

1

What Is a Clinical Skill?

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Historically in veterinary medicine, degree programs have been based upon the Flexner model described in medical education, with two basic blocks: two to three years of preclinical training and one to two years of clinical training (Flexner, 1910). Approximately 10–15 years ago, a trend developed in veterinary education to include more hands-on training during veterinary programs, often beginning in the start of the first year, with an emphasis on teaching day-one skills necessary for success in practice (Hubbell et al., 2008; Doucet and Vrins, 2009; Welsh et al., 2009; Smeak et al., 2012; Dilly et al., 2017 RCVS, 2020;). The idea of moving clinical training earlier in the program and further emphasizing integration of knowledge and other skills into the clinical workplace led to current veterinary programs being more like two inverse wedges rather than two blocks placed one on top of the other as separate units of the same program (Figure 1.1).

Formal veterinary clinical skills training programs, which emphasized the use of models and simulators and constructed dedicated clinical skills centers for teaching, began in the early to mid-2000s as a way to accommodate this need for earlier training (Baillie et al., 2005; Scalese and Issenberg, 2005; Pirkelbauer et al., 2008; Read and Hecker, 2013; Dilly et al., 2017). Reports of

objective structured clinical examinations (OSCEs) that are used to assess learners' hands-on skills, and descriptions of best practices for implementing skills curricula, began to follow (Smeak, 2007; Rhind et al., 2008; May and Head, 2010; Hecker et al., 2010; Read and Hecker, 2013; Dilly et al., 2017).

Concurrently, over the last 10 years, there has been a recognition of the need to incorporate more professional skills training (NAVMEC, 2011; Cake et al., 2016). Today's employers are not only searching for confidence and technical competence in new graduates but good communication abilities as well (Perrin, 2019). Rather than simply being competent in one's hands-on skills alone, effective integration of professional communication and technical skills performance is crucial for successful practice (NAVMEC, 2011; Rhind et al., 2011). Other "marketable skills" described in a recent report of the characteristics most often sought by employers posting job advertisements in the United Kingdom included enthusiasm, special interest, communication, all-rounder, client care, team player, autonomous, caring, ambitious, and high clinical standards (Perrin, 2019). These "skills" are important to employers and are key to minimizing dissonance and dissatisfaction for the graduates as well (May, 2015; Perrin, 2019).

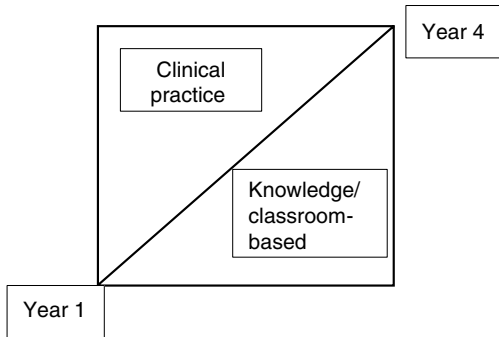


Figure 1.1 Flexner model (with separation between preclinical and clinical blocks) versus the more recent curricular models that are more like inverse wedges introducing clinical content earlier into the start of the curriculum.

The Royal College of Veterinary Surgeons (RCVS) Day One Competencies and the American Association of Veterinary Medical Colleges' (AAVMC) North American Veterinary Medical Education Consortium (NAVMEC) report are both recognized as early frameworks that defined competencies across a number of areas that lead to graduate success (NAVMEC, 2011; RCVS, 2020;). More recently, there have been other developments toward employability of new graduates and improved teaching of professional skills. The VetSet2Go project represents an international collaboration of educators (<https://www.vetset2go.edu.au>), who surveyed employers, clients, new graduates, and other stakeholders before combining this information with what was already published in the literature. The resulting white paper and framework have been used to guide development of resources, as well as tools for educators and learners (Cate et al., 2016; Hughes et al., 2018). This framework highlights professional identity formation, skills needed for practice career longevity, and development of resilience. More recently, outcomes-based frameworks have been described (Bok et al., 2011; Molgaard et al., 2019; Matthew et al., 2020). The AAVMC's competency-based veterinary education (CBVE) framework is currently being considered and implemented across multiple international veterinary schools simultaneously, which brings exciting opportu-

nities for conducting comparative analysis of students and graduates across schools. Having a shared framework of competencies, entrustable professional activities, milestones, and terminology is critical for training educators, comparing learners, and generalizing results across programs (Molgaard et al., 2018a; Molgaard et al., 2018b; Salisbury et al., 2019). With schools historically only focusing on their own programs, this opportunity has not existed in veterinary medicine to date.

In the strictest sense, veterinary clinical skills are psychomotor tasks that can be assessed in a simulated environment (satisfying “shows how” on Miller's pyramid of clinical competence) or within the actual clinical workplace (satisfying “does” on Miller's pyramid of clinical competence, see Figure 5.1) (Miller, 1990). Obvious examples might include donning and doffing a surgical gown, suturing skin, performing venipuncture, safely restraining a patient, or performing a complete physical examination. But what about interpreting herd records, observing animal behavior, or designing an isolation facility? Recently, authors have argued that the pinnacle of Miller's pyramid of clinical competence is not just related to technical skill competence as Miller originally described but is actually “is trusted” (to perform on one's own) (ten Cate et al., 2020) or “is” (to incorporate the development of professional identity) (Crues et al., 2016).

During curriculum development or program revision to incorporate further clinical skills training, there can be heated debate among educators and practitioners about what skills are the most necessary to teach, or even about what constitutes a “clinical skill.” Before the more recent rise of competency-based education, some educators and practitioners used Delphi-like processes and developed lists of skills to be taught in veterinary programs such as Day 1 Skills, first published in 2002 (RCVS, 2020). These practitioners tended to focus on what they believed was important for their own daily practice and based the skills list on what might be needed for their particular geographical

location. Practitioners also focused on what they wished to be taught to students who were soon to become their employees and colleagues. Educators tended to focus more on their own areas of specialty and what they believed new graduates should be able to perform based on past teaching experience.

The more recently described competency-based approaches to education have tried to focus more on “outputs,” rather than only on “inputs” for determining what should be taught in the curriculum. The majority of veterinary graduates today will enter private small animal, first-opinion practice, and it has been suggested that educators focus on asking practitioners working in that environment what skills the graduate will need (Bain and Salois, 2019). It should be noted that a broad range of practices must be consulted because there are differences in equipment and personnel available from practice to practice. Surveys of practicing veterinarians engaged in performing authentic veterinary tasks in general practice have also proven critical to determining the frequency, importance, and perceived difficulty for performance of these skills (Hubbell et al., 2008; Doucet and Vrins, 2009; Smeak et al., 2012; Luby et al., 2013; Kreisler et al., 2019). Not being limited in licensure at present, veterinary graduates ultimately require a broad range of skills for commonly seen conditions and diseases of all the major domestic species, and they require different skills than a specialist working in a tertiary referral environment (May, 2015). It is critically important that information be gathered across all types of practice, and published surveys exist in the literature for skills in surgery, equine practice, bovine practice, and small animal practice (Hubbell et al., 2008; Doucet and Vrins, 2009; Smeak et al., 2012; Luby et al., 2013; Kreisler et al., 2019). These resources are very useful and essential to consult when considering what to incorporate into an educational program.

Integration of clinical skills in the curriculum requires consideration of when to present the material and whether to integrate it with other

competencies. It is not enough for learners to learn the technical performance alone because without the knowledge of when to use the skill, when not to use the skill and how to modify the performance of the skill when needed, then the learner performs as a trained technician (Michels et al., 2012). The development of a veterinary professional requires that the learner has declarative or background knowledge, procedural knowledge about how to perform the skill, and can also apply diagnostic reasoning and clinical decision-making. In effect, developing a clinical skills program means achieving a comprehensive consensus on all of these aspects and not simply generating a list of skills (Michels et al., 2012).

Initially, the emphasis of outcomes-based education in the health professions was on the post-graduate learner, but more recently there has been a shift to incorporate undergraduate training as well (Ferguson et al., 2017). The competency-based educational approach supports the continual documented improvement of learner performance from novice to proficient and emphasizes training in the clinical workplace (Dreyfus, 2004). Assessment is becoming increasingly focused on a programmatic approach that includes multiple direct observations of student performance that are then integrated to provide a complete picture of learner competence (Bok et al., 2018; Norcini et al., 2018; van Melle et al., 2019).

The development of entrustable professional activities (EPAs) is ushering in a new era for skills training where students are ultimately encouraged to bring individual skills and competencies together in a comprehensive authentic workplace procedural performance (ten Cate, 2005). EPAs are activities that are performed in the workplace and offer a chance for observation and assessment. Assessors have a chance to observe “in the moment” and comment on the learner’s ability to perform tasks required in practice. The repetitious completion of such activities in the clinical veterinary teaching environment allows the trainee to grow and learn from the formative feedback provided to them. The AAVMC’s CBVE

working group recently defined nine different domains and 32 competencies in a framework, which represents consensus across a number of veterinary programs (Molgaard et al., 2018a; Molgaard et al., 2018b). The group then described eight EPAs that can be used for assessing and documenting learner development during the clinical years of the training program. Clinical skills training is now evaluated across programs through the use of OSCEs to assess introductory individual skills and short procedures in the years prior to clinical rotations, and EPAs and workplace-based assessments that evaluate more complex procedures or activities where multiple competencies need to be performed simultaneously in the clinical environment (Petersa et al., 2017; ten Cate et al., 2018; Molgaard et al., 2018b).

Programmatic assessment has recently been validated in veterinary medicine and shows that a change in performance is not simply due to variability between raters but is due to variance in learners' growth (Bok et al., 2018). This is important because we can now demonstrate learner change over time and predict the rate at which mastery will occur (Pusic et al., 2015). Limitations of accreditation (e.g. American Veterinary Medical Association's Council on Education mandating the maintenance of a four-year program) and reduced financial support (e.g. in the United States, many colleges have poor public support and rely heavily on tuition dollars) may mean that true time-independent advancement may prove challenging for veterinary programs.

In summary, veterinarians used to talk about "see one, do one, teach one," but today this is no longer considered a valid approach to teaching and learning skills (Michels et al., 2012). Clinical skills teaching, learning, and assessment have evolved. There is a growing body of evidence regarding learning theories, teaching and assessment principles, and learner development that can be used to the advantage of learner, teacher, and other stakeholders. An abundance of research and scholarship has changed the way that educators teach and the way programs are designed. This book is intended to focus on teaching, learning, and assessment of clinical skills in the modern veterinary curriculum and is a resource guide for students, as well as their instructors. This book is written for both veterinary and veterinary nursing students and includes chapters regarding development of skills curriculum (Chapter 2), how skills are best taught and learned (Chapter 3), and how skills are best practiced prior to assessment (Chapter 4). Also included are chapters on how learners know if they are learning what they need to (Chapter 5), how learners know they are being assessed fairly (Chapter 6), how learners can best learn in a simulated environment (Chapter 7), how to make use of peer teachers (Chapter 8), and what other skills are vital to a successful practice career (Chapter 9). The appendices include examples of OSCE assessments and recipes for simple models that instructors and learners can use and make.

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