

ADVANCING ONE HEALTH: NATIONAL PERSPECTIVES ON VETERINARY LEADERSHIP IN THE 21ST CENTURY

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Introduction

The global health landscape of the twenty-first century is increasingly shaped by the recognition that human well-being cannot be separated from the health of the animals we live alongside and the environments we share (Gibbs & Gibbs, 2012). Veterinarians stand at the critical intersection of these domains. Originally trained to treat individual sick animals, the profession has evolved far beyond that narrow mandate. Today, veterinarians are involved in food safety inspection, zoonotic disease surveillance, antimicrobial stewardship, public health policy, wildlife conservation, and biomedical research - each activity carrying direct or indirect consequences for millions of human lives (WVA, 2026; van Herten & Meijboom, 2019). The World Veterinary Association (WVA) formally recognises veterinarians as healthcare professionals whose activities contribute to the physical, mental, and social well-being of human populations through animal health, welfare, and the human-animal bond (WVA, 2026). The concept of One Health - the collaborative effort of multiple disciplines working locally, nationally, and globally to achieve optimal health for people, animals, and the environment - provides the theoretical framework within which modern veterinary responsibilities are best understood (AVMA, 2008; Lerner & Berg, 2015). This article examines the multi-dimensional role of veterinarians as guardians of both food security and public health, explores the moral and practical challenges the profession faces, and argues for a holistic, prevention-centred

approach anchored in the One Health paradigm.

Defining the Veterinarian's Role

The role of the veterinarian has broadened substantially over recent decades. Beyond clinical care of individual animals, modern veterinarians are expected to incorporate collective and global perspectives while simultaneously protecting animal welfare and contributing to public health (Meijboom, 2018). According to Rollin, the most fundamental ethical question in veterinary practice is whether the veterinarian's primary allegiance lies with the animal or the owner (Rollin, 2013). In the food production context, however, that binary is insufficient: veterinarians must also weigh the interests of food companies, retailers, consumers, and society as a whole (van Herten & Meijboom, 2019). The Federation of Veterinarians of Europe acknowledges that professional obligations can conflict, placing the burden of balancing responsibilities on the individual practitioner - a tension that reflects the expanding scope of veterinary accountability (FVE, 2009). The WVA veterinary oath encapsulates this breadth: veterinarians pledge to prevent, diagnose and treat disease in all animal species; to communicate and help prevent the impact of zoonotic diseases; to advocate for sustainable management of animals in their ecosystems; and to contribute to animal, human, and environmental health through continual professional development. (WVA, 2026).

The Link Between Veterinary Practice and Food and Health Security

Food security and health security are inextricably linked, and veterinarians occupy a critical node in both systems. Safe, nutritious food derived from healthy animals is a biological prerequisite for human well-being. In many low- and middle-income countries, veterinary services are especially important: they protect livestock that sustain family incomes, reduce poverty, and improve access to safe and nutritious food, thereby contributing to social stability and community well-being (WVA, 2026). By supervising animal health across terrestrial and aquatic production systems, veterinarians ensure that meat, dairy, fish, and other products reaching consumers are safe, wholesome, and free of contaminants - a function that sits at the heart of global public health infrastructure (Gibbs & Gibbs, 2012; WVA, 20260).

Role in Animal Health Management

Animal health management is the foundational pillar of veterinary practice, encompassing disease prevention, clinical treatment, welfare promotion, and herd or flock health planning (Islam, 2015). The OIE defines good animal welfare as a state in which an animal is healthy, comfortable, well-nourished, safe, able to express innate behaviour, and free from pain, fear, and distress - a standard that veterinarians are trained to assess and uphold (OIE, 2008). The 'Five Freedoms' framework - freedom from hunger and thirst, discomfort, pain and disease, fear and distress, and freedom to express normal behaviour - provides the operational foundation for veterinary welfare assessment in diverse production and companion animal contexts (Islam, 2015; WVA, 2026).

Veterinarians possess unique cross-species pathobiological expertise that enables them not only to treat disease but to proactively identify and address production-system factors that undermine animal resilience. Research shows that pushing animals towards high productivity increases

the risk of certain diseases, making the veterinarian's advisory role in farm management critically important (Rauw *et al.*, 1998; van Herten & Meijboom, 2019). A particularly instructive example concerns antimicrobial use in intensive livestock farming. In the Netherlands, veterinarians were central to the dramatic reduction of antimicrobial consumption under the 'Dutch Model', which combined mandatory herd health plans, regular farm visits, registration and benchmarking of drug use, vaccination strategies, and improved biosecurity - ultimately benefiting animal health, human health, and the environment simultaneously (Food and Veterinary Office, 2017).

Role in Food Safety and Quality Control

Veterinarians play a central role in food safety systems across the entire production chain, from farm to consumer. By overseeing animal health and conducting ante- and post-mortem inspections, they ensure that contaminated or adulterated products are kept out of the food supply. The World Veterinary Association (WVA) emphasizes that veterinarians contribute directly to human health and nutrition by maintaining safe food systems. In the context of antimicrobial resistance (AMR), veterinarians are essential in promoting the responsible use of antimicrobials in animals, acting as key stewards alongside physicians and pharmacists to preserve the effectiveness of critical medicines (WVA, 2026). The misuse of antimicrobials in animals poses a serious risk to human health by driving drug resistance. Consequently, global scientific consensus supports stricter antimicrobial use policies in animal production, with veterinarians playing a leading role in implementing these practices at the farm level (WHO, 2017; van Herten & Meijboom, 2019).

Role in Zoonotic Disease Prevention

Approximately 75% of emerging infectious diseases in humans originate from animals, making zoonotic disease surveillance a critical responsibility of the veterinary profession (Gibbs & Gibbs, 2012).

Veterinarians play a key role in monitoring and controlling diseases transmissible between animals and humans, such as rabies, salmonellosis, avian influenza, and Q fever. Their expertise is essential for disease surveillance, prevention, and outbreak management (WVA, 2026). The Q fever epidemic in the Netherlands (2007–2010), which infected over 4,000 people and caused 74 deaths, highlighted how gaps in integrated veterinary and human health systems can escalate livestock-origin pathogens into major public health crises. The rapid expansion of goat farming in densely populated areas was identified as a key contributing factor (Roest *et al.*, 2011; van Herten & Meijboom, 2019).

Veterinarians contribute to zoonotic disease control through both reactive and proactive approaches. Reactive measures include outbreak investigations, multidisciplinary response efforts (as seen during Ebola, West Nile virus, and SARS outbreaks), and control strategies such as culling and movement restrictions. Proactive efforts involve vaccination programs, biosecurity implementation, disease surveillance networks, and pathogen discovery initiatives. The USAID-supported PREDICT programme exemplifies this proactive One Health approach, where veterinarians lead early warning systems to detect and reduce zoonotic threats before they spill over into human populations (Gibbs & Gibbs, 2012).

Role in Public Health and the One Health Concept

The One Health concept is defined as the collaborative effort of multiple disciplines -working locally, nationally, and globally - to attain optimal health for people, animals, and the environment. In this framework, veterinary medicine is not peripheral to human public health but intrinsic to it (AVMA, 2008; Lerner & Berg, 2015). Van Herten and Meijboom (2019) articulate an 'encapsulated health' argument: the best way to safeguard human health is to promote the health of animals and the environment. This means that

the central professional responsibility of veterinarians - expertise in animal health and welfare is itself the most effective contribution they can make to public health, rather than a competing concern (van Herten & Meijboom, 2019). Veterinary contributions to public health span food safety and security, surveillance and prevention of emerging infectious diseases, environmental health, biomedical research, and health security policy (WVA, 2026).

In environmental health, veterinarians protect biodiversity and reduce health risks linked to environmental damage, climate change, and land-use change. By monitoring diseases at the wildlife-livestock-human interface and supporting ecosystem management, they help prevent future health threats - work that reflects the One Health principle that the health of people, animals, and plants depends on healthy ecosystems (Gibbs & Gibbs, 2012; WVA, 2026). The WVA emphasises that One Health is indispensable to achieving global health resilience. Modern challenges - from zoonotic spillovers to AMR and climate-related disease emergence - require human and veterinary medicine to function under a unified cross-sectoral framework, enabling early detection, prevention, and coordinated response rather than reactive management. Veterinarians also safeguard the mental and social well-being of human populations by supporting the human-animal bond. Interaction with companion animals and responsible care of livestock are associated with psychological, social, and emotional benefits for caregivers and communities - an often-overlooked dimension of veterinary public health contribution (WVA, 2026).

Challenges Faced by the Veterinary Profession

Despite its indispensable role, the veterinary profession faces a complex array of moral, structural, and systemic challenges that can impede the full realisation of its public health mandate. First, professional responsibility conflicts are endemic to

veterinary practice. Veterinarians must simultaneously serve the interests of individual animals, animal owners, food companies, consumers, and society - interests that frequently diverge. Neither veterinary legislation nor professional codes typically offer clear guidance when these obligations collide, leaving individual practitioners to navigate competing demands without adequate institutional support (FVE, 2009; van Herten & Meijboom, 2019). The post-weaning diarrhoea case in Dutch pig farming illustrates this dilemma sharply: veterinarians treating piglets with colistin - a human 'last-resort' antibiotic - are fulfilling their duty of animal care while simultaneously contributing to antimicrobial resistance that threatens human medicine. Alternative strategies are available but complex, costly, and dependent on farmers' financial capacity to implement them (Rhouma *et al.*, 2017; van Herten & Meijboom, 2019).

Second, the structural dependence of veterinarians on farmers and clients for their livelihood constrains their professional autonomy. Farm animal veterinarians are frequently limited in their ability to advocate for systemic change because their commercial relationship with farmers can deter them from confronting practices that generate health risks at the population level (Speksnijder *et al.*, 2015; van Herten & Meijboom, 2019).

Third, the growing specialisation within the profession - particularly the shift toward companion animal practice in high-income countries - has, paradoxically, reduced collective veterinary capacity in the public health, food safety, epidemiology, and foreign animal disease domains that are most critical to One Health implementation (Gibbs & Gibbs, 2012).

Fourth, at the institutional level, national veterinary organisations have been reluctant to take strong public stances against the structural problems of intensive livestock farming, partly because their membership is financially tied to sectors they would need to criticise, and partly because internal moral diversity makes consensus statements difficult (van Herten & Meijboom, 2019). Fifth,

despite international recognition of the One Health concept, practical implementation of integrated human-veterinary health governance remains inconsistent. The Q-fever epidemic revealed that ministerial disagreements between agriculture and public health departments can delay life-saving interventions even when veterinary science has provided the relevant evidence. (Haalboom, 2017; van Herten & Meijboom, 2019).

Conclusion

Veterinarians are central guardians of food systems and public health, operating at the critical animal-human-environment interface and serving as key architects of global health security, food safety, disease prevention, and ecological resilience. The One Health framework provides the necessary intellectual and institutional basis to integrate these roles effectively. Within this context, the "encapsulated health" argument helps reconcile the apparent tension between animal welfare and societal responsibility by emphasizing that improving animal health and welfare ultimately protects human health. Livestock systems grounded in resilience, good welfare practices, and reduced antimicrobial reliance generate fewer public health risks than those driven primarily by cost minimization. The Dutch model of antimicrobial reduction exemplifies this principle, demonstrating that coordinated action among veterinarians, farmers, government, and industry can achieve substantial outcomes, as reflected in a 64% reduction in veterinary antimicrobial use since 2009-benefiting animal, human, and environmental health simultaneously and reinforcing the value of preventive over reactive approaches.

Future Importance of the Veterinary Profession

As the world confronts accelerating zoonotic disease emergence, climate change, biodiversity loss, and the AMR crisis, the importance of veterinarians to global health governance will only intensify. A new generation of veterinarians, physicians, ecologists, biologists, and social scientists is

reshaping the One Health concept in novel and more integrated ways. Veterinary schools are progressively restructuring curricula around One Health competencies - multispecies clinical knowledge, animal-human-environmental health integration, and professional skills in communication, collaboration, and policy advocacy. These reforms position the profession to be a strong advocate and leader of One Health for decades to come. The WVA's recognition of veterinarians as healthcare professionals alongside physicians and pharmacists reflects this trajectory. Building cross-sectoral models that integrate human and veterinary medicine under a single operational framework will allow societies to prevent many health crises rather than simply reacting to them.

The Need to Strengthen Veterinary Services

Realising the full potential of veterinary medicine as a public good requires deliberate investment at multiple levels. At the individual level, veterinarians need clearer ethical frameworks and better institutional support to navigate competing responsibilities without sacrificing professional integrity. At the organisational level, national and international veterinary associations must overcome internal fragmentation and financial dependencies to advocate boldly for structural changes in livestock production systems. Professional integrity - a commitment to the

profession's core values even when commercially inconvenient is the prerequisite for the public trust that gives veterinary expertise its authority. At the policy level, governments must ensure that veterinary services are adequately resourced, regulated, and integrated into national and international health architectures. In countries where no animal welfare legislation exists, national veterinary associations should take the lead in initiating such legal frameworks. The World Organisation for Animal Health (WOAH) sets international standards to protect animal health, public health, and safe trade. Veterinarians are the professionals who translate these standards into practice through surveillance, reporting, risk management, and the strengthening of veterinary governance. Their role within international health governance further reinforces their status as essential health professionals contributing to global health security.

In summary, the veterinary profession stands at a historic juncture. The tools, knowledge, and institutional frameworks to address the greatest health challenges of the coming decades are largely in place. What remains is the collective will of veterinarians, professional organisations, governments, and societies - to deploy those capabilities to their fullest extent in service of animals, humans, and the planet we share.

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