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EDITED BY

Thomas H. Beery,
Kristianstad University, Sweden

REVIEWED BY

Dauda Ayomide Onawola,
One Health in Action Initiative, Nigeria
M. Camille Hopkins,
United States Department of the Interior,
United States

*CORRESPONDENCE

Macon Overcast

✉ macon.overcast.z@gmail.com

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Veterinary clinicians as One Health messengers: opportunities for preventing zoonoses while promoting biophilia in the United States

Macon Overcast^{1,2*}

¹Smithsonian Institution, Washington, DC, United States, ²Global Health Program, Smithsonian Conservation Biology Institute (SI), Washington, DC, United States

One Health is a transdisciplinary approach to health science that recognizes the linked and interdependent ecology of environmental, human, and animal health. Effective communication of zoonotic disease risks through a One Health framework presents an opportunity to both prevent emerging infectious diseases and enhance public appreciation for wildlife and conservation, herein termed biophilia. While veterinary practitioners have historically played a pivotal role in public health and conservation, structural changes in the veterinary profession—including the dominance of companion animal practice, fee-for-service models, and corporate consolidation—limit their potential as One Health communicators, and thus wildlife conservation advocates. Additionally, the human-animal bond is often singularly framed as a health resource for pet owners and companion animals, neglecting its broader role within communities and its connection to other social, ecological, and epidemiological networks that include human and wildlife populations. This article outlines key constraints facing veterinarians as One Health communicators and proposes two solutions to integrate preventive zoonoses messaging and biophilia promotion within veterinary clinical practice: (1) the human-animal bond should be reconceptualized within veterinary clinical sciences as a community-level resource akin to natural capital, and (2) the veterinary extension workforce should be expanded to include agents facilitating local conservation and public health information exchange with companion animal veterinarians. Through these solutions, the veterinary profession can further enhance its principal role in One Health. Such efforts would empower veterinarians to communicate about zoonotic disease risks and conservation, ensuring that One Health principles are embedded in everyday clinical interactions and broader community initiatives.

KEYWORDS

veterinary medicine, one health communication, community practice, companion animal, human-animal bond, local conservation

Introduction

One Health is defined as ‘an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent’ (Adisasmito et al., 2022). Biophilia, as posited by E.O. Wilson, describes the process explaining ‘to the degree that we understand other organisms, we will place a greater value on them, and on ourselves’ (E.O., 1984). One Health enables a biophilic approach for messaging zoonoses risk by emphasizing the shared ecology of infectious disease and conservation management tasks. More specifically, One Health offers a sustainable strategy to prevent wildlife borne zoonoses while preserving public regard for wildlife and nature by providing a conceptual framework for practitioners to speak in a unified voice (Destoumieux-Garzon et al., 2018; Kirkey, 2024; Reaser et al., 2025). Further, while prevention of emerging infectious disease is often presumed to be delegated to tropical and subtropical regions, the United States and Europe contain tremendous biodiversity in proximity to changing landscapes where human contact with vectors and zoonotic reservoirs still affects spillover risk (Patz et al., 2004; Randolph, 2001). For example, in early 2025 University of Rochester in collaboration with the United States Centers for Disease Control and Prevention identified a novel Henipavirus with zoonotic potential in Northern Short Tailed Shrews sampled from Alabama (Parry et al., 2025). The perceptive axiom balancing zoonoses risk perception and biophilia can be further observed through concern for zoonotic disease origins in wildlife leading to culling, pest management strategies, and zoonoses risk and animal welfare perception affecting food purchasing decisions (Anderson and Reaser, 2024; Stel et al., 2022; Decker et al., 2010). Despite these dynamics, the impact of zoonoses risk perception on biophilia is sparsely defined across community types, and there persists a variable public understanding of endemic zoonoses (Oruganti et al., 2018; Paul et al., 2010; Eisen et al., 2017; Sandhu and Singh, 2014).

The effective responsibility for linking veterinary public health with conservation lies on public institutions, including universities, while operational support for grass roots actors such as veterinary clinicians is largely neglected (Hassan et al., 2023). Notwithstanding the importance of top-down communication and programmatic campaigns, clinical veterinarians (herein termed ‘clinicians’) moderate significant interactions with community members about zoonoses arising from wildlife (Chakraborty et al., 2024). Further, the rising emphasis on the human-animal bond, a phenomenon in the United States and globally, presents an opportunity to leverage the clinician-client interface for One Health and conservation messaging (Chakraborty et al., 2024; Mendez et al., 2017). In short, clinicians possess tremendous potential to strengthen local conservation and community health goals – they just need the time, energy, and support to do it. Reducing zoonoses and promoting biophilia via the domestic veterinary workforce is a bottom-up strategy that can generate cultural momentum in

tandem with other strategies. Here, I outline contemporary barriers and succinct opportunities linking veterinary clinicians to this challenge.

Constraints to One Health communication in a rapidly changing profession

The veterinary profession formally emerged at the turn of the 20th century from state directives that recognized public need for systematized equine health services, as demanded by urbanization and industrialization, and evolved in the coming decades to combat agricultural epidemics (Greene, 2010). Species targeted in clinics mirrored those in regulatory practice, emphasizing farm animal and equine care (Smith, 2013). Regulatory veterinarians also began supporting state fish and wildlife programs as early as the 1940s, and further at federal programs in the 1960s (Congress, 1914). The programmatic attention to wildlife disease and zoonoses at agricultural and varied environmental interfaces, signifies an inchoate One Health paradigm that would evolve further in the latter half of the century as landscape and ecological drivers of disease began to be recognized.

In the late 1900’s, the dominant veterinary professional pathway shifted to dog and cat health and today pets in America demand more attention than ever, creating an industry that is a diverse ecosystem experiencing fast change within itself (Smith, 2013). Now, the majority of veterinarians become small animal clinicians, and at the heart of veterinary career incentive structures rests a large clot of veterinarian student debt (AVMA, 2024; Lairmore et al., 2024). Companion animal practice, particularly specialty services, boasts the highest average salary amongst other practice areas and skews career choice away from farm animal, public service, and other career pathways based on fiscal pressure (Bain and Lefebvre, 2022).

Despite the pull of private markets, through veterinary training, One Health is addressed as a conceptual paradigm with support from many public service programs but nests implementation within veterinary clinics at the level of the time and emotional resource constrained practitioner (Janke et al., 2021). In the dominant fee-for-service clinic model, financial pressure may negatively impact non-financially incentivized tasks, where practitioners must individually and proactively strategize extra-patient priorities (Deluty et al., 2020; Lloyd, 2013). Like human healthcare, fee-for-service models can lead to over-utilization of services, higher costs, fragmented care and disincentivizing non-monetary action such as community engagement on broader issues in the field, such as ‘Preventing Zoonoses. Promoting Biophilia’ (Baker, 1997; Dowd and Laugesen, 2020). The Veterinarian-Client-Patient relationship (VCPR), as a legal definition, does not specify wildlife and ecosystems as stakeholders for veterinary practice decisions, although the veterinarian’s oath includes a commitment towards conserving animal resources (AVMA, 2003; Veterinary Oaths). Additionally, veterinarians are among the highest at-risk health profession group for burnout, depression,

and self-harm due to a multitude of factors speculated to be intrinsic to the field and the personality characteristics it tends to attract (Nett et al., 2015; Stetina and Krouzecky, 2022). Without structural support, One Health communications are at risk of adding to veterinarian brain drain and increasing veterinarian migration from low to high resource settings as seen in human healthcare (Dohlman et al., 2019).

Further, the veterinarian's position broadly as a community pillar and autonomous business owner is somewhat existentially challenged by the rise in corporate veterinary practice ownership (Kogan and Rishniw, 2023; Steinbach, 2023). While veterinarian owned small businesses persist, corporations have consolidated impressive margins of the market and, by affect, hold tremendous influence over veterinary practice norms and business strategies. In 2021, it was estimated that nearly half of all companion animal clinical revenue in the United States arose from corporate practice (Kogan and Rishniw, 2023). Many clinicians are skeptical that the stakeholder power generated through consolidated ownership and private equity will guarantee higher quality of care and fair prices, although benefits such as predictable hours and higher institutional resources could benefit One Health messaging in corporate contexts (Ruiz, 2019; Smither, 2015; Kogan and Rishniw, 2023). In 2023, Kogan et al. found that 12% of veterinarians in their survey (n=896) preferred working for corporate practice, compared to 55% who preferred private practice (Kogan and Rishniw, 2023). While there is some evidence that corporate environments may currently offer lower pricing schedules, the rise of dominant market ownership may threaten future competitive pricing, as has been seen by other industries including human healthcare (Khan, 2021; Dafny, 2021; Kogan and Rishniw, 2023). Consolidation is also under growing scrutiny from the wider public, as seen by the publication of 'Big Vet' articles in The Atlantic, CBS News, and Bloomberg, highlighting the importance of community-focused veterinary service delivery (Carrol, 2023; Novak, 2025; Bryant, 2023; Olen, 2024). Notwithstanding the uncertain impact of these trends on financial accessibility to and public perception of veterinary services, it remains to be seen if corporate practice will effectively leverage the veterinarian to accomplish non-financially incentivized tasks in benefit of the broader public.

Despite these trends, domestic animals still introduce conservation hazards and embody risk arising from wildlife and natural environments (Mendoza Roldan and Otranto, 2023). Standard prevention protocols for dogs and cats target multiple pathogens arising from peri-domestic wildlife or arthropod vectors, and the ecosystem impact of free-roaming and feral dog and cat populations through predation of small mammals and birds is widely recognized, driving local extinction in some cases (Silva-Rodriguez and Sieving, 2012; Medina et al., 2011; Twardek et al., 2017; Day et al., 2012). Companion animals and livestock may also become a prey source for large carnivores, increasing human-wildlife conflict and threatening biophilia (Hughes and Macdonald, 2013). To complicate management, the variability of public perception of free-roaming domestic animals often obstructs regulatory support (Lord, 2008). The agricultural sector may be a step ahead and addresses risks posed by the domestic-wildlife

interface by supporting agriculture extension agents work closely between industry and university veterinary medicine and animal science departments to provide producers with evidence based communications, often through a One Health lens. Analogous interface between companion animal stakeholders has not been widely adopted. Some pet health programs explicitly incorporate a One Health paradigm into general practice to link patient and client care with broader community health concerns, such as those through the University of Washington, University of Minnesota and more broadly through zoo education programs (Minnesota, 2025; Washington, 2018). However, such programs often operate as non-profits relying on subsidies or fixed-payment structures and may not provide a viable solution for veterinarians in fee-for-service settings (Blackwell and O'Reilly, 2023; Coalition, 2018, Garabed et al., 2022).

Contemporary representation of Human-Animal Bond

The expansion of companion animal clinical practice in the United States is also moderated by the increasing emphasis of the Human-Animal Bond (HAB), and more specifically the human-pet bond, a dynamic deserving unique attention. Research of the HAB indicates pet ownership benefits to mental and physical health, although there is need to standardize metrics across research (Rodriguez et al., 2020; Ellis et al., 2024; Michigan, 2019, Sara Hussein, 2021). Human-animal relationships, directly and via zoonoses, have long been powerful representations in contemporary art, seen in contemporary productions such as Netflix's "Sweet Tooth" and the recurring tropes in Wes Anderson's filmography (Asenath and Santhanalakshmi, 2021; Martinelli and Lankauskaitė, 2022; Sadaf Ashraf and Farooq, 2024). Within this context, veterinary practice benefits from the rise of the HAB, as pet owners become increasingly concerned with pet health outcomes and the positive impacts owning pets may bring. The increased veterinary business opportunities may further improve animal welfare by increasing clients' veterinary care seeking behaviors (Rault et al., 2020). Veterinary health corporations include purported benefits within their communication campaigns and often conduct their own client surveys research that underline their prioritization of this relationship (Hospital, 2020, 2016). Veterinary care advancements often accompany cultural shifts towards individual pet ownership, which can be observed globally, too, as veterinary clinical markets emerge alongside economic development (Parlasca et al., 2023; Mohamud et al., 2023; Gizaw et al., 2023).

However, in its current formulation in the veterinary services industry, the HAB nests benefits at the level of the individual relationship – i.e. between companion animals and their caretakers – without drawing on the benefits of the HAB to communities and ecosystems. This isolates veterinary patients and clients from the networks within which they live, decreasing the practitioner's opportunity to communicate through a One Health lens. Without recognizing the broader context of veterinary disease

and interspecies contact networks, management of this relationship in the clinic will not be sustainable at scale (Curran, 2017). Future veterinary public health research and business strategies should prioritize evaluating community impacts of human-animal relationships, such as the cumulative impact of pet ownership and veterinary health behavior and health promotion on sociology (rather than psychology) and broader human-nature relationships - expanding the paradigm of the HAB to routinely include wildlife and shared ecosystems as stakeholders within the veterinary healthcare community (Andersen et al., 2013). This approach recognizes that the human animal bond is a shared resource and thus can be situated closer to the base of the health impact pyramid, where structural and socioeconomic interventions can provide more effective upstream strategies, similar to zoonoses risk communication and other biophilic messaging (Frieden, 2010).

Solutions

Current trends leave a gap for biophilic conservation and One Health messaging within clinical practice, where currently the time, energy, and resource constrained practitioner currently must strategize their own approach to these goals. Opportunities exist for academic training and professional pipelines to adapt and I present the following solutions as logistically feasible near-term opportunities to provide support for the veterinarian's responsibility to serve as One Health and wildlife conservation messengers.

Human-animal bond as natural capital

Natural capital refers to the 'living and nonliving components of ecosystems - other than people and what they manufacture - that contribute to the generation of goods and services of value for people' (Guerry et al., 2015). Domestic animals represent a link to ecosystems with dual trade-offs. Pets may bear risk via wildlife borne disease, including zoonoses, from entering wild areas - as such is the case for hunting, sledding, and other working dogs - but they may also introduce risk to wildlife through potential ecosystem disturbance (Crowley et al., 2020; Toepp et al., 2018). Characterizing the human-animal bond without recognizing the broader context of veterinary disease and community networks will prevent sustainable development of clinical management strategies at scale (Tam et al., 2013). Zoonoses prevention and the promotion of biophilia are resources that provide value through protection of health and nature - which is more easily conceptualized as the absence of a hazard, such as pathogen infection, human-wildlife conflict, or domestic animal-wildlife conflict, respectively. Thus, a paradigm shift in veterinary profession recognizing the human-animal bond as a resource akin to natural capital, will have a downstream positive impact on the veterinary clinician's ability to communicate about zoonoses through a biophilic lens (Munawar, 2024). Such representation has been advanced in the sustainability and social sciences, but it has not yet been widely adopted within

veterinary public health research and clinician training, where instead the market perceptively drives HAB implementation (Konstantinova et al., 2021).

Future research should aim to clarify the value of the human-animal bond at community levels by strengthening links between appropriate socioeconomic measures, cultural values, and ecosystem health with veterinary management strategies. Future epidemiological studies may incorporate methods native to ecology and social sciences, such as participatory pathway analysis, to conceptualize how the human-animal bond impacts health and population management strategies and changes over time (Su et al., 2024). Community and veterinary focus group meetings with standardized criteria for feedback evaluation, such as weighted sum or weighted product models, may be used to engage communities, rank stakeholder priorities, and thus ensure sustainable veterinary service development (Puska et al., 2022; Ayan et al., 2023). Implementation and evaluation at local scales underscores the need for additional extension infrastructure serving public health, veterinary clinician, and wildlife stakeholders in tandem. With appropriate planning, such approaches could simultaneously advance local and state initiatives for conservation and public health management, as they relate to veterinary clinical practice.

Extension positions for one health engagement at companion animal practice

Veterinary extension programs emerged at veterinary and animal science colleges as cooperatives between academic institutions, industry, and state and federal agricultural departments to advance agricultural and public health through dissemination of research and technical information (Congress, 1914). Analogous work targeting companion animal practice would empower the pet health sector to appreciate One Health, local zoonoses risk, and local conservation issues. Importantly, providing structural support for such communications elevates responsibility for generating locally contextual One Health messages from individual clinicians to the business and regulatory structures that support veterinary health deployment. Extension agents would serve veterinary clinics directly and the broader community with messages emerging from timely science and regulatory directives. Extension positions should be placed at academic or state government institutions and funded through good faith co-sponsorship of various private business, corporate, professional organization, and government (including academic) sources that seek to moderate the deployment of veterinary services for various private and public goals.

A third-party agent simultaneously avoids putting additional strain on the time constrained practitioner while contributing infrastructure that delivers non-monetary incentivized services to the community. Candidate strategies could be identified centrally through extension programs and then specified to local clinical contexts. For example, Reaser et al. propose a 'Love Them and Leave Them' messaging campaign to prevent zoonoses and promote biophilia (Reaser et al., 2025). Environmental psychology has also posited numerous design strategies for incorporating biophilia into

servicescapes, and art demonstrations may be used to facilitate a nuanced and further reaching community footprint (McGee and Marshall-Baker, 2015; Beaumont, 2024). With adequate time and energy resources, increased engagement in One Health and biophilic messaging may also help veterinarian efficacy and increase emotional rewards, and support resources would avoid adding on to burnout (Clise et al., 2021). Systematic tracking of clientele and veterinary attitudes within locally catered and standardized program evaluations would work align this model with federal strategic frameworks aiming to expand the One Health workforce (Stel and Banach, 2023; Behraves et al., 2023).

Discussion

The veterinary profession is experiencing growth that highlights the dominance of companion animal clinical practice career pipelines, fee-for-service models, and the rise of corporate practice. These trends incidentally may limit the reach of veterinarians as One Health communicators. I propose two solutions to support the companion animal veterinarian's role as a One Health communicator. First, the veterinary clinical sciences, namely through academic training institutions, should advance the conception of the human-animal bond as a community resource similar to natural capital, rather than a phenomena solely benefiting pets and pet owners. Broadly, this recommendation could be seen as an analogous effort to communities creating more human-nature interactions – such as the urban planning of green and blue spaces, primary school programs exposing students to nature, and know-your-farmer programs – and aligns with the American Association of Veterinary Medical Colleges recognition of One Health as a strategic approach towards advancing global well-being (Flint, 2013; AAVMC, 2014; Kim et al., 2021; USDA, 2016). Second, industry and public co-sponsored veterinary extension positions should be placed at veterinary colleges or state agencies to disperse One Health and conservation information to clinical practices. These actions allow for the continued development of the veterinary profession while increasing the stakeholder power of veterinary clinicians as community members and experts in science and health practice. Such action aims to provide nested space and strategy for organizing research and cross-sectoral allocation of resources, which is a primary constraint when operationalizing One Health goals (Destoumieux-Garzon et al., 2018).

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

MO: Conceptualization, Writing – original draft.

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Conflict of interest

The authors declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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