

Challenges and Issues  
Veterinary Education



# Establishing veterinary graduation competencies and its impact on veterinary medical education in Korea

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## ABSTRACT

Competencies are defined as an observable and assessable set of knowledge, skills, and attitudes. Graduation competencies, which are more comprehensive, refer to the required abilities of students to perform on-site work immediately after graduation. As graduation competencies set the goal of education, various countries and institutions have introduced them for new veterinary graduates. The Korean Association of Veterinary Medical Colleges has recently established such competencies to standardize veterinary education and enhance quality levels thereof. The purpose of this study is to describe the process of establishing graduation competencies as well as their implication for veterinary education in Korea. Graduation competencies for veterinary education in Korea comprise 5 domains (animal health care and disease management, one health expertise, communication and collaboration, research and learning, and veterinary professionalism). These are further divided into 11 core competencies, and 33 achievement standards, which were carefully chosen from previous case analyses and nation-wide surveys. Currently, graduation competencies are used as a standard for setting clear educational purposes for both instructors and students. Establishing these competencies further initiated the development of detailed learning outcomes, and of a list of basic veterinary clinical performances and skills, which is useful for assessing knowledge and skills. The establishment of graduation competencies is expected to contribute to the continuous development of Korean veterinary education in many ways. These include curriculum standardization and licensing examination reform, which will eventually improve the competencies of new veterinary graduates.

**Keywords:** Competence; veterinary curriculum; learning objective

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**INTRODUCTION**

The paradigm in modern medical education has changed from the traditional teacher-centered education to student-centered learning. The core of this change was the need for clear standards that students should achieve through the curriculum. Achievement standards are defined as observable and assessable competencies, which refer to the ability to encompass a set of elements including knowledge, skills, and attitudes to perform a particular task [1]. Competency-based education is a method of defining and educating students based on the competencies they can use for on-site work immediately after graduation [1,2] and it is the most widely applied curriculum in current medical education. In the medical fields, it is crucial to define competencies to be achieved by students because the scope of performing independent work is expanded at each stage of education.

The World Organization for Animal Health (WOAH) defined veterinary services as global public goods [3]. The WOAH introduced the international standard graduation competencies and relevant curriculum recommendations that are essential for the smooth provision of veterinary services [4]. In North America, the core competencies that new veterinary graduates must be equipped with have been newly established. The Association of American Veterinary Medical Colleges presented core competencies in the Roadmap for Veterinary Medical Education in the 21st Century to respond to social changes, development in veterinary medicine and its educational environment [5]. The Royal College of Veterinary Surgeons (RCVS) has established Day One Competences, using it in their education [6,7]. Such cases have led to demands for establishing graduation competencies for veterinary education in Korea so that new veterinarians acquire aptitudes that correspond to global standards.

A total of 10 veterinary colleges function in Korea, with approximately 500 new students selected each year. While modern veterinary education in Korea began in 1908, the greatest change in the curriculum was the reform into the 6-year education system in 1998, which considered that increasing educational length by 2 years could provide sufficient time to secure professional education. Nevertheless, until the early 2000s, there has hardly been any change in the teaching methods and educational environment. Till date, all Korean veterinary colleges operate with a traditional subject-based curriculum. The teaching methods comprise didactic lectures and empirical lab practices. In terms of evaluation, a written exam in the form of relative evaluation is a common assessment method for each course. Furthermore, the practical exam format varies across colleges, and competency-based lab or practical exams for clinical subjects are rarely conducted. This may be due to the fact that colleges have insufficient faculty members, teaching staff, and facilities.

Meanwhile, the absence of learning achievement standards applicable to all veterinary colleges resulted in differences in the educational contents and levels of each university. Ultimately, this led to differences in the students' learnings and their competencies. Subsequently, it became the fundamental cause of lowering the difficulty level of the Korean veterinary licensing examination, hindering the securing of basic competencies of new graduates. The absence of graduation competencies halts the enhancement of veterinary service quality at the national level and the fostering of veterinarians corresponding to international standards.

Consequently, the Korean Association of Veterinary Medical Colleges (KAVMC) has established the Korean veterinary graduation competencies in 2016, through questionnaires

and research studies targeting professors, students, veterinarians, and stakeholders related to veterinary services [8]. The establishment of these competencies has become the starting point for various standards, necessary for veterinary education thereafter. The purpose of this study is to describe the process of establishing graduation competencies and the implied changes in veterinary education.

## THE INITIAL PROCESS OF ESTABLISHING GRADUATION COMPETENCIES

The establishment of graduation competencies was pursued by a research committee formed by the KAVMC Education Committee in 2016. The research committee members were mainly composed of faculty members representing each veterinary college and veterinary personnel with expertise in veterinary education.

The research committee initially derived graduation competencies that were suitable for the Korean veterinary environment through an analysis of the North American Veterinary Medical Education Consortium (NAVMEC) Core Competencies, Office International des Epizooties (now known as WOAH) Day-1 Competences, RCVS Day One Competences, and the core curriculum and competencies of veterinary colleges in Japan. The initial document consisted of 30 items in 7 domains. A broad range of surveys was conducted regarding the initial document on students, veterinarians, and professors, and about 1,500 counts of returned material were retrieved. Then, a factor analysis was conducted to prepare a draft consisting of 5 domains, 15 core competencies, and 42 achievement standards.

A review of content suitability of the draft was commissioned to the Korean Veterinary Medical Association, the Korean Society of Veterinary Science, the Korean Association of Veterinary Clinical Education, other professional veterinary organizations, and non-governmental organizations. In addition, legal consultation was employed for the legal content related to veterinarians. The final document was reviewed by a scholar of Korean literature to secure the clarity of phrases and named “Veterinary Education Graduation Competencies 2016,” after fixing 5 domains, 13 core competencies, and 39 achievement standards [8].

The structure of the Korean veterinary graduation competencies is similar to that of other countries (**Fig. 1**). The competency domain denotes broad distinguishable areas of competence that constitute a general descriptive framework for a profession [9]. Core competencies represent the spectrum of knowledge that enables a veterinarian to have the confidence to be productive in their chosen career on the first day after graduation [5]. Achievement standards refer to what students should achieve through education to accomplish core competencies.

The “Veterinary Education Graduation Competencies 2016” consisted of five domains: animal health care and disease management; one health expertise; communication and collaboration; research and learning; and veterinary professionalism. In each domain, core competencies were classified into two to three competencies, and two to four required achievement standards were established. These graduation competencies are goals that should be achieved by each veterinary student in Korea. In addition, efforts from each veterinary college to develop a curriculum that introduces detailed learning outcomes, and outcome assessment standards based thereon, became necessary.

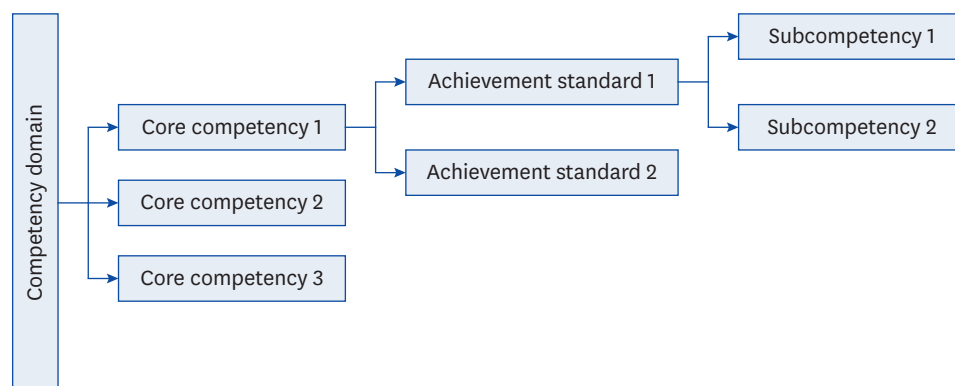


Fig. 1. Schematic structure of Korean veterinary graduation competencies.

The “Veterinary Education Graduation Competencies 2016” was expected to initiate significant changes in veterinary education upon enactment; however, the reverberation from each college was not as significant as anticipated. The reason was that, among the contents of the document, the domain for animal health care and disease management had been oversimplified and was not easy to utilize. In addition, it was found that some of the contents were declarative rather than competency-related, due to which many restrictions appeared in their direct application to the actual education. Therefore, it was necessary to develop detailed guidelines that could be actually applied.

## DEVELOPMENT OF DETAILED LEARNING OUTCOMES AND REVISION OF VETERINARY EDUCATION GRADUATION COMPETENCIES 2016

On comparing the content of the “Veterinary Education Graduation Competencies 2016” with that of the Competency-Based Veterinary Education (CBVE) presented by the American Association of Veterinary Medical Colleges (AAVMC) Working Group in 2018 [10] and the RCVS Day One Competences, we find that CBVE and RCVS Day One Competences has three out of nine and four out of five domains related to clinical practice, respectively. Thus, the proportion of clinical practice in the “Veterinary Education Graduation Competencies 2016” is excessively reduced.

The initial graduation competencies established in 2016 described a broad range of contents in abbreviated sentences, requiring instructors or colleges themselves to further develop specific and detailed guidelines that could be applied in education. As burden steadily grew, the KAVMC Education Committee derived learning outcomes based on instructors’ needs [11]. Veterinary education learning outcomes are composed of three areas, including veterinary concepts and principles, veterinary clinical practice, and professionalism. The learning outcomes describe essential knowledge, skills, and attitudes that should be taught within curriculum. Embodied as such, they become the basis for the development of a competency-based curriculum for universities. Moreover, it is expected that the learning outcomes can also be used as self-evaluation data in the learning process for students.

Meanwhile, additional materials were developed to reinforce the clinical competency of new graduates. A list of 54 clinical skills required to perform basic clinical practice was established [12]. Currently, a guidebook for basic clinical skills describing standard procedures for each clinical skill is being developed. In addition, a list consisting of 61 basic clinical practices was provided based on the terminal learning outcomes in veterinary clinical practice [13]. The development of such guideline materials promotes their actual utilization by instructors and students; thus, they can be used for competency-based education.

In the process of developing these materials, the Education Committee considered that it was inevitable to revise “Veterinary Education Graduation Competencies 2016” to overcome forementioned shortcomings. In particular, the oversimplified clinical competencies needed to be supplemented. Recently, the committee published the “Veterinary Education Graduation Competencies 2020” supplemented by a list of 5 domains, 11 core competencies, and 33 achievement standards. The most important changes were providing 96 sub-competencies under the achievement standards (Appendix 1). Sub-competencies are specific or practical items of performances, skills, or activities that enable achievement standards. The structure is similar to the CBVE presented by AAVMC [10] but lacks a milestone concept.

The research committee conducted a cross-analysis between the “Veterinary Education Graduation Competencies 2020” and AAVMC competency framework and found that the number of domains were different, but the core competencies and achievement standards were quite similar [13].

## DISCUSSION

The “Veterinary Education Graduation Competencies 2016” catalyzed various changes in the Korean veterinary college education landscape. Their establishment is extremely significant in that it systematically classified by domains all the competencies that any student from a veterinary college in Korea must be equipped with at the time of graduation. These competencies have helped clarify education goals for both instructors and students.

### Changes in college curriculum

As the abovementioned research results were published, their application in veterinary colleges was observed. For example, a prospective graduate at a particular college reviewed the content listed in each terminal learning outcome to confirm the degree of background knowledge acquired in the curriculum, and provided feedback to the faculty. Another college requires students to build portfolios in the five domains of graduation competencies, as part of its curriculum activities. Further, a college conducts a self-evaluation survey on the veterinary clinical skills items for graduates, which is expected to be utilized as reference material for long-term curriculum reform as it enables longitudinal research on graduates’ clinical skill achievement levels. These cases show the positive effects of establishing graduation competencies in veterinary education. Further, they are expected to vastly help enhancing the competencies of new veterinarians in the long term.

### Changes in standards for the veterinary education accreditation

Graduation competencies for veterinary education indirectly show a multitude of ripple effects. Among the assessment domains of Korean accreditation for veterinary education in operation, whether a curriculum reflecting the graduation competencies for veterinary

education has begun to be evaluated. This change served as the impetus for curricular reform in each veterinary college so that graduation competencies may be achieved on priority. In particular, it has demonstrated the immediate effect of reinforcing clinical training to improve clinical competencies. Moreover, the introduction of an objective structured clinical examination in the national veterinary licensing examination, based on the presented list of clinical performances and skills, is being discussed. Meanwhile, there is a growing demand to use the terminal learning outcomes as bases for questions in the national veterinary licensing examination, which if realized, it would become an opportunity to advance the standardization of veterinary education.

### **Conditions for the successful utilization of graduation competencies**

The positive effects of establishing graduation competencies as described above are encouraging. However, various conditions must be met in the future for graduation competencies to fully achieve the purpose of the initial enactment. Although graduation competencies are reflected in the accreditation condition for veterinary education, colleges do not bear the obligation to mandatorily reflect them in their curricula due to the lack of law enforcement. Therefore, for the efficient operation of the curriculum, the willingness of the university to actively reflect graduation competencies in its curriculum is essential, and professional organizations or experts need to be employed for the support thereof. In addition, to utilize graduation competencies, joint efforts by the National Committee for Veterinary Licensing Examination, the council of professors for each subject, and the Accreditation Board for Veterinary Education in Korea are also necessary. Finally, KAVMC must promote the positive effects of the use of graduation competencies, to provide a basis for colleges to utilize them more actively, and supplement the contents through periodic reviews.

For the practical application of graduation competencies, the aforementioned conditions must be fulfilled. However, it is not easy to uniformly apply graduation competencies in veterinary education as each college has a different curriculum, number of faculty members, and facilities and resources. Therefore, to apply graduation competencies in the curriculum the following steps must be adhered to. First, a cross-analysis between graduation competencies and educational objectives must be performed for each subject to ensure that the curriculum covers topics that are required to achieve graduation competencies. Subsequently, a feasible curriculum should be developed based on the college's own circumstances and analysis results. Moreover, it is necessary to offer non-curricular courses that can help develop those competencies that are not addressed during regular course hours. Finally, it is important to assess prospective graduates' competency level yearly to identify areas of improvement.

The graduation competencies for Korean veterinary education were established with consideration to social demand as well as changes in the veterinary educational environment in Korea. It appears that setting graduation competencies came somewhat late compared to other countries; however, its impact is emerging quite rapidly. The establishment of veterinary education graduation competencies has promoted the development of terminal learning outcomes as well as of the list of basic veterinary clinical performances and skills. It is also contributing to the standardization of education in the 10 veterinary colleges in Korea and to the improvement of the competencies of new graduates. In conclusion, the graduation competencies for veterinary education proposed by the KAVMC will serve as a key factor in developing veterinary education along with the national veterinary licensing examination and the accreditation system for veterinary education.



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## Appendix 1

### Contents of the Veterinary Education Graduation Competencies 2020

1. Animal health care and disease management
  - 1.1 Clinical reasoning and decision-making
    - 1.1.1 Collects animal information and understands comprehensively
    - 1.1.2 Prioritizes problems for differential diagnosis
    - 1.1.3 Creates and adjusts a diagnostic and treatment plan based on evidence
    - 1.1.4 Establishes diagnostic and treatment plans corresponding to animal and client's situation
    - 1.1.5 Handles in accordance with priority in an emergency situation
    - 1.1.6 Applies knowledge to suit various situations
    - 1.1.7 Recognizes limitations of knowledge, skills, and resources, and seeks consult as necessary
  - 1.2 Individual animal care and management
    - 1.2.1 Performs surgical procedures and postoperative care
    - 1.2.2 Promotes comprehensive welfare and preventive care
  - 1.3 Animal population care and management
    - 1.3.1 Applies population management principles in accordance with legal regulations and economic realities
    - 1.3.2 Recommends and evaluates regulations to secure biosafety
    - 1.3.3 Advises stakeholders on activities to promote animal welfare
2. One health expertise
  - 2.1 Recognition and management of zoonoses
    - 2.1.1 Accurately recognizes zoonoses and responds accordingly
  - 2.2 Leadership in one health
    - 2.2.1 Understands and promotes relationship among the health and safety of animals, people, and the environment
    - 2.2.2 Implements and promotes ecological civic consciousness
3. Communication and collaboration
  - 3.1 Communication
    - 3.1.1 Communicates as a professional should
    - 3.1.2 Adapts communication styles suitable for colleagues' and clients' situation
    - 3.1.3 Prepares documents appropriate for the intended audience
  - 3.2 Collaboration
    - 3.2.1 Solicits, respects, and integrates contribution from others
    - 3.2.2 Functions as an expert, leader, or member within an organization
    - 3.2.3 Maintains continuous relationships and collaborates with adjoining fields of expertise
    - 3.2.4 Understands and respects cultural diversity
4. Research and learning
  - 4.1 Life-long learning
    - 4.1.1 Collects, analyzes, and evaluates health-related information
    - 4.1.2 Engages in continuous self-directed expertise enhancement and self-development
    - 4.1.3 Conducts self-directed learning based on life-long learning
  - 4.2 Development and dissemination of veterinary knowledge
    - 4.2.1 Integrates, coordinates, and applies knowledge and skills required to resolve pending issues
    - 4.2.2 Develops useful knowledge and skills, and shares them with stakeholders



- 5. Veterinary professionalism
  - 5.1 Professional identity
    - 5.1.1 Makes ethical decisions that meet professional obligations
    - 5.1.2 Manages time in accordance with work
    - 5.1.3 Establishes professional identity and reflects on personal actions
    - 5.1.4 Attends to the well-being of self and others
  - 5.2 Management of self and organization
    - 5.2.1 Weighs economic factors in personal and business decision-making
    - 5.2.2 Delivers veterinary services based on an understanding of and compliance with legal requirements
    - 5.2.3 Seeks the health and safety of animals, clients, and colleagues