animal Foundation Veterinary Scholar Program, one funded by the American Humane Association Veterinary Student Scientist Program, six funded from competitive grants through NIH, NSF, or USDA, and four funded through donations made to the MSU Development Office. A total of 219 veterinary students participated in the program from 2000-2014. Of these, 20 veterinary students were from Tuskegee University, one was from the University of Tennessee, one from Louisiana State University, one from Purdue University, and one from Ecole Nationale Vétérinaire de Toulouse. The remainder (195) were MSU-CVM students.

Janet Gomez (Year 4 DVM student) participated in the SRE in 2012 and published a co-first-author paper in the Journal of Virology. She was subsequently selected (from a pool of 263 applicants) as one of 10 students to complete a Dr. James A Ferguson Emerging Infectious Diseases Fellowship at CDC. In 2013, a DVM student (Martha Frances Dalton) was one of three veterinary students selected from a national pool to participate in the Summer Internship Program in Biomedical Research for Veterinary Medical Students at NIH in Bethesda, MD. In 2014, 16 students participated in the SRE program. Nine were funded by NIH T35, four by Merial (one through the Merial international program), one by the Morris Animal Foundation, and two by a private donor for food animal research. Twelve were MSU-CVM students, three were Tuskegee students, and one was from Ecole Nationale Vétérinaire de Toulouse. All 16 participants traveled to the Merial-NIH National Veterinary Scholars Symposium at Cornell University on August 1-2, 2014, to present their research results and attend sessions presented by leaders in veterinary and biomedical research. One DVM-PhD student also attended the 2014 Merial-NIH NVSS at Cornell.

All trainees participating in the program receive a stipend of $5,400 for the 12 week program. For all Merial students, MSU-CVM pays half of their stipends. MSU-CVM provides also part of the stipends for the Morris Animal Foundation and American Humane Association trainees. MSU-CVM provides financial support for student travel to the National Veterinary Scholars Symposium, travel to research animal facilities at the University of Mississippi Medical Center, and costs for recruiting students into the program. For out of state students, MSU-CVM provides for living expenses ($1,200 per student).

Students participating in the SRE program receive hands-on experience designing, conducting, analyzing, and reporting bench, clinical, or field research under the guidance of an experienced faculty mentor. Students also receive instruction in research ethics, animal use in research, laboratory safety and biosafety, scientific writing and presentations, patenting and licensing, record keeping, and research proposal development. As a component of the program, students receive instruction and write a short research proposal in NIH specific aims format.

MSU-CVM recently implemented a plan to engage at least 25 percent of students in the veterinary professional curriculum in formal mentored research programs. To assist this process, the College has committed an additional $40,000 per year for the years 2014-2018 from indirect costs recovered from the COBRE grant. Part of this will be used to supplement funding for stipends to increase student participation in the Summer Research Experience program. Another portion of these funds will be allocated to support student participation in research throughout the year. In addition, a Year 4 research elective course is being implemented to provide opportunities for students to receive credit in the DVM curriculum for short-term participation in research projects. This course is being implemented as a Special Topics course in 2014. Full approval for the course will be sought from the University Committee on Courses and Curricula in 2015. Part of the $40,000 in college funding will be used to support this research elective course.

The CVM has an MOU with the Memphis Zoo establishing an externship for DVM students to conduct research projects in collaboration with scientists at the zoo's research unit. Also, critical thinking exercises in multiple rotations complement the clinical experience and model life-long learning. The College has invested in international programing, particularly in Africa, with the expectation that this will stimulate student interest and expand veterinary activity in global One Health endeavors. In 2014, the CVM hosted its first collaborative student experience with Makerere University, Uganda. In early 2014, MSU-CVM was named a Global Center for Aquatic Knowledge by the UN FAO. This designation is expected to generate increased opportunities for aquaculture-based international development and associated student experiences.

10.3.c. Describe efforts by the college that facilitate the link between veterinary medical student research and subsequent or concurrent graduate education.

The MSU-CVM DVM-PhD program was initiated in 2007. Currently, there are eleven DVM-PhD students in the program. Dr. Talisha Moore completed her DVM in May 2011 and is in a clinical neurology residency at Purdue while completing her dissertation. She will return to MSU and join our faculty on completion of the residency. One is in Year 7 (Dr. Lauren Bright), three are in Year 4 (Courtney Hunter, Shauna Trichler, and Caitlin Riggs), two are in Year 3 (Sherry Blackmon and Amanda Cain), two are in Year 2 (Brittany Szafran and Jaime Rutter), and two are in Year 1 (Liesel Schneider and Jordan Smink). An unforeseen outcome of the DVM-PhD program has been increased interdepartmental collaborations among CVM faculty. In 2014, a Year 2 DVM-PhD student (Sherry

Blackmon) was selected to participate in the Agricultural Outlook Forum Student Diversity program. She was selected as one of the 10 graduate students from a pool of 70 applicants.

Under the original DVM-PhD program structure, students spend the first 2 years working on the PhD before matriculating into the DVM curriculum in Year 3. The goals of the first 2 years are to complete PhD coursework and a significant portion of the PhD research. Currently, all the DVM-PhD students in this track have published one or two peer-reviewed manuscripts by the time they matriculate into the DVM program in Year 3. The PhD is completed during the DVM program and the year following graduation. Ten of the current students are under this structure. In 2013, an alternate DVM-PhD structure was approved by the DVM-PhD Steering Committee. Under this structure, students start in the DVM program. After completing the first 3 years of the DVM curriculum, students begin graduate coursework in spring of Year 3. The PhD research is integrated with elective rotations from the DVM curriculum over the next 3-4 years. One Year 2 DVM-PhD student is using this alternative structure. All DVM-PhD students receive a stipend and tuition waiver during the years spent in graduate training. When they are in the DVM curriculum, each student receives the resident tuition rate minus $10,000 per year.

In addition to the DVM-PhD program, some veterinary students who complete the Summer Research Experience program decide to pursue graduate degrees during the DVM curriculum. Currently one DVM student who participated in the 2013 SRE program (Jim Nichols) is enrolled in a PhD degree program. One of our DVM students from the 2008 SRE program (Dr. Claire Fellman) is currently in a PhD-residency program (Small Animal Internal Medicine and Pharmacology). Twenty-four of 139 (17.3%) of SRE participants from 1999-2010 pursued advanced training beyond the DVM degree. This includes residency training and/or MS (13.7%) and PhD (3.6%). The College's goal is for 25% of SRE participants to pursue advanced training beyond the DVM degree.

The College offers a 5 year DVM/non-thesis MS degree in population medicine. This program was formalized recently as a population medicine non-thesis concentration within the Veterinary Medical Sciences MS degree option. In this program, students begin graduate coursework in spring of Year 3 and complete coursework in Year 4. After finishing the DVM degree, students spend the next year in multiple, short-term internships related to their specialty and graduate one year after completing the DVM. Current specialties in this program include production medicine (poultry, aquaculture, beef cattle, dairy cattle, and swine), wildlife, epidemiology/public health, food safety, and shelter medicine**.**

All of the CVM's clinical residents in the Department of Clinical Sciences are required to complete an MS degree program. Some of the clinical residents elect to pursue a PhD degree instead of an MS. As a result, DVM students interact on a daily basis with clinical resident/graduate students while in their clinical rotations.

10.3.d. Describe college research seminars and presentations for DVM students

The annual MSU-CVM Research Day was initiated in 2007. The 8th annual Research Day was held on August 14, 2014. The purpose of Research Day is to recognize and promote research conducted at the CVM. In particular, the Research Day is intended to foster a culture of research among the veterinary professional students and encourage them to become involved. CVM Research Day is a required experience attended by all Year 1 and Year 2 veterinary students.

Each year, all MSU veterinary students from the Summer Research Experience program give presentations at Research Day, with some selected for oral presentations and the remainder giving poster presentations. Oral presentations are selected by a faculty panel evaluating the quality of students' oral presentations at the end of the SRE program. In 2014, six veterinary students from the 2014 SRE program presented their research results at Research Day. The oral presentations at Research Day were judged, and the top two presenters recognized with awards. The top two will present their research at the 2015 Winter Meeting of the MVMA.

At each Research Day, a featured speaker is invited to give a one hour presentation attended by all Year 1 and Year 2 students. Each speaker is a nationally recognized veterinary researcher who is a positive role model for veterinary and graduate students. For the past 5 years speakers were:

2010	James Fox, DVM, MS, DACLAM	Director of Comparative Medicine Massachusetts Institute of Technology

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2011	Luis Rodriguez, DVM, PhD	Research Leader for Foreign Animal Diseases USDA/ARS Plum Island Animal Disease Center
2012	R. Mark Simpson, DVM, PhD, DACVP	Center for Cancer Research National Cancer Institute, NIH
2013	Franziska Grieder, DVM, PhD	Director of Office of Research Infrastructure, NIH
2014	Lisa Nolan, DVM, PhD	Dean, CVM, Iowa State University

Seminars and presentations are also provided to members of the CVM Laboratory Animal Practitioners/Research Club. This student organization consists of 33 members and meets frequently throughout the year to discuss topics related to laboratory animal medicine, biomedical research, and career opportunities in these fields. Topics covered at recent meetings included (1) research program updates presented by laboratory animal, basic science and research faculty, (2) a panel discussion on research-related careers, (3) a tour of the laboratory animal facilities at the University of Tennessee- Memphis, (4) planning session for a scientific writing workshop, and (5) a presentation on how to pursue a PhD or Master's degree at MSU-CVM.

STANDARD 11. OUTCOMES ASSESSMENT

11.1.a. NAVLE school score report data and passage rates over the past five years

Table A – NAVLE

Year		Students taking exam(s)	Students passing exam(s)	Average scores
2010		72	71 (99%)	538
2011		72	70 (97%)	540
2012		78	73 (94%)	515
2013		76	73 (96%)	511
2014		80	80 (100%)	515

11.1.b. Student attrition rates with reasons.

Table B – Attrition

Entering Class	Attrition*	Reason for Relative Attrition		Absolute Attrition**		Absolute Attrition Reasons	
		Academic Failure/Additional Program	Personal	Number	Percentage	Academic	Personal
2006 (Class of 2010)	1			1	1.39% (1/72)	1	
2007 (Class of 2011)	3	1		2	2.63% (2/76)	2	
2008 (Class of 2012)	5	3		2	2.5% (2/80)		2[a]
2009 (Class of 2013)	8	1		7	8.75% (7/80)	5	2
2010 (Class of 2014)	8	2		6	7.14% (6/84)	4	2[a]

* Students that either withdrew from the program or moved to a different (earlier) class

** Students that left and did not return

[a] 1 student in each class transferred to veterinary school in their home state

Attrition data were analyzed using a Cochran-Armitage Trend Test to evaluate linear change in the attrition rate. When all reasons are considered, there was a significant increase (p=0.02) in attrition over time, from 2010 to 2014. However, the attrition could not be attributed solely to personal (p=0.11) or to academic (p=0.10) reasons.

Most students who leave the program do so during Years 1 and 2 of the curriculum (13 of 18 absolute attritions occurred during Years 1 and 2). Beginning with the 2012-2013 academic year, the College implemented an "at risk" academic advising program in Years 1 and 2 to identify and advise students who have exam grades or course averages of less than a C in any course. Since implementation of this academic advising program, 4 students have been dismissed due to poor academic performance during phase 1 of the curriculum. We will continue to monitor attrition rates.

11.1.c. The learning objectives for each of the nine listed competencies and a summary of the analysis of evidence-based data collected for each of the nine competencies used to ensure that graduates are prepared for entry level practice (please note that a listing of course and elective blocks does not constitute evidence of learning). Evidence of student learning outcomes for clinical competencies must be obtained by direct measures. These may include capstone experiences, student portfolios, standardized clinical proficiency exams, or other evaluations of clinical performance based on measurable and published program objectives. Indirect measures should not be used as the sole determinants of clinical competency outcomes. Examples include employer surveys and student course or rotation grades. Appendix Standard 11: A.

The College uses direct and indirect assessment methods to evaluate student proficiency in achieving the learning objectives for each of the nine clinical competencies, which are embedded throughout the curriculum. These assessment methods were developed through consultation with Dr. Dana Franz, MSU Associate Professor of Curriculum, Instruction and Special Education. Evaluation of student proficiency in the nine clinical competencies begins in Years 1 and 2 of the curriculum (Appendix Standard 11: B) and continues more extensively in Years 3 and 4 while students are on clinical rotations, electives, and supervised externships.

Students are evaluated during clinical rotations using a standardized rubric that assesses proficiency in the clinical competencies. Rotation evaluations also assess each student's performance in areas unique to that specific rotation. Learning objectives in each rotation are used to create electronic assessment forms. There are 10 main categories in which students are evaluated: basic and applied knowledge, analytical (problem solving) skills, technical skills, surgical skills, health promotion/disease prevention/biosecurity/zoonosis, patient management skills, emergency and critical care, critical analysis of new information and research findings relevant to veterinary medicine, communication skills, and professional values/behaviors/ethics. Specific assessments are made within each of these main categories, and each direct assessment on the evaluation tool is linked to one or more of the nine clinical competencies. (Appendix Standard 11: C) A similar assessment rubric with defined performance levels and corresponding scores is used across the required rotations to evaluate clinical competencies. (Appendix Standard 11: D) This instrument is used by faculty, house officers, and technicians as part of the evaluation process, and contributes to the student's final grade for required clinical rotations.

The clinical competency data for each student are collected longitudinally across all required rotations, allowing the Director of Clinical Education and the Associate Dean for Academic Affairs to track a specific student through the required rotations and evaluate their performance in each clinical competency area. (Appendix Standard 11: E for example student) If a student consistently demonstrates poor performance, the student is notified and given strategies for improvement structured toward the area of weakness. Clinical competency data can also be examined to determine how a subset of students (i.e., bottom 25%) or an entire class is performing over time. Radar graphs are used to compare clinical competency data among various target groups. (Appendix Standard 11: F)

Additionally, students are evaluated by direct assessment with formative mid-block evaluations in every rotation lasting 4 weeks or longer. (Appendix Standard 9: E, SAS Midblock Evaluation form) Mid-block evaluations provide students with real-time feedback while still providing an opportunity for them to demonstrate proficiency of a skill or clinical competency before the rotation is completed. Mid-block evaluations are not used in calculating the student's final grade.

<u>Threshold Events/Threshold Performances</u>

The College employs Threshold Events and Threshold Performances as methods of assessment of students' proficiency in the nine clinical competencies. Most of the Threshold Events and Threshold Performances are via direct measures. A Threshold Event is a basic clinical skill or knowledge assessment expected of new graduates entering clinical practice. Threshold Performance is the minimum score a student must achieve to demonstrate clinical competency in a basic skill or knowledge assessment. Threshold Performance must be demonstrated in a specific assessment to pass the rotation regardless of the overall grade received during the rotation. Competency-specific Threshold Events and Threshold Performances are assessed via direct measures, using faculty observation, mini-CEXs, and written and clinical proficiency examinations.

There are up to 12 Threshold Events in each required clinical rotation. All core clinical rotations require students to pass a written examination (direct assessment) that is NAVLE-like and locally standardized. A clinical proficiency exam (direct assessment) is also used as part of student evaluation and is incorporated into a Threshold Event in six core rotations: Food Animal Medicine and Surgery, Radiology, Anesthesia, Laboratory Services, Equine Medicine and Surgery, and Ambulatory. These clinical proficiency exams are similar in scope and nature to the CPE used by the AVMA–ECFVG (which the College has administered four to five times per year since 1982). These clinical exams, in addition to the written exams, enable direct assessment of each student. A summary of Threshold Event data for the past four years is provided in Appendix Standard 11: G.

Clinical Proficiency Exams Overview

All students on the Food Animal Medicine and Surgery rotation are assessed on their clinical competency during a live animal clinical proficiency exam which is used as part of overall student assessment. Adult dairy cows are used and the students must be able to demonstrate specific entry level procedures or techniques expected of new graduates. The students rotate through multiple stations and are observed as they perform various skills and procedures. While on the Radiology rotation, all students are assessed on their ability to demonstrate that he/she can obtain a diagnostic quality radiograph based on radiation safety practices, animal positioning, radiographic technique, and film quality. Additionally, students are evaluated on his/her ability to interpret a series of radiographs. Each student on the Anesthesia rotation must be able to demonstrate that he/she can safely and competently plan and carry out an anesthetic procedure for a clinical patient without faculty or staff assistance (though under direct observation). On the Laboratory Services rotation, each student must demonstrate proficiency in performing a necropsy as well as a written anatomic report supporting the necropsy. Additionally, students on this rotation must pass multiple sections of a clinical pathology/microbiology exam which mimics real cases and scenarios. The Equine Medicine and Surgery rotation uses a practical exam as one component for evaluation of student knowledge base. Each student rotates through several stations where they are asked to demonstrate techniques/procedures using live horses. This clinical procedures practical exam is similar in scope to the Food Animal exam. While on the Large Animal Ambulatory rotation, each student is given two herd-based case scenarios and two individual case scenarios. With the herd-based cases each student must fully investigate the case prior to interviewing the "client". Each student meets with the "client" (who is an Ambulatory faculty member) and asks questions to elucidate additional information. During these interviews, the students are assessed on ability to elicit proper information, devise a management plan that addresses the problem, and their knowledge of the costs associated with the proposed plan. These scenarios take place over 3-5 days and conclude with the faculty member reviewing each scenario with the students and ensuring they have a sound understanding of the condition presented and the decisions which were made while working through the case. As part of the CVS rotation, each student is video recorded while interacting with a real client in an exam room. The videos are then reviewed independently and scored by two staff members (CVM Director of Outreach and CVM Director of Communications) with training and backgrounds in communications. The student is then offered suggestions and strategies for improvement (formative evaluation) and is videoed and scored again later in the rotation so that demonstration of improvement can be documented (summative evaluation). Also on CVS, student performance during elective surgeries is directly observed and evaluated by a faculty member using a scoring rubric.

Externship Mentor Evaluations

Year 4 students who participate in externships are also evaluated on the nine clinical competencies by their externship mentor following each externship experience. Data from these evaluations are collected, evaluated, and used in part to assess educational preparedness of students to enter veterinary practice. Additionally, students are required to complete detailed case logs of patients seen during externship experiences. These are reviewed by the Director of Clinical Education for thoroughness and numbers of patients seen. These case logs are then included in a student portfolio demonstrating the breadth of clinical training during externships.

(http://www.cvm.msstate.edu/intranet/31-intranet/325-coe A summary of externship experiences for the past 4 years is found in Appendix Standard 9: B. Externship mentor evaluations are found in 11: H.

Clinical Procedures Checklist
Clinical Procedures Checklists are used to document technical proficiency skills performed by students in the curriculum and ensure basic technical skills are measured directly. Service chiefs polled their respective faculty members to obtain a list of procedural competencies expected of an entry level veterinarian. These lists were compiled into the Clinical Procedures Checklist that currently contains 133 required procedures. Students are given the booklets in Year 2 and begin documenting procedures performed in Year 2 laboratories, 3rd and 4 year clinical rotations, and the Critical Care Laboratory in Year 3. Seventy percent of the required procedures must be completed at the end of Year 3. Eighty-five percent of the required procedures must be completed by December 1st of Year 4. The data from the Checklists are entered into a spreadsheet for review by the Director of Clinical Education and the Curriculum Committee. Based on analysis of the data, a few minor adjustments were made. (http://www.cvm.msstate.edu/intranet/31-intranet/325-coe)

11.1.d. Employment rates of graduates (within one year of graduation)

Table C – Employment Rates

Graduating class	# Graduates who received employment or advanced training offers / # completing this question, and (%)	Mean # employment or advanced training offers received (national average)
2008	66/66 (100%)	2.0 (2.51)
2009	64/66 (97%)	2.06 (1.92)
2010	72/72 (100%)	2.04 (1.71)
2011	71/72 (99%)	1.8 (1.6)
2012	76/78 (97%)	1.9 (1.6)
2013	74/76 (97%)	2.0 (1.7)

11.1.e. Assessments of graduating seniors; and assessments of alumni at some post-graduation point (for example, three and/or five years post-graduation) assessing educational preparedness and employment satisfaction

Before graduation, Year 4 students complete an electronic Exit Survey that gathers data regarding satisfaction with their education and preparedness to enter practice. These data for the classes of 2012-2014 are available in Appendix Standard 11: I. Exit Survey and Student Satisfaction Survey (conducted annually with each class) data are reviewed by the Cabinet and distributed to the Curriculum Committee for their use in curricular assessment. Additionally, all students are sent an email reminder notifying them of the suggestion box to be used for anonymous input regarding any of the COE standards.

Each senior student is invited to the Dean's home for dinner and an informal exit interview before graduation. Attendance at these events typically approaches 100% of the class (groups of 20-22 are hosted over several evenings). These interviews are also attended by the Dean, Associate Dean for Academic Affairs, Associate Dean for Administration, Assistant Dean for Admissions and Student Affairs, and the Director of Clinical Education. Specific questions regarding satisfaction with the curriculum, facilities, and policies are posed, and students are encouraged to comment on any CVM-related topic. Additionally, each student is provided a card and asked to provide constructive criticism anonymously. Students are advised that they may schedule confidential meetings with the Dean and/or other administrators. Notes taken during the exit interviews and all anonymous comments are compiled into a report. Pertinent information is shared with the Curriculum Committee and faculty. Feedback received at exit dinners is coupled with additional information (e.g., course evaluations, alumni surveys, class surveys, etc.) and has been used to make substantive changes in the curriculum. Recent examples include changes made in to CVS, ICU, the emergency service on the Starkville campus, and improving the process for selecting elective courses and externships.

Alumni who graduated within the last 5 years are surveyed with an online questionnaire containing 24 questions that measure satisfaction with and quality of their veterinary education. Results from the most recent survey can be found in Appendix Standard 11: J.

Survey results indicate that there are three areas which may warrant additional emphasis: (1) Alumni suggested more training in emergency and intensive care management. This has been addressed through the newly required AERC externship in which students help manage a large number of emergency cases. Also, a criticalist joined the faculty in 2014. In addition, improved after-hours staffing and the purchase of new equipment have resulted in an enhanced student experience in the AHC. (2) Alumni recommended more training in business and management skills. This will be addressed by using a lecture capture system to record lectures in the Veterinary Business Management Year 4 elective course (allowing all students access to the materials covered), employing additional classroom space to allow more students to enroll in the elective course, and incorporating VetVance on-line modules into the CVS rotation and during Year 1 orientation. (3) Alumni indicated that improvement was needed in the curriculum regarding research in veterinary medicine. During the past year, CVM has increased student exposure to research in both Phase 1 and the clinical rotations.

11.1.f. Assessments of employers of graduates to determine satisfaction with the graduates

Employers of CVM graduates are surveyed (electronic and hard copy) during the graduates' first year of employment. Survey results from employers of the classes of 2011 and 2013 are available. (Appendix Standard 11: K) The areas which received the lowest ratings were related to emergency care and associated treatments, biosecurity, public health, and regulatory diseases. However, these areas still received acceptable ratings. Overall, and especially for the class of 2013, results indicate that employers of CVM graduates are very satisfied with the students' preparedness to enter practice.

11.1.g. Assessments of faculty (and other instructors, for example interns and residents) related to such subjects as adequacy of clinical resources, facilities and equipment, library and information resources, etc; and preparedness of students entering phases of education

Faculty and staff satisfaction surveys are conducted annually by MSU to measure satisfaction with University programs and leadership. In addition, CVM periodically conducts faculty and staff satisfaction surveys (2011 and 2013) to gather information on topics including work environment, College communication, job satisfaction, leadership, and mission and commitment to quality. The surveys (77 questions for faculty, 70 questions for staff) provide information specifically related to the maintenance and efficiency of labs/classrooms/teaching areas, environmental safety and hazards, availability of equipment and supplies, and faculty and staff workloads. In 2013, 86% of faculty strongly agreed or agreed that "The College provides students with the basic scientific knowledge, skills, and values necessary to independently practice veterinary medicine at an entry-level for a variety of animal species" (only 6 % disagreed). House officers are also surveyed to gauge their satisfaction with clinical resources and facilities, teaching/learning environment, and the aptitude with which students leave our program. It is evident from survey results that our house officers feel that they have adequate training and interaction with faculty, adequate opportunities to interact with clients, are exposed to adequate caseload and patient care. Eighty-nine percent of responders Agreed or Strongly Agreed with the following statement: "At the time of graduation, DVM students have the basic scientific knowledge, skills and values necessary to independently practice veterinary medicine at entry-level for a variety of animal species."

Survey results are considered when making programmatic changes and improvements.

11.1.h. Additional assessment that might assist the college in benchmarking its educational program

Additional assessments used to assist the College in benchmarking educational programs include NAVLE scores, job placement rates, placement rates into internship/residency programs, and starting salaries. Over the past three years, the CVM placement rate of graduating seniors into internships averaged 91% (North American veterinary school average = 87.2%).

VIRMP Matching Rates (Percent): MSU-CVM vs National Average

	2012	2013	2014
MSU – CVM	88%	100%	90%
National Average	83%	89%	90%

Average starting salaries for MSU Graduates Compared with National Average

	2009	2010	2011	2012	2013
MSU – CVM	$67,070	$71,500	$68,804	$74,954	$70,415
National Average	$65,185	$67,548	$66,714	$65,998	$67,535

MSU-CVM 5- year average is nearly $4,000 above national average
National average = $66,596. MSU average = $70,548 (6% greater)
Source: AVMA Annual Graduate Surveys

11.2. Institutional Outcomes

11.2.a. Describe how the college evaluates progress in meeting its mission (for example, benchmarking with other institutions, etc.)

The CVM uses the AAVMC's Comparative Data Survey to benchmark with other regional CVMs and others with similar class sizes and without medical schools on their campuses. Data compared include faculty numbers, caseload, hospital revenue, salaries, diversity, and extramural research expenditures. Differences among colleges must be considered when evaluating data, such as those that do not have the state diagnostic laboratories as part of their colleges.

The College also seeks outside counsel to evaluate progress and benchmark with other institutions. Over the past 3 years, the College has hosted nine veterinary college deans (as well as other administrators and leaders in the profession) for visits and to provide input into programs and operations. In 2012, the College invited Ronald Warner DVM, PhD, DACVPM (Epidemiology) from Texas Tech University Health Sciences Center to review preventive medicine activities and curriculum and make suggestions for improvement. Currently we have a group of faculty (led by Dr. David Smith) working on developing ideas to increase and further upgrade preventive medicine and one-health in our curriculum.

The College is currently accredited by AAHA, AAVLD, AAALAC and CVTEA.

11.2.b. Describe the adequacy of resources and organizational structure to meet the educational purposes (dean should provide).

The Mississippi Legislature has shown consistent support for the CVM, even during the recession. Also, during the recession the legislature provided about $20M in bond funding (funding that CVM does not have to pay back) to repair the Wise Center roof and building envelope and replace the necropsy laboratory. Caseload continues to increase and provides excellent learning opportunities for students.

Organizational structure of the University and College are adequate and provide the College with substantial flexibility in meeting its education mission. The Office of Academic Affairs provides direct support to the faculty. (Appendix Standard 11: L - Organization Chart) The administrative assistant for the Associate Dean of Academic Affairs has a master's degree in Workforce Education Leadership. This individual is the faculty's resource for data entry in the curriculum map and also provides clerical support for the Curriculum Committee. The Academic Affairs Manager has a bachelor's degree in professional accounting and supervises a staff of five. One staff member is assigned to each of the 4 years in the DVM curriculum to assist faculty involved with student instruction. The staff help prepare examinations, distribute them, and provide the faculty with statistical reports on each examination in Phase 1 of the curriculum. The Academic Affairs staff distributes the Phase 2 student evaluation forms electronically to faculty and house officers for grade input and subsequently release the grades to the students. This allows us to measure, document, record, analyze, and distribute assessment and evaluation activities throughout the DVM program. The staff is also responsible for generating the Phase 2 student schedules of required clinical rotations and elective experiences. A staff member coordinates the off-site educational

experiences including specialty practice and academic externships, advanced clinical rotations at other academic institutions, and research-related directed individual study. Direct support for laboratories associated with Phase 1 classes and Phase 2 elective courses is provided by the multidisciplinary laboratory (MDL) coordinator (Bachelor of Science in Nursing) and staff. The MDL staff plan, organize, set-up and disassemble each of these laboratories. They are also resources for students participating in these laboratory experiences.

11.2.c. Describe outcomes assessed for college activities that are meaningful for the overall educational process (for example, scholarly activity of the faculty, faculty awards), faculty and staff perception of teaching resources, student satisfaction with the educational program, teaching improvement benchmarks, and others). If your program assesses other outcomes, briefly describe the results.

Scholarly activity of faculty is assessed during the annual evaluation process, and includes documentation of peer-reviewed publications, abstracts, book chapters, patents, research grant support, graduate student success, and awards received. The annual Dean's Pegasus Awards Program rewards faculty for excellence in teaching, research, and service (recipients are selected by the faculty and staff). Students select the recipient of the annual Zoetis Distinguished Teacher Award. The DAFVM provides cash awards for outstanding faculty in five categories. This year, CVM faculty received two of the awards (teaching and service categories) and one support staff award. Other measured outcomes valuable to the educational process include publications in educational journals (e.g., J Vet Med Educ, 41(1): 90-95, 2014) and presentations at AAVMC and other education-based conferences. Four CVM faculty members gave oral presentations at the AAVMC conference in 2014. Dr. Margaret Kern presented the topic "Mississippi State University College of Veterinary Medicine's Flexible Experiential Curriculum" at the 2012 AAVMC conference and also at Washington State University. She also facilitated a workshop on "Outcomes Assessment" at Tuskegee University's School of Veterinary Medicine in 2012 and has consulted with three Associate Deans for Academic Affairs from other colleges regarding outcomes assessment. Among many other achievements: Dr. Mark Lawrence received the IHL Black History Month Educator of the Year Award for the MSU DAFVM; Missy Hadaway (Admissions and Student Affairs Coordinator) received the Irvin Atly Jefcoat Excellence in Advising Award and a National Academic Advising Association certificate of merit; Dr. Kelli Jones received the World Veterinary Poultry Association's Young Veterinarian of the Year award; and Dr. Phil Bushby received the AVMA's Animal Welfare Award. The College's publication (Pegasus Press) was recognized twice with an ACE (Agricultural Communications Excellence) Silver Award.

Faculty teaching is evaluated by students (for each course) and through peer evaluations. This information is part of the faculty member's annual evaluation process with their department head. Faculty members are referred to the MSU Center for Teaching and Learning to improve teaching skills and methods.

Student satisfaction is measured many ways, including through course evaluations that are reviewed by the instructors, course leader, and department heads. These evaluations are also used by the Curriculum Committee during its systematic curricular review. Student satisfaction is also measured through exit interviews, an anonymous comment box available to students, and regular class meetings with Years 1 and 2 students. Additionally, class officers meet with the Assistant Dean for Admissions and Student Affairs during each semester to provide input into wellness programs, student activities, and policies that may have an impact on their learning and overall success. The Student Satisfaction Survey contains questions related to teaching, cafeteria, library, equipment, student support services, facilities, and a general section.

Faculty and staff perceptions of teaching resources are assessed through satisfaction surveys.

CVM administrators are evaluated annually by the College faculty and staff, and the University conducts an in-depth 360 degree review of CVM administrators (Dean, Department Heads, Associate and Assistant Deans) every 3 years.

11.2.d. Describe how outcomes findings are used by the college to improve the educational program (give examples).

Outcomes from the various assessment tools are evaluated and discussed by the Curriculum Committee and the Cabinet before making programmatic changes. Each year following Year 4 exit interviews, data and information are collated into a document that is shared with relevant course leaders, department heads, and faculty. Also, service areas identified in the exit interviews meet with administrators to discuss comments provided by the students. In

response to students' request for more clinically relevant material in Years 1 and 2, content specialists now emphasize clinical relevance during presentation of basic science courses. This effort has been well received by students, as noted in course evaluations and recent exit interviews. Students requested additional instruction in cardiology, behavioral medicine, and ophthalmology. In response, the College now provides an additional offering of a Year 4 Veterinary Cardiology elective (taught twice per year by a boarded cardiologist). The College has hired a behavior medicine resident (in collaboration with the University of Tennessee) to increase delivery of behavior lectures, provide case consultations, and teach the Clinical Behavior elective. A boarded ophthalmologist was hired in 2013, and an ophthalmology intern was added in 2014 to support the growing case load. Additionally, students receive exposure to ophthalmology cases while working with another boarded ophthalmologist during the 2-week AERC externship. Student comments in 2012 regarding the CVS rotation led in part to a number of changes in staffing and student activities to improve learning. Following input from students (exit surveys) and alumni on after-hours and emergency care, the Dean appointed an Efficiencies Task Force. Recommendations from this Task Force led to several improvements in after-hours procedures to improve patient care and client service.

Information gathered from alumni surveys indicated additional lectures relating to veterinary business and practice management would improve the curriculum. In response, the College is planning to increase the delivery of lectures relating to these topics throughout the curriculum and also use the College's lecture capture capabilities to ensure lectures delivered in the Veterinary Business Management elective will be available to all students.