A model curriculum for the study of animal welfare in colleges and schools of veterinary medicine

AVMA Model Animal Welfare Curriculum Planning Group

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Animals have played important roles in the lives of people for thousands of years as companions, sources of food and fiber, a means of transport, models in biomedical and other forms of research and education, as sources of entertainment, and by providing assistance with the work and tasks of daily living. Society has expressed a growing interest in how we use and care for animals and has pressed for improvements in their quality of life. Concern about the welfare of animals has become commonplace, and the subject remains at the forefront of discussions regarding responsible and ethical animal use. Questions about how to measure animals’ welfare have spurred the development of new areas of scientific research, and a desire to protect animals’ welfare has led to the development of guidelines and standards for animal care that have substantial ethical, performance, economic, social, cultural, legal, and trade implications.

A definition of animal welfare has been adopted by the World Organisation for Animal Health (OIE) and is included in chapter 7 of its Terrestrial Animal Health Code:

Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behavior, and if it is not suffering from unpleasant states such as pain, fear, and distress.

Good animal welfare requires disease prevention and appropriate veterinary treatment, appropriate shelter, management and nutrition, humane handling and humane slaughter or killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.

This definition has been adopted by numerous countries and organizations, including the AVMA. Importantly, the definition makes it clear that animal welfare refers to the state of the animal. Proper care and handling are expected, but evaluating an animal’s welfare requires a complete assessment of what the animal experiences from the animal’s perspective.

Today, the 3Rs, the Five Freedoms, and the Five Do...
difficult to achieve with respect to which criteria should be included, how they should be measured, and their relative importance within the interdisciplinary concept of animal welfare. These disagreements include elements of both science and philosophy. Three overlapping orientations to animal welfare have been described by Fraser et al \(^\text{9}\) and include considerations focused on basic health and functioning of the animals (ie, the body), the animals’ affective states (ie, the mind), and the animals’ natural living conditions (ie, the nature of the animals). Awareness of these different orientations is helpful in understanding the values that underpin stakeholders’ concerns about particular husbandry practices and the types of outcome measures that are likely to resonate with individuals or groups. For example, across species, the controversial practice of tail docking is often debated on the basis of pain associated with the surgery (affective states), importance of the tail for species-typical behavior (natural living), and relative risk of injury and infection (biological function). Historically, veterinary evaluations of animals’ welfare have been weighted toward the body (ie, how animals function; their health, productivity, and reproduction), with considerably less recognition and appreciation of how animals’ welfare is impacted by the mind (ie, affective states, such as fear, frustration, and pleasure) \(^\text{9}\) or their ability to live a natural life. \(^\text{10,11}\) All of these approaches have played a role in the development of animal welfare-related policy and standards around the world.

**Animal Welfare in the Veterinary Profession**

Veterinarians are increasingly expected to provide expert advice on animal welfare-related issues. \(^\text{12,13}\) The North American Veterinary Medical Education Consortium, \(^\text{14}\) the OIE ad hoc working groups on Animal Welfare \(^\text{35}\) and Veterinary Education, \(^\text{16}\) and the Federation of Veterinarians of Europe \(^\text{17}\) identify veterinarians as key advocates for animals’ health and welfare. The need for veterinarians to formally and proactively embrace their responsibilities in protecting animals’ welfare was recognized in a 2010 update that added the words and welfare and prevention and to the first paragraph of the Veterinarian’s Oath \(^\text{18}\):

Being admitted to the profession of veterinary medicine, I solemnly swear to use my scientific knowledge and skills for the benefit of society through the protection of animal health and welfare, the prevention and relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge.

I will practice my profession conscientiously, with dignity, and in keeping with the principles of veterinary medical ethics.

I accept as a lifelong obligation the continual improvement of my professional knowledge and competence.

In 2011, the AVMA, Federation of Veterinarians of Europe, and Canadian Veterinary Medical Association issued a joint statement \(^\text{19}\) that describes the special role veterinarians play in educating others about practices that promote good animal welfare. This joint statement emphasizes that veterinarians should not limit their involvement to facilitating the implementation of existing best practices, but should strive for continuous improvement in animal care as clinical and scientific knowledge, societal expectations, and technology evolve.

As key advocates, veterinarians are expected to have knowledge about animal welfare and its assessment as one of their core competencies. One key area of involvement for veterinarians is the development of standards for the care of animals as individuals and populations. This includes, but is not limited to, responsible breeding, husbandry, transportation, handling, and management. It is vital that veterinarians be closely involved in decisions related to the development of standards for animal activities, the enforcement of voluntary or mandatory requirements, and the refinement of standards on the basis of experience and scientific or technical advancements. For example, increasing public interest in animal welfare issues is recognized as an important consumer trend and trade issue. \(^\text{20,21}\) Concerns about the welfare of animals used for biomedical research, \(^\text{22,23}\) food production, \(^\text{24,25}\) and companionship \(^\text{26}\) have resulted in the development of standards meant to reassure the public and address specific issues of concern. Voluntary and mandatory standards of practice have often arisen piecemeal across industries and jurisdictions, so veterinary participation is vital to ensure consistency and efficacy. A focus on animal welfare must be maintained while other important factors such as consumer protection, sustainability, species integrity and conservation, and public health are also addressed. This effort to ensure that standards to protect animals’ welfare are legitimate and proportionate to the need or risk, serve the community’s interests, and are based on sound scientific and ethical principles is a vital leadership role for veterinarians in relation to human-animal interactions and animal welfare.

To ensure veterinarians are better prepared to provide leadership during public discussions, there is a need to include current and consistent information about factors that affect animals’ welfare and techniques for welfare assessment in the veterinary curriculum. \(^\text{27,28}\) Knowledge about animals’ welfare is derived from multiple disciplines, and much of that information has not fully made its way into traditional veterinary medical education, apart from a focus on animals’ physical health. \(^\text{29,30}\) Furthermore, among colleges that provide animal welfare-related education and training, there are inconsistencies in what topics are covered, how topics are addressed, and to what depth. \(^\text{32,33}\) Several educational models have been proposed, \(^\text{29,32,34,35}\) but the uptake of these
models has been limited. In 2009, the AVMA, in conjunction with the Association of American Veterinary Medical Colleges, hosted an international symposium on animal welfare in veterinary medical education and research\(^7\) that brought together educators and researchers from around the world to discuss how to best strengthen the education of veterinarians regarding animal welfare, ethics, and law.

### The Model Animal Welfare Curriculum Planning Group

The Model Animal Welfare Curriculum Planning Group was convened in 2011 to assist in addressing gaps in animal welfare–related education for veterinary students. Composed of multidisciplinary subject matter experts from around the world and representatives from 3 key stakeholder groups (Association of American Veterinary Medical Colleges, Canadian Veterinary Medical Association, and USDA), the planning group was tasked with conducting a needs analysis, formulating a philosophy statement for animal welfare–related instruction, defining curriculum objectives, describing core competencies, and identifying instructional resources. During the project, group members were acutely aware of the challenges involved in defining a new area of emphasis for veterinary education and integrating it into an already crowded curriculum.

### Proposed Model Animal Welfare Curriculum

#### Needs analysis

Veterinary college curricula are driven, in part, by the AVMA Council on Education standards for accreditation of colleges of veterinary medicine and the topics covered by the North American Veterinary Licensing Examination. Specifically, the council’s standard 79(g) requires that the curriculum at accredited colleges shall provide “the knowledge, skills, values, attitudes, aptitudes and behaviors necessary to address responsibly the health and wellbeing of animals in the context of ever-changing societal expectations.”\(^8\) Questions included in the North American Veterinary Licensing Examination are based on a job analysis of the tasks that practitioners perform in practice and the knowledge required for competent performance of those tasks.\(^9\) Questions are arranged by system and species, and because animal welfare is not defined as a separate system, it is covered only in the context of behavior and multisystem topics such as husbandry. Thus, there currently is no standardized mechanism for directly evaluating the animal welfare knowledge of new veterinary graduates.

As a first step in fulfilling its mandate, the Model Animal Welfare Curriculum Planning Group developed a survey to elicit information on animal welfare content included in current veterinary college curricula. The survey was sent to the associate academic dean, or equivalent, of all 35 Council on Education–accredited veterinary medical colleges in the United States, Canada, and the Caribbean in December 2011. Animal welfare content, in the context of the survey, referred to lectures, seminars, and courses (mandatory or elective) that covered issues such as animal welfare regulations, animal welfare policy, and related professional responsibilities such as reporting of animal abuse; quality-of-life assessment; end-of-life decisions; euthanasia; behavior; pain and distress evaluation, scoring, and mitigation; and assessment of animal well-being. Responses were obtained from 21 of the 35 (60%) veterinary colleges, including from 14 of the 28 (50%) veterinary colleges in the United States, all 5 veterinary colleges in Canada, and both veterinary colleges in the Caribbean.

Respondents consistently ranked animal welfare as a priority in their curriculum, and 15 of 21 (71%) respondents indicated that veterinary student knowledge of animal welfare was very important to their college. However, none of the veterinary colleges from which responses were obtained required students to have a background in animal welfare prior to admission to the veterinary program, and only 9 of 21 (43%) respondents indicated that animal welfare was taught at the undergraduate level at their institution. Hence, veterinary colleges are expected to deliver all necessary animal welfare–related knowledge to veterinary students during their training.

The survey asked respondents to indicate whether their college offered curriculum content in 6 subjects (animal welfare, ethical issues, animal behavior, animal welfare regulations, recognition and management of pain and distress, and euthanasia and quality-of-life issues) and, if so, the number of contact hours provided in each of these subjects, whether each of the 6 subjects was considered a core versus elective topic within the curriculum, and whether students were assessed on their knowledge in each of those 6 subjects (Table 1). Overall, most colleges offered curriculum content in each of these subjects, although the number of contact hours ranged widely; only 3 subjects (animal welfare, ethical issues, and animal behavior) were considered core curriculum topics by most colleges, and for 5 of the 6 subject areas, most colleges did not formally assess student knowledge at the end of learning. These results were similar to results of a study\(^10\) of all Council on Education–accredited colleges of veterinary medicine conducted subsequent to and independent of the planning group’s work.

Results of the planning group’s survey suggested that colleges would benefit from evaluating how they are delivering animal welfare information within their curricula and how they could explicitly introduce and integrate related educational material throughout all years of the program. Introducing evaluations on the subject matter, such as assessing specific clinical competencies, would also enable in-
To promote understanding that because animal welfare is an important component of the profession, veterinarians must accept the study of animal welfare as a legitimate discipline. To accomplish this, they must seek and be provided with the tools they need to actively participate in animal welfare assessments and the wider social discussions about appropriate animal care and use.

Developing a philosophy of animal welfare–related instruction

Veterinarians have a key responsibility to protect animals’ welfare because of the important role they play as intermediaries among animals, their owners, and other stakeholders. To assume a leadership role in this field, veterinarians must accept the study of animal welfare, including its scientific and ethical dimensions, as a legitimate discipline. To accomplish this, they must seek and be provided with the tools they need to actively participate in animal welfare assessments and the wider social discussions about appropriate animal care and use.

Whereas some veterinarians may choose to specialize in the field of animal welfare after graduation, all veterinarians must be sufficiently conversant in assessing aspects of animal welfare for a range of species so as to inform their subsequent actions when providing advice and care for animals. Further, it is important that this material be integrated throughout all years of the educational program so that veterinary students can fully appreciate how animal welfare theory is effectively translated into clinical practice.

Defining curriculum objectives

An important step in developing a model animal welfare curriculum was defining overall objectives for the curriculum. In this regard, the planning group developed the following curriculum objectives:

- To ensure that graduating veterinarians have the appropriate knowledge and skills to assess and promote good animal welfare.
- To reinforce the key role veterinarians play in ensuring the good health and welfare of animals.
- To raise awareness that animal welfare is an evolving discipline with an ever-expanding knowledge base and that continuing education is required to retain competence in the field.
- To promote understanding that because animal welfare issues evolve, veterinarians must have an ongoing ability to reassess these issues to continue to satisfactorily meet societal expectations.

Proposed objectives, competencies, and skills

Day-one competency in animal welfare implies that, by the time they graduate, veterinary students will have attained core knowledge and key skills in this area. Often, knowledge is attained before skills are developed, but in many curricula, there is increasing emphasis on teaching knowledge and skills simultaneously. For example, clinical skills are more often being introduced in the first and second years of the veterinary program.

The planning group determined that the core knowledge objectives for a proposed animal welfare curriculum should include an understanding of key concepts of animal welfare, the scientific and sociological components of animal welfare, techniques used to assess animal welfare, the role of veterinarians in animal welfare, and contemporary issues in animal welfare (Appendix 1). Key components and so-called day-one competencies (ie, abilities students should be able to demonstrate by the time of graduation) were developed for each of these core knowledge objectives. For each of the day-one competencies, the planning group also developed lists of related skills and examples of how students could be evaluated to assess whether they had adequately obtained the necessary skills (Appendix 2).

Understanding that curricula have variable structures and that each college will determine the order in which topics are to be taught, the planning group agreed that core knowledge objectives should be met early, with a greater emphasis on skill development and clinical application as the educational program progressed. In addition, because regional variations were considered likely to exist regarding the nature and relative importance of animal welfare issues encountered, application of overarching concepts to locally relevant issues was encouraged.

Integration of Animal Welfare in the Veterinary Curriculum

One of the most important barriers to including animal welfare topics in veterinary curricula is a lack of available teaching time. Thus, it may be unrealistic to expect colleges to develop or adopt standalone
courses covering core animal welfare knowledge and skills. In addition, doing so may not necessarily be desirable, as this might lead students to believe that welfare has been covered in a short course during a particular year of their veterinary degree program. Rather, the planning group has suggested that animal welfare–related topics be integrated into existing courses. For example, the role of the hypothalamic-pituitary-adrenal axis in the stress response (an animal welfare–related topic) could be discussed during a course on physiology; the scientific and social aspects of genetic selection in companion animals, such as breed associations with brachycephalic syndrome and syringomyelia, could be taught during courses on anatomy or genetics; and the scientific and ethical implications of potentially painful routine procedures, such as castration, dehorning, and tail docking of livestock, could be integrated into courses on health management or food animal surgery and used to highlight ethical issues regarding human use of animals in various contexts. In the same way, training in animal welfare–related skills (eg, assessment of animal welfare at the individual animal or group level) could be integrated into relevant clinical subjects or taught with other professional skills.

**Assessment of Veterinary Student Competency in Animal Welfare**

Veterinary students are often assessment-driven, and a lack of assessment in animal welfare–related topics could interfere with student understanding of animal welfare as an important subject. The factual basis of core animal welfare knowledge can be assessed through standard methods (eg, written tests, case studies, practical examinations) augmented by relevant assignments (eg, an animal welfare assessment scenario exercise or submission of a science-based literature review on a particular topic to evaluate critical thinking). The practical application of animal welfare knowledge can be assessed by encouraging students to assist in resolution of clinical cases with a welfare component or by supporting participation in related extracurricular activities (eg, the Animal Welfare Judging and Assessment Contest). When animal welfare–related knowledge is integrated with existing courses, student achievement can be assessed during examinations and assignments in the relevant courses. Skills-based assessments are always more challenging but can be accomplished through the use of case studies that provide relevant information in the form of clinical data, photographic or video images of animals and facilities, and production records. Role-playing and case scenarios can also be used to help students gain confidence in discussions with clients about animal welfare–related issues, such as euthanasia decisions and financial implications of welfare recommendations.

**Future Directions**

When developing these recommendations, planning group members discussed the need to support veterinary colleges wishing to develop or augment teaching in animal welfare. Among the issues raised was that not all colleges have faculty members with the necessary background to teach this subject. Interdisciplinary and interprofessional delivery of information through cross-departmental, cross-college, or cross-institutional collaboration can assist in addressing gaps in expertise. Another idea proposed was creating train-the-trainers workshops, which could assist faculty members and clinicians in developing core knowledge of animal welfare. Similarly, animal welfare teaching sessions could be included at national or international veterinary meetings to facilitate sharing of curricular materials, approaches, and expertise.

Owing to the limited number of educators with expertise in the wide diversity of animal welfare topics that need to be addressed, online resources may be particularly useful for delivery of animal welfare curriculum content. For example, an online repository could be established to share lectures and images from case studies. A portal of this type is hosted by the World Continuing Education Alliance, with which the World Veterinary Association has partnered to promote general veterinary continuing education, including animal welfare–related material. To ensure the material provided is appropriate, such portals should incorporate expert peer review into their dissemination protocols. Online modules can also be made interactive to allow examination of competencies. Videoconferencing capabilities at many veterinary colleges allow remote delivery of lectures.

Specialization promotes the advancement of disciplines through research, instruction, and delivery of high-quality, targeted services. The development of opportunities for veterinarians to specialize in animal welfare after graduation is expected to expand the pool of animal welfare instructors and researchers. Realization of this goal depends on creating suitable opportunities for postgraduate study, such as focused advanced degree and residency training programs. In 2012, the American College of Animal Welfare was established as an AVMA-recognized veterinary specialty organization.

**Conclusions**

Animal welfare has grown both nationally and internationally as a critically important subject of interest to legislative bodies, industry, agricultural and veterinary communities, and the general public. With the advancement of animal welfare knowledge, the focus is no longer solely on the physical well-being of animals, but on their whole well-being, including psychological health. Veterinarians are seen as animal experts and have a moral obligation to protect animals’ welfare.
In response to increasing societal needs and concerns related to animal welfare, veterinary colleges must provide a suitable framework of core competencies in this subject for veterinary students. This means not only teaching basic knowledge about animal welfare, but also providing opportunities for students to demonstrate their ability to evaluate and solve clinical welfare concerns as seen in the real world. Despite demands on and the complexities of the veterinary curriculum, there are numerous ways to integrate animal welfare instruction to ensure student competency. Colleges should collaborate and share resources and teaching methods to meet the growing multidisciplinary needs of this field. By doing so, veterinarians can solidify their role in the eyes of society as animal experts.

Acknowledgments

This report has not undergone external peer review. The model curriculum has been approved by the AVMA Board of Directors.

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## Appendix I

Core knowledge objectives and day-one competencies in a proposed model animal welfare curriculum for colleges and schools of veterinary medicine.

<table>
<thead>
<tr>
<th>Core knowledge objective</th>
<th>Key component</th>
<th>Day-one competency</th>
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<tbody>
<tr>
<td>Concepts of animal welfare</td>
<td>Characterization of welfare (eg, quality of life, continuum from good to bad, animals’ perspective, and individual vs population)</td>
<td>Demonstrate the use of an animal welfare conceptual framework to assess an animal welfare situation</td>
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<td></td>
<td>Definitions (eg, coping, feelings, notions of needs, longevity, suffering, OIE definition, and AVMA principles)</td>
<td>Identify scientific components that are relevant to understanding a specific animal welfare situation</td>
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<td></td>
<td>Major frameworks (eg, 3 orientations [mind, body, and nature], 3Rs, Five Freedoms, ethical matrix, and 5 domains)</td>
<td>Identify sociological components that are relevant to understanding a specific animal welfare situation</td>
</tr>
<tr>
<td>Scientific components of animal welfare</td>
<td>Adaptive capacity (eg, reproduction, growth, production, and homeostasis)</td>
<td>Design and perform a comprehensive assessment of an animal’s welfare</td>
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<td></td>
<td>Stress physiology (eg, eustress and distress)</td>
<td>Design an efficacious intervention in animal welfare</td>
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<tr>
<td></td>
<td>Health (eg, disease and injury)</td>
<td>Design and perform a comprehensive assessment of an animal’s welfare</td>
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<td></td>
<td>Behavior (eg, species-specific behavior, behavioral needs, and abnormal behavior)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Affective states (eg, fear, pain, and pleasure)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Scientific components (eg, sentience, preferences, and goal-directed behavior)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Sociological components (eg, deontological, relational, and utilitarian)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Frameworks for ethical decision-making and risk analysis</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Ethical relativism and values pluralism (eg, environmentalism, dominion, and animal rights)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td>Attitudes and beliefs (eg, religion, culture, and cognitive dissonance)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>History and tradition (eg, animal-human interactions)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Human-animal interactions (eg, human-animal bond and caretaker raising)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Laws and regulations (eg, international, federal, state, and local ordinances)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Market and economic forces (farmed animals and companion animals)</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<td></td>
<td>Compliance and assurance programs</td>
<td>Differentiate between personal and professional ethical perspectives</td>
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<tr>
<td>Techniques applied to assess animal welfare</td>
<td>Resource or input-based parameters (eg, vaccination and ventilation)</td>
<td>Design an efficacious intervention to responsibly address an animal’s welfare concerns and assist client in its implementation</td>
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<td></td>
<td>Animal or outcome-based parameters (eg, heart rate, vocalization frequency, pain score, body condition score, disease incidence, and air quality)</td>
<td>Design an efficacious intervention to responsibly address an animal’s welfare concerns and assist client in its implementation</td>
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<tr>
<td></td>
<td>Caregiver and human-based parameters (eg, training and record keeping)</td>
<td>Design an efficacious intervention to responsibly address an animal’s welfare concerns and assist client in its implementation</td>
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<td></td>
<td>Individual animal and population-based approaches</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Role of veterinarians in animal welfare</td>
<td>Legal obligations (eg, practitioner, regulator, and expert witness)</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Professional policies and ethics relating to animal welfare</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Critical appraisal of scientific literature</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Client education</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Communicating and mediating diverse views</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Advocacy for patients</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Ethical reasoning</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Veterinarian’s Oath</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Staying current with animal welfare science literature</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Duty of care</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td>Compassion fatigue</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>and potential impacts on animals’ welfare</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<td></td>
<td>Differentiate between personal and professional ethical perspectives</td>
<td>Demonstrate the ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
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<tr>
<td>Contemporary issues in animal welfare</td>
<td>Confinement housing</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Humane endpoints</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Euthanasia, slaughter, and depopulation</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Transport</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Animal cruelty, abuse, and neglect</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Hoarding</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Unwanted animals</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Repurposing animals</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Animals in research, testing, and education</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Optimizing animal environments (environmental enrichment)</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<td></td>
<td>Low-stress handling and restraint</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
</tr>
<tr>
<td></td>
<td>Painful procedures</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Cosmetic procedures</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Responsible animal breeding and genetic manipulation</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Human-wildlife interactions and control</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Animals used in sport and entertainment</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
</tr>
<tr>
<td></td>
<td>Ownership of wild and exotic animals</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
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<tr>
<td></td>
<td>Organ transplantation between companion animals</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
</tr>
<tr>
<td></td>
<td>Phylogenic scale of sentience and consideration (invertebrates, fish, and primates)</td>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and socio-logical influences and veterinary professional responsibilities</td>
</tr>
</tbody>
</table>
### Appendix 2

**Key skills and skills assessments in a proposed model animal welfare curriculum for colleges and schools of veterinary medicine.**

<table>
<thead>
<tr>
<th>Day-one competency</th>
<th>Related skill development</th>
<th>Skill assessment (example)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate the use of an animal welfare conceptual framework to assess an animal welfare situation</td>
<td>Application of animal welfare frameworks and principles</td>
<td>Determine whether the student, when provided with a welfare scenario, can select and apply an appropriate conceptual framework to assess animal welfare</td>
</tr>
<tr>
<td>Identify scientific components that are relevant to understanding a specific animal welfare situation</td>
<td>Assessment of physiologic and behavioral responses to housing, care, and management Assessment of physiologic and behavioral responses to disease or injury Recognize pain in various species and variations in pain among animals of the same species (eg, in a clinic, with routine surgeries on farms, and with and without analgesia)</td>
<td>Evaluate appropriateness of scientific components selected by student during a clinical assessment of animal welfare for a postoperative patient</td>
</tr>
<tr>
<td>Identify sociological components that are relevant to understanding a specific animal welfare situation</td>
<td>Euthanasia decision-making Disease control (public health) Expected standard of animal care Federal, state, and local animal welfare laws and enforcement Market-driven compliance with standards of care</td>
<td>Evaluate student’s ethical reasoning and communication skills in facilitating a euthanasia decision during a role-playing exercise or a supervised client consultation</td>
</tr>
<tr>
<td>Design and perform a comprehensive assessment of an animal’s welfare</td>
<td>Facility design Handler and caretaker skills Compliance with acceptable levels of animal care (eg, voluntary and regulatory standards) Forensics</td>
<td>Evaluate student’s ability to interpret animal welfare outcomes collected during an animal welfare assessment and determine compliance with an animal welfare standard</td>
</tr>
<tr>
<td>Design an efficacious intervention to responsibly address an animal’s welfare concerns and assist a client in its implementation</td>
<td>Euthanasia techniques Humane endpoints Palliative care Environmental enrichment Pain management Disease control Injury prevention</td>
<td>Determine whether a student can adequately demonstrate low-stress handling techniques such as toweling for restraint of a feline patient or alternatives to electric prod use in food animal species</td>
</tr>
<tr>
<td>Demonstrate ability to provide expert analysis, guidance, education, and leadership on animal welfare issues pertinent to the community</td>
<td>Provide guidance in developing voluntary and regulatory standards Professional obligations for reporting noncompliance with standards of care Mediate ethical conflicts and dilemmas</td>
<td>Evaluate student’s ability to assess a research proposal from the perspective of a veterinarian serving on an institutional animal care and use committee, determine acceptability, and suggest refinements or requirements as necessary to improve animal welfare</td>
</tr>
<tr>
<td>Formulate and convey an informed view of a contemporary or emerging animal welfare issue, including scientific and sociological influences and veterinary professional responsibilities</td>
<td>Implementation of low-stress handling Selection of breeding stock Future trends in animal welfare public policy Develop and defend an animal welfare position on a controversial animal issue</td>
<td>Evaluate a student’s response to a simulated media inquiry about breed-specific legislation promulgated to prevent dog bite injuries, including acknowledgment of reliable sources of information, differing ethical viewpoints, and cultural considerations</td>
</tr>
</tbody>
</table>