TITLE: Development of core entrustable professional activities linked to a competency-based veterinary education framework

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Development of core Entrustable Professional Activities linked to a Competency-Based Veterinary Education Framework

Abstract

Veterinary schools have been moving toward competency-based education and assessment for the past 15 or more years. In 2015, educational leaders from Association of American Veterinary Medical Colleges (AAVMC) member schools came together with a strong call to action to create shared tools for clinical competency assessment. This resulted in the formation of the AAVMC Competency-Based Veterinary Education (CBVE) Working Group, which then embarked on the creation of a shared competency framework and the development of eight core entrustable professional activities (EPAs) linked to this framework. This paper will report on the development of these EPAs and discuss their role in competency-based veterinary education and assessment.

Practice Points

- Entrustable professional activities (EPAs) integrate multiple competencies to create opportunities for workplace-based assessment.
- The AAVMC Competency-Based Veterinary Education (CBVE) EPAs describe eight core workplace activities in veterinary clinical practice.
- Each EPA includes a description, brief commentary, and elements of the activity.
- Each EPA is mapped to the most relevant competencies in the CBVE Competency Framework.

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Introduction

Competency-based medical education (CBME) has been promoted in healthcare professions since 1978 as a way of preparing learners to meet societal and patient needs (McGaghie et al. 1978). A crucial component of this educational paradigm is preparing learners to competently perform core professional activities in clinical practice. These activities have been termed "Entrustable Professional Activities" (EPAs) in the CBME context (Ten Cate 2005, Ten Cate 2018). EPAs describe the work of the professional and incorporate multiple competencies. They afford an integrated, holistic organizing framework within which a learner's progression towards competency can be evaluated. In this way, EPAs function as a "bridge between a competency framework and daily clinical practice" (Ten Cate 2018, p. 1), and provide a context for assessment based upon the extent to which learners may be entrusted to perform these core activities (Ten Cate 2005). The use of EPAs linked to a competency framework and milestones is intended to help guide learner progression and entrustment decisions to address the shortcomings of single-point, subjective judgments of complex tasks (Ten Cate 2005; Andrews et al. 2018).

EPAs have been developed for undergraduate medical education in the US (Obeso et al. 2017) and the Netherlands (Ten Cate et al. 2015). The Association of American Medical Colleges (AAMC) has defined 13 core EPAs that every resident should be able to do without direct supervision on Day 1 of residency, regardless of specialty (Englander et al. 2016). The Utrecht Framework has 5 core EPAs and departs from other frameworks in that it also has 31 small nested EPAs. This was designed to not only prepare medical students for the competence required to execute the 5 core EPAs during the final, transitional year of undergraduate medical school, but also guide practice and mastery in the smaller activities in earlier years of that curriculum (ten Cate et al. 2018).

Similar to undergraduate medical education, veterinary degree programs internationally range from 4 to 6 years, and entrance requirements vary from completion of secondary studies in high school to attainment of a university degree. However, in contrast to human medicine, veterinary graduates are licensed to practice veterinary medicine without requiring additional practical training. While advanced training is available, it is estimated that less than 10% of veterinarians have completed a residency and the credentialing process to become board-certified specialists (pers. comm., Ed Murphey, Assistant Director of Education and Research, American Veterinary Medical Association). Clinical trainees are typically professional students (akin to undergraduate medical students) in the last 12 to 18 months of the veterinary degree program and are not yet eligible to practice independently. In veterinary medicine, the American Veterinary Medical Association Council on Education (AVMA COE) accredits both national and international programs. There are 35 veterinary colleges accredited by the AVMA COE in the United States and Canada, a number of schools in Australia, the United Kingdom, and the West Indies, as well as schools in Mexico, the Republic of Ireland, the Netherlands, France, South Korea, and New Zealand (American Veterinary Medical Association Council on Education 2019). Under the policies and procedures of the AVMA COE, all of these colleges and schools are held to the same standards and expectations for their graduates.

A shift towards competency-based veterinary education (CBVE) has been gaining momentum since 2001 (Quality Assurance Agency for Higher Education 2002, American Veterinary Medical Association Council on Education 2004, NAVMEC Board of Directors 2011, Bok et al. 2011, World Organisation for Animal Health (OIE) 2012). In 2015, a multinational group of veterinary educators came together to create the three components of competency-based education (competencies, milestones, and EPAs) that could be standardized across veterinary education. This work occurred in an integrated fashion over a 3-year time period, led by a core working group, with the engagement of other veterinary educators internationally. This paper describes the development of the core EPAs for veterinary clinical practice and their relationships to the concurrently developed Competency-Based Veterinary Education (CBVE) Framework created by the group (Molgaard et al. 2018a).

Method

The catalyst for developing the CBVE Framework was a compelling call for the creation of shared workplace-based assessment tools by veterinary educational leaders and outcomes professionals at the June 2015 Association of American Veterinary Medical Colleges (AAVMC) Workshop on Assessment of Clinical Competencies. With the support of the AAVMC, a 10-person working group was established in December 2015 from leaders in veterinary education representing international AAVMC member institutions. Representatives were included from various regions of North America, England, and the Netherlands, as well as those with previous experience in Australasia. Members of the CBVE Working Group and their institutions are noted in the list of authors. Guidance in developing the CBVE Framework was provided by Dr. Jody Frost, an educational consultant and facilitator.

The CBVE Working Group ('Working Group') met over ~2 years through bi-monthly video conferences (1–2 h each) and five face-to-face workshops (1–2 days each) to develop and refine the competency framework and EPAs. Extended face-to-face meetings were essential for conceptual development and accelerated progress. Progressive feedback on the developing competency framework and EPAs was sought through presentations at conferences attended by veterinary educators and educational leaders (deans, associate deans, and outcomes professionals), along with webinars and surveys of the associate and assistant deans from all of the AAVMC member schools. Input from employers, new graduates and students was obtained through available data published in the veterinary literature (Kinnison and May 2013; Bok et al. 2014; Dixon et al. 2017) and gathered previously at the Working Group members' institutions (unpublished) and integrated during revision processes. Progressive updates on the developing framework and EPAs were provided to stakeholder professional organizations in veterinary education.

The Working Group drafted core EPAs by identifying and articulating those professional, clinical activities of veterinarians that are essential for all graduates, regardless of their school or career paths, and mapped them to the CBVE Framework. Prior to this work, there were no EPAs for veterinary education published in the literature. The Working Group determined that the AAMC Core EPAs for Entering Residency were most relevant to veterinary education, given these are more general than EPAs developed for postgraduate medical specialty training (Obeso

et al. 2017) and they represent many of the activities that veterinary graduates will perform in clinical practice. In addition, the Working Group drew upon the EPA-based Utrecht undergraduate clinical curriculum (ten Cate et al. 2015, 2018) and considered the nine clinical competencies developed by the AVMA COE (American Veterinary Medical Association Council on Education 2019). Eleven veterinary EPAs were initially identified, then iteratively refined through successive discussions by the Working Group and feedback gathered from stakeholders. EPAs eliminated were determined to be either unrealistic to expect every student to perform in every AAVMC member school (e.g. Interact with a client regarding end-of-life care), or not an EPA but rather a component of multiple EPAs (e.g. Explain patient management instructions to other veterinary professionals or staff). Concurrent development of both the CBVE Framework and EPAs enabled refinement of both competencies and EPAs to create consistency and cross-mapping between these two components of CBVE.

Results

The iterative development, feedback, and refinement process resulted in eight core EPAs for veterinary clinical practice (Molgaard et al. 2018a). The CBVE Framework is comprised of 32 competencies organized in nine domains of competence. This provided the necessary scaffold for the development of EPAs that synthesize these competencies. Each of the eight EPAs was mapped to relevant domains of competence in the CBVE Framework, designating both the most relevant and secondary (supporting) domains (Table 1). A list of the 'elements within the activity' maps each EPA element to a specific competency or competencies within the relevant domains of competence. In the printed booklet, color-coded blocks and icons are used to help readers quickly visualize relationships among EPAs, competencies, and domains (Figure 1). The CBVE Framework and EPAs were published and released to AAVMC member institutions and the public in March 2018 (Molgaard et al. 2018a, 2018b).

Discussion

Competency frameworks must be linked to meaningful evaluation of achievement if they are to be effective in guiding learner progress towards desired outcomes (Lockyer et al. 2017). The first step in this process is to identify the core professional, clinical activities that graduates must perform and with which learners may be entrusted, to provide meaningful context for workplace-based assessments. Identifying the competencies required to perform these EPAs creates links to the competency framework, demonstrates application of competencies, and provides useful information for administrative purposes (e.g., curricular mapping, accreditation). Furthermore, linking the EPAs to an entrustment scale and other workplace assessments enables targeted feedback on learner progression in the "real life" teaching and workplace context of veterinary clinicians (Ten Cate et al. 2016; Van Melle et al. 2017; Bok et al. 2018). Correspondingly, this article reports the process used by an international team of veterinary educators to create core clinical EPAs mapped to a recently-created CBVE Framework. This work will guide and support the development of workplace-based assessment in veterinary education.

The Working Group drew upon EPAs developed for undergraduate medical education (Obeso et. al 2017; Ten Cate et al. 2015) and the COE clinical competencies for veterinary education

(American Veterinary Medical Association Council on Education 2018). The nine COE clinical competencies list broad areas of veterinary medicine and have multiple relationships to each CBVE core EPA. Although the use of EPAs in undergraduate, compared to postgraduate, medical education has been questioned (Krupat 2018), it can be justified by the developmental progression of learners, the generalizability and applicability of the principles underlying EPAs, and the importance of recognition and quality assurance of student work in the clinical workplace (Chen, et al. 2015). Inclusion of EPAs in a competency-based educational system is even more imperative in veterinary medicine where graduates are licensed to practice all aspects of veterinary medicine across all animal species immediately following graduation.

The core EPAs for veterinary medicine reflect those activities that are undertaken daily in the generalist veterinary clinical practice workplace. Some are similar to the AAMC Core EPAs for Entering Residency. For example, CBVE EPA 4 and AAMC EPA 10 are both expressed as "Recognize a patient requiring urgent or emergent care and initiate evaluation and management". Other CBVE EPAs are broader. For example, CBVE EPA 1 encompasses AAMC EPAs 1, 2 and 3. This larger EPA was created because it was determined that the tasks of history-taking, physical examination, and identification of prioritized differential diagnoses are usually performed together rather than in isolation, thus constituting a single EPA. CBVE EPAs 6 and 7 are quite different from the AAMC EPAs because veterinary graduates must be competent in surgery and anesthesia. These differences reflect the distinctive end-points required of training for veterinary medicine compared with undergraduate human medicine. As encountered in human medicine (Tekian 2017), the Working Group grappled with the inclusion criteria for a true EPA. Discussion coalesced around including only those workplace activities that are core for every veterinary graduate irrespective of their institution, and that integrated multiple tasks and competencies. For example, one initially proposed EPA was, "Explain patient management instructions to other veterinary professionals or staff." This "EPA" was eliminated because it was determined to be a specific communication-related competency that was a component of other EPAs.

Implementation and field testing of the CBVE EPAs has only just begun and may result in future refinements and revisions, for example, splitting of larger EPAs and creation of nested EPAs. For example, EPA 1 includes history taking, physical examination, and creation of a prioritized differential diagnosis list, which often occur over a span of time, making direct observation of all components challenging in a busy clinical environment. Periodic updates are expected to reflect changes in the context of veterinary education, conceptual and practical developments in the field of competency-based education, and contemporary feedback from veterinary students, employers, and faculty at veterinary schools who have implemented competency-based education in their curricula.

The integrative nature of EPAs allows educators to provide informed judgments about learner performance based on holistic demonstrations of competency (Ten Cate et al. 2016; Holmboe et al. 2017). In addition, the use of EPAs helps to address the criticism that competency-based education contributes to (or fosters) a reductionist approach and checklist mentality for healthcare education (Ten Cate 2005; Pangaro & Ten Cate 2013; Holmboe 2015; Carraccio et al.

2017; Holmboe et al. 2017). Establishing a core set of EPAs for CBVE also provides greater avenues for assessment and coaching of veterinary students in the clinical setting prior to graduation. Since EPAs are based on routine clinical activities, they offer a structure for providing feedback to learners based on frequent (in some cases daily) low-stakes *ad hoc* entrustment decisions coupled with brief, rich coaching feedback (Chen, O'Sullivan, et al. 2015; Andrews et al. 2018). Low-stakes assessment with in-the-moment feedback helps to guide learner growth and allows "safe" learning in a context where mistakes can be immediately addressed and resolved (Carraccio et al. 2016). In CBVE, development of an entrustment scale specific to the nature of veterinary clinical education and its constraints is important. Correspondingly, field-testing of an entrustment scale is underway.

Limitations

The CBVE EPAs and CBVE Framework have been developed from a North American, Western European and Australasian perspective. While there is interest in applying the framework to the needs of veterinary education in other regions, broader input may be needed to reflect additional needs of veterinary education internationally. It should be noted that the CBVE EPAs incorporate most, but not all, of the competencies in the CBVE Framework. While the importance of a veterinarian's role in protecting animal health, human health, and environmental health cannot be understated, the core EPAs reported in this paper were designed to focus predominantly on professional activities found within generalist veterinary clinical practice, capture activities expected of all veterinary graduates for accreditation and licensure, and reflect the activities learners are expected to perform in the workplace while still in training. Veterinary schools are encouraged to create additional EPAs applicable to their local context, which may include other competencies within the CBVE Framework. For activities that are deemed essential but not performed by veterinary students in a clinical setting, assessment tools that are not linked to EPAs may be more relevant.

Conclusion

Medical educators suggest we have entered a new phase of competency-based education with the integration of competencies, EPAs, and developmental milestones, supporting the holistic evaluation of competence as well as the teaching and assessment of specific competencies (Holmboe et al. 2017). The development of EPAs has been catalytic in medical education by situating competencies in a context that has cognitive congruence for the educators who are teaching and assessing learners in the clinical setting. In medical education, the components of CBME were created by different groups and across a wide span of time. They were also somewhat geographically bound, for example with varying frameworks in Canada, the United States, and Europe. The CBVE Working Group has developed core EPAs linked to a competency framework in an integrated, synchronous, and timely fashion, under the auspices of the AAVMC. This effort has benefited greatly from the work that preceded it in CBME and has led to the development of eight core clinical EPAs that are mapped to the CBVE Framework. These may be used to support the development of assessments to guide learner development and progression toward competence and the independent practice of veterinary medicine.

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Declaration of Interest
The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article. The AAVMC funded the involvement of Dr. Jody Frost as a consultant and facilitator for the group, as well as funding graphic design, publication and meeting expenses.

Glossary

Competency-Based Veterinary Education (CBVE): Is an approach modeled after competency-based medical education and is designed to prepare graduates for professional careers by confirming their ability to meet the needs of animals and the expectations of society. This approach focuses on outcomes-based and learner-centered education and assessment

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Table 1: CBVE EPA 1: Gather a history, perform an examination, and create a prioritized differential diagnosis list

EPA 1: Gather a history, perform an examination, and create a prioritized differential diagnosis list	
Description of Activity	Perform a history and exam on an individual animal or herd/flock and assimilate the information collected to derive a prioritized differential diagnosis.
Commentary	The history and examination should be tailored to the clinical situation and specific patient encounter. This data gathering serves as the foundation for evaluation and management. Expectations include integration of the scientific foundations of medicine with clinical reasoning skills to guide information gathering.
Elements within Activity	***Consultation*** • Obtain a complete and accurate history in an organized fashion [1.1] • Demonstrate client-centered interview skills (establish rapport, attentive to verbal and nonverbal cues, client culture, socioeconomic factors, demonstrate active listening skills) [5.1; 5.2] • Identify the client complaint [1.1] • Identify pertinent history elements associated with common conditions [1.1] • Demonstrate cultural competence in interactions with clients, recognizing the potential for bias [5.2, 6.4] ***Examination*** • Perform exam (individual animal or herd) [1.1] • Communicate findings [5.1] • Attend to patient welfare and client safety and comfort [1.4, 2.2, 8.3] ***Determining Differential Diagnosis*** • Create a problem list [1.2] • Justify prioritized differential diagnosis(es) [1.2] • Consult or refer as needed based on limitations [1.7] ***Documentation*** • Document findings in the medical record [5.3]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 5: Communication
Secondary Domains	2: Individual Animal Care & Management 6: Collaboration 8: Financial & Practice Management

Table 2: CBVE EPA 2: Develop a diagnostic plan and interpret results

EPA 2: Develop a diagnostic plan and interpret results	
Description of Activity	Integrate individual animal or herd data to create a prioritized differential diagnostic list and determine a diagnostic plan, obtain consent for diagnostic testing and interpret results.
Commentary	Developing a diagnostic action plan is an iterative, reflective process that requires continuous adaptation to avoid common errors of clinical reasoning.
Elements within Activity	• Use clinical reasoning skills to create a prioritized differential diagnosis list [1.2; 9.2] • Select initial diagnostic tests/procedures [1.3; 9.1] • Explain working diagnosis and rationale for further testing [1.3; 5.1; 9.2] • Develop a financial estimate and obtain and document informed consent [1.4; 5.2; 5.3; 6.1] • Interpret test results [1.1] • Update working diagnosis, diagnostic plan and client consent as new information is obtained [1.3, 5.2, 9.2] • Document diagnostic plan in medical record [5.3]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 5: Communication
Secondary Domains	6: Collaboration 9: Scholarship

Table 3: CBVE EPA 3: Develop and implement a management/treatment plan

EPA 3: Develop and implement a management/treatment plan	
Description of Activity	Utilize working diagnosis and client considerations to formulate a management/treatment plan for an individual animal or herd (including referral or euthanasia when warranted), implement the plan and adjust based on response.
Commentary	Developing a management/treatment plan is an iterative, reflective process that requires synthesis of medical, ethical, legal and economic factors, as well as knowledge of the strengths and limitations of the client, veterinarian, team and facilities. Implementation of the plan includes performance of veterinary procedures, team collaboration and client education.
Elements within Activity	• Use clinical reasoning skills to integrate medical, ethical, legal and economic factors, and client desires, to create a management/treatment plan [1.3; 1.4; 3.1; 7.1; 8.2; 9.2] • Act in the face of ambiguity resulting from gaps in available information [1.3; 1.6; 7.3] • Explain treatment options to client and respond to questions [1.4; 5.1; 5.2] • Perform therapeutic interventions, including euthanasia when warranted [2.1] • Educate client or team to provide ongoing care for patient, and recognize changes or concerns that trigger additional action [1.3; 5.1; 9.3] • Integrate new information as it is available to update management/treatment plan [1.3; 9.2] • Recognize limitations of personal veterinary skills, team or facilities and arrange for referral based upon client circumstances [1.7; 6.1] • Follow-up with clients or team to determine change in patient status, compliance with recommendations, and/or capability to implement treatment plan [5.2; 6.3]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 2: Individual Care & Management 5: Communication 7: Professionalism & Professional Identity 8: Practice & Financial Management
Secondary Domains	3: Animal Population Care & Management 6: Collaboration 9: Scholarship

Table 4: CBVE EPA 4: Recognize a patient requiring urgent or emergent care and initiate evaluation and management

EPA 4: Recognize a patient requiring urgent or emergent care and initiate evaluation and management	
Description of Activity	Recognize a patient/situation that requires urgent or emergent care and triage based on severity. Initial emergency management should include procedures that support vital functions.
Commentary	This activity requires both application of knowledge and psychomotor skills as well as the ability to function as part of a team, to know one's limitations, and to seek help when necessary. Initial evaluation of individual should include level of consciousness and adequacy of ventilation and circulation.

Elements within Activity	• Quickly assess a situation to identify patient(s) that might require urgent or emergent treatment [1.1; 1.5]
	• In the case of multiple patients, effectively triage patient care according to severity of condition [1.5]
	• Evaluate patient status to determine and triage urgent problems [1.1; 1.5, 7.2]
	• Update client on the urgency of the patient's status and immediate management plans [5.1; 5.2]
	• As necessary, initiate emergency management to support vital functions such as: [2.1]
	  o Provide oxygen
	  o Secure an airway and effective ventilation
	  o Establish effective circulation
	  o Provide effective pain relief and sedation for safe patient handling
	  o Correct life-threatening alterations (e.g., hypoglycemia, hypothermia)
	  o Control hemorrhage
	  o Stabilize fractures
	• Identify potential underlying etiologies for the urgent or emergent patient status and determine initial management plan [1.2; 1.3]
	• Discuss patient status and initial management plan (including euthanasia when warranted) with client and identify client expectations [1.3; 1.4; 5.1; 5.2; 7.1]
	• Optimize patient care by engaging team members, determining when to function as a leader or team member and working within personal limitations [1.7; 6.1; 6.2]
	• Document initial patient assessment, necessary interventions, possible diagnoses and management plan, and client communication in the medical record [5.3]

Most Relevant Domains	1: Clinical Reasoning & Decision-making 2: Individual Care & Management 6: Collaboration 7: Professionalism & Professional Identity
Secondary Domains	5: Communication

Table 5: CBVE EPA 5: Formulate relevant questions and retrieve evidence to advance care

EPA 5: Formulate relevant questions and retrieve evidence to advance care	
Description of Activity	Identify questions and information resources. Critique the quality of the evidence and assess the applicability to the clinical situation.
Commentary	The use of evidence-based practices and self-awareness are essential to identify and remedy/correct knowledge gaps. Life-long learning is an essential professional practice to promote quality patient and population care.
Elements within Activity	• Formulate focused pertinent questions based on situation evaluation [9.2] • Appraise sources of information to evaluate the quality of the content [9.1] • Assess applicability and generalizability of published studies to specific clinical situations [1.6; 9.1, 9.2] • Identify resources and use information technology to assess accurate and reliable online medical information and retrieve animal/herd information [7.4; 9.1] • Evaluate animal/herd response to interventions and use available evidence to adjust care plan [1.3]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 7: Professionalism & Professional Identity 9: Scholarship

Table 6: CBVE EPA 6: Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management.

EPA 6: Perform a common surgical procedure on a stable patient, including pre-operative and post-operative management.	
Description of Activity	Perform a surgical procedure, including pre-operative preparation of the patient and the surgeon and post-operative care.
Commentary	Attention to patient preparation to minimize contamination, knowledge of the procedure and regional anatomy, manual dexterity to competently and efficiently complete the procedure, reflection and response to changes, and post-operative care.
Elements within Activity	• Formulate surgical plan [2.1] • Direct the veterinary team to assist in procedure [6.2] • Prepare self and surgical site to perform procedure [2.1] • Perform surgical procedure [2.1] • Apply principles of tissue handling, hemostasis, asepsis and surgical skills [2.1] • Recognize own limitations and ask for assistance when required [1.7] • Respond to changes in patient status [1.3; 1.5] • Formulate analgesic and post-operative care plan [1.3; 2.1]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 2: Individual Care & Management 6: Collaboration

Table 7: CBVE EPA 7: Perform general anesthesia and recovery of a stable patient including monitoring and support.

EPA 7: Perform general anesthesia and recovery of a stable patient including monitoring and support.	
Description of Activity	Induce, maintain and recover a stable anesthetic patient (ASA 1 or 2), including monitoring vital functions and providing supportive care. Evaluate patient status, and determine a suitable anesthetic and analgesic protocol.
Commentary	Apply knowledge of anatomy, physiology, pharmacology and the procedure as well as psychomotor skills to execute the protocol safely. Recognize and manage complications.
Elements within Activity	• Evaluate patient based on history, physical examination, results of diagnostic tests and procedure for suitability for anesthesia (ASA status 1 or 2 – a normal, healthy patient or a patient with mild systemic disease that does not result in functional limitations) [1.1; 1.3] • Formulate a general anesthetic and analgesic protocol including premedication, induction, maintenance and recovery. Select drugs and equipment. [1.3] • Share plan with team members and answer questions [6.1] • Execute anesthesia and recovery safely [2.1]. This includes: o Select and prepare anesthetic, support and monitoring equipment o Prepare patient for anesthesia o Administer premedication to patient o Induce anesthesia and establish airway o Maintain anesthesia o Monitor vital signs including blood pressure and respond to common complications associated either with anesthesia or the procedure o Recover patient from anesthesia, including assessment of pain and administration of analgesic drugs if necessary • Collaborate with others to update plan as needed [6.1] • Follow legal requirements for use of controlled substances [8.2] • Maintain an anesthetic record including drugs, doses, route and time of administration, vital signs, important anesthetic and procedure events and complications [5.3]
Most Relevant Domains	1: Clinical Reasoning & Decision-making 2: Individual Care & Management 5: Communication 6: Collaboration 8: Practice & Financial Management

Table 8: CBVE EPA 8: Formulate recommendations for preventative healthcare.

EPA 8: Formulate recommendations for preventative healthcare.	
Description of Activity	Create a preventive healthcare plan, considering the animal/herd needs, the client's capabilities, and the care setting, to optimize health and welfare, and to prevent spread of disease.
Commentary	Prevention of disease is a core veterinary activity that protects the health of animals and the public.
Elements within Activity	• Evaluate individual animal or herd needs, considering age, health status, exposure risk [1.1, 2.2, 3.1] • Make recommendations regarding disease screening [1.1, 2.2; 3.1, 5.1] • Educate clients and stakeholders on disease prevention measures [2.2; 3.1, 3.3, 5.1, 5.2, 9.3] • Perform preventive healthcare measures [2.1] • Document recommendations and procedures in the record [5.3]
Most Relevant Domains	2: Individual Care & Management 3: Animal Population Care & Management 5: Communication
Secondary Domains	1: Clinical Reasoning & Decision-making 9: Scholarship

Figure 1: CBVE EPA 2: Develop a diagnostic plan and interpret results

EPA 2

Develop a diagnostic plan and interpret results

DESCRIPTION OF ACTIVITY	Integrate individual animal or herd data to create a prioritized differential diagnostic list and determine a diagnostic plan, obtain consent for diagnostic testing and interpret results.
COMMENTARY	Developing a diagnostic action plan is an iterative, reflective process that requires continuous adaptation to avoid common errors of clinical reasoning.
MOST RELEVANT DOMAINS	**1: Clinical Reasoning & Decision-making** ■ **5: Communication** ■
SECONDARY DOMAINS	6: Collaboration ■ 9: Scholarship ■
ELEMENTS WITHIN ACTIVITY	• Use clinical reasoning skills to create a prioritized differential diagnosis list **[1.2; 9.2]** ■ • Select initial diagnostic tests/procedures **[1.3; 9.1]** ■ ■ • Explain working diagnosis and rationale for further testing **[1.3; 5.1; 9.2]** ■ ■ ■ • Develop a financial estimate and obtain and document informed consent **[1.4; 5.2; 5.3; 6.1]** ■ ■ ■ ■ • Interpret test results **[1.1]** ■ • Update working diagnosis, diagnostic plan and client consent as new information is obtained **[1.3, 5.2, 9.2]** ■ ■ ■ • Document diagnostic plan in medical record **[5.3]** ■