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OPINION

# The WOAH global wildlife health collaborating centre network (WOAH-WildNet): A coordinated and transformative approach to global wildlife health challenges

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## Introduction

Wildlife health is integral to functioning, complex ecosystems [1], directly and indirectly influencing the health of people, animals, plants, and the environment [2–4]. Healthy wildlife populations are essential for ecosystem services and are at the heart of the One Health approach [3,4], which aims to sustainably balance and optimize the health of people, animals, and ecosystems through multisectoral and transdisciplinary collaboration [5].

Despite its importance, wildlife health initiatives often operate in silos, limiting capacity to address transboundary threats such as emerging diseases, pollution, and environmental changes. Anthropogenic changes, including habitat loss, degradation, fragmentation, and unsustainable harvesting, exacerbate wildlife health challenges [6–9]. These pressures disrupt species biology and alter host-pathogen dynamics [10–12], underscoring the importance of coordinated collective action in addressing

harmful effects on the health of wild animals. While local conservation efforts are vital, long-term success in safeguarding biodiversity requires a unified, global network. For instance, without harmonized surveillance and response systems, individual institutions cannot effectively track pathogens across borders or share diagnostic capabilities.

The World Organisation for Animal Health (WOAH) Collaborating Centre Network for Wildlife Health—WOAH-WildNet—was established to bridge these gaps. By fostering global collaboration, sharing resources, and enabling data exchange, WOAH-WildNet provides a transformative, systems-based approach to wildlife health, managing risks, and enhancing ecosystem resilience. Central to this mission is breaking down silos to promote intersectoral coordinated responses to complex wildlife health challenges.

## The WOAH collaborating centre network for wildlife health

The WOAH-WildNet aims: "*To maintain a global network of wildlife health institutional leaders that support knowledge development, information exchange, and expertise sharing; by enhancing communication, collaboration, and engagement among Collaborating Centres to advance wildlife health for WOAH Members around the world.*"

The network aims to enhance global wildlife health by supporting and coordinating efforts among the WOAH Collaborating Centres (https://www.woah.org/en/what-we-offer/expertise-network/collaborating-centres/), Reference Centres, and other wildlife health institutions of international repute. WOAH-WildNet provides a platform for sharing scientific expertise among its network members and facilitates a systems approach by enabling transformative processes through the Four Cs: Communication, Coordination, Collaboration, and Capacity Strengthening [5], to increase resilience among its network institutions [13].

The network's transformative potential lies in its ability to operationalize One Health in a more resource and time-efficient manner through coordinated implementation and embed wildlife health into One Health, moving beyond conceptual alignment (Fig 1). WildNet aims to shift wildlife health from a project- or outbreak-based reactionary approach to a standards-aligned and systems-based transformative approach. It can do so by connecting technical excellence (including diagnostics, surveillance, and policy) with institutional mechanisms (such as standards adoption, training, and data sharing) across 183 WOAH Member countries and territories. For example, the network can help harmonize protocols to diagnose harmful infectious pathogens, such as avian influenza virus, in wildlife across multiple continents, enabling cross-border data comparability that—on a global scale—did not previously exist. In contrast, fragmented responses to previous wildlife disease outbreaks—such as the independent national investigations during chytrid fungus emergence that caused the collapse of many amphibian populations—demonstrated the inefficiencies and lost opportunities that WildNet could now address through shared standards, open communication channels, and joint training. These examples show how the network could convert siloed national and reactive expertise into a globally coordinated,

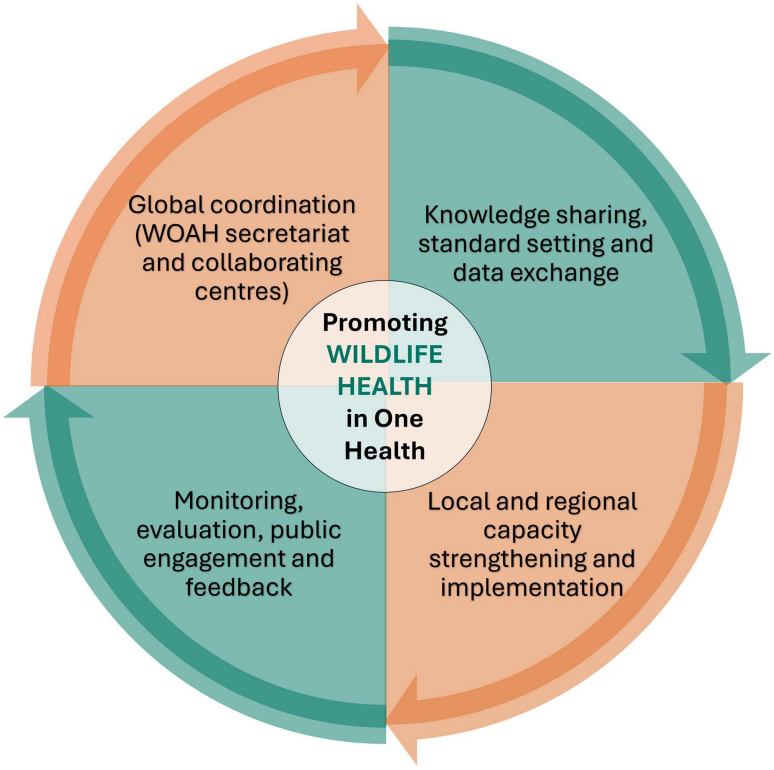


**Fig 1. The World Organisation for Animal Health (WOAH) Collaborating Centre Network for Wildlife Health (WOAH-WildNet) transformative cycle links global coordination, knowledge exchange, local implementation, and feedback within a One Health framework, illustrating how continuous collaboration drives adaptive and resilient approaches to global wildlife health.** This figure was created by the authors and is published under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

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proactive, standards-aligned systems-based approach, representing a genuine transformative change in how wildlife health is governed and practiced.

Established in 2023, the network currently comprises 19 founding designated WOAH Collaborating Centres spanning five continents, supported by a Secretariat and Chairs. The network offers several unique advantages. First, it is mandated by the WOAH's Wildlife Health Framework and backed by WOAH, a 100-year-old intergovernmental organization and the global authority on animal health. This multilateral backing provides the capacity to translate science into international standards, including the WOAH Terrestrial and Aquatic Codes and the WOAH Wildlife Health Framework (2021), which guide the 183 Members (States and Territories) of WOAH in surveillance, biosecurity, and safe wildlife trade practices. Unlike other networks that focus on single diseases or regions, WOAH-WildNet provides the first global platform that unites international standards and authorities, such as the WOAH Terrestrial Animal Health Code and the Aquatic Animal Health Code, with scientific coordination. This dual role facilitates real-time data sharing and standardized protocols across all wildlife health domains.

WOAH-WildNet brings together multidisciplinary and multisectoral expertise to address complex wildlife health challenges in terrestrial, marine, and freshwater aquatic ecosystems. The network draws on wildlife risk management expertise, epidemiology, pathology, genetics, bioinformatics, conservation biology, public health, environmental, and social sciences, incorporating systems thinking within the One Health approach to ensure inclusive, effective stakeholder engagement.

## Network activities and impact

WOAH-WildNet supports the development of standards and guidelines, including chapters relevant to wildlife health in the WOAH Terrestrial and Aquatic Manuals, identifies gaps in planning and implementing wildlife health initiatives at the global level, and contributes to the WOAH Wildlife Health Framework implementation [14]. It also serves as a resource pool for *ad hoc* requests for information from WOAH and its 183 Members promoting evidence-based decision making.

The network is building on scientific excellence to improve the health of wild terrestrial and aquatic animal populations through state-of-the-art research and science-policy translation. It is contributing to the development of wildlife health standards, risk guidance, recommendations, and plans through engagement with national veterinary authorities, conservation agencies, Indigenous and local community representatives, nongovernmental organisations (NGOs), academia, and research institutes using participatory workshops, simulation exercises, and co-development of surveillance priorities to ensure equitable inclusion and locally relevant outcomes, while transparently communicating both the progress achieved and challenges encountered. Current undertakings include the development of a standard operating procedure for wildlife outbreak investigations and a gap analysis for Chapter 1.1.2 of the WOAH Terrestrial Manual (collection, submission, and storage of diagnostic specimens) so that the manual can be updated to better meet the needs of WOAH members and all stakeholders in wildlife disease investigations.

The network will connect with other relevant networks, such as those using Global Early Warning System (GLEWS+; a collaborative early warning and risk-assessment platform focused on zoonotic and animal disease threats at the human-animal-environment interface), implementing the FAO-UNEP-WHO-WOAH Quadripartite One Health Joint Plan of Action, IUCN SSC's in using the risk analysis approach to improve wildlife health outcomes, and Wildlife Disease Association (WDA) regional networks. We are leveraging overlapping network memberships to maximize synergies in the wildlife health and broader One Health domains, including livestock, pet, human, and environmental health. It will draw on this diverse expertise to develop sustainable surveillance approaches and strengthen global wildlife health initiatives by addressing the evolving needs of WOAH Members. Together, this network offers significant opportunities for collaboration, expertise sharing, standardizing processes, and information (including protocol) exchange toward addressing global wildlife health challenges. It will also enhance the understanding and management of risks to both wildlife health and the stability of the network itself by forming resilient and synergistic partnerships that recognize the needs, motivations, and values of all stakeholders [15].

The network will become sustainable in the long run through its members taking ownership, maintaining motivation levels, and mobilizing financial and human resources through WOAH and the network constituents. Integrating network activities into network member workflows and capacity-building approaches will be key to long-term success.

## Outlook

A global wildlife health Collaborating Centre network can be transformative by promoting a shift from isolated reactions to local wildlife health challenges to proactive, coordinated, preventative approaches that connect local solutions through global coordination and local actors to broader expertise. By uniting expertise across disciplines and regions, the network will help enable early detection of emerging diseases, rapid and more effective responses to disease outbreaks, novel solutions to long-term problems, and data-driven conservation strategies that can be implemented at the required local, regional, or global geographical scale. It will foster standardized surveillance, enhance knowledge exchange, and bridge gaps between wildlife, domestic animal, and human health, advancing the One Health approach. This transformation would help mitigate biodiversity loss and zoonotic spillover risks and build resilience against future pandemics and outbreaks in humans and animals, ensuring a more sustainable coexistence between humans and nature. By advancing the role of wildlife health within the One Health approach, WOAH-WildNet aims to play an important role in addressing global health and conservation challenges.

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## References

1. Liu J, Dietz T, Carpenter SR, Alberti M, Folke C, Moran E. Complexity of coupled human and natural systems. Science. 2007;317(5844):1513–6. https://doi.org/10.1126/science.1144004
2. Barroso P, Relimpio D, Zearra JA, Cerón JJ, Palencia P, Cardoso B, et al. Using integrated wildlife monitoring to prevent future pandemics through one health approach. One Health. 2022;16:100479. https://doi.org/10.1016/j.onehlt.2022.100479 PMID: 36600947
3. Ribas MP, García-Ulloa M, Espunyes J, Cabezón O. Improving the assessment of ecosystem and wildlife health: microbiome as an early indicator. Curr Opin Biotechnol. 2023;81:102923. https://doi.org/10.1016/j.copbio.2023.102923 PMID: 36996728
4. Smits JEG, Fernie KJ. Avian wildlife as sentinels of ecosystem health. Comp Immunol Microbiol Infect Dis. 2013;36(3):333–42. https://doi.org/10.1016/j.cimid.2012.11.007 PMID: 23260372
5. One Health High-Level Expert Panel (OHHLEP), Adisasmito WB, Almuhairi S, Behravesh CB, Bilivogui P, Bukachi SA, et al. One Health: a new definition for a sustainable and healthy future. PLoS Pathog. 2022;18(6):e1010537. https://doi.org/10.1371/journal.ppat.1010537 PMID: 35737670
6. Thompson RCA. Parasite zoonoses and wildlife: one health, spillover and human activity. Int J Parasitol. 2013;43(12–13):1079–88. https://doi.org/10.1016/j.ijpara.2013.06.007 PMID: 23892130
7. Díaz SM, Settele J, Brondízio E, Ngo H, Guèze M, Agard J, et al. The global assessment report on biodiversity and ecosystem services: summary for policy makers; 2019.
8. Roy H, Pauchard A, Stoett P, Renard Truong T, Bacher S, Galil B, et al. Summary for policymakers of the thematic assessment report on invasive alien species and their control. IPBES Invasive Alien Species Assessment; 2023. p. 1–56.
9. Marrana M. One Health. In: Prata JC, Ribeiro AI, Rocha-Santos T, editors. Academic Press; 2022. p. 73–111.
10. Williams PC, Bartlett AW, Howard-Jones A, McMullan B, Khatami A, Britton PN, et al. Impact of climate change and biodiversity collapse on the global emergence and spread of infectious diseases. J Paediatr Child Health. 2021;57(11):1811–8. https://doi.org/10.1111/jpc.15681 PMID: 34792238
11. Guth S, Hanley KA, Althouse BM, Boots M. Ecological processes underlying the emergence of novel enzootic cycles: arboviruses in the neotropics as a case study. PLoS Negl Trop Dis. 2020;14(8):e0008338. https://doi.org/10.1371/journal.pntd.0008338 PMID: 32790670
12. Prüss-Üstün A, Wolf J, Corvalán C, Bos R, Neira M. Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks. World Health Organization; 2016.

13. Occhipinti J-A, Hynes W, Geli P, Eyre HA, Song Y, Prodan A, et al. Building systemic resilience, productivity and well-being: a Mental Wealth perspective. BMJ Glob Health. 2023;8(9):e012942. https://doi.org/10.1136/bmjgh-2023-012942 PMID: 37748793

14. Food and Agriculture Organization of the United Nations, World Health Organization, United Nations Environment Programme, World Organisation for Animal Health. One health joint plan of action (2022–2026): working together for the health of humans, animals, plants and the environment. World Health Organization; 2022.

15. Michie S, Thomas J, Johnston M, Aonghusa PM, Shawe-Taylor J, Kelly MP, et al. The Human Behaviour-Change Project: harnessing the power of artificial intelligence and machine learning for evidence synthesis and interpretation. Implement Sci. 2017;12(1):121. https://doi.org/10.1186/s13012-017-0641-5 PMID: 29047393