

**21.11. Outcomes Assessments**

**21.11.1. Student outcomes.**

Student educational outcomes must include, but are not limited to:

**21.11.1.a. NAVLE (NBE and CCT) school score report data and passage rates over the past five years (Table A),**

A. NAVLE Results

Class	Students Taking Exam	Students Passing Exam	Average Scores	Criterion Group Average	Percent Passing
2006	73	72	501	500	98.6%
2005	73	68	508	503	93.2%
2004	76	73	535	529	96.1%
2003	73	68	536	521	93.2%
2002	75	70	511	519	93.3%

**21.11.1.b. student attrition rates with reasons (Table B),**

B. Attrition

Class	Attrition	Reason for Relative Attrition		Absolute Attrition
		% Academic	% Personal	
2006	6*#	50.0%	50.0%	1
2005	7	57.1%	42.9%	2
2004	3*\$	33.0%	67.0%	1
2003	1		100.0%	0
2002	4		100.0%	4

\*Student conduct suspensions (one each in the classes of 2004 and 2006) are included in the academic category.

# One personal Attrition is a student who took a planned one year period to work on his PhD and then joined the class of 2007

\$ Includes a student who dropped out in first week of first year

**21.11.1.c. employment rates of graduates (within one year of graduation),**

See Appendices 11-1 and 11-2.

**21.11.1.d. 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,**

Senior student exit surveys (see Appendix 11-3) are conducted every year to assess the student’s satisfaction with their education and to obtain data on their immediate plans after graduation. A survey of all graduates was undertaken in 1999 ( see Appendix 11-1). As of 2005, we began annual sampling of graduates one year and 5 years post-graduation (see Appendix 11-2).

**21.11.1.e. assessments of employers of graduates to determine satisfaction with the graduates**

An annual employer survey was initiated in 2005. For the class of 2004, the response rate was low (10 responses). Each employer indicated that the diagnostic capabilities, medical knowledge and surgical skills of the alumnus were average or above. All employers indicated that they would hire another NCSU graduate. When

asked what areas of weakness the CVM might have addressed, no suggestion appeared more than once. Individual suggestions included providing more business management, communication skills, surgery skills, and practical clinical expertise.

**21.11.1.f. 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, and**

See Appendix 11-4.

**21.11.1.g. additional assessment that might assist the college in benchmarking its educational program.**

The overall curriculum content is monitored by the Assistant Dean of Academic Affairs and the Faculty Committee on Curriculum and Course Evaluation. Extramural learning opportunities are monitored through both the student's evaluation of the experience and the mentor's evaluation of the student and the experience. Faculty teaching ability is monitored by reviewing student instructor evaluations and peer evaluation of teaching. The quality of the faculty is demonstrated by the large number of invited continuing education programs performed and by external awards (see Appendices 11-5 and 11-6). The graduate and residency programs are monitored by the Comparative Biomedical Studies Graduate Studies Committee and the Committee on House Officer Programs, using tracking of the number of applicants for advanced training positions, programmatic reviews and exit interviews. Each individual residency program tracks the certification board pass rate for its residents and the employment opportunities.

The Hospital Board tracks the hospital caseload, hospital revenue, client satisfaction and referring veterinarian satisfaction. Maximizing the quality of the hospital experience exposes students to a busy, positive hospital environment. Each hospital rotation is evaluated using online course and instructor evaluations.

**21.11.2. Institutional outcomes.**

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

The university planning process involves input from the faculty and the departments. Each department submits a three-year plan to the Dean and the Cabinet. The College then submits a three-year plan (called the Compact Plan) to the University. The latest plan was developed for the 2005-2007 period. This plan is reviewed annually, to assess progress and determine priorities (see Appendix 11-7). An example of how this plan is used is the recent initiative to bring NBAF to North Carolina (<http://www.ncc-nbaf.org>). In addition to the formal Compact Plan, the College held an administrative planning retreat in October 2006 to help determine the College goals for the next 10 years. Once faculty committees have designed implementation plans, concrete goals and timelines are determined.

The College provides data for the AAVMC Comparative Data Report. The College compares itself to other veterinary colleges in the Southeast (Auburn, University of Georgia, University of Tennessee, Virginia, Maryland, Louisiana State, Mississippi State), as well as to all veterinary colleges in North America (see Appendix 11-8). The College is in the enviable position of ranking # 5 in state appropriations and number of faculty, yet # 20 in DVM student numbers and # 28 in student tuition and fees. Of concern is the fact that starting salaries for faculty currently rank # 12. Although Raleigh also ranks # 12 for cost of living in locales with veterinary colleges, the value for salary in Raleigh is low (145/188 on the May 2005 Salary Value List, salary.com). The College recently ranked fourth in US News and World Report's ranking of veterinary colleges.

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

The College's financial resources are adequate. State appropriations have been relatively stable, with growth in resources coming from tuition revenue (particularly contract students), hospital revenue and sponsored program revenue. Future increases are unlikely to come from major increases in tuition, because of tight state controls, but might come from increasing numbers of students. Additional areas for income generation include state/private entrepreneurial partnerships and development opportunities.

The facilities are adequate to excellent. The new Research building is state of the art. The main College building has wireless computer access throughout the building, is undergoing renovation to upgrade HVAC systems and has undergone recent renovations in the cafeteria, library, student commons and the hospital. The major problem for the College is limited space to accommodate the programmatic growth that has occurred since the building was constructed. Planning for a new small animal hospital is well underway and plans are being developed for renovations to the large animal hospital, the current hospital space, and laboratory animal holding space. Numerous off-site facilities and partnerships provide exposure to a wide variety of animal species and practice types.

Faculty resources are excellent, both in terms of quality and quantity. The major concern is that strong private sector employment opportunities have created a challenging faculty retention and recruitment environment. Initiatives to meet this challenge include the Clinical Compensation Plan (which allows faculty to develop entrepreneurial efforts outside the teaching hospital), the introduction of flexible scheduling to allow faculty members more time to deal with family responsibilities, the creation of focused clinics that allow faculty to concentrate on cases related to their field of expertise and expansion of the faculty and resident pool to allow division of emergency duty among more individuals.

The College attracts highly qualified students (entry GPA average = 3.57) and admits 30-31% of in-state applicants and 4-5 % of out-of-state applicants. The absolute attrition rate is low (< 5%), and the NAVLE pass rate is high (5 year average = 95%). A high percentage of the graduates apply for internships (23-56%) and the acceptance rates are high (62-73%). The average salary of graduates has increased steadily (\$47,875, with a \$3,142 benefit package for the class of 2004). The 2005 employer survey indicated that employers are satisfied with the training received by graduates.

The organizational structure of the College has evolved to meet the challenge of programmatic expansion. When outside review found that the College's external affairs needed to be placed under the direction of a Cabinet level position, the position of Assistant Dean of College Relations was created. Within the office of Academic Affairs, an Assistant Dean position (with primary responsibility for curriculum matters), Director of Diversity, and a Clinical Counselor have been added. Two new staff positions were added to support the College's web-based activities. The Hospital Board has recently added a new Service Chief of Emergency and Critical Care to represent the expanding faculty in these areas. The Center for Comparative Medicine and Translational Research has recently hired a Director. The ongoing construction and management of the growth of the Centennial Bio-Medical Campus created a need for oversight. Dr. Olson will assume this role and a national search will be conducted to refill the position of Associate Dean of Research and Graduate Programs.

**21.11.2.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.**

See Appendices 11-5 and 11-6

### **21.11.3. Clinical competencies outcomes**

*Veterinary graduates must have the basic scientific knowledge, skills and values to practice veterinary medicine, independently, at the time of graduation. At a minimum, graduates must be competent in providing entry-level health care for a variety of animal species.*

**The school/college must develop relevant measures and provide evidence that students/graduates have had adequate access to primary care cases and hands-on experiences with live animals during the clinical year and must address clinical competencies in the following areas:**

- 1. comprehensive patient diagnosis (problem solving skills), appropriate use of clinical laboratory testing, and record management**
- 2. comprehensive treatment planning including patient referral when indicated**
- 3. anesthesia and pain management, patient welfare**
- 4. basic surgery skills, experience, and case management**

5. basic medicine skills, experience, and case management
6. emergency and intensive care case management
7. health promotion, disease prevention/biosecurity, zoonosis, and food safety
8. client communications and ethical conduct
9. strong appreciation for the role of research in furthering the practice of veterinary medicine

**Provide a) the learning objectives for each of the nine listed competencies and b) a summary of the analysis of evidence-based data collected for each of the nine listed competencies used to assure that graduates are prepared for entry level practice (please note that a listing of core and elective blocks does not constitute evidence of learning).**

Through faculty interviews, a list of learning objectives for the nine competencies was developed. The master list is detailed in Appendix 11-9 and is available to the students in a waterproof, pocket-sized book and on-line ([http://www.cvm.ncsu.edu/studentservices/dvm\\_program/clinical\\_competencies/index.html](http://www.cvm.ncsu.edu/studentservices/dvm_program/clinical_competencies/index.html)). Beginning with the class of 2009, every student must be signed off on each core skill. The rationale for allowing students to get signed off on the skills throughout the four years, rather than having a capstone exam, was that spreading the documentation process over a longer period of time would reduce student stress regarding competency and allow them to see the progress in skill level over time. The advisor checks the book once each year to make sure that the student is making satisfactory progress. Because this is a new program and is spread out over the four years, we will not have complete documentation of observed competency for these skills until the class of 2009 graduates. We have, however, always had a skill sign off system for the skills taught in the Teaching Animal Unit. In the Introduction to Clinical Practice course (taught in third year), each student must demonstrate competence in basic surgery, anesthesia, physical exam, and diagnostic technique skills in a small group setting. In the Small Animal Community Classroom, competence must be demonstrated in basic small animal physical examination, small animal diagnostic techniques, routine medical knowledge, and surgery.

In addition to these direct measures, we also routinely survey both our graduates and our graduate's employers regarding clinical competency.

**Describe how outcomes findings are used by the college to improve the educational program (give examples). Describe changes that were made in the curriculum based upon the competencies of your graduates.**

The 1999 alumni survey and senior exit interviews guided improvements in the educational program through 2004. Since that time, the exit interviews, data gathered in the 2005 alumni survey, the 2005-2006 employer survey and the 2006 faculty survey have helped to guide changes and to assess if changes made between 1999 and 2005 have had an impact. In particular:

#### **The need for more experience in surgery**

- The entire large and small animal surgery faculty designed an integrated 4 year plan for teaching surgery skills and implemented the entire plan by 2000-2001. The 3rd year surgery course was moved to 2nd year in the 1998-1999 year, which allowed all classes from 2001 onwards an additional year of surgery experience. Surgery was added to the 3rd year Introduction to Clinical Practice course, and the 3rd year Large Animal Surgery course was converted to an Advanced Principles of Surgery course. Psychomotor skills training was incorporated into the Life Skills Program (prior to 1st year), emphasized in anatomy dissection, and reinforced at the end of second semester 1st year. Synthetic and cadaver models were developed and utilized for teaching specific surgery skills.
- Dr. Kelli Ferris was hired in 1999 to start a community practice and mobile spay/neuter clinic. Students are allowed to participate on a volunteer basis once they have completed the 2nd year course. A 4th year rotation that incorporated high volume spay/neuter was developed. Recently, this program has become centered at the Wake County Shelter and a second instructor, Dr. Brenda Stevens has been added.
- Dr. Kyle Mathews began an Advanced Surgery selective in 2004.
- In the 2005 alumni survey, the number of students who felt that they were poorly prepared for surgery fell from 13 mentions (Class of 2000: pre-change) to five mentions (Class of 2004: post-change) and the nature of the comments changed (Class of 2004: not well prepared for surgeries other than spay/neuter).

### **The need for more business/jurisprudence training**

- A selective on Success in Business was developed in 1999. The faculty voted to make this selective a requirement for all students in 2004, which was implemented for the Class of 2008.
- Two undergraduate business courses (6 credits) were added as prerequisites in 2001.

### **The need for communication training**

- Dr. Greg Lewbart developed a selective in Communication and client counseling.
- Dr. Laurel Williams and Dr. Mat Gerard attended the Bayer Communications Workshops to prepare for increased communication training of students. They began offering a selective in communication in Fall 2005, which replaced the Communication and Client Counseling selective.
- In the past, English literature courses were accepted for the six credit prerequisite requirement in English composition and/or public speaking. Currently, only courses that demonstrate proficiency in verbal and written communication are being accepted.

### **The need for more hands-on training**

- Several selectives were developed that offered hands-on training including Equine Dentistry, Small Animal Dentistry, Clinical Techniques (Medical and Surgical Treatments), Sample Collection and Interpretation, Physical Therapy and Rehabilitation, and Large Animal Endoscopy.
- The 3rd year Introduction to Clinical Practice course includes intensive training (3 students/1 instructor) using fresh cadavers.
- The Clinical Competency book was implemented in 2005, beginning with the class of 2009. This four-year program documents that each student performs basic “must-learn” skills.

### **The need for more primary care**

- Community classroom selectives and 4th year rotations were developed for both large and small animal. The 4th year small animal program originally utilized practice experiences, but is now taught entirely at the Wake County shelter, where a more uniform educational experience can be designed. This program has two full time instructors, Dr. Kelli Ferris and Dr. Brenda Stevens. The large animal program utilizes a tightly structured extramural study experience, run by Drs. Malcolm Roberts and Richard Mansmann.
- The Wellness Clinic, a Saturday primary care experience in the small animal teaching hospital, was opened in 2004. This clinic uses students from years 1-3 to provide routine health care to CVM personnel.
- One primary care rotation is a core rotation in the focus area system.

### **The need for emergency training**

- The small animal emergency service was initiated in 2004. A day emergency service is currently being implemented.
- One emergency/critical care rotation is required of all students. There are options for both large and small animal experience.

### **The need to allow earlier specialization**

- Selectives (implemented in Fall 1997) were the first attempt to allow training in specialized areas. The 2005 alumni survey indicated that most students found these courses to be a valuable experience.
- In the 2003 curricular vote, the faculty voted to develop focus areas. A focus area system was implemented in the 2004-2005 school year. The 4th year curriculum was specifically changed to allow specialization. Within the focus area system, there is also the opportunity to develop selectives and electives for focused training of students in years 1-3.
- A focus area based extramural studies program was implemented in 2006.

### **Other course issues raised in surveys**

- A small animal dentistry selective was added in 2002. A companion animal dentist, Dr. William Krug, was hired in 2006. The equine dentistry selective is a required course for students in the equine focus area.
- Animal nutrition will become a prerequisite as of 2008 admissions cycle. A veterinary nutritionist was hired in 2006.
- A number of courses that students did not find particularly helpful have been reorganized (Toxicology, Epidemiology/Public Health).
- The number of technicians in the hospital has been doubled over the last several years to remove students from overnight emergency/critical care duty and to allow students more time to learn case management, rather than being used as technical help. It is the philosophy of the College that student labor should not be used to run the hospital, and that students should be focusing on veterinary knowledge and skills rather than technician skills.

### **Facilities and equipment issues raised in the surveys**

- The College's first space priority was the research building. This was completed in 2004.
- The next space priority is the building of a new small animal hospital, which is scheduled to begin in 2008. Each service will have new clinical rounds room space in the new hospital. In the meantime, clinical rounds spaces are being created for each service, which helps to relieve the need for small teaching rooms for rounds.
- Once the hospital moves, portions of the current hospital will be used to create new instructional space. In the mean time, courses are being scheduled to minimize the use of D-239.
- Ten small teaching rooms have been equipped with upgraded AV equipment
- The Mobile Computing Initiative started in 2001 with distribution of hardware to the 4th year class only and wireless coverage in teaching, common and selected areas of the hospital. The program expanded to all DVM students in 2003 and to all House Officers in 2006. The wireless upgrade to cover the entire main building was completed in fall 2006. Currently, there are approximately 475 Palm handheld computers in the hands of students, faculty and staff throughout CVM. The curricular committee recently approved a laptop requirement for future classes. This requirement needs further development before its implementation.
- The biomedical communications and information technology personnel are being integrated into a single unit and two new people have been hired to improve the College's web presence, including the development of web-based instructional material.
- Temperature control in several of the classrooms remains a problem, despite the new heating/cooling renovation.

It is anticipated that once we begin to have classes graduating under the focus area/clinical competency systems (Class of 2009), we will be able to make direct changes in the clinical competency skills list. The needs of the students for developing clinical competency will be balanced by time and labor constraints. For example, when we first implemented the changes in surgical training, we set a goal of having each student perform 20 elective surgeries prior to graduation. We had exceptional students who graduated with as many as 60 surgeries, but found that a core requirement of 10 surgeries for each student was practical and could be completed by students in all focus areas. We anticipate that the use of the Clinical Competencies check list will allow us to remedy any problems in training in a timely and practical manner.