

Minister of Education, Culture, Sports, Science and Technology  
President, Japanese Association of Establishments for Veterinary Education

## **Recommendations: Shaping Epidemiology Education in Veterinary Medicine to Support the Era of One Health**

**Presented by : The Society of Farm Animal in Infectious Diseases, the Japanese Society of Veterinary Epidemiology, Health and Global Policy Institute (HGPI), and the Japanese Society of Veterinary Science Epidemiology Section  
(in Japanese syllabary order)**

### **Background**

#### **1. Issues in the animal health sector**

While the 2010 foot-and-mouth disease epidemic that occurred in Miyazaki Prefecture was successfully eradicated through measures that included emergency vaccinations, it resulted in the culling of 290,000 heads of livestock, including vaccinated animals. In the 2022-2023 season, Japan recorded a new record high of 84 cases of highly pathogenic avian influenza (HPAI) and over 17 million birds were culled. This stoked concern about the supply of livestock products and caused a surge in egg and chicken prices. Classical swine fever (CSF) reemerged in Japan in 2018 and infections were detected in wild boars, and the difficulty of controlling infectious diseases in wild animals has resulted in a prolonged CSF epidemic. The spread of these and other diseases that were previously undetected in Japan, more frequent outbreaks, and longer epidemics all present situations that were previously unknown to the country, and mounting appropriate responses to them will require leadership from veterinarians involved in livestock infectious disease control at various levels of government, including the national and prefectural levels. In the midst of such circumstances, epidemiology will play a vital role in appropriate measures as it is used for tracking outbreaks and identifying risk factors in animal populations, developing and deploying outbreak control strategies in communities or at farms, predicting the spread of infections, and calculating the cost-effectiveness of countermeasures and evaluating them. In addition to responding to infectious disease outbreaks in animal populations, epidemiology is also a useful tool for designing surveillance measures during periods between outbreaks, for eradicating endemic diseases, and for supporting decision-making in routine medical care and livestock epidemic prevention. However, shortcomings in epidemiology education for veterinarians have led to shortages of qualified personnel, inadequate data analysis skills, and other issues related to response capacity in real-world livestock production settings.<sup>1</sup>

#### **2. Issues in the public health sector**

Many of the new and re-emerging infectious diseases that have troubled society in recent years have been zoonotic diseases, which are diseases of animal origin, and some people have expressed concern that after causing animal-to-human infections or crossing species barriers, these diseases could cause human-to-human infections. Examples of this include the outbreak of COVID-19 in December 2019 and the multi-country outbreak of Mpox in 2022 and 2023. Another recent problem facing society is the growing incidence of a tick-borne disease called severe febrile thrombocytopenia syndrome (SFTS). While we know that SFTS can infect ticks, wild animals, and humans, its epidemiological mechanism remains unclear. As for bacterial infections that impact humans and animals such as enteropathogenic *E. Coli* (EPEC) and *Salmonella*, one concern is the increase in antimicrobial resistance (AMR), which occurs when bacteria acquire resistance to the antimicrobials used to treat them. The excessive use of antimicrobials in pets and livestock has been identified as a potential factor for the acquisition/selection of AMR in human pathogens. To address these complex issues that impact humans, animals, and the environment, we must elucidate the underlying factors that influence infectious disease transmission and the emergence of AMR bacteria in a data- and evidence-based manner and generate suitable countermeasures. As epidemiology education provides the foundation for collecting and analyzing the necessary data as well as making effective use of findings, it will be an essential part of these efforts.

#### **3. Issues in the clinical veterinary sector**

In companion animal medicine, an area of veterinary medicine for dogs, cats, and other companion animals that attracts many graduates of veterinary schools, advancements in prevention and medical technologies are prolonging lifespans for companion animals, making it increasingly important for veterinary professionals to have the capacity to treat conditions that may be associated with specific genetic predispositions like tumors or lifestyle diseases such as obesity or diabetes. In addition to providing treatments on an individual level, responding to these diseases appropriately will require taking an integrative view of

many cases to analyze factors for their occurrence and to select evidence-based treatment methods. This will require the use of epidemiology.

#### **4. Global trends in veterinary epidemiology education and current circumstances in Japan**

As these issues show, the animal health, public health, and clinical veterinary sectors all require veterinary professionals to possess knowledge, skills, attitudes, and aptitude in epidemiology. These are collectively referred to as “competencies,” and veterinary professionals must be able to apply them in real-world settings as soon as they complete their veterinary education. On the global level, the World Organisation for Animal Health (WOAH) and the Food and Agriculture Organization of the United Nations (FAO) have expressed high expectations for the role of epidemiology in veterinary medicine. Focusing on efforts from the WOAH, the *Recommendations on the Competencies of Graduating Veterinarians* released in 2012 (when the organization was known as the Office International des Epizooties (OIE)) present a set of basic competencies for Day 1 graduates of veterinary schools. The OIE recommendations clearly emphasize the importance of epidemiology by naming it the first basic competency required for becoming a licensed veterinarian, stating “Epidemiology [...] serves as the foundation and logic of interventions.”<sup>2</sup>

However, in Japan, efforts to incorporate practical epidemiology training into veterinary education have been sluggish, there are too few instructors who can teach veterinary epidemiology, and many schools of veterinary medicine do not offer practical epidemiology training to foster capacity for immediate response in practical settings.<sup>3</sup> Given these circumstances in society, the Japanese Society of Veterinary Science Epidemiology Section, the Japanese Society of Veterinary Epidemiology, the Society of Farm Animal in Infectious Diseases, and Health and Global Policy Institute (HGPI) have compiled the following recommendations regarding the desirable direction for epidemiology education in the field of veterinary medicine in Japan.

##### **Recommendation 1: Promote epidemiology education that is based on both lectures and practical training to foster veterinary professionals who can apply epidemiology as Day 1 graduates**

Nationwide, Japan has seventeen schools of veterinary medicine,<sup>4</sup> and steady progress has been made in efforts to standardize veterinary education among those schools using a shared model core curriculum that was formulated in 2011. The core curriculum includes lectures and practical training courses. While epidemiology is positioned as a lecture course in the field of applied veterinary education,<sup>5</sup> the number of epidemiology lectures offered and the content covered vary significantly among universities. A 2023 survey of the seventeen universities found that the number of lectures on epidemiology ranged from a minimum of five to a maximum of fifteen. While education quality is not solely determined by number of lectures, the universities that provided fewer lectures did not fully cover the scope specified in the core curriculum.<sup>3</sup> Furthermore, after graduation, veterinary professionals must possess the capacity to respond to disease outbreaks, to identify risk factors for zoonotic diseases and address them, and to formulate evidence-based treatment strategies in small animal veterinary medicine. This means practical training in epidemiology designed with these issues in mind is an essential part of developing the specific problem-solving skills needed to address them. Despite this need, practical epidemiology training is not a mandatory part of the core curriculum, and is only offered at 10 of the 17 universities (58.8%).

Around the world, the Day 1 Competencies<sup>2</sup> presented by the WOAH in 2012 are widely referred to as the basis of veterinary education. As those competencies include “skills,” we can infer they intend veterinary education to encompass both lectures and practical training. Since the *Veterinary Education Core Curriculum OIE Guidelines*<sup>6</sup> formulated in 2013 were based on the WOAH Day 1 Competencies, they could be considered the “WOAH version” of a core curriculum. They include a number of items related to epidemiology, such as biomathematics, descriptive epidemiology, study design and implementation, data analysis, the critical evaluation of published information, infectious disease control, and risk analysis. Based on those guidelines, schools of veterinary medicine in Europe, the United States, and Australia have established ample opportunities for students to learn about and participate in practical epidemiology training in addition to lectures. That training simulates real-world veterinary practice and includes items ranging from statistics training to weeks-long exercises on outbreak response.<sup>3</sup> By implementing such training, those schools have created environments to provide students with precisely the skills they need to apply and make the most of their epidemiological knowledge from the day they graduate.

In light of these points, working with organizations like the Japanese Association of Establishments for Veterinary Education or the Japan University Accreditation Association (JUAA), Japan should also add practical epidemiology training to its core curriculum to serve as a foundation for fostering the latest WOAH Day 1 Competencies in order to realize epidemiology education that encompasses both lectures and practical training and to promote the development of human resources with the capacity to apply epidemiology.

**Recommendation 2: Establish environments that are conducive to practical epidemiology training through efforts that are centered around flagship schools of epidemiology and that include having specialists in epidemiology serve as instructors as well as sharing training materials and personnel**

As discussed in Recommendation 1, veterinary education is predicated on both lectures and practical training, and Japan has a particular need to expand practical epidemiology training. In addition to making practical epidemiology training a mandatory subject in the core curriculum, however, ensuring that high-quality training is provided at all seventeen schools will also require securing instructors who can provide appropriate training as well as producing educational materials. Reasons indicated by the seven universities regarding the absence of practical epidemiology training included “insufficient time in the curriculum” (7 universities), “lack of instructors” (2 universities), and “too few computers” (1 university). Among those seven universities, three indicated that they would like to incorporate such training if they had access to a good textbook on the subject.<sup>1</sup>

With regards to teaching materials for practical epidemiology training, it is desirable that textbooks and practical training materials are prepared for use in university and post-graduate education through collaboration that is centered on relevant academic societies and that involves educators and researchers involved in veterinary epidemiology. In addition, even when teaching materials become available for use, instructors with sufficient experience in epidemiological research will be needed to plan and conduct practical training. However, rapidly securing the necessary educators and establishing educational environments at every university is unrealistic, so one option may be to designate some of the ten universities that already provide practical epidemiology training as flagship universities for veterinary epidemiology. In addition to serving as hosts in joint practical epidemiology training with other universities, flagship universities could serve as leaders in expanding veterinary epidemiology education through efforts that aim to develop more effective practical training methods, to provide training on pedagogy, or to establish a nationwide system for collaboration among instructors.

While support for epidemiology education from flagship universities for other universities will be effective when epidemiology education is first introduced at all schools of veterinary medicine, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) should provide support so all veterinary students can be provided with education that meets global standards in a steady and sustainable manner. This should include ensuring all schools of veterinary medicine have instructors with sufficient experience in epidemiology research on staff and have educational materials or facilities in place.

To make practical epidemiology training more applicable in real-world settings, strengthening collaboration with communities and related institutions will be essential. Working together with parties like national and prefectural livestock health departments, livestock health centers, production animal veterinary clinics, companion animal veterinary clinics, academic societies, and research institutions will make it possible to provide practical epidemiology training that is more practical, effective, and sustainable. Additionally, collaboration among flagship universities and communities is likely to promote education for veterinary professionals after graduation and to provide future graduates of veterinary medicine throughout Japan with more practical epidemiology education that they will be able to apply immediately to every challenge they encounter in real-world practice.

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<sup>1</sup> Makita, K. Nationwide questionnaire survey regarding epidemiology. *The Journal of Farm Animal in Infectious Disease*. 2023;12(4), 111 - 117.  
<https://www.kachikukansen.org/kaiho2/PDF/12/12-4-4.pdf>

<sup>2</sup> OIE (2012) Recommendations on the Competencies of graduating veterinarians (‘Day 1 graduates’) to assure National Veterinary Services of quality  
<https://www.woah.org/app/uploads/2021/03/dayone-b-ang-vc.pdf>

<sup>3</sup> Makita, K. The current state of veterinary epidemiology education in Japan and around the world. *The Journal of Veterinary Epidemiology*. 2024;28(2), 128 - 135.

<sup>4</sup> These include ten national universities (Hokkaido University, Obihiro University of Agriculture and Veterinary Medicine, Iwate University, the University of Tokyo, Tokyo University of Agriculture and Technology, Gifu University, Tottori University, Yamaguchi University, University of Miyazaki, and Kagoshima University), one public university (Osaka Metropolitan University), and six private universities (Rakuno Gakuen University, Kitasato University, Nippon Veterinary and Life Science University, Nihon University, Azabu University, and Okayama University of Science).

<sup>5</sup> Japanese Association of Establishments for Veterinary Education (2012) *Model Core Curriculum for Veterinary Education, 2012 Edition*  
<https://www.jaeve.org/cur/release/img/ModelCoreCurriculumH24.pdf>

<sup>6</sup> OIE (2013) Veterinary Education Core Curriculum OIE Guidelines <https://www.woah.org/app/uploads/2021/03/af-core-ang.pdf>

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**Supporting organizations**

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