Letters to the Editor

Insurance coverage for veterinary graduates

I want to congratulate Malinda Larkin on her excellent series of articles in the February 1, 2012, issue of *JAVMA* reporting on the serious financial issues confronting veterinary students and recent graduates. Dr. Jim Wilson's comment[1] that the profession, including students themselves, has had its head in the sand regarding the unsustainable trends in educational debt is very much on target, something I learned firsthand during my recent visits to the US and Caribbean veterinary colleges.

However, there are bright spots amid all the financial gloom. This includes work being done by the two AVMA insurance trusts, such as the student scholarships program from the AVMA PLIT and the insurance programs designed specifically for veterinary students and new graduates by the AVMA GHLIT.

The AVMA GHLIT provides new graduates medical, disability, and life insurance with guaranteed coverage regardless of medical history. Insurance can be purchased with interest-free financing for the first six months after graduation and at a 4% interest rate afterward, and policy prices are set at the level 1 regional rate for 18 months after graduation, regardless of where the new graduate lives. Given that regional pricing rates range from level 1 for certain rural areas in Wyoming to level 17 for major metropolitan areas like New York City, this can represent a substantial discount. Finally, AVMA GHLIT insurance represents national coverage that follows new graduates wherever their career takes them.

I encourage new graduates to explore the programs the AVMA GHLIT has in place to help them secure proper insurance coverage at a time when finances are a critical issue.

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1. Larkin M. Higher debt, lower salaries a continuing concern for grads. *J Am Vet Med Assoc* 2012;240:242–247.

Questions about dexmedetomidine as a preanesthetic in cats

I read with great interest the study by McSweeney et al[1] on the use of dexmedetomidine as a preanesthetic in cats in the February 15, 2012, issue of *JAVMA*. To date, I have only used this drug as a sedative or a temporary general anesthetic for very brief procedures. I look forward to using it in the manner they describe. However, I did have a couple of questions. The authors mention that the sympathomimetic effects of ketamine should counteract the bradycardia commonly seen with α_2-adrenoceptor agonists. They also cite a study[2] that discourages the use of anticholinergics concurrent with α_2-adrenoceptor agonists because of the resulting hypertension and increase in myocardial oxygen consumption. Can we expect the net physiologic effects of a sympathomimetic such as ketamine to be similar to that of a parasympatholytic agent? Given that it did not appear that blood pressure was assessed in the study, could the use of ketamine potentially cause hypertension? I am also curious why the IM route was chosen over the IV route for ketamine administration.

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1. McSweeney PM, Martin DD, Ramsey DS, et al. Clinical efficacy and safety of dexmedetomidine used as a preanesthetic prior to general anesthesia in cats. *J Am Vet Med Assoc* 2012;240:404–412.
2. Monteiro ER, Campagnol D, Parrilha LR, et al. Evaluation of cardiorespiratory effects of combinations of dexmedetomidine and atropine in cats. *J Feline Med Surg* 2009;11:783–792.

Veterinary workforce debate

I read with concern two recent articles in the *JAVMA*. The first was a *JAVMA* News report[1] that discusses the current economic concerns of veterinary colleges in the United States. The article mentions that officials from the AVMA and the US veterinary colleges met to discuss the findings from the 2012 Association of American Veterinary Medical Colleges Advocacy Survey in a closed-door economic summit this past January. Not surprisingly, the veterinary colleges are concerned about ongoing steep reductions in state funding and have had difficulties offsetting these losses through increases in tuition and student enrollment. The article goes on to note that total enrollment at US veterinary colleges is expected to increase from 9,363 for the 2002–2003 academic year to 11,677 for the 2012–2013 academic year. That's a 25% increase in only 10 years.

The second article that concerned me was the commentary by Dr. Bennie Osburn on how the veterinary colleges should respond to current predictions regarding trends in the veterinary workforce.[2] Dr. Osburn argues that we will need more veterinarians in the future and favorably compares the fact that 74.3% of fourth-year veterinary stu-

Instructions for Writing a Letter to the Editor

Readers are invited to submit letters to the editor. Letters may not exceed 500 words and 6 references. Letters to the Editor must be original and cannot have been published or submitted for publication elsewhere. Not all letters are published; all letters accepted for publication are subject to editing. Those pertaining to anything published in the *JAVMA* should be received within one month of the date of publication. Submission via e-mail (*JournalLetters@avma.org*) or fax (847-925-9329) is encouraged; authors should give their full contact information, including address, daytime telephone number, fax number, and e-mail address.

Letters containing defamatory, libelous, or malicious statements will not be published, nor will letters representing attacks on or attempts to demean veterinary societies or their committees or agencies. Viewpoints expressed in published letters are those of the letter writers and do not necessarily represent the opinions or policies of the AVMA.

dents who responded to the 2011 AVMA senior survey had received at least one offer of employment with the fact that only 65% of nursing students and 24.4% of new college graduates had a job offer at the time of graduation. However, I believe that the only relevant comparison is to the veterinary market, and the percentage is down dramatically from the 90.3% reported for the 2003 senior survey.[3] Dr. Osburn further states that the approximately 80 students who graduate each year with combined veterinary and doctoral degrees is "not nearly enough to fill the expected need for veterinarian researchers," but this is the same reasoning that was used to lobby for an increase in the number of graduates to fill rural practice jobs. I do not believe that simply increasing student enrollment will fill these voids.

To my mind, closed-door meetings involving the AVMA leadership and veterinary college officials are not in the best interests of the veterinary profession because such meetings leave the impression that participants are more focused on maintaining the economic viability of the current academic institutions than on improving the economic viability of the veterinary profession as a whole. I do not believe that increasing student enrollment during a time when there has been a documented decrease in the demand for veterinary services[4] will improve the veterinary profession. Dr. Osburn states that "veterinary medical education should not be expected to change dramatically with every perceived shift in the prevailing winds." I contend that the increase in student enrollment is, in fact, a dramatic change in response to the current prevailing winds. We need solutions that honestly include the interests of the veterinary profession overall and suggest that such discussions must be open.

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1. Larkin M. State cuts put colleges in precarious situation. *J Am Vet Med Assoc* 2012;240:501–502.
2. Osburn BI. How schools of veterinary medicine should respond to current predictions regarding trends in the veterinary workforce. *J Am Vet Med Assoc* 2012;240:517.
3. Wise JK, Shepherd AJ. Employment, starting salaries, and education indebtedness of year-2003 graduates of US veterinary medical colleges. *J Am Vet Med Assoc* 2004;224:212–215.
4. Burns K. Reversing the decline in patient visits. *J Am Vet Med Assoc* 2011;239:729–732.

I am writing in response to the recent commentary[1] by Dr. Bennie Osburn, which was published in the March 1, 2012, issue of *JAVMA*. As a new graduate with a large educational debt load, I found Dr. Osburn's commentary optimistic but worry that it does not reflect the current veterinary workforce situation. According to the most recent AVMA senior student survey, starting salaries for veterinarians remain low but educational debt is higher than ever.[2] As a result, it seems likely that at least some new graduates may have been forced to take a position with a low salary, in an unwanted location, or in a hospital that did not practice medicine up to their standards. In contrast to Dr. Osburn's optimism, I would suggest that there are clear veterinary workforce issues that require immediate attention.

In his commentary, Dr. Osburn mentioned that the percentage of fourth-year veterinary students who had received a job offer was higher than the percentages of nursing students and college graduates who had, seemingly suggesting that because veterinary graduates were better off, the situation in the veterinary profession must be fine. However, the fact that other professions are facing workforce issues does not make the veterinary situation any better. Dr. Osburn also mentions that an oversupply of veterinarians could be helpful if a foreign disease outbreak were to occur; however, such rare events would not be sufficient to support the career of many veterinarians.

Recent reports indicate that existing veterinary colleges are increasing their class sizes, more foreign schools are being accredited, and new veterinary colleges are slated to open, and I fear that this increase in the supply of veterinarians will only serve to keep starting salaries low. I believe that the profession should work to reverse

Continued on page 934.

this damaging trend and that veterinarians and veterinary students should voice their opinions on this important issue.

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1. Osburn BI. How schools of veterinary medicine should respond to current predictions regarding trends in the veterinary workforce. *J Am Vet Med Assoc* 2011;240:517.
2. Shepherd AJ, Pikel L. Employment, starting salaries, and educational indebtedness of year-2011 graduates of US veterinary medical colleges. *J Am Vet Med Assoc* 2011;239:953–957.

We read the recent commentary[1] by Dr. Bennie Osburn with interest. In his commentary, Dr. Osburn cited the finding from the 2011 AVMA survey of graduating veterinary students that 74.3% of seniors who were actively seeking employment or advanced education in veterinary medicine had received at least one offer by the time of the survey. However, what remains unclear is the percentage who received offers of employment in private practice versus the percentage who had received offers for positions in advanced education or whether those applying for positions in advanced education did so because of concerns about finding employment in private practice.

Dr. Osburn favorably compares the 74.3% of senior veterinary students with at least one offer of employment with the fact that only 65% of new nursing school graduates had one or more offers of employment at the time of graduation. We believe, however, that it would be more interesting to compare results for 2011 graduates with past data for veterinary students. For instance, we would be interested in the percentages of 2011 graduates with two, three, or more offers for employment in private practice versus percentages for students graduating 10 and 20 years ago.

Finally, Dr. Osburn suggested that the foot-and-mouth disease outbreak in the United Kingdom during 2001 and 2002 highlighted the need for more veterinarians to deal with similar public health crises. However, we do not believe that the veterinary colleges should be determining enrollment numbers on the basis of crises that may occur only once every decade or so because it is not clear what those additional graduates would do while waiting for the next crisis.

It is possible that the complex changes in our health-care system in the United States don't require an increase in the number of students enrolled so much as a change in how we screen applicants to identify more individuals who are interested in pursuing careers in areas other than private practice, such as public health or research. Or, perhaps, we do need fewer graduates.

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1. Osburn BI. How schools of veterinary medicine should respond to current predictions regarding trends in the veterinary workforce. *J Am Vet Med Assoc* 2012;240:517.

Editor's note:

For the past several decades, the AVMA has annually conducted a survey of fourth-year veterinary medical students regarding expected employment following graduation, with results published in the *JAVMA*. Although the percentage of respondents who received one or more offers for employment or advanced education has routinely been reported, this has not been broken down into percentages who received offers for employment in private practice versus offers for advanced education or employment in other sectors of the veterinary profession (eg, public or corporate practice). It seems likely that some individuals who received offers for advanced education also received offers for employment in private practice and that some individuals did not pursue any positions in private practice because of a desire to pursue advanced education. Thus, interpreting percentages of students who received offers of employment in individual sectors would be difficult. Importantly, for the 2011 survey, when respondents who had accepted internships were asked their primary reason for undertaking an internship, 36.9% indicated that they planned to apply for a residency, 36.9% indicated that they wanted to practice better-quality medicine, 22.1% indicated that they believed they needed more training before entering veterinary practice, and only 4.1% provided some other reason.

Kurt J. Matushek, DVM, MS, DACVS
Editor-in-Chief

The author responds:

To answer some of the responses to my commentary, the AVMA and Association of American Veterinary Medical Colleges economic summit meetings were initiated to identify and gain a common understanding of the economic issues facing the veterinary profession in an atmosphere where ideas can flow freely. We welcome all input and suggestions and plan to publicize the results of these meetings.

In regard to the letter writers' comments about the percentages of fourth-year veterinary students receiving job offers, Dr. Jim Lloyd, associate dean for the Michigan State University College of Veterinary Medicine, who also holds a doctorate in economics, reports that according to data obtained from the annual AVMA senior surveys, between the years of 2002 and 2009, approximately 90% of senior students had received offers of employment or advanced education by the time of the survey, with a mean of approximately 2.5 job offers/student for students who had received at least one offer. Since 2009, between 74.3% and 79.5% of senior students reported receiving at least one job offer, with the mean number of offers for students who had received a job offer ranging from 1.6 to 1.9. A telling statistic from the 2011 AVMA senior survey is that, of those who had accepted a job offer or position in advanced education, 84.2% had accepted a position that matched their first choice. Although we don't know exactly why more students are pursuing advanced education, the need for more veterinarians to obtain graduate degrees is critical because these individuals will be the discipline-based scientists of the future who will develop new diagnostic

tests, vaccines, and pharmaceuticals, among other advancements.

In addition, the US Bureau of Labor Statistics projects that there will be an additional 22,000 jobs for veterinarians in 2020, compared with 2010.[1] However, after accounting for replacement of veterinarians expected to retire, the US colleges of veterinary medicine will graduate approximately 10,000 fewer veterinarians than the projected number of openings. Granted, some of the new jobs projected by the Bureau will be in nontraditional areas, such as food safety and security, animal health and welfare, public health, epidemiology, and research.

Another interesting finding from the annual AVMA senior surveys is that even with the slight decrease in 2011, starting salaries for veterinarians over the past 10 years have been rising faster than the rate of inflation. According to Dr. Lloyd, this trend is not consistent with an overabundance of veterinarians.

Regarding class size, I believe that the 2.3% annual increase in student enrollment over the past 10 years has been relatively modest. Although student debt clearly remains a major issue, more loan repayment and forgiveness options are available today than in the past.[2]

In conclusion, I believe that veterinary medicine provides a firm foundation for a broad swath of personally and financially rewarding careers, but it may be that some veterinary medical graduates need to broaden the scope of their intended career path. Once again, I want to reaffirm my deep conviction regarding the outstanding relevance and inherent rewards of veterinary medical education.

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1. US Bureau of Labor Statistics. Employment projections: fastest growing occupations. Available at: www.bls.gov/emp/ep_table_103.htm. Accessed Mar 16, 2012.
2. Association of American Veterinary Medical Colleges. Get help paying for a veterinary medical education. Available at: www.aavmc.org/financing-your-education. Accessed Mar 16, 2012.

Cardiopulmonary resuscitation in small animals

I read the recent Reference Point article[1] on CPR in small animals with interest. However, the authors' statement that "Considerable efforts have been made to advance methods of CPR since its introduction 50 years ago" is not entirely correct and needs to be addressed. Dr. Claude S. Beck of the Western Reserve University School of Medicine[2] and Dr. B. F. Hoerlein of the Auburn University College of Veterinary Medicine[3] were among the first to describe the clinical application of CPR in human and veterinary medicine, in 1941 and 1955, respectively.

In fact, the use of electrical shocks to abolish ventricular fibrillation in a dog was described as early as 1899 by Prevost and Battelli,[4] and there are many early publications[5,6] of experimental studies involving animals that underwent CPR.

In 1958, Booth et al[7] of the Colorado State University College of Veterinary Medicine and Biomedical Sciences assembled a 115-V variable transformer and ammeter for cardiac defibrillation in dogs. They reported that an electrical shock of 70 to 90 V and at least 2 A was necessary to successfully defibrillate the ventricles.

As indicated by these many early publications, it has been considerably more than 50 years since CPR was introduced. Nevertheless, it is commendable that Boller et al[1] have organized an erudite proposal for a chain of survival for small animal CPR that will be useful for veterinary clinicians.

Nicholas H. Booth, DVM, PhD
Jacksonville, Fla

1. Boller M, Boller EM, Oodegard S, et al. Small animal cardiopulmonary resuscitation requires a continuum of care: proposal for a chain of survival for veterinary patients. *J Am Vet Med Assoc* 2012;240:540–554.
2. Beck CS. Resuscitation for cardiac standstill and ventricular fibrillation occurring during operation. *Am J Surg* 1941;54:273–279.
3. Hoerlein BF. Cardiac resuscitation in a dog with cardiac arrest. *J Am Vet Med Assoc* 1955;127:210–212.
4. Prevost JL, Battelli F. Sur quelques effets des décharges électrques sur le coeur des mammifères. *Comptes Rendus Acad Sci* 1899;129:1267–1268.
5. Leeds SE, Mackay ES, Mooslin K. Production of ventricular fibrillation and defibrillation in dogs by means of accurately measured shocks across exposed heart. *Am J Physiol* 1951;165:179–187.
6. Wiggers CJ. The mechanism and nature of ventricular fibrillation. *Am Heart J* 1940;20:399–412.
7. Booth NH, Will DH, Moss LC, et al. An electrical apparatus and its application in defibrillating the heart of the dog. *J Am Vet Med Assoc* 1958;132:117–122.

The author responds:

We are grateful for the insightful comments received from Dr. Booth in response to our publication on CPR in small animals.[1] His remarks highlight the fact that substantial scientific work in the resuscitation of people and animals that had undergone cardiac arrest was undertaken prior to 1960. Indeed, reviewing the history of resuscitation from sudden cardiac arrest, one notices that a series of extraordinary events, discoveries, and setbacks populate the path to our current understanding of CPR. The interested reader is referred to the wonderful book[2] by Dr. Mickey Eisenberg, *Life in the balance: emergency medicine and the quest to reverse sudden death*, in which the author describes the evolution of the three elements that define contemporary CPR: airway and breathing control ("the breath of life"), artificial circulation ("the pulse of life"), and the use of electricity to induce and disrupt ventricular fibrillation ("the spark of life"). No fewer than 117 methods of manual ventilation were described by Dr. Karpovich in his 1953 book,[3] but not mouth-to-mouth or mouth-to-nose ventilation. These methods of expired-air ventilation were described 100 years prior but were abandoned. Similarly, the use of chest compressions as a remedy for cardiac arrest remained rare, although its effectiveness was first described toward the end of the 19th century. Maybe the first published scientific work on the topic (interestingly in cats) was published in 1878.[4] Prior to 1960, artificial circulation during cardiac arrest was provided by open chest cardiac massage and, although highly effective, required

specialized skills, limiting its use to doctors. Dr. Booth mentioned some of the many researchers who pioneered the development of electrical defibrillation. Moreover, he himself contributed to the field by designing a defibrillator for clinical use in dogs before defibrillation had even become a clinical reality in human medicine.[5]

Of note, these three elements of CPR (breathing, circulation, and defibrillation) largely developed independently from one another. It was not until 1960 that breathing and circulation in the form of closed-chest compressions and mouth-to-mouth ventilation were combined to create a strategy that allowed everyone, not just doctors, to partake in resuscitation,[6] marking the origination of modern CPR. The sentence in our article that initiated Dr. Booth's comment was in reference to that time 50 years ago. However, it is because of the work of many scientists throughout the years, including Dr. Booth, that we find ourselves the guardians of a rich heritage of knowledge. It is the foundation for our quest toward an optimal treatment strategy for cardiac arrest because survival rates continue to be unacceptably low. We thank Dr. Booth for the opportunity to further expand on the history of CPR.

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1. Boller M, Boller EM, Oodegard S, et al. Small animal cardiopulmonary resuscitation requires a continuum of care: proposal for a chain of survival for veterinary patients. *J Am Vet Med Assoc* 2012;240:540–554.
2. Eisenberg MS. *Life in the balance: emergency medicine and the quest to reverse sudden death*. Oxford, England: Oxford University Press, 1997.
3. Karpovich PV. *Adventures in artificial respiration*. New York: Association Press, 1953.
4. Boehm R. Ueber Wiederbelebung nach Vergiftungen und Asphyxie. *Arch Exp Path Pharm* 1878;8:68–101.
5. Booth NH, Will DH, Moss LC, et al. An electrical apparatus and its application in defibrillating the heart of the dog. *J Am Vet Med Assoc* 1958;132:117–122.
6. Kouwenhoven WB, Jude JR, Knickerbocker GG. Closed-chest cardiac massage. *JAMA* 1960;173:1064–1067.

Stress versus fear in cats

In their article "Associations among weight loss, stress, and upper respiratory tract infection in shelter cats," Tanaka et al[1] have made a valuable contribution to our understanding of a major problem we face in sheltered cats. However, I submit that the article contains a fundamental flaw in its use of the Kessler and Turner[2] cat stress scoring system as a measure of stress in the subject cats. Despite its name, the Kessler and Turner system is not a measure of stress. Rather, it measures fear, as evidenced by the fact that the 3 highest scores assigned with this scoring system are labeled as fearful, very fearful, and terrorized.

In situations involving strong emotional responses, the stress response coexists with the specific emotion, and fear is just one of a spectrum of emotions that can be activated in this process.[3] However, experimental evidence has demonstrated that for all of their shared characteristics, stress mechanisms are neither fully distinct from nor the same as the associated emotional state; the stress response becomes a component part of the emotion with which it is associated.[3] The relevant point for this study is that fear is not stress and stress is not fear.

Numerous problems may result from the error of mislabeling fear as stress or equating the two. First, stress resulting from many other causes—psychologic and physical—may not be measured. Examples of such causes include physical discomfort, understimulation or boredom, overstimulation, frustration, uncertainty, anxiety, social isolation, conflict and aggression with conspecifics, lack of choice, and separation anxiety.[4–6] Second, such a mislabeling incorrectly suggests that when the cat's score improves (as a result of treatment, time, or both), the cat's stress is alleviated, when it may be that the only improvement is in the cat's fear level. Third, this error incorrectly suggests that we have an accurate and reliable method for measuring stress in cats, which we don't.

The fact that the Kessler and Turner cat stress scoring sytem[2] has been used in numerous studies of purported stress since its development does not make it any more appropriate a tool for measuring stress; it merely underscores the fact that the test was misnamed from the outset. For the study reported by Tanaka et al,[1] this means that the results are limited to the associations in shelter cats between weight loss, upper respiratory tract infection, and fear.

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1. Tanaka A, Wagner DC, Kass PH, et al. Associations among weight loss, stress, and upper respiratory tract infection in shelter cats. *J Am Vet Med Assoc* 2012;240:570–575.
2. Kessler MR, Turner DC. Stress and adaptation of cats (*Felis sylvestris catus*) housed singly, in pairs and in groups in boarding catteries. *Anim Welf* 1997;6:243–254.
3. Lazarus RS. *Stress and emotion*. New York: Springer Publishing Co, 1999.
4. Loveridge GG, Horrocks LJ, Hawthorne AJ. Environmentally enriched housing for cats when housed singly. *Anim Welf* 1995;4:135–141.
5. Van den Bos R. Post-conflict stress-response in confined group living cats (*Felis sylvestris catus*). *Appl Anim Behav Sci* 1998;59:323–330.
6. Patronek GJ, Sperry E. Quality of life in long-term confinement. In: August JR, ed. *Consultations in feline internal medicine*. 4th ed. Philadelphia: WB Saunders Co, 2001;621–634.

Additional thoughts on ovariectomy versus ovariohysterectomy

We have been following the letters regarding the commentary published by Drs. DeTora and McCarthy[1] on the relative advantages of ovariectomy (OVE) versus ovariohysterectomy (OVH) for elective sterilization of cats and dogs with interest and wanted to respond to Dr. Bender's query[2] regarding whether OVH is still the primary procedure taught in veterinary schools in the United States. At the University of Wisconsin School of Veterinary Medicine, the OVH procedure is taught in the third-year student surgical instruction laboratory. This is done because the goal of

the laboratory is to teach and develop fundamental surgical skills, such as surgical decision-making, dissection, and ligation skills, in a laboratory environment without euthanizing animals and not merely to teach students a specific procedure for elective sterilization. Ovariohysterectomy, as opposed to OVE, provides greater opportunities for student surgeons to be challenged and exercise these skills without an attendant increase in surgical morbidity. A side benefit of this exercise is that students learn how to perform an OVH, a skill that, at a minimum, would be needed for the surgical treatment of pyometra. Concurrently with these laboratory exercises, students attend lectures during which they are exposed to the concepts behind use of OVE instead of OVH for sterilization of healthy animals without evidence of uterine abnormalities and the potential technical advantages of such an approach. Clearly, a robust literature has been developed supporting the use of OVE, which was aptly cited by Drs. DeTora and McCarthy. Particularly compelling are studies from Utrecht with substantial numbers of study animals and extremely long follow-up times demonstrating no differences in outcomes or odds of developing disease in the remaining reproductive tract between the two procedures. Furthermore, our students are exposed to the OVE procedure and pertinent discussions on this topic in rounds during their senior year of veterinary school, where OVE is our preferred procedure for healthy animals when laparoscopic sterilization is elected. Dr. Bender expressed surprise that no comments or responses were forthcoming from other experts or teachers in this field. From our perspective, the lack of a response is due to the fact that we consider the points raised by Drs. DeTora and McCarthy to be well supported by the literature and noncontroversial. We fully expect that over time, the long-standing tradition of performing an OVH will be gradually supplanted by use of the OVE procedure as new graduates and current concepts fully permeate into the practice environment.

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1. DeTora M, McCarthy RJ. Ovariohysterectomy versus ovariectomy for elective sterilization of female dogs and cats: is removal of the uterus necessary? *J Am Vet Med Assoc* 2011;239:1409–1412.
2. Bender WM. Ovariectomy versus ovariohysterectomy (lett). *J Am Vet Med Assoc* 2012;659–660.

Veterinary curriculum strategies

During the 1980s, various commentators predicted that the veterinary profession would soon reach a crossroads, where we would be faced both with an oversupply of veterinarians in the United States and with an imbalance in the supply of veterinarians to various sectors within the profession. Although it has taken more time than we may have thought, I believe that we have reached that crossroads.

Why a crossroads and not a crisis? Crises require emergency management; crossroads require short-term and long-term decision making. It is my view that both short-term and midterm to longer term options are available to the profession, but action now is required to forestall rapid worsening of current financial and oversupply issues in the veterinary profession that may indeed precipitate crises in the near term.

With regard to the short term, I believe that the profession needs to consider new approaches to training researchers. Part of the difficulty in making this change is the fact that many undergraduate biology departments no longer emphasize training in traditional aspects of biology and zoology. There is nothing wrong with today's undergraduate emphasis on molecular sciences, but producing superior biomedical researchers requires greater depth of basic biological understanding and thus a more balanced undergraduate education for those majoring in biology. Some undergraduate biology departments do still provide a zoological perspective, and veterinary college admissions could be structured to more seriously consider qualified candidates from these programs.

Also, in the short term, I recommend that the veterinary colleges attempt to balance their entering classes on the basis of career interest (ie, research vs clinical medicine), species emphasis, and interest in specific biomedical research disciplines. Faculty need and deserve time to reshape their curricula, but further delays should be avoided. In addition, because restructuring the profession is the business of all veterinarians, all segments should be represented by those who actively function therein and everyone should have a voice.

With regard to midterm to longer term solutions, I suggest that the goal of combining specialty board certification with completion of a doctoral degree in a single individual was workable in the past but that the knowledge base for most research disciplines and clinical specialties has increased so rapidly that combining the two credentials in a single person may result in a lack of true depth in either area. Instead, I suggest that the veterinary colleges should consider placing more emphasis on programs that are purely research oriented and that may not include a veterinary degree. My own long research career has been based on a solid foundation in biology and zoology, my veterinary degree, and constant direct experience in interdisciplinary research, thus demonstrating the viability of multiple curriculum strategies.

Doctoral degree programs in veterinary science need to be intensive but also need to be broadening. One possible solution would be to insert master's degree programs into the doctoral degree curriculum and structure the master's degree programs in such a way as to broaden the candidates' understanding of basic biology, biochemistry, statistics, and the fundamentals of medicine (the latter not necessarily accompanied by a clinical emphasis).

The goal now and for the future must be to use various curriculum strategies to increase focus and quality. This begins with accepting the fact that we now find ourselves in a position that truly does require crossroads-type decision making.

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