

From Pandemics to Prevention: Why One Health Approach Must Guide the Future of Global Health

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The COVID-19 pandemic exposed, in the most devastating terms, a truth many of us have long known: human health cannot be separated from animal health or the health of our shared environment. The One Health approach — an integrated, multi-sectoral strategy that recognizes the interdependence of people, animals, plants, and ecosystems has moved from a persuasive academic idea to a necessary foundation for prevention, preparedness, and resilience against future health threats.(1,2)

Historical Roots and Evolution of the One Health

Concept: The intellectual roots of One Health trace back to the "One Medicine" thinking of veterinary and comparative medicine, and more recently, it has been codified as a public-health strategy as zoonoses, antimicrobial resistance (AMR), and ecosystem change accelerated.(3,4) Recognizing the need for coordinated global action, the Food and Agriculture Organization (FAO), World Health Organization (WHO), World Organisation for Animal Health (WOAH), and United Nations Environment Programme (UNEP) formalized structures such as the One Health Joint Plan of Action (2022–2026) to operationalize One Health at global and country levels.(5)

Why One Health is Indispensable Today: The majority of emerging infectious diseases are zoonotic. Land-use change, deforestation, wildlife trade, and intensifying agriculture have expanded the human-animal interface, increasing spill over risk.(6) Tackling these drivers requires coordinated surveillance across humans, livestock, and wildlife,

as well as addressing upstream ecological and socio-economic causes rather than reacting only downstream.

Antimicrobial resistance is also fundamentally a One Health problem. Antimicrobial use and waste across human medicine, veterinary practice, and agriculture create selective pressures that transcend sectoral boundaries.(7) Effective stewardship and surveillance must thus span the antimicrobial lifecycle.

Climate change further compounds these challenges. Rising temperatures, changing rainfall patterns, and habitat shifts alter disease ecologies, food systems, and water security.(8) Such environmental pressures magnify health inequities: the same communities that bear the brunt of environmental degradation are often those with the weakest health systems.(9) A One Health orientation aligns prevention and adaptation so that health, livelihoods, and ecosystems are jointly protected.

Implementation Gaps and Persistent Challenges:

Translation and implementation of One Health into consistent, scalable outcomes remains challenging with obstacles like,

- Siloed financing and short funding cycles that discourage long-term preventive investments.(10)
- Fragmented data systems and incompatible surveillance standards across sectors.
- Workforce shortages and limited incentives for cross-disciplinary career paths.

- Due to lack of standardized One Health metrics measuring impact is difficult.(11)
- Equity concerns — global initiatives can under-prioritize local needs and community knowledge.

Addressing these gaps requires shifting global and national priorities from episodic emergency funding to sustained prevention, and from programmatic pilots to systems change.

A Pragmatic Agenda for Research, Policy, and Practice: To move One Health from principle to routine practice certain strategies can be adapted such as,

- Countries should establish permanent One Health coordination units with clear mandates, budget lines, and legal authority to convene health, agriculture, environment, and development sectors.
- International donors and domestic budgets must reallocate resources toward surveillance, ecosystem protection, safer livestock practices, and community-based interventions that reduce spill over risk.
- Interoperable systems and cross-sectoral data standards are essential for early detection and timely response. Legal frameworks must balance rapid data sharing with ethics and privacy.
- Antimicrobial Stewardship Programmes must integrate human, animal, and environmental pathways, from pharmaceutical stewardship to waste-management policies.
- Invest in formal training programs, joint field placements, and career tracks that reward cross-sectoral competencies.
- Interventions must be co-designed with affected communities, indigenous peoples, and small-holder producers to ensure cultural fit and sustainability.
- Define a concise set of indicators spanning governance, surveillance, prevention activities, and outcomes to allow benchmarking and accountability.

A Call to Action: One Health is not an optional intellectual exercise; it is an operational necessity. The international community's recent policy advances – including the Quadripartite's Joint Plan

of Action provides a blueprint, but words alone are inadequate. We must convert commitments into permanent institutions, sustained financing, interoperable information systems, and inclusive programs that prevent harm upstream rather than only reacting downstream. The next global pandemic, or the insidious spread of resistant pathogens, will not respect disciplinary boundaries. Only an integrated, well-resourced, equity-centered One Health approach can offer enduring protection for people, animals, and the ecosystems on which we all depend.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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