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alternatives

*Alternatives to the
Harmful Use of
Nonhuman Animals
In Veterinary
Medical Education*

**Association of Veterinarians
for Animal Rights**

P.O. Box 208, Davis, California
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alternatives

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The AVAR is a nonprofit organization of veterinarians, veterinary medical students and veterinary medical technicians. Its membership is international in scope. A major mission is to take veterinary medicine beyond the level of 'adequate veterinary care.'

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Preface

The purpose of this booklet is to inform veterinary medical students, and those aspiring to be, and educators about some of the alternatives to the harming or killing of nonhuman animals in veterinary medical education. In addition, through editorial comments, it is hoped to sensitize the skeptical reader to the need for such alternatives from a spiritual perspective.

Since the first edition of this booklet in 1989, the list of alternatives has grown significantly. Often spurred on by the desires of new students, dedicated educators have developed highly innovative and effective means of teaching conceptual and psychomotor skills in ways which do not harm or kill living beings and which do not compromise the ethical principles of students, faculty or veterinary medicine itself.

A complete listing of all alternatives available is not feasible in this format. In addition, it is likely that there are alternatives of which I am not aware or which will be developed after publication of this booklet. This booklet, therefore, should be considered only a *sampling* of what is available. All items listed here are from a much more substantial database of information which is kept in electronic format and which is updated regularly. See page 44 for details on how to obtain a copy of this database.

I would appreciate news of any existing alternatives not included here, but keep in mind that such information may already be in the master database. More importantly, critical and thoughtful reviews of specific alternatives are welcomed. If substantiated, these would become part of the master database to alert others to the experience described.

All information about a particular alternative listed here is subject to change. The source name for each is mentioned under the listing and detailed in the section on sources (see page 40). Inclusion in this guide is not intended as an endorsement by the AVAR of particular products. Moreover, the AVAR does not condone the continued production of media which are made from recording new instances of artificial demonstrations of biologic phenomena if such demonstrations result in harm or death to the individuals being used. Reproduction or re-mastering of existing media is acceptable to the AVAR.

In this book, each alternative is listed only once. Many alternatives, however, are useful in more than one category. Alternatives for cardiovascular pharmacology, for example, might also pertain to cardiovascular physiology. Someone interested in such alternatives, therefore, should check the listings under both 'Pharmacology' and 'Physiology.' In addition, some of the alternatives may be for other educational settings, such as undergraduate college or human medical school. It is believed, however, that there may be common principles which would be of benefit in veterinary medical education.

In some cases, an alternative may not be commercially available or may be an idea or process rather than an entity per se. For these, the price is designated as 'Not applicable' and the lead person to contact for more information is listed as the source.

What Is an 'Alternative'?

The concept of alternatives involves mind set as well as the physical availability of an alternative for a specific exercise. Because education involves transferring information already available, there *always* are alternatives to the harming or killing of others, if one is sincere and open-minded on the subject.

Just what is meant by an 'alternative'? In some cases it may be a replacement of a particular exercise, for example, the use of a model instead of dissection to teach children the principles of anatomy.

In other cases, an alternative may be an exercise which stimulates the student to take an interest in science, but does not necessarily replace a specific exercise. For example, in the case of dissection at the pre-professional level, the actual exercise is not critical and the knowledge is obtainable in other ways. The key benefit appears to be an initiation into the life sciences. One might, therefore, have the students involve themselves in examining their own physiologic parameters such as heart rate, vision or hearing. Although not a replacement for dissection in a strict sense, this type of exercise will be just as educational and stimulating. Because it does not involve the harming or killing of non-consenting beings, it has the added benefit of providing, albeit indirectly, a lesson in compassion. A paper discussing the issue of dissection in more detail is available from the AVAR. See page 44 for information on how to obtain this paper.

In still other cases, an alternative may involve nonhuman animals, but the use is either beneficial to the individual or does not harm her or him. An example would be having a veterinary medical student use her or his own companion dog to learn the art of examining the eye, instead of a dog who will be used for other projects and eventually be killed. Similar situations can be contrived for teaching other psychomotor skills such as surgery and you will find many variations of the theme in the section providing current policies of veterinary medical schools starting on page 17.

Another alternative in surgical training is the AVAR's animal shelter/veterinary medical student externship program. Students in the externship program spend two to three weeks at an animal shelter learning about cat and dog overpopulation, using their medical expertise to treat incoming animals, and gaining surgical experience through the sterilization of cats and dogs who will be made available for adoption. The AVAR is actively working to implement this program at veterinary medical schools in the U.S.A.

I have put together a paper discussing the topic of surgical training, with citations demonstrating the equal educational value of using alternatives compared with traditional methods. The majority of this paper is reprinted starting on page 14 of this booklet. It can be obtained in its entirety from the AVAR. See page 44 for details.

Another alternative, although somewhat problematical, would be an *existing* recording of an objectionable situation to be used instead of repeating it in class. For example, the phenomenon of anaphylactic shock has been documented on film by staging it in guinea pigs. Whereas the original act itself may be considered unconscionable by many, some may consider it appropriate to use the film. It would be necessary, however, to explain to the students that the original event is not being condoned and that we simply are taking advantage of it to maximize the educational benefit. It also would mean that, if such a film were lost, the original event should not be restaged.

What are some of the reasons for using alternatives? Alternatives are durable and usually economical. Even if initially expensive, most alternatives become highly cost-effective over time. For some alternatives, students can use them repeatedly without incurring further costs.

Alternatives are convenient and allow students to use them at the students' own pace, without the stress of relevant live-animal exercises. Students can use them outside of class, allowing a degree of practice not available in the laboratory. Although some alternatives are not exact replacements for an exercise, they are reliable and are not subject to the vagaries often plaguing the teaching laboratory.

Most importantly, alternatives are humane. They offer educators and students numerous ways to teach and learn, respectively, all types of information without harming or killing other beings.

Seeking an end to educational exercises which purposefully harm or kill other animals is a moral imperative for compassionate and thoughtful individuals. This can occur most expeditiously if there is a change in mind set, a change from one which views other animals as mere 'tools' to one which considers them to be deserving of the same respect as human beings. If we do this, then we can concentrate our efforts on improving available alternatives and developing new ones. Necessity would then become the mother of invention. We could begin the journey out of the Dark Ages of violence and destruction perpetrated without consent and presumably, against the will of individuals in the name of education.

A Sampling of Available Alternatives

ANATOMY

- Title:** Plastination for anatomy specimens
Format: Natural specimen
Source: University of California School of Veterinary Medicine (one source of information)
Price: Unavailable
Description: Natural specimens, after formalin fixation, are dehydrated and then infiltrated with silicone; results in a durable, real anatomic specimen which can last indefinitely for use in anatomy labs
- Title:** Silyophilization for anatomy specimens
Format: Natural specimen
Source: Michigan State University (one source of information)
Price: Unavailable
Reference: Ocello, et al., 1995
Description: Natural specimens, after fixation, are prepared by lyophilization and silicone infiltration; results in translucent, durable preserved specimen which is resistant to compressive forces
- Title:** **Veterinary neuroanatomy: An interactive atlas of the brain and neural pathways**
Format: Software -- Macintosh®
Source: S.L. Cummings (and associates)
Price: Unavailable
Reference: Cummings, et al., 1992
Description: Full color digital images are presented of whole brain and brainstem of sheep, and stained histological transverse sections of the canine brain; neural pathways are visualized in animated tutorial programs which are interactive; relevant gross or histological sections may be viewed from any point in all pathways

ANESTHESIA

- Title:** Anesthesia and Analgesia of Laboratory Animals
Format: Software -- Macintosh®
Source: Richard T. Fosse
Price: \$ 40.00 - 45.00 depending on version
Description: Interactive program teaches aspects of injectable and inhalation anesthesia and analgesia in rats, mice and guinea pigs
- Title:** The use of interactive computer-based case simulations to teach veterinary anesthesia
Format: Software
Source: Michigan State University
Price: Unavailable
Reference: Wilson and Sneed, 1992
Description: Interactive, problem-based anesthesia case simulations covering a range of different disease syndromes, different species, and related anesthetic challenges including a dog with head trauma, a foal with a ruptured bladder, a horse with colic, and a great Dane with bloat; each case includes an introduction to patient and disease history, specific pathophysiology, and actual anesthetic techniques

BIOCHEMISTRY

- Title:** Biochemical Simulations: Computer Simulation Of Laboratory Exercises
Format: Software -- IBM®-compatible, others
Source: David A. Bender
Price: £ 25.00
Description: Simulation of various biochemical exercises
- Title:** ENZKIN: Enzyme Kinetics
Format: Software -- Apple® II
Source: University of Iowa, CONDUIT
Price: \$ 60.00 (single package)
\$ 175.00 (site license)
Description: Provides fast, realistic results of enzyme-catalyzed reactions

CLINICAL CASES

- Title:** Effect of neurectomies in the horse
Format: Videotape -- VHS, 3/4-inch, Beta
Source: The Ohio State University, College of Veterinary Medicine, Division of Educational Resources
Price: \$ 15.00 (3/4-inch, preview, each)
\$ 15.00 (rental, each)
\$ 29.95 (Beta, VHS, purchase, each)
\$ 50.00 (3/4-inch, purchase, each)
Description: Two tapes demonstrating 1) effect of neurectomies distal to the equine brachial plexus and 2) effect of neurectomies of major nerves of the equine lumbosacral plexus
- Title:** Equine cecum and large colon
Format: Videotape -- VHS, 3/4-inch
Source: Cornell University, Biomedical Communications, College of Veterinary Medicine
Price: \$ 75.00
Description: Demonstration of the equine cecum and colon, in health and in experimental non-surgical obstructive disease with colic
- Title:** Starvation Tutorial
Format: Software -- Macintosh®
Source: Unisoft
Price: Unavailable
Description: Covers the biochemical changes occurring in human beings from their last meal to 40 days without food

CLINICAL SKILLS

- Title:** Koken Rat
Format: Model
Source: BELTECH LLC
Price: \$ 175.00
Description: Students can learn and practice venipuncture and intra-gastric tubing; a rabbit model also available

Title: Life/form® CPR Dog
Format: Simulator
Source: Nasco
Price: \$ 895.00
Description: Simulator designed to teach cardiopulmonary resuscitation in dogs; allows placement of endotracheal tube, practice in assisted breathing, cardiac massage, coordination of the respiratory cardiovascular functions

MICROBIOLOGY

Title: Bacteriology Lab
Format: Videotape -- VHS, 3/4-inch
Source: Oklahoma State University
Price: \$ 35.00 (preview/rental, each, either format)
\$ 50.00 (VHS, purchase)
\$ 60.00 (3/4-inch, purchase)
Description: Demonstration of various diagnostic techniques in bacteriology, including collection of specimens

PATHOLOGY

Title: FishGuts
Format: Software -- Macintosh®, Windows™
Source: Andrew Kane
Price: \$ 200.00
Reference: Kane, 1995
Description: A multimedia training tool for fish anatomy and pathology; still in development

Title: Introduction to Acute Inflammation
Format: Software -- Macintosh®
Source: B.R. Weeks, DVM, et al.
Price: Unavailable
Description: Demonstration that teaches concepts of inflammation, mediators of inflammatory responses, and vascular changes in inflammation; uses graphics and animation; contains a review quiz

PHARMACOLOGY

Title: Cardiolab
Format: Software -- IBM®-compatible
Source: Biosoft
Price: \$ 199.00 (£ 99; DM 229; FF 1200)
Free demo disk
Description: Simulates effects of cardiovascular drugs on anesthetized or pithed animals; heart rate and blood pressure traces are used to monitor changes after administration of agonists, antagonists, and unknowns

Title: KinetiClass
Format: Software -- Macintosh®
Source: Jeff Wilcke, DVM, MS
Price: Contact author
Description: Demonstration of pharmacokinetics

Title: Neuromuscular Blocking Drugs I and II
Format: Videotape -- VHS, 3/4-inch, Beta
Source: The University of Minnesota, College of Veterinary Medicine
Price: \$ 100.00
Description: Pharmacologic and physiologic effects of neuromuscular blocking agents in small nonhuman animals

Title: Sympathetic and depressor nerve stimulation in the rabbit
Format: Videotape -- VHS, 3/4-inch
Source: Cornell University, Biomedical Communications, College of Veterinary Medicine
Price: \$ 50.00
Description: Demonstration of classical autonomic nervous control of the heart, blood pressure, pupil, and ear skin temperature in the anesthetized rabbit

Title: The Actions of Norepinephrine and Cardiac Glycosides on the Dog Heart Lung Preparation, Parts I and II
Format: Videotape -- VHS, 3/4-inch
Source: University of Colorado
Price: \$ 60.00
Description: Lecture/demonstration showing effects increasing blood volume, myocardial failure by sodium pentobarbital, competence test in the failing heart, effects of norepinephrine, effects of ouabain

PHYSIOLOGY

- Title:** **Cardiopulmonary response to exercise**
Format: Videotape -- 1/2-inch, 3/4-inch
Source: University of California, Audio/Visual Services
Price: \$ 70.00 (rental)
\$ 140.00 (purchase)
Description: Demonstrated using a dog running on a treadmill
- Title:** **Cardiovascular Laboratory Videodisc Simulation**
Format: Software -- IBM@-compatible, videodisc
Source: Charles E. Branch, PhD
Price: \$ 800.00
\$ 50.00 (demo)
Description: Simulates cardiovascular and respiratory physiology dog lab, demonstrating preparation of the dog and results of physiological and pharmacological demonstrations
- Title:** **Intestinal motility in the rabbit**
Format: Videotape -- VHS, 3/4-inch
Source: Cornell University, Biomedical Communications, College of Veterinary Medicine
Price: \$ 50.00
Description: Shows surgical preparation to study intestinal movements in an anesthetized rabbit; describes effects of parasympatholytic drugs on the intestinal motility
- Title:** **Physiological effects of hemorrhage**
Format: 16mm film
Source: University of California, Audio/Visual Services
Price: \$ 70.00 (rental)
\$ 140.00 (purchase)
Description: Reactions to blood loss are demonstrated in the dog
- Title:** **Renal Dynamics - Physiology Laboratory Demonstration Series**
Format: Videotape -- VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 20.00 (either format, rental, USA only)
\$ 35.00 (VHS, purchase)
\$ 40.00 (3/4-inch, purchase)

- Description:** Demonstrates exaggerated effects of blood pressure reduction, glomerular afferent arteriole constriction, and an osmotic diuretic upon urine flow in a dog
- Title:** **Respiratory Pressures - Physiology Laboratory Demonstration Series**
Format: Videotape -- VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 15.00 (either format, rental, USA only)
\$ 25.00 (VHS, purchase)
\$ 30.00 (3/4-inch, purchase)
Description: Demonstrates intrapleural and intrapulmonic pressure relationships under conditions of eupnea, dyspnea and positive pressure ventilation in a dog
- Title:** **Respiratory Reflexes - Physiology Laboratory Demonstration Series**
Format: Videotape -- VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 25.00 (either format, rental, USA only)
\$ 55.00 (VHS, purchase)
\$ 50.00 (3/4-inch, purchase)
Description: Demonstrates several reflexes associated with the regulation of ventilation in a dog

SURGERY

- Title:** **DASIE (Dog Abdominal Surrogate for Instructional Exercises)**
Format: Model
Source: DASIE International
Price: \$ 15.00 each DASIE
\$ 50.00 for videotape
Reference: Holmberg, et al., 1993
Description: Simulation for practicing abdominal surgery in general and gastrointestinal and urogenital surgical procedures in particular
- Title:** **Plastic parenchymal abdominal organ models**
Format: Model
Source: Greenfield, Cathy L., DVM
Price: \$ 20.00 each
Reference: Greenfield, et al., 1993
Description: Models for practicing surgery on spleen, kidney, liver of dogs

Title: Sawbones® for dog and horse orthopedic procedures
Format: Model
Source: Sawbones®
Price: Various, depending on model type
Reference: DeYoung and Richardson, 1987
Description: Realistic artificial bone specimens providing working models for various orthopedic operations

Title: Sharpoint® PracticeRat™
Format: Simulator
Source: Surgical Specialties Corporation
Price: Unavailable
Reference: Watson, 1994
Description: Simulator for learning and practicing microsurgery including microvascular and micro neurosurgery

Title: Simulator/Media Based Teaching of Basic Surgical Skills (Hemostasis-Ligature Placement)
Format: Model, simulator
Source: Daniel D. Smeak, DVM
Price: Not applicable
Reference: Smeak, 1989
Description: Foam pad with a v-shaped trench cut in surface to simulate a surgical incision, and red ribbon to simulate bleeding vessels

TOXICOLOGY

Title: Emergency Treatment of Dogs and Cats Poisoned by Convulsing Pesticides
Format: Videotape -- VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine; AVMA Audiovisual Library
Price: ISU: \$ 25.00 (either format, rental, USA only)
ISU: \$ 50.00 (VHS, purchase)
ISU: \$ 60.00 (3/4-inch, purchase)
AVMA: Free rental
Description: General principles of pesticide poisoning therapy presented; recommended treatments for toxicosis due to cholinesterase inhibitors, chlorinated hydrocarbons, strychnine, fluoroacetate, and cyanide discussed; clinical signs and successful treatments of dogs poisoned by carbofuran and strychnine demonstrated

Title: Strychnine Toxicosis in the Dog
Format: Videotape -- VHS, 3/4-inch; 16mm film
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 175.00 (VHS or 3/4-inch, purchase)
\$ 200.00 (film, purchase)
Description: Follows two dogs receiving different doses of strychnine through clinical signs and treatment with sodium pentobarbital and activated charcoal

Title: Urea and NPN Toxicosis in Ruminants (Non-Protein Nitrogen)
Format: Videotape -- VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 25.00 (either format, rental, USA only)
\$ 45.00 (VHS, purchase)
\$ 50.00 (3/4-inch, purchase)
Description: Outlines the role of non-protein nitrogen compounds in protein production in ruminants and discusses their potential for toxicosis; includes detailed discussion of biochemical mechanisms involved, illustration of clinical signs, and recommendations for treatment

Title: Water Deprivation - Sodium Ion Toxicity (Salt Poisoning in Swine)
Format: Videotape --VHS, 3/4-inch
Source: Iowa State University, College of Veterinary Medicine
Price: \$ 20.00 (either format, rental, USA only)
\$ 40.00 (VHS, purchase)
\$ 45.00 (3/4-inch, purchase)
Description: Clinical signs, pathology, treatmentNon-violence in Surgical Training

Non-violence in Surgical Training

The following is to stimulate thought about the dilemma of developing the psychomotor skills necessary to do surgery without resorting to 'practice' nonhuman animals in veterinary medicine. It is not intended to be a precise method of how to develop these skills, rather it is intended to argue that it is possible to achieve these skills without killing healthy nonhuman animals.

It must be understood at the outset that the surgical training veterinary medical students currently receive prior to obtaining their degree does not make them surgeons. At best, for the average student, it may increase their confidence as it initiates them to the complexities of surgery. It has the potential, however, of reducing the student's confidence because of the confusion and frustration the students may experience during the very limited exposure they receive during school. Contrariwise, it may inspire overconfidence making the student a serious liability to patients and clients upon graduation, until experience improves the new graduate's skills.

Although these problems will not be overcome simply by instituting alternatives, certain alternatives such as inanimate objects may allow for increased exposure to basic skills which are fundamental to more complex procedures (Dunayer, 1990; Greenfield, et al., 1993; Greenfield, et al., 1995; Johnson and Farmer, 1989; Johnson, et al., 1990). Because these materials are not associated with the logistical problems live nonhuman animal use entails, they can be used repeatedly and at the student's convenience. Increased experience with knot tying boards and suturing of foam rubber models cannot help but improve proficiency thereby making any subsequent live nonhuman animal experience that much more rewarding.

As an example, at the Ohio State University College of Veterinary Medicine, Dr. Dan Smeak taught students how to ligate blood vessels by using foam pads and red string to simulate incisions. He and his coworkers found that students who practiced on these inanimate models did better when faced with a real surgery than students who had learned on the animals themselves (Smeak, 1989; Smeak, et al., 1991).

Whereas one must at some point use live nonhuman animals to improve the skills necessary to do surgery, it does not follow that one must purposefully kill these animals in the process. In this respect the typical manner in which surgical skills are taught to veterinary medical students in this country is ethically indefensible. Nonhuman animals taken from 'pounds' or purchased from dealers or breeders are used and killed like so many disposable commodities. This is in stark contrast to the situation in human medicine in which people aspiring

to become physicians do not kill human beings (nor, as is increasingly becoming the case, non-human beings) in the name of education.

The killing of nonhuman animals in veterinary medical education continues, unfortunately, out of convenience and habit, not because it is pedagogically necessary. There are several alternatives to the killing of healthy nonhuman animals in surgical training. Bear in mind that the British veterinary medical schools use cadavers and an apprentice system. The fact that many of their graduates compete successfully for residency and faculty positions in this country [U.S.A.] attests to our respect for their abilities. Furthermore, the school of veterinary medicine at the University of Utrecht in the Netherlands does not harm or kill any nonhuman animals in its surgical or other training. What is particularly pertinent here is that this school is fully accredited by the American Veterinary Medical Association (AVMA).

Anything which involves a nonhuman animal or simulates certain anatomical features should be acceptable for the acquisition of basic skills such as suturing, some aspects of tissue handling, and the like. This can include knot tying boards or similar mechanical devices, especially when combined with visual aids such as photographs or videotapes for use during times when personal supervision is inconvenient. Models simulating various organs also have been shown to be feasible in preparing students for the real patient (Greenfield, et al., 1993; Greenfield, et al., 1995; Holmberg, et al., 1993; Holmberg and Cockshutt, 1994; Johnson and Farmer, 1989). A cadaver can provide the added dimension of learning surgical anatomy at the same time. There now is evidence that students training on cadavers develop proficiency equal to those using live animals (Carpenter, et al., 1991; Pavletic, et al., 1994; White, et al., 1992).

It should be obvious that the source of the cadaver is important if one is proposing an alternative for moral or ethical reasons. It would not do to use cadavers from the 'pound,' for example, if one is opposed to using these animals in the living state even though the procedures may be terminal (non-survival surgery) and, therefore, would result in the same outcome for the animal (death).

Sharpening of one's skills in hemostasis and critical tissue handling seems unlikely to be accomplished except on living animals. One way this can be done is by using a patient who needs the surgery, under strict supervision by a surgical instructor (Johnson and Farmer, 1990). Initial involvement by the student may be limited to fairly simple steps such as skin incision or suturing. As her or his skills improve, the student gradually could increase the level of involvement until he or she was able to do some of the more common procedures in their entirety. This would mean more work on the part of those involved in the training of the students. In addition, it would be desirable, although not necessary, to increase the clinical part of the curriculum from the current average of less than a year to something longer in most situations in order to increase the students' exposure to clinical surgery. Any perceived 'disadvantages' to such a program should be viewed in the context that the program would help nonhuman animals who needed the surgery and would be ethically defensible and less desensitizing to the students.

An alternative could be the use of a patient dying of cancer or other hopeless situation. This is, in principle, no different from willing one's organs for use after death. After getting permission from the client, the patient would be deeply anesthetized. The

various procedures would be done and then the patient would be euthanized without allowing recovery from the anesthetic. It should be obvious that this is no different in any meaningful respect from the manner in which it is done on healthy animals who are killed afterwards. Postoperative care skills can be developed on any patient, including those who actually needed the surgery. It largely is immaterial from a pedagogical aspect that someone else did the surgery.

Another alternative which would provide not only surgical experience for students, but also would give the students experience in caring for animals after surgery involves cooperating with local animal shelters. Under a system coined benevolent transfer by the Michigan Humane Society, potentially adoptable animals would be transferred from a local shelter to a school of veterinary medicine. The animals would be attended to by veterinary medical students. Physical examinations, diagnostic procedures and treatments would be rendered by the students, with supervision by experienced faculty. Those animals not already neutered would be spayed or castrated by the students. After the animals have recovered and when it is safe to have them leave the hospital, they would be transferred back to the shelter. In the situations in which this has been done, these animals have been shown to have a higher adoption rate as seen in the experience of Mississippi State University, North Carolina State University, University of California and University of Prince Edward Island. As with programs using patients already having human companions, this program would be beneficial to all. The spay and castration aspects of such a program now are a standard part of the curriculum at many schools as can be seen in the next section of this booklet.

The AVMA, which is responsible for accreditation of veterinary medical schools in this country, does not dictate the manner in which surgery is taught. Its concern lies primarily in ensuring that students are exposed to sufficient numbers of patients in order to have an experience base that will provide for continued learning after graduation. As mentioned, they have accredited at least one school which does not harm or kill nonhuman animals in its programs. Although sometimes used as a reason for disallowing alternatives, one can see that any such plea to AVMA accreditation problems is vacuous.

In conclusion, there are no pedagogical reasons why nonhuman animals must undergo unnecessary surgery followed by death in order to teach the principles of surgery to veterinary medical students or others. Humane alternatives are available and require only a change in mind set to facilitate their use (Greenfield, et al., 1994).

Current Policy on Alternatives for Students at North American Veterinary Medical Schools

Often the driving force behind the initiation of an 'alternative' track at a school is the desire of serious and concerned students. If the administration and faculty are open to this, the student may find it easy to work with individuals to achieve educational goals without compromising her or his personal beliefs with respect to how other animals are viewed and used.

Being aware of each veterinary medical school's policy concerning student requests of this type may be helpful to the aspiring applicant. For this reason, every school in North America was queried on this subject. Listed here are each school surveyed and what response was received. The only editing done was to remove extraneous information. Contact information, current at the time of preparation, also is included.

Auburn University: College of Veterinary Medicine, Auburn University, AL 36849-5517; Dr. Timothy R. Boosinger, Dean, voice phone: 334-844-3694; fax: 334-844-3697

The following, which was originally sent on 12 October 1995, was reaffirmed by Dr. Boosinger, 12 August 1997:

"...the College does have an alternative program and does not force any student to sacrifice or otherwise compromise the health and well-being of the living animal. These are resolved by individual agreements between the student and classroom instructor and have, in truth, involved the College Administration to a minimal degree. This, however, does not constitute a policy statement..."

Colorado State University: College of Veterinary Medicine and Biomedical Sciences, Ft. Collins, CO 80523; Dr. James L. Voss, Dean; voice phone: 970-491-7051; fax: 970-491-2250; web site: <http://www.vetmed.colostate.edu/>

The following is from a letter from A.P. Knight, Professor & Head, Department of Clinical Sciences, dated 20 October 1997:

"...I enclose the latest position statement from our surgery faculty regarding the surgery training program.

"In essence the surgeons have adopted the position that any surgery lab that requires the use of live animals to be euthanized at the end of the laboratory experience is not required of all students. Students wishing to perform surgical procedures on cadavers or who would prefer to gain their surgical training through select clinical experiences and preceptorships may do so without penalty. Students graduating from Colorado State University will have an adequate basis in entry level surgery techniques to enable them to be successful veterinary practitioners. We strongly encourage any student who wishes to become a competent surgeon to pursue board certification in surgery."

This is the document to which Dr. Knight referred

*"POSITION STATEMENT, SURGICAL TRAINING PROGRAM,
COLLEGE OF VETERINARY MEDICINE AND BIOMEDICAL
SCIENCES, COLORADO STATE UNIVERSITY (1996)*

"Some degree of competence and skill in veterinary surgery is expected of all graduate veterinarians. As a result, the faculty of College of Veterinary Medicine and Biomedical Sciences at Colorado State University remain committed to provide excellent training in veterinary surgery for students in the PVM program. This is not to say that all veterinary students must or will graduate with the same degree of skill and competence in surgery. Indeed the inherent skill and natural aptitude of a student, as well as the emphasis that a student places on taking surgical electives will influence a student's ability in surgery at graduation. The quality and depth of training in surgery after graduation plays an even larger role in determining a veterinarian's ultimate ability as a surgeon. Thus, it is not the goal of the college that all students graduate with exactly equal skill in surgery, anymore than it is a goal that students have exactly equal skill in any other facet of veterinary medicine. It is the responsibility of the college to ensure that each student graduate with a minimum competence in surgery. Further, it is the intent of the college to provide, within its fiscal capabilities, reasonable training opportunities for those PVM students with the aptitude and desire for further development of surgical skills. Lastly, the faculty continues to be committed to the principles of humane use and treatment of all animals, including animals used in teaching.

"Training in surgery, as with other disciplines in veterinary medicine, is founded in the basic sciences of anatomy, physiology and pathology. Particular emphasis in surgical training is placed on anatomy. Study of animal cadavers are currently considered an integral part of the first year curriculum in anatomy. Surgical laboratories are offered in the third and fourth years of the PVM curriculum. The Surgical Principles Laboratory is required for all third year veterinary students. The Surgical Principles Laboratory is devoted to development of basic surgical skills and is taught mostly using inanimate surgical models. The final day of the Surgical Principles Laboratory involves performing surgery on a live anesthetized animal. The animal is humanely killed at the end of the laboratory without recovering from general anesthesia. Students with a moral objection to performing terminal surgery on live anesthetized animals are given the option of completing the laboratory on a cadaver animal.

"The Junior Surgery Laboratory is a highly recommended elective available to all third year students. This laboratory involves performing basic surgical procedures on live anesthetized animals. These animals also are humanely killed at the end of the laboratory without recovering from anesthesia. The reason for using living animals in these laboratories is to provide the most realistic training possible in all aspects of surgery including, but not limited to, hemostasis and handling of living tissues. These laboratories are usually a student's first experience with performing surgery and are intended to provide a foundation for future training in surgery. Strict adherence to aseptic technique and good surgical practices is maintained in these laboratories to ensure that the maximum learning experience is obtained.

This is also done out of respect for the animals that are being sacrificed. Students may elect to have the Junior Surgery Laboratory taught using cadaver animals. Students are asked to indicate their preference for a cadaver laboratory before their third year begins and will be scheduled together so that only cadaver surgeries are performed in the laboratory during that week. No official record is kept indicating whether a student chose a live-animal or cadaver laboratory. Students are not restricted from taking any clinical rotation or elective course in the curriculum. In addition to the Junior Surgery Laboratory, several advanced small and large animal surgery laboratories are available as elective courses during the third and fourth year of the curriculum. Some of these laboratories involve the use of live-anesthetized or cadaver animals. No official alternative is available for these elective courses.

"Core surgical training in the PVM curriculum continues with clinical rotations on various clinical surgery services. At least one rotation in either Large Animal or Small Animal Surgery is required for all students. Students are expected to participate and assist with surgical treatment of clinical patients in the Veterinary Teaching Hospital under the guidance of the surgical faculty. All students are also expected to complete at least rotation on the Spay/Neuter Clinic. On this rotation, students are the principle surgeons on clinical elective surgeries under the supervision of a veterinarian. In addition to the required clinical rotations, students may elect extra rotations on clinical surgery services. Approved preceptorships that emphasize surgery are also available as elective rotations.

"All live and cadaver animals used for university laboratories are obtained from sources approved by the university under the guidelines and approval of the USDA. Students should understand that the source of animals for laboratories is determined by the university and not by the students taking a particular course.

"The PVM curriculum is designed to allow veterinary students considerable latitude in choosing areas of emphasis and specialization depending on their career goals. This flexibility in the curriculum applies to training in surgery. Again it is not the intent of the college that all students achieve exactly the same level of competence in surgery, only that a minimum standard is achieved. Students who elect to perform their basic surgical training on cadavers should do so with the understanding that, in the opinion of the surgical faculty of the college, cadavers to not provide the same degree of training and competence in surgery as live animals. Students are encouraged to consider this when choosing their elective clinical rotations in an effort to make up for any deficits in their surgical training. Extra clinical rotations or preceptorships that emphasize surgery may be appropriate for students electing the cadaver option. Ultimately, responsibility lies with each student to seek guidance and appropriate training, both before and after graduation, in each area of veterinary medicine in which they wish to be competent. The surgical faculty are always available and willing to counsel students on ways to obtain additional training in surgery.

"The surgical faculty remain committed to provide the best possible training in surgery for veterinary students. The faculty also is committed to minimizing the use of terminal live animal surgery through the use of inanimate models and alternative methods wherever possible. Further, the faculty is sympathetic toward

the legitimate moral objections that some students may have against the use of terminal live animals in their training. Dr. Christopher Orton, designated as the liaison between veterinary students and the surgical faculty and Dr. A.P. Knight, Chair of the Department of Clinical Sciences, are available to students with questions or concerns regarding the use of animals in their surgical training.” (emphasis in original)

Cornell University: College of Veterinary Medicine, Ithaca, NY 14853-6401; Dr. Donald F. Smith, Dean; voice phone: 607-253-4072; fax: 607-253-3701

The following is taken from a letter from Franklin M. Loew, dated 2 October 1995:

“The Committee for the Use of Live Animals in Teaching has been collecting data on live animal use at Cornell’s College of Veterinary Medicine since 1988. The Committee monitors animal use, encourages departmental evaluation of animal use following each course and airs complaints (although decisions for or against continued animal use rests finally with the instructor).

“During the period this committee has been active, dramatic changes in the number of animals used in teaching have occurred. During the late 1980’s and early 1990’s, the greatest reductions in animals occurred in Physiology and Microbiology where an 80% reduction in animal use was observed. This resulted from a reorganization of laboratory experiences, greater dependence on audio-visual aides and financial restraints. Since 1993 Cornell has implemented a new case-based tutorial system of education. During the first three years of this curriculum, extensive use is made of dry laboratory autotutorials. Computer stations (one per student) make available numerous case-based laboratories in which students must demonstrate knowledge of specific subjects before advancing through the program. Programs combine written narratives with still photographs and videotapes to provide a comprehensive teaching experience. Dry lab autotutorials combine information from each of the basic science subjects with clinical material. Animal numbers were reduced further in Physiology and Microbiology, but now dramatic reductions have occurred in the Foundation Course I Anatomy and the Animal Body (64% reduction). In addition, Foundation Course VIIa ‘Physical Examination’ is now being taught primarily with student-owned pets thus reducing the numbers of institutionally owned animals by 90%. Animal use is expected to be reduced this year in student surgery since non-animal alternatives will be used exclusively for small animal surgical exercises in the junior year.

“Since the late 1980’s, Cornell has also allowed third-year students to choose either the classical small animal surgery laboratory using anesthetized animals or a modified program where cadavers are employed. Approximately 20% of the class has selected the latter over the past five years, however, these are still recorded as animals used. In addition, our student surgery program has involved conducting spays and castrations on cats and dogs from the local SPCA which are later adopted. The latter animal opportunities are expanded in the new curriculum and will be a principal training tool for fourth-year students.

“As I have a chance to review all these matters, there may be further changes.”

Iowa State University: College of Veterinary Medicine, Ames, IA 50011; Dr. Richard F. Ross, Dean; voice phone: 515-294-1242; fax: 515-294-8341; web site: <http://www.vetmed.iastate.edu/vetmed.html>

The following is taken from an enclosure in a letter from Kathy Kuehl, Student Services Secretary, dated 25 September 1997:

“Iowa State University College of Veterinary Medicine Policy on Utilization of Animals in the Professional Curriculum

““The humane, respectful, and responsible care and treatment of all animals is a primary College goal in the context of a broad-based, intellectually stimulating, and effective professional curriculum. Animals are essential components of several courses and laboratory exercises. The College Administration requires that animals utilized in teaching be treated humanely and that students and faculty be sensitive to both animal and human needs. The Faculty recognized [sic] the value of all animals and strives to utilize the minimum number of animals required for effective teaching of basic biomedical principles. The College encourages the development and use of alternative instructional methods to replace the utilization of nonpatient animals while maintaining a high quality educational experience.

“Faculty of the College of Veterinary Medicine may require students to satisfactorily complete exercises involving live and dead animals. If so required by the course instructor, veterinary students shall participate in all instructional exercises, including those that utilize university-owned and client-owned animals. Failure to satisfactorily complete required exercises constitutes an academic deficiency.”

“It should be noted that this policy provides for discretion by the course instructor. Faculty do in fact respond to individual student concerns as they arise, and attempt to arrive at solutions which are acceptable to the student while meeting the academic objectives of the course. Acceptable modifications include attending another university which offers alternatives for part of the coursework, or providing alternative experiences at Iowa State University, including substitution of humane society spays and neuters for surgical laboratory procedures.”

Kansas State University: College of Veterinary Medicine, Manhattan, KS 66506; Dr. Ronald J. Marler, Dean; voice phone: 913-532-5660; fax: 913-532-5884; web site: <http://www.vet.ksu.edu>

The following, which originally had been sent on 8 June 1995, was reaffirmed by R.G. Elmore, Associate Dean, 18 August 1997:

“Members of the administration and faculty of the College of Veterinary Medicine at Kansas State University are committed to the ethical use of animals in the professional veterinary teaching program. Where possible; through the use of non-animal models, interactive computerized simulations, etc.; the use of live animals in laboratories has been greatly reduced or eliminated. Basic surgical techniques are taught through spay/neuter programs in cooperation with local animal shelters. Advanced surgical techniques are learned while completing the procedures on clinical patients during the 4th year.”

Louisiana State University: School of Veterinary Medicine, Baton Rouge, LA 70803; Dr. David Huxsoll, Dean; voice phone: 504-346-3100; fax: 504-346-5702

The following is from a letter by Joseph Taboada, Director of Professional Instruction and Curriculum, dated 30 October 1997:

"We have great concern for the issue of animal welfare and examined this issue very carefully as we designed our new curriculum which started with the class entering in the fall of 1997. Animals have traditionally been an extensive and important part of our curriculum in both the basic science and clinical science phases of study. In designing the new curriculum we examined the issue of animal use and concluded that in many cases there were viable alternatives that would allow us to limit their use. We also concluded that in some cases there were not appropriate alternatives to animal use. Based on what we saw as the most appropriate balance between the needs of the nonhuman animals that were and are so important and the human animals we are charged with giving the best possible veterinary education and training [to], we reduced or eliminated animal use in physiology, pharmacology, and neuroscience labs and continued using animals in anatomy, pathology, clinical techniques, palpation, physical examination, and surgery labs. In some cases the animals used are student owned and in some cases they are university owned. Where possible and appropriate we use clinical material. We have successfully reduced the number of surgery labs that use animals in favor of models and alternative experience. For example we have developed models for suture and orthopedic labs. We have also developed a spay/neuter lab using humane society animals that are to be adopted out. However, we still have a number of terminal surgery labs in both the 3rd and 4th year surgery courses.

"We have developed two courses in the new curriculum that are designed to foster an awareness of animal related issues. One is an introduction to Veterinary Medicine and the other is entitled Animals in Society. These courses are designed to acquaint our students with many of the issues relative to animals and their use in our society and to give them a venue to explore these issues through discussion and introspection. We feel that by approaching these issues in a rational and non-confrontational manner at an early point in our students' education we will not only be raising their awareness but will be providing them with some of the valuable tools that these future leaders will need to balance such sensitive and timely issues in the emotionally charged environment they will be entering upon graduation. We have approached the issue of alternatives for those students requesting them on a case by case basis. In the 3rd year surgery class there is an alternative set of classes that students opting out of labs are required to participate in. We do not have alternatives for some of the animal based experience such as anatomy, pathology, physical techniques, and the clinical rotations and do not view alternatives as being appropriate in these courses."

Michigan State University: College of Veterinary Medicine, East Lansing, MI 48824-1314; Dr. Lonnie J. King, Dean; voice phone: 517-355-6509; fax: 517-432-1037; web site: <http://www.cvm.msu.edu/>

The following, taken from a letter from J.D. Krehbiel, Associate Dean for Academic and Student Affairs, dated 18 September 1995, was reaffirmed 14 October 1997:

"...our college has for some time modified its surgery instruction, keeping in mind the personal concerns of students as well as more effective and more efficient means in instruction.

"Our first surgery course is taught in Semester 4 and is focused entirely on basic principles of instrument handling, gowning and gloving technique, suture techniques and knot tying, and basic psychomotor skills. Inanimate models and cadaver specimens are used for these laboratories and live animals are not utilized.

"The second surgical course required of veterinary students also uses some introductory models laboratories and includes a limited number of live animal surgeries in which the animals are euthanized at the end of the procedure. Much of the term is spent on surgical procedures in neutering animals provided by the Capital Area Humane Society and Ingham County Animal Control. These animals are recovered and returned to these agencies for further adoption.

"Those students who choose not to participate in the five non-recovery laboratories are required to spend three additional block rotations in clinical clerkships. These clerkships include anesthesiology, soft tissue surgery, and orthopedic surgery.

"We have used this model for the past three years and it has been successful in developing competent surgical skills for those students who do not participate in the traditional laboratories."

Mississippi State University: College of Veterinary Medicine, Mississippi State, MS 39762; Dr. H. Dwight Mercer, Dean; voice phone: 601-325-3432; fax: 601-325-1498; e-mail: coleman@acad.cvm.msstate.edu

The following was received in August 1997:

"The College of Veterinary Medicine at Mississippi State University has since 1985 and without exception had:

- 1. Alternative instructional experiences for students who wish not to 'use' laboratory (non-client owned) animals in painful or stressful situations. They have only to ask and discuss. We are cooperative and sincere regarding suitable alternative instructional opportunities.*
- 2. The opportunity for students or staff to adopt research and teaching dogs, cats, rodents, rabbits, and some birds after the animals' use in teaching or research and if the animals are suitable as pets. Mississippi law prohibits donation of larger animals with an economic value.*
- 3. The use of non-animal or non-living materials to practice all aspects of surgery and some aspects of cardiac monitoring and respiration. We use cloth skin, plastic bones, necropsy specimens, and models.*

4. A program with the Columbus, MS, humane society to teach most of sophomore surgery doing neutering procedures on dogs and cats intended for adoption. Most are adopted. Only 3 terminal procedure laboratories are still in place plus are elective, senior rotation in advanced surgical techniques.

5. An administration and faculty in an AAALAC-accredited college dedicated to cooperation and not conflict with students of varying, equally valid ethical positions."

North Carolina State University: College of Veterinary Medicine, 4700 Hillsborough Street, Raleigh, NC 27606; Dr. Oscar J. Fletcher, Dean; voice phone: 919-829-4200; fax: 919-829-4452; e-mail: oscar_fletcher@ncsu.edu; web site: <http://www2.ncsu.edu/ncsu/cvm/cvmhome.html>

The following was received from David G. Bristol, Associate Dean of Academic Affairs, on 18 August 1997:

"There is not an official 'alternative curriculum' in the college. Individual alternative arrangements have been made within courses for small groups of students as long as the faculty member overseeing an individual course is convinced the students in an 'alternative' program will gain similar educational experiences as those in the traditional program. As in the past, we continue to include live animal, cadaver, and model [surgeries] within the program. Our 'Perfect Pet' spay neuter program has been continued to assure students get experience with these most common surgical procedures. This program has the obvious additional benefits of creating animals that are often more adoptable and of addressing one aspect of the pet overpopulation problem."

The Ohio State University: College of Veterinary Medicine, Columbus, OH 43210; Dr. Glen F. Hoffsis, Dean; voice phone: 614-292-1171; fax: 614-292-7185; e-mail: rremy@magnus.acs.ohio-state.edu; web site: <http://www.vet.ohio-state.edu/>

The following information was confirmed by William R. Fenner, Assistant Dean, Veterinary Student Affairs and Admissions, 2 September 1997:

"The Ohio State University College of Veterinary Medicine has developed programs to address student concerns about the source and use of animals during their veterinary education. All freshmen veterinary students are introduced to core courses on ethics and jurisprudence. A series of lectures are presented on moral, ethical and legal issues facing the veterinary profession. Case examples and a speaker panel are included to promote student questions and class discussion. The course objectives are:

"1. To identify principles of veterinary medical ethics, the Honor Code, Veterinary Oath and guidelines for personal ethics and professional behavior.

"2. To introduce the philosophical view and personal value of animal rights and animal welfare issues with their relevance to the veterinary profession.

"3. To define the role of the veterinarian with peers, clients, animals and the public on societal issues of pet ownership, use of animals in education, research, animal production methods to insure optimal health care and welfare of people and animals.

"4. To identify the role of the veterinarian on legal requirements of licensing, contracts, medical records, health certificates, and dispensing of medications.

"There are three components of a program dealing with the source and use of animals in teaching. The first component addresses the source of animals for use in anatomy laboratories. The college obtains its canine cadavers from a commercial vendor. This vendor obtains its cadavers from animal shelters. The vendor does not euthanize animals, but obtains animals which were euthanized by the shelter. It then embalms the animals and injects them with latex. The College works with the vendor to provide cadavers which were euthanized for medical, rather than population control measures, but cannot guarantee that an individual animal was euthanized for medical reasons. The College purchases horses and cattle at an auction ring, then euthanizes them and embalms them in the College for the large animal anatomy laboratories. A student may provide an acceptable animal to the anatomy faculty, which will be embalmed for a laboratory group.

"We do not currently have affiliation with our local humane society but we have a cooperative surgical teaching program with the Franklin County Animal Shelter. In this program, senior students are directly supervised by a faculty member (supported by a animal welfare grant) and perform sterilization procedures and other necessary elective operations such as tumor removals, cherry eye corrections, etc. to make these patients more 'adoptable'. Next year we expect to incorporate third-year students into this program as part of our alternative surgical training laboratory program.

"Our standard surgical training laboratory courses have been altered to provide an ethical but sound learning experience. In our second-year introduction to surgery laboratory course, we use skin and suture pattern simulators (coupled with specific autotutorials) to expose students to the necessary hand-eye motor skills required for suturing and knot tying. At the end of this course, students practice skin and subcutaneous tissue closure on fresh cadavers obtained from ethical sources. For third-year students, the operative practice laboratory experience uses models early in the course such as hemostasis simulators and skin simulators (and autotutorials) to refine their surgical technique. After students have fulfilled the learning objectives in these early laboratories, we progress to using fresh cadavers for teaching surgical anatomy, dissection and suturing exercises. Finally, a series of live animals (slated for adoption - from citizens for humane action) are spayed or neutered under the direct supervision of the anesthesia and surgery faculty. As you can see, we have developed a standard program that gradually improves student skills and confidence levels using models and cadavers at first, then laboratories focus on patients in need of sterilization and adoption for teaching hemostasis and tissue handling skills. We are undergoing constant change in our surgical curriculum to provide the most meaningful and ethical program available.

"Students may also choose a formal Alternative Curriculum, which substitutes cadavers for live animal surgeries. The students then make arrangements with surgeons to perform live animal surgeries, under supervision, before proceeding with the curriculum. For a student enrolled in the alternative curriculum, the objectives and requirements of these alternative courses must be satisfied prior to the student receiving a satisfactory grade, and prior to the student entering the

fourth year clinical rotations of the veterinary curriculum. This requires that students in the alternative curriculum must take their elective quarter during Spring Quarter of their third year allowing them to complete their additional surgery rotation prior to the start of Clinics I, II or III. The exception to this is the extra fourth year rotations in Equine Medicine and Surgery and Ambulatory required of those students selecting the Alternative Advanced Equine Procedures Elective (Vet Clin 622.02).

"In many laboratories in the alternative courses, intact cadavers or tissue specimens, appropriate to the intended purposes, will be used. These specimens or cadavers will be offered to the students by the Veterinary College, from sources currently used to provide such material for the standard courses. If the student opposes the cadavers' or tissues' source, it will be the student's responsibility to provide his/her own cadavers or specimens. This will allow the student to become familiar with the animal procurement process, assure the student of the material's source, and remove the burden of custom procurement from the faculty. These cadavers or specimens must be obtained within all applicable federal, state, local and institutional guidelines. Client-owned animals from The Ohio State University Veterinary Teaching Hospital (OSUVTH) cannot be used as cadavers for the alternative courses.

"During the fourth year clinical rotations, there is an alternative for the Veterinary Preventive Medicine Rotations. This is a fourth year veterinary core rotation currently utilizing laboratory animals (mice and rats), chickens, and swine in the teaching of preventive medicine as it applies to public and animal health. Live animals are currently used in three laboratory sections.

"A student desiring an alternative to this course may submit a proposal for approval to the preventive medicine faculty for alternative but acceptable experiences. The student will be allowed to acquire an experience utilizing pocket pets for the laboratory animal experience. The student is allowed to acquire an experience in a clinical setting utilizing pet or other birds to substitute for the poultry experience. It is suggested that time spent in OSUVTH's Raptor Rehabilitation program and/or experience at the Division of Animal Industry (Diagnostic Laboratory, Ohio Department of Agriculture (ODA), Reynoldsburg, Ohio) will be sufficient to gain this experience.

"The faculty of The Ohio State University College of Veterinary Medicine are dedicated to working with students to provide the best possible education, while remaining sensitive to student concerns about animal welfare and use. Students should be aware that the faculty will not compromise their educational program in the process of addressing student concerns."

Oklahoma State University: College of Veterinary Medicine, Stillwater, OK 74078; Dr. Joseph W. Alexander, Dean; voice phone: 405-744-6648; fax: 405-744-6633; e-mail: vetjwa@okway.okstate.edu; web site: <http://www.cvm.okstate.edu>

No response was provided.

Ontario Veterinary College: University of Guelph, Guelph, Ontario N1G 2W1, Canada; Dr. Alan Meek, Dean; voice phone: 519-823-8800; fax: 519-837-3230; e-mail: ameek@ovcnet.uoguelph.ca; web site: <http://www.ovcnet.uoguelph.ca/hompage.html>

The following is taken from a letter from Peter Conlon, Assistant Dean for Student Affairs, dated 21 October 1997:

"The information pertaining to the use of animals at the University of Guelph and in the curriculum of the Ontario Veterinary College is available in the University's Calendar and on the College's Home Page which can be accessed at: www.uoguelph.ca and www.ovcnet.uoguelph.ca, respectively."

When I perused the Calendar, the only information I could find relevant to this issue was under the heading "Use of Animals" for the section on Veterinary Medicine:

"Live animals may be used for teaching purposes in some courses in the veterinary program. All animals are protected by the Animals for Research Act of Ontario (1980), the Guidelines for the Care and Use of Experimental Animals (Canadian Council on Animal Care), and the Animal Care Policies of the University of Guelph."

Oregon State University: College of Veterinary Medicine, Corvallis, OR 97331; Dr. Robert C. Wilson, Dean; voice phone: 541-737-2141; fax: 541-737-4245

No response was provided.

Purdue University: School of Veterinary Medicine, 1240 Lynn Hall, West Lafayette, IN 47907-1240; Dr. Alan H. Rebar, Dean; voice phone: 317-494-7607; fax: 317-496-1261; web site: <http://www.vet.purdue.edu/>

No response was provided.

Texas A&M University: College of Veterinary Medicine, College Station, TX 77843-4461; Dr. Robert F. Playter, Interim Dean; voice phone: 409-845-5051; fax: 409-845-5088; web site: <http://www.cvm.tamu.edu>

The following was received from Dr. Playter, 15 October 1997:

"The following paragraph may be included in your 'alternatives' guidelines:

"The faculty of the College of Veterinary Medicine at Texas A&M University is dedicated to providing a quality educational experience. Animal welfare is a primary concern and the respectful and responsible care of all animals is emphasized. All animal use is conducted under the National [Institutes] of Health and United States Department of Agriculture guidelines for animal use. All protocols are reviewed and approved by the Animal Care and Use Committee. Where possible, faculty have reduced animal use by implementation of alternative instructional methods and special programs such as the cooperative surgery program with humane shelters. In this program, students neuter animals that are then returned to the shelter for adoption. The faculty and the administration are open to the concerns of students with valid ethical positions."

Tufts University: School of Veterinary Medicine, 200 Westboro Road, North Grafton, MA 01536; Dr. Philip Cobe Kosch, Dean; voice phone: 508-839-5302; fax: 508-839-2953

The following, which was originally sent on 30 August 1995, was reaffirmed by Anthony Schwartz of Tufts, 20 August 1997:

"Tufts University School of Veterinary Medicine's surgical teaching laboratories for veterinary students include the following, which are the only required surgical laboratory exercises involving living animals. In small animal surgery, the students participate in a spay clinic run in cooperation with a local humane society, in which the spayed animals are sent back to the shelter for adoption. In large animal surgery, an abomasopexy procedure is performed on dairy heifers to prevent displaced abomasum. The heifers are obtained as a loan to the school from a dairy operation. Postoperatively, they are sent back to the farm on which they had been raised. All other required surgical laboratory training uses cadavers or cadaver parts."

Tuskegee University: School of Veterinary Medicine, College of Veterinary Medicine, Nursing and Allied Health, Tuskegee, AL 36088; Dr. Albert W. Dade, Interim Dean; voice phone: 334-727-8174; fax: 334-727-8177

The document, "Animal Usage in The Academic Programs", was sent in a letter from Dr. Dade, dated 6 November 1997. The content of the document is:

"The Administration and Faculty of the Tuskegee University School of Veterinary Medicine are committed to the ethical use of animals in the professional veterinary teaching program. The humane, respectful, and responsible care and treatment of all animals is of primary concern. At the same time, the Administration and Faculty are dedicated to working with students to provide the best possible educational experience. Therefore, while ever sensitive to the student's concerns about animal welfare and use, the School will not compromise its educational standards."

"Through the use of non-animal models, interactive computerized simulations, and other technological advancements, the number of live animals utilized for the effective teaching of basic biomedical principles has been greatly reduced or eliminated. However, live animals continue to be essential components of certain courses. The School administration requires that those animals utilized in teaching be treated humanely and that students and faculty be sensitive to both animal and human needs."

"The areas which have traditionally utilized animals for educational purposes include anatomy, physiology, pharmacology, toxicology, and surgery. Live animal usage has been totally eliminated from the pharmacology and toxicology programs at the School of Veterinary Medicine. The following programs have been or are being instituted to limit or eliminate animal usage in the remaining programs."

"• Gross Anatomy: Currently, animal dissection is used to teach gross anatomy. To significantly reduce this usage, plastinated specimens are being prepared as supplemental alternatives to dissection. Steps are underway to combine plastinated specimens with hypermedia computer-assisted instruction. Such combinations will further decrease the need for animal usage."

"• Physiology: In physiology laboratory, pre-recorded, commercially-available, learning modules are used as alternatives. The necessary equipment is also available for faculty to record experiments customized to meet additional learning

objectives. Currently, there are only two live animal experiments (EKG and Glucose tolerance), both of which are minimally invasive, survival experiments. A computerized interactive biomedical sciences laboratory is under development which will further decrease the need for live animal experimentation."

"• Surgery: Various alternative methods are utilized in the surgery courses. Use of simulated canine abdomens and other substitutions are used to practice suture patterns and to perform abdominal incisions and closures, intestinal anastomosis and enterotomy, and other techniques. Cadavers are also utilized for the practice of surgical techniques whenever practical. Finally, in those surgical procedures which utilize live animals, non-survival protocols have been implemented to prevent undue suffering on the part of the animals. Advanced surgical techniques are learned while completing the procedures on clinical patients during the 4th year of the curriculum."

"In conclusion, the School supports the development and use of alternative instructional methods to replace non-patient animal utilization while maintaining a high quality educational experience."

University of California: School of Veterinary Medicine, Davis, CA 95616-8734; Dr. Bennie I. Osburn, Dean; voice phone: 530-752-1360; fax: 530-752-2801; web site: <http://www.vetmed.ucdavis.edu/>

The following is from a letter from John R. Pascoe, Executive Associate Dean, dated 21 October 1997:

"The required surgical training curriculum for students in the School of Veterinary Medicine involves a two quarter course held in the third year. It consists of the following lab exercises:

"Lab 1: This involves anesthetizing dogs and learning how to prepare them for various types of surgery, including clipping the hair, and washing and draping the surgical site. The dogs are from the vivarium and are recovered from anesthesia. After the last teaching session, the dogs go back to the vivarium and may be used in Lab #2 or other courses."

"Labs 2-4: These involve various surgical procedures done on anesthetized dogs that are euthanized at the end of the laboratory. Students not wishing to use live animals may use cadavers. The cadavers are obtained through a local animal shelter, usually from dogs euthanized for want of a home. Students who have objections to this source of cadavers can obtain a cadaver from a source considered to be easier to defend from an ethical perspective, such as that of a patient dying of spontaneous disease. Several veterinary practices in the region and the Veterinary Medical Teaching Hospital's body will program help facilitate acquisition of suitable-source cadavers. Storage facilities are available for cadavers obtained by students."

"Labs 5-10: These involve castrating dogs, or spaying dogs or cats brought to the university from 5 regional animal shelters. The students do the surgeries and administer anesthesia under appropriate aseptic conditions, allow the animals to

recover from anesthesia and provide postoperative medication and care as needed. When they are ready to travel, the dogs and cats go back to the shelter of origin for adoption. The adoption rate for dogs and cats who already are reproductively sterile is considerably higher than for non-neutered animals.

"Because training in anesthesia techniques is an important part of these instructional laboratories, students using cadavers for the surgical exercises are required to complete supplemental anesthesia training experiences at the teaching hospital.

"This program is an example of the efforts being made at the School to provide much-needed live animal surgical and anesthesia training in an ethically defensible and socially responsible manner.

"In elective surgical classes, cadavers have been substituted, where appropriate and when requested, to achieve the same instructional objectives. Students and faculty continue to work together to explore alternatives to traditional methods of instruction where animals are used.

"In several techniques laboratories, animals have been replaced by appropriate inanimate models for training students to collect blood and place catheters. Funding is currently being solicited to develop models for teaching intubation techniques for anesthesia and emergency situations.

"In anatomy laboratories, changes are being made in the examination format which will allow students to complete a computer based exit exam offered in each laboratory session. This project, undertaken by veterinary students, was sponsored in-part by AVAR and will eventually result in a reduction in the number of animals used in anatomy instruction."

University of Florida: College of Veterinary Medicine, Gainesville, FL 32610-0125; Dr. Joseph A. DiPietro, Dean; voice phone: 352-392-4700; fax: 352-392-8351

The following was received from James P. Thompson, Associate Dean for Students and Instruction, dated 19 August 1997:

"The University of Florida College of Veterinary Medicine and its faculty recognize their responsibility to provide veterinary students an ethically acceptable veterinary medical and surgical education. During the professional degree training program, certain courses require the use of animals or animal tissues to ensure the successful training of a minimally competent veterinarian. Where possible in the professional curriculum, most notably in the required and elective surgery courses, opportunities are provided to allow students to choose between the traditional use of animals and alternative methods to achieve similar educational goals."

University of Georgia: College of Veterinary Medicine, Athens, GA 30602; Dr. Keith W. Prasse, Dean; voice phone: 706-542-3461; fax: 706-542-8254; e-mail: prassek@calc.vet.uga.edu

The following was received from Sheila W. Allen, Associate Dean for Academic Affairs, 5 September 1997:

"If one of our veterinary medical students has a concern regarding the use of animals in their training, members of our faculty, department heads, and those of us in the Dean's office are willing to discuss the student's concern(s). As a result of these discussions, alternative methods for training may be recommended and are tailored to the student's concerns and the resources available."

University of Illinois: College of Veterinary Medicine, 2001 South Lincoln, Urbana, IL 61801; Dr. Victor E. Valli, Dean; voice phone: 217-333-2760; fax: 217-333-4628; web site: <http://www.cvm.edu/>

No response was provided.

The AVAR has learned through other sources that they have instituted a program of working with a local shelter, in which the students spay and castrate the animals and return them for adoption.

The University of Minnesota: College of Veterinary Medicine, St. Paul, MN 55108; Dr. David G. Thawley, Dean; voice phone: 612-624-9227; fax: 612-624-8753

The following, originally from Sagar M. Goyal, Acting Associate Dean of Academic Affairs, on 22 September 1995, was reaffirmed 24 October 1997:

"The Department of Small Animal Clinical Sciences at our college allows students to elect not to participate in live animal surgery labs in response to their ethical concerns. In the 2-quarter junior surgery course, all live animal surgeries are performed on animals obtained from the Humane Society (castration[s] and ovari hysterectomies) with the exception of one laboratory in which purchased animals are utilized.

"In large animal surgery, [requests] for exemption are handled on a case by case basis. We determine what the student's objection is, get together with the student, and try to come up with a method whereby the student can achieve the required learning experience and meet the objectives of the exercise in question."

University of Missouri: College of Veterinary Medicine, Columbia, MO 65211; Dr. H. Richard Adams, Dean; voice phone: 573-882-3877; fax: 573-884-5044

No response was provided.

University of Montreal: Faculty of Veterinary Medicine, Saint-Hyacinthe, Quebec J2S 7C6, Canada; Dr. Serge Larivière, Dean; voice phone: 514-345-8521; fax: 514-778-8114

The following letter was received from Béatrice Doizé, Chairperson of the Animal Care Committee, dated 2 August 1995:

"The Faculty of Veterinary Medicine is in compliance with the standards established by the Canadian Council of Animal Care for all the animals used for research as well as for teaching.

"Supervision, authorization and control of the use of animals in our Faculty are the [responsibility] of the animal care committee and the committee of animal facilities management.

"One of the aims of these committees is to fully support the concepts of 'replacement, reduction and refinement' of Russell and [Burch]. In consequence they encourage firmly the usage of alternative methods for research and teaching.

"We are aware of the importance of animal welfare and the need to provide strong veterinary [medicine] teaching while taking the needs of students with ethical concerns in account."

University of Pennsylvania: School of Veterinary Medicine, 3800 Spruce Street, Philadelphia, PA 19104-6044; Dr. Alan M. Kelly, Dean; voice phone: 215-898-5438; fax: 215-573-8837

No response was provided.

The AVAR has learned through other sources that as of 1993, the core course for *all* students, not just for those wanting an alternative, does not involve the use of nonhuman animals killed for training purposes. Instead, the students learn by spaying and castrating dogs and cats from a local shelter, with return of these individuals for adoption. The only course in which healthy dogs are killed is an optional elective surgery course.

University of Prince Edward Island: Atlantic Veterinary College, 550 University Avenue, Charlottetown, Prince Edward Island C1A 4P3, Canada; Dr. Lawrence E. Heider, Dean; voice phone: 902-566-0800; fax: 902-566-0958; e-mail: lheider@UPEI.ca

The following is from a letter received from Dr. Heider, dated 23 October 1997:

"The responsible and humane care and treatment of all animals is a priority at the Atlantic Veterinary College. As one aspect of this, the Animal Care Committee carefully reviews any prospective use of animals in teaching. All departments have reduced live animal use over the last several years.

"Animal-based physiology and pharmacology laboratories have been replaced with case-based seminars and computer-assisted learning. Small animal surgery and anaesthesia are taught using dogs and cats from two regional humane societies. The animals are neutered and then returned to the societies for adoption. Students learn physical examination skills by examining dogs and cats at the humane society. Large animal surgery is taught using cadaver specimens, with 1 exploratory laparotomy procedure during third year performed under regional anaesthesia on cows maintained for teaching. This is the only surgical procedure these cows undergo. Surgical skills are also practiced on model (such as DASIE) and bones.

"Some university-owned animals are maintained for teaching clinical skills. All procedures performed (from grooming and physical examinations to diagnostic procedure) must be approved by the Animal Care Committee (ACC), in accordance with the guidelines of the Canadian Council on Animal Care. The ACC also stipulates appropriate rest periods for the animals between procedures, and housing and maintenance requirements which include exercise opportunities and time outdoors."

University of Saskatchewan: Western College of Veterinary Medicine, 52 Campus Drive, Saskatoon, Saskatchewan S7N 5B4, Canada; Dr. Alex Livingston, Dean; voice phone: 306-966-7448; fax: 306-966-8747

The following letter was received from Alex Livingston, dated 6 July 1995:

"Thank you for your letter regarding the AVAR booklet for prospective veterinary students. While we at the [Western College of Veterinary Medicine] are continually reviewing the curriculum (and one aspect of that involves the reduction of animal usage), we do not, at present, accept students from the USA. Thus it would appear that no purpose would be served by including the [Western College of Veterinary Medicine] in your booklet."

Because the AVAR receives requests about Canadian schools from Canadian citizens, a letter asking for responses to inquiries from these individuals was sent in reply in July 1995, but no further reply was received.

University of Tennessee: College of Veterinary Medicine, Knoxville, TN 37901; Dr. G. Michael Shires, Dean; voice phone: 423-974-7262; fax: 423-974-4773

The following, which was originally sent on 6 June 1995, was reaffirmed by Dr. Shires, 14 August 1997:

"Concerning the availability of alternative methods: we currently have two alternatives to the use of specially purchased live animals in teaching in that our surgeons have accepted the use of cadavers as a substitute combined with some requirements for extra surgery in the senior year on client owned animals. This requirement must be fulfilled prior to graduation.

"The answer to your second question regarding conflicting ethical problems is that we are fortunate in that we have had rare occurrences of this type of conflict as we have worked very hard to develop a sympathetic and compassionate curriculum. In rare cases where concerns are expressed it is almost always due to communication problems between the student and the instructor and thus far have been resolved with mutual satisfaction."

The University of Wisconsin: School of Veterinary Medicine, Madison, WI 53706; Dr. Daryl D. Buss, Dean; voice phone: 608-263-6716; fax: 608-265-6748; e-mail: bussd@svm.vetmed.wisc.edu

The following is taken from a letter from Daryl D. Buss, dated 16 September 1997:

"The document Animal Use in Veterinary Medical Education describes the faculty's philosophy on the use of animals in teaching and research. The courses in the professional program have been developed with that philosophy as a basis, which has resulted in minimizing the need to purchase animals for use in education. Our small animal surgery course focuses training on a spay/neuter program done in cooperation with the humane societies in the area. The animals used in these laboratories are returned to the humane societies for adoption. In addition, surgery laboratories that teach thoracic, abdominal or orthopedic procedures are presented contingent on availability of cadavers from the humane

society. Unless cadavers are obtained by such a mechanism, [these laboratories are] not taught because the faculty feel that it is inappropriate to purchase animals for this use. In an elective large animal surgery course, ponies and ruminants that are en route to slaughter facilities are used for instruction in the laboratories. Students are not required to participate in these large animal surgery laboratories."

The document to which Dr. Bruss referred is too lengthy to reproduce here. It is available in its full text in the electronic version of this database, detailed on page 44.

Virginia Tech and University of Maryland: VA-MD Regional College of Veterinary Medicine, Blacksburg, VA 24061-0442; Dr. Peter Eyre, Dean; voice phone: 540-231-7666; fax: 540-231-7367; e-mail: cvmpxe@mail.vt.edu; web site: <http://www.vetmed.vt.edu>

The following is from a letter from Dr. D. Phillip Sponenberg, Professor, Pathology and Genetics, dated 13 November 1997:

"Our surgery courses are basically split into two sorts. One is the introductory course, and in that course students do ovari hysterectomies on shelter animals that are then adopted. In many cases they already have been adopted, and return for the ovari hysterectomy. This course also includes nonterminal laparotomies on sheep, and a castration of pony stallions. No alternative is offered for this course.

"The second course involves terminal surgeries on dogs. As an alternative the students can do surgery on cadavers. Students electing the alternative can fulfill the anesthesiology requirement by assisting other groups in the terminal surgeries, or if this is objectionable to them they can do an extra three week anesthesiology block in the senior year."

Washington State University: College of Veterinary Medicine, Washington State University, Pullman, WA 99164-7010; Dr. Borje Gustafsson, Dean; voice phone: 509-335-9515; fax: 509-335-6094; web site: <http://www.vetmed.wsu.edu/>

The following is taken from a letter from Karl K. White, Professor of Surgery, dated 18 September 1997:

"The non-traditional program continues to be offered without generating much stress to any of the various parties. Participation varies from year to year with as few as 0 and as many as 10 participating from a given class. We continue to offer the summer course and usually have the maximum of 18 students enrolled. If we have only 1 or 2 WSU students enrolled for the following Fall in the non-traditional course, they are given the option of participating in the summer course instead (option, not required). Most choose to participate during the summer because of the intensity of the instruction and the opportunity to interact with DVM students from other schools.

"The option to participate in the non-traditional 3rd year surgery instruction program is presented to each class in the Spring semester of their 2nd year. They have the option of electing the non-traditional laboratory course, for the following Fall. The non-traditional laboratory course parallels the traditional course with identical time commitments, same faculty, and same facilities. Completion and

performance criteria are identical. The non-traditional labs are held at the same time and in the same surgery suites as the traditional labs.

"During the 3rd professional year students enrolled in the alternative surgery laboratory course perform both cadaver and live surgeries. Cadavers for the laboratory are obtained from a regional animal shelter. They are brought dead to the shelter after a fatal accident, died at the shelter due to injury (usually) or illness or were euthanized at the shelter for humane reasons. Live animal anesthesia and surgery experiences are gained through cooperative spay and castration programs with several area shelters. Students choosing the alternative laboratory experience are, like others, responsible for all reading, videotape reviews, lectures, quizzes and tests. Models and simulators are used in both the alternative and traditional surgery programs. Performance expectations of the faculty/staff are identical for students enrolled in both laboratories.

"Those completing the non-traditional sequence are treated no differently as 4th year students and have no added clinical commitments. We generally believe that, with current instructional techniques, the non-traditional students will have to work a bit harder (ie. be more self-disciplined) than the traditional students in order to reach like levels of expertise. This is usually not a problem due to the relatively high motivation level of the non-traditional students, probably stemming from their strong desire to express their ethical concerns in a positive and successful manner. No special notations are made on transcripts or degrees as a result of participation in the non-traditional instruction program. For the most part this option is treated as just another choice to be made in the educational program. Faculty have no interest in 'keeping track' of participants.

"To qualify students must express interest sufficient to write a 1 page request giving their reasons. This is not intended to be exclusionary but rather to assure the faculty that the student has given the choice some thought and is willing to put some effort into the option.

"On the rare occasions in which ethical 'impasse' appears in other courses a settlement has always been negotiated without much fanfare. This area is not a problem at this time. The faculty have always been willing to meet the students at least half way. The constant expectation has been and will continue to be that if extra effort is required because of instructional concessions made by faculty the student(s) must make that effort. Faculty have not attempted to introduce 'punitive' work in this regard.

"Thank you for the opportunity to comment on our current status. We continue to learn from this program and continue to move techniques developed in the non-traditional lab setting into the traditional course, not because they are new but because they are better."

References Cited in this Booklet

- Carpenter, L.G., Piermattei, D.L., Salman, M.D., Orton, E.C., Nelson, A.W., Smeak, D.D., Jennings, P.B. and Taylor, R.A.: A comparison of surgical training with live anesthetized dogs and cadavers. *Vet. Surg.* **20**: 373-378, 1991.
- "No statistically significant differences could be detected between the two groups [of students, with respect to skill, outcome]."*
- Cummings, S.L.; Guinan, M.J.; Magliano, D.J. and Kitchell, R.L.: Veterinary neuroanatomy: An interactive atlas of the brain and neural pathways. *J. Vet. Med. Ed.* **19** (4): 162, 1992 (Fall).
- DeYoung, D.J. and Richardson, D.C.: Teaching the principles of internal fixation of fractures with plastic bone models. *J. Vet. Med. Ed.* **14** (1): 30-31, 1987.
- Dunayer, E.: *Alternatives to the harmful use of nonhuman animals*. The Association of Veterinarians for Animal Rights, 1990.
- Greenfield, Cathy L.; Johnson, Ann L.; Arends, Mark W. and Wroblewski, Andrzej J.: Development of parenchymal abdominal organ models for use in teaching veterinary soft tissue surgery. *Vet. Surg.* **22** (5): 357-362, 1993 (September-October).
- "Models of the canine spleen, kidney, and liver were made from soft plastic to simulate the organs of the live animal as closely as possible in appearance and tissue handling properties. Each organ model was independently evaluated by five small animal surgeons who performed several common surgical procedures on each model. All models had a realistic appearance and, with the exception of one tissue handling problem with the kidney model, and one with the liver model, tissue handling properties of the models were comparable to those of the organs in the live animal. All models were useful for teaching each of the procedures evaluated."*
- The authors posit, "We believe that veterinary students will develop better surgical skills using realistic soft tissue models as an adjunct to live animal training than they can using traditional methods alone."*
- Greenfield, C.L.; Johnson, A.L.; Smith, C.W.; Marretta, S.M.; Farmer, J.A. and Klippert, L.: Integrating alternative models into the existing surgical curriculum. *J. Vet. Med. Ed.* **21** (1): 23-27, 1994 (Spring).

Discusses the modification of their surgical training curriculum to meet animal welfare and student conscience concerns. Have met with approval by faculty and students and still evolving.

"At The University of Illinois, we have made humane issues a priority in our surgical teaching program and we have taken a pro-active attitude."

"Over the next few years, our surgical laboratory curriculum will continue to evolve to the point of having no nonsurvival surgical laboratories. The elective neutering procedures on humane shelter animals will be used for all instruction of live-animal surgery and postoperative patient care during the 3rd-year surgical laboratories."

Greenfield, Cathy L.; Johnson, Ann L.; Schaeffer, David J. and Hungerford, Laura L.: Comparison of surgical skills of veterinary students trained using models or live animals. *J. Am. Vet. Med. Assoc.* **206** (12): 1840-1845, 1995 (15 June).

Found that there was no significant difference between traditionally trained students for the most part.

Holmberg, D.L.; Cockshutt, J.R. and Basher, A.W.P.: Use of a dog abdominal surrogate for teaching surgery. *J. Vet. Med. Ed.* **20** (2): 61-62, 1993 (Fall).

The authors found DASIE to be an effective alternative for preparing students for live surgery. It was well received by the students.

Holmberg, David L. and Cockshutt, Joanne R.: A non-animal alternative for teaching introductory surgery. *Humane Innovations and Alternatives* **8**: 635-637, 1994.

Johnson, Ann L. and Farmer, James A.: Evaluation of traditional and alternative models in psychomotor laboratories for veterinary surgery. *J. Vet. Med. Ed.* **16** (1): 11-14, 1989 (Spring).

"The use of large and in some cases unrealistic models were superior to live animals for demonstrating basic concepts and allowing the students to gain basic skills. ... Students readily accepted alternative models as long as clinical relevance had been demonstrated by the instructor."

"Basic psychomotor skills that are essential to the surgeon can be learned with inanimate models. In addition, motor proficiency can be achieved with repetition on models, making the use of models a superior alternative to live animals for learning basic motor skills."

Johnson, Ann L. and Farmer, James A.: Teaching veterinary surgery in the operating room. *J. Vet. Med. Ed.* 17 (1): 10-12, 1990 (Spring).

Discuss the methods of teaching surgery using patients.

Johnson, A.L.; Harari, J.; Lincoln, J.; Farmer, J.A. and Korvick, D.: Bone models of pathological conditions used for teaching veterinary orthopedic surgery. *J. Vet. Med. Ed.* 17 (1): 13-15, 1990 (Spring).

"Bone models simulating radius curves and a femoral nonunion were developed. The models were used successfully in senior student orthopedic surgery rotations and in a continuing education laboratory. The models were ideal for demonstrating and teaching preoperative planning, operative principles and procedures, and postoperative results of corrective osteotomies to veterinary students, interns, residents, practitioners, and clients."

Kane, Andrew: Multimedia as a training tool for fish anatomy and necropsy. *Lab Animal* 24 (5): 48-50, 1995 (May).

Ocello, P.; Render, J. and Rosenstein, D.: A new method for preserving ocular tissue for veterinary education. *Am. Coll. Vet. Ophthalmol. (Transactions)*: 115, 1995 (September).

Pavletic, Michael M.; Schwartz, Anthony; Berg, John and Knapp, Deirdre: An assessment of the outcome of the alternative medical and surgical laboratory program at Tufts University. *J. Am. Vet. Med. Assoc.* 205 (1): 97-100, 1994 (1 July).

Surgical procedures assessed were: "Ovariectomy, Castration, Laceration Abscess, Laparotomy, Gastrotomy, Eyelid surgery, Cystotomy, Intestinal anastomosis, Splenectomy, Gastric torsion/Gastropexy, Simple fracture repair, Cast/Splint application, Thoracotomy, Other"

Medical and diagnostic procedures assessed were: Transtracheal aspirate, Urinary catheterization (male), Urinary catheterization (female), Bone marrow aspiration, Venipuncture, Needle aspirate, True cut needle biopsy, Ophthalmic examination, Otic examination, Cerebrospinal fluid tap, Cystocentesis, Venous catheter placement, Other"

"Our results suggest that use of cadavers during the third-year laboratory program, when supplemented with additional clinical training during the fourth year, can provide training comparable to that provided in a conventional laboratory program."

Smeak, D.D.: Simulator/media based teaching of basic surgical skills. *Proceedings of the First Annual International Foundation for Ethical Research Workshop: Alternatives to Live Animals in Veterinary Medical Education*: 10-12, 1989.

Smeak, D.D., Beck, M.L., Shaffer, C.A. and Gregg, C.G.: Evaluation of video tape and a simulator for instruction of basic surgical skills. *Vet. Surg.* 20: 30-36, 1991.

Watson, Neil: A new microsurgical simulator. *Good Medicine* 3 (3): 8-9, 1994 (Summer).

White, K.K., Wheaton, L.G. and Greene, S.A.: Curriculum change related to live animal use: A four-year surgical curriculum. *J. Vet. Med. Ed.* 19: 6-10, 1992.

"The small animal surgical faculty have noted that students from the alternative surgical laboratory program are more timid and hesitant the first time they incise living tissue. This hesitancy is only apparent on the first live tissue surgery. In all other segments of the 4th-year small animal surgery and anesthesia rotations, including patient care, the alternative students perform on a par with the students from the standard laboratory experience."

Wilson, D.V. and Sneed, S.: The use of interactive computer-based case simulations to teach veterinary anesthesia. *J. Vet. Med. Ed.* 19 (4): 164, 1992 (Fall).

*Sources for the Alternatives Cited in this Booklet**

AVMA Audiovisual Library: c/o Video Placement Worldwide, 25 Second Street North, St. Petersburg, FL 33701; voice phone: 800-266-6310

BELTECH LLC: 1240 Chula Vista Drive, Belmont, CA 94002; voice phone: 415-654-1284; fax: 415-654-1285

Bender, Dr. David A.: 49 Draycott Avenue, Kenton, Middlesex, United Kingdom HA3 0BL; voice phone: 011 44 0181 907 9933; fax: 011 44 0181 907 9933; e-mail: dab@biochem.ucl.ac.uk

Biosoft: P.O. Box 10938, Ferguson, MO 63135; voice phone: 314-524-8029; fax: 314-524-8129; e-mail: ab47@cityscape.co.uk

Branch, Charles E., PhD: Department of Physiology and Pharmacology, Interactive Video Project, College of Veterinary Medicine, Auburn University, Auburn, AL 36849; voice phone: 205-844-5414

Cornell University: Biomedical Communications, College of Veterinary Medicine, Large Animal Teaching Hospital, L-21, Ithaca, NY 14853-6401; voice phone: 607-253-3234

Cummings, S.L., M.J. Guinan, D.J. Magliano and R.L. Kitchell: Veterinary Anatomy and Cell Biology, School of Veterinary Medicine, University of California, Davis, CA 95616

DASIE International: 292 South River Road, RR #2, Elora, Ontario N0B 1S0, Canada; fax: 519-846-8960

Fosse, Richard T.: Laboratory Animal Veterinary Services, University of Bergen, Armauer Hansens House, Haukeland Hospital, N-5022 Bergen, Norway; voice phone: 011 47 5 974696; fax: 011 47 5 974617; e-mail: richard.fosse@med.uib.no

Greenfield, Cathy L., DVM: University of Illinois, College of Veterinary Medicine, 2001 South Lincoln, Urbana, IL 61801

Iowa State University: College of Veterinary Medicine, Biomedical Communications, 2261 College of Veterinary Medicine, Ames, IA 50011-1250; voice phone: 515-294-6988; fax: 515-294-2654

Kane, Andrew: Aquatic Pathology Center, University of Maryland, Baltimore, MD; voice phone: 410-706-7230; e-mail: akane@umabnet.ab.umd.edu

Michigan State University: College of Veterinary Medicine, East Lansing, MI 48824-1314; voice phone: 517-355-6509; fax: 517-336-1037

Nasco: 901 Janesville Avenue, P.O. Box 901, Fort Atkinson, WI 53538-0901; voice phone: 800-558-9595; fax: 414-563-8296; e-mail: info@nascofa.com

The Ohio State University: College of Veterinary Medicine, Division of Educational Resources, Room 0005A, Veterinary Hospital, 601 Vernon L. Tharp Street, Columbus, OH 43210-1089; voice phone: 614-292-0942; fax: 614-292-6989

Oklahoma State University: The University Library, Learning Resource Center, 102 Veterinary Medicine Building, Stillwater, OK 74078-0375; voice phone: 405-744-6729; fax: 405-744-5609

Oxford University Press: Walton Street, Oxford OX2 6DP, United Kingdom; voice phone: 011 44 865 56767; fax: 011 44 865 56646

Sawbones®: P.O. Box 409, 1021 Southwest 188th Street, Vashon Island, WA 98070; voice phone: 206-463-5551; fax: 206-463-2526; e-mail: info@sawbones.com

Smeak, Daniel D., DVM: Department of Veterinary Clinical Sciences, The Ohio State University, College of Veterinary Medicine, Columbus, OH 43210; voice phone: 614-292-1171; fax: 614-292-7185

Surgical Specialties Corporation: P.O. Box 310, Reading, PA 19607; voice phone: 800-523-3332; fax: 610-777-4926

Unisoft: University of Otago, P.O. Box 56, Dunedin, New Zealand; voice phone: 011 64 24 797 716; fax: 011 64 24 741 607

University of California, Audio/Visual Services: Davis, CA 95616; voice phone: 530-752-3553

University of California School of Veterinary Medicine: Davis, CA 95616; voice phone: 530-752-1361; fax: 530-752-2801

University of Colorado: Office of Educational Services, Health Sciences Center, Campus Box A066, 4200 East 9th Avenue, Denver, CO 80262; voice phone: 303-270-6403

University of Iowa, CONDUIT: 100 Oakdale Campus, M306, Iowa City, IA 52242-5000; voice phone: 800-365-9774

The University of Minnesota, College of Veterinary Medicine: St. Paul, MN 55108; voice phone: 612-624-9227; fax: 612-624-8753

Weeks, B.R., DVM, et al.: Department of Veterinary Pathology, Texas A&M University, College Station, TX 77840; voice phone: 409-845-2651

Wilcke, Jeff, DVM, MS: VMRCVM, Virginia Tech, Blacksburg, VA 24061; voice phone: 703-231-4621; fax: 703-231-7367; e-mail: jwilcke@vt.edu

** Voice phone and fax numbers are listed for callers from the U.S.A.*

A Student's Right To Refuse: A Legal Opinion

By Professor Gary Francione, State University of New Jersey, Rutgers School of Law (this is reprinted from the 1990 publication of this booklet)

In most cases, a student in veterinary medical school *does* have the right not to be forced to violate her/his ethical or religious principles concerning the use of nonhuman animals in the classroom. The issue of student rights is complicated, however, and requires a basic understanding of the source of these rights.

The first amendment to the United States Constitution provides, in essence, that there shall be no abridgment of the right to practice religion. Many people who have a more progressive view of traditional religions understand that reverence for life is very much a part of those religions. The U.S. Supreme Court has also interpreted this guarantee to protect not only "traditional" religious beliefs, but also ethical beliefs that may not be connected with spiritual belief even when that belief is not linked to a particular "traditional" religious doctrine.

The problem with reliance on the first amendment protection of religious freedom is that the guarantee only protects governmental interference with that freedom. If the school involved is a "state" school, then curricular requirements constitute governmental interference.

If, however, the school involved is ostensibly a "private" school, the use of the first amendment to the federal Constitution becomes more difficult, although not impossible. A person who seeks to use the first amendment protection of ethical and religious belief against a "private" school will have to show that although the school is private, there is significant involvement by state or federal government in the operation of the school so that it effectively becomes a "state actor" for these purposes. It is not enough that the school involved receives federal or state money—more involvement is needed. For example, if a private school has state representatives involved in the planning of curriculum, that involvement would probably be relevant in determining whether the "private" school was really a "state actor." Also, a yet untested issue in this context is whether certain aspects of the geographical admission policy of at least some veterinary medical schools reflects arrangements between the schools and those states involved that would have an impact on "state action."

But the federal Constitution is not the only source of rights. Most states also have their own constitutions that protect ethical or religious

beliefs, and some of these provisions may apply even to private schools. Many states also have civil rights laws and some of these may be used against state and private schools alike.

In addition, in most cases, failure by veterinary medical schools to provide an alternative to student surgery or other course requirements involving the harmful use of nonhuman animals is not related to legitimate educational concerns, but is more concerned with a desire simply to frustrate those students who are sympathetic to the animal rights movement. In such cases, other bodies of law, such as contract law and tort law, become relevant. For example, a decision not to provide an alternative because school officials do not like those sympathetic to the idea of animal rights probably violates the contractual obligation of the school not to make such decisions on anything other than a solid and supportable educational ground, and might even constitute tortious conduct by those involved in making the decision.

Finally, there is a good deal of interest on the state level in state laws that specifically and explicitly protect students from coercion to hurt, kill or use nonhuman animals in the classroom. This source of students' rights will become increasingly important in the future.

In addition to the very broad (and overly simplified) outline above, individual cases may make appropriate the use of other legal doctrines, such as the due process and equal protection guarantees in the federal Constitution, or the state constitutional or statutory protections. If you are a student and you feel that your rights are being violated, contact a lawyer and obtain her/his advice regarding the specifics of your case.

A student who wishes to obtain an alternative should, as a first step, approach course and school officials in a non-confrontational manner. Explain to these teachers and to your school that you are not challenging their right to design curriculum; you are merely asking them to respect your ethical or religious beliefs.

As a final comment, I wish to commend those courageous students across the country who have in the past and present, and those who will in the future, refused to be forced to kill or hurt nonhuman animals as part of their educational programs. The use of nonhuman animals which leads to their harm or death is wholly unnecessary, and cannot be justified by educational concerns. Your courage has helped to advance the most defenseless beings in our society.

Related Materials Available Through the AVAR

Alternatives in Education Electronic Database

This electronic version is the master database from which information for this booklet was derived. It is the source of the most complete and current information on these alternatives and thousands of others of various types.

It is available on floppy disks or from the World Wide Web. The program installed from floppy disks can be run on either Windows™ 3.1x or Windows®95 platforms. To order on floppy disks, send \$5.00 in U.S. currency with your request to the AVAR. You will receive the program on either low density or high density 3 1/2-inch diskettes. If your computer cannot read high density diskettes, advise us at the time of your order.

If you have access to the Internet, you can download self-extracting files containing the program engine and the database. There you can choose either the Windows™ 3.1x (16-bit) program engine or the Windows®95 (32-bit) program engine. The Uniform Resource Locator is:

http://www.envirolink.org/arrs/avar/alted_db.htm

The following publications are available for \$1.00 each:

Non-violence in surgical training, by Nedim C. Buyukmihci, VMD

Discusses the issue of psychomotor skill acquisition in the field of surgery, with references to studies comparing 'alternative' with traditional methods; touches on the issue of 'pound seizure'

The issue of dissection, by Nedim C. Buyukmihci, VMD

Discusses the pedagogic and ethical concerns surrounding dissection and cites studies on the educational value of alternatives

These manuscripts can also be downloaded from AVAR's home page on the Internet:

http://www.envirolink.org/arrs/avar/avar_www.htm

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