

Original Article

Getting Ready for One Health Approach to Tackling Global Health Insecurity

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ABSTRACT

There has been an ever-rising need for multidisciplinary, multisectoral researchers to pull their expertise together in tackling today's mounting global health insecurity. The rising incidences of emerging and re-emerging diseases coupled with the disturbing issue of antimicrobial Resistance (AMR) call for a new approach to tackling these challenges. The One (OH) Health approach to research stipulates that human, animal, and environmental health questions be evaluated in an integrated and holistic manner that would provide a more balanced view of the interconnections of the humans, animals, and the environments, with potential solutions, than would be possible with siloed approach. However, OH approach is complex and faced with considerable challenges to implement as it lacks a uniform guidance and framework to guide implementation. In this Commentary, attempts are made to elucidate more what OH approach is all about, give a succinct history of emergence of OH approach and discuss important factors that need to be considered before implementing a OH approach in research.

Keywords: Ecohealth, OH, One Health, One Medicine, One World One Health..

INTRODUCTION

Human development has come with undeniably massive environmental disruptions and ecosystem alterations. The environmental disruptions have led to climate change, desertification, loss of biodiversity reflecting in species extinction. This has inspired ideas on how to sustain the environment and the ecosystem, ultimately leading to the formulation of sustainable development goals with the introspection that the well-being of our planet can only best be handled with due consideration and integration of both human, animal, plant, and ecological environment health.^{1,2} The One Health (OH) approach to tackling

health issues refers to the collaboration of multi-sectoral, multi-disciplinary experts locally and globally, contributing their expertise towards attaining optimal health for humans, animals, and environment. OH, has been defined as “a generalised and flexible term that captures the will to address the complexities and interrelations that exist between human, animal and ecological health”.³ OH involves recognising the connections between all living species and shared spaces. Some have referred to OH as Ecohealth, public health and traditional ecological knowledge.⁴ The World Organisation for Animal Health and the Centres for Disease Control and Prevention and many other

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health organisations see OH as the intersection of three pillars or circles – human health, animal health, and environmental health.^{5,6} (**Figure 1**). One Health is about the health of human beings, animals, plants, and ecosystems. It looks at health through the prism of interdependence existing amongst species living in shared environments, over time and across space.⁷

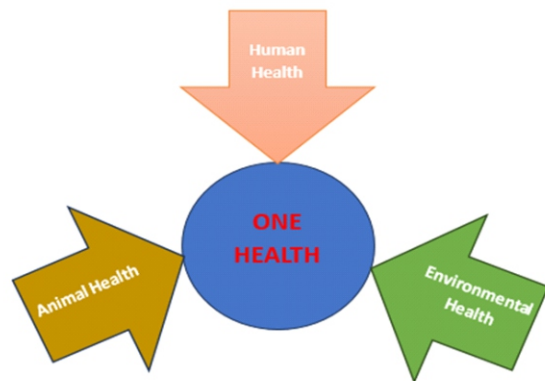


Figure 1. One Health illustration

The Global Health Challenge of Infectious Diseases

Large part of the world's premature death and disability are due to infectious diseases.⁸ Humans', animals', and plants' diseases are caused by bacteria, viruses, protozoa, and other agents.⁹ Increased risk of disease transmission has been attributed to the high pace at which contact between humans, animals, plants, and their shared environment occur.¹⁰ New diseases can erupt as a result of disruption in host characteristics, environmental conditions, and species habitats.^{10,11} This phenomenon could lead to new or emerging diseases as commonly observed with viral diseases becoming as common as emerging and reemerging diseases, in a range of ecological settings globally.^{12,13} About 200 zoonotic agents are recognised by the World Health Organisation (WHO), and many more are being discovered yearly as molecular biology and genomic technology improve and as factors like human encroachment create new opportunities for zoonotic and reverse zoonotic transmissions to occur.^{14,15} Over 70 percent of humans' emerging infections are zoonotic, and about two-thirds of these originate from wildlife or domestic animals.^{13,16} Some of these emerging and re-emerging infectious diseases include dengue, Ebola haemorrhagic fever, yellow fever, chikungunya,

respiratory viral infections such as pandemic influenza H1N1 2009, Avian influenza H5N1, SARS, and H7N9.¹⁷ There is also the ever rising global problem of antimicrobial resistance culminating in pathogens failing to respond to most or essentially all of the available antimicrobials.¹⁸ Today, humans are bedevilled with many opportunities for infectious diseases outbreaks due to the rapid-changing human-animal ecosystems interfaces and a myriad of other factors.¹⁹ These infectious diseases, especially the zoonoses are difficult to control. They need greater and well-coordinated efforts to prevent the establishment of infectious agents in new hosts, and the promotion and maintenance of good health for all species and ecosystems. Based on the foregoing, a OH approach that draws from multiple disciplines and recognises the interdependence of health is all that is required to better prevent, respond to, and reduce health impacts without compromise to our ability to respond in the future.²⁰

Brief History and Evolution of One Health

The concept of One Health approach towards achieving global health security has its historical roots in the understanding of the interconnectedness of the three core aspects of health – human, animal, and environmental. Though, the formal term “One Health” gained traction in the 21st century, the underlying principles of One Health have been acknowledged and practised for many years. In 19th century, comparative medicine was raised to combine physianthropy and veterinary medicine, while in 20th century, a series of concepts were put forward from One Medicine to Ecosystem Health (EcoHealth), with practitioners recognising the similarities between humans' and animals' diseases.²¹ The Ottawa Charter for Health Promotion in 1986 embodied the broader concepts of health and the critical consideration of interrelatedness between health and the environment. This advanced the notion of reciprocal care and pledged to “counteract the pressures towards harmful products, resource depletion, unhealthy living conditions, and environments.”²² The development of One Medicine to One Health concept did not gain prominence until in 1998, when the concept of One Health underwent

careful, practical and seminal validation in Mauritania and Chad.^{23,24} The Wildlife Conservation Society hosted a symposium in New York in 2004 where the Manhattan Principles supporting the concept of One World One Health (OWOH) were established.²⁵ The OWOH approach was formally adopted by the WHO, the Food and Agricultural Organisation (FAO), the World Organisation for Animal Health (OIE), the United Nations System Influenza Coordination, the United Nations Children's Fund, and the World Bank and summarised in the report entitled "Contributing to One World, One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface".²⁶ This unique foundational document was prompted by the 2003 highly pathogenic avian influenza virus (HPAI) H5N1 widespread outbreak that caused a pandemic threat.²⁷ The World Medical Association and the World Veterinary Association in 2012 signed a collaborative Memorandum of Understanding in Bangkok, Thailand to collaborate in carrying out joint educational programmes, responsible use of antimicrobials, cross-species surveillance, and collaborative research.²⁸ One Health laid emphasis on the joint discussion of human, poultry and wildlife, aiming to improve human and animal health through cooperation of multiple sectors relevant to health or to save money and add value to environmental services.^{29,30} Later on, China held their first One Health International forum in Guangzhou in 2014, while Guo-Qiang Chen, an academic from Shanghai Jiao Tong University School of Medicine in 2020, chose "Quan Jian Kang (全健康)" as Chinese translation of One Health.³¹

International organisations and NGOs which over the last two decades have applied One Health approach in their guidelines and practices are associated with the fast-tracked development of One Health. Scientific research institutions in One Health began to be established in many countries including Australia, United States, Canada and others.³² Though, there has been a varied definitions and descriptions of One Health today, however, all share common features.^{33,34}

Important Factors to Consider before

Implementing a One Health approach to Emerging Infectious Diseases

To successfully implement a One Health approach, below is a list of core factors and systems the authors considered very necessary to be on ground:

- 1. Governance and Leadership:** The establishment of a multi-sectoral coordinating committee with balanced representation from human health, animal health, plant health, and environmental health agencies is crucial for successful implementation. Establishment of legislation and policy on human health, animal health and environmental health is needed. Also, a monitoring system should be in place to checkmate and address corrupt practices. Strong leadership and coordination at the national, international or institutional levels is required.
- 2. Surveillance and Early Warning:** Need to development integrated surveillance systems for monitoring infectious disease outbreaks in humans, animals, and the environment, also, there is need to strengthen early warning tools and systems to detect and respond promptly to potential outbreaks.
- 3. Risk Assessment and Modelling:** Need to develop risk assessment tools and be able to conduct comprehensive risk assessments to identify and prioritise potential health threats. Need to develop multidimensional models for risk assessment, prediction of disease spread, comparing of the impact of intervention strategies deployed in OH, and assessing their cost-effectiveness.
- 4. Diagnostic and Laboratory Capacity:** Need to build an enhanced laboratory infrastructure and capabilities for rapid and accurate diagnosis of diseases in humans, other animals, and plants. Promotion of the establishment and use of advanced diagnostic technologies is crucial for OH initiatives.
- 5. Research and Innovation:** Need to invest

in research to unravel the dynamics of infectious diseases at the human-animal-plant-environment interface. Incorporate OH AMR, OH zoonoses, OH ecosystem, etc. into training. Foster innovation in vaccines, therapeutic new drugs discovery, and improved diagnostics.

6. **Capacity building and Training:** Need to build capacity on the healthcare professionals, veterinarians, biologists, environmental scientists etc. by providing them with good training opportunities. Provide more platforms for evidence-based training. Build technical capacity for animal health workforce. To achieve a holistic knowledge base in OH, programmes in medicine, veterinary medicine, and other health professional education programmes should include core competencies related to OH in their curricula.
7. **Communication and Information Sharing:** Establish and strengthen communication channels for timely sharing of information among stakeholders - human health, animal health, and environmental health practitioners. Need to be able to develop and disseminate evidence-based and culturally appropriate messages for a specific audience during infectious disease outbreaks. Need to Implement Risk Communication and Community Engagement (RCCE) strategies to keep the public informed for appropriate response. Also, a need for all sectors involved in OH approach to work together to reduce barriers to information exchange through data privacy sharing agreements and through establishing a rapid approach to information sharing as needed. Furthermore, a need to develop a framework for multisectoral coordination in reporting and communication that guarantees information sharing.
8. **Policy and Legislation:** Need to develop and implement policies that support the integration of OH principles into subnational, national and international health frameworks. Need to put in place policy documents and response plans for prioritised and potential infectious disease outbreaks. Need to have on ground existing legislation and policy that facilitate collaboration across multiple sectors.
9. **International Collaboration:** Need to strengthen intersectoral collaboration locally and internationally, and collaborations with international organisations, such as WHO, FAO, and OIE. This could be realised via establishing interdisciplinary partnerships, leadership and coordination, using a skilled workforce with an emphasis on innovation, research and development. Need to increase investments in joint research data sharing and health data interoperability platforms that will be based on common standards, say, by the WHO.
10. **Environmental Stewardship:** Need to promote well-coordinated and sustainable practices to mitigate environmental factors contributing to infectious diseases, including the inclusion of environmental experts in rapid response team during outbreaks. Need to include relevant indicators in OH reporting systems pertaining to environmental health. Need to consider the impact of climate, deforestation, biodiversity loss, and other environmental changes on health.
11. **Emergency Preparedness and Response:** Need to develop and regularly update contingency plans for responding to health emergencies. Need to organise joint training/workshops and drills involving human, animal, and environmental health experts in readiness for a multidisciplinary rapid response launch in case of outbreaks.
12. **Monitoring and Evaluation:** Need to establish mechanisms (strategic objectives, activities, indicators, means of verification, time frame, and responsible party) for

monitoring and evaluating the effectiveness of OH interventions. Improve future response efforts by recourse to feedback and lessons learned.

- 13. Community Engagement:** Need to engage community members in dialogue on OH initiatives and empower them to play a role in disease prevention and control. Foster community involvement in OH and discuss need for community mobilisers. Need to identify, discuss, and address cultural practices and community-specific factors affecting health outcomes.
- 14. Resource Mobilization:** Need for both local and international partners and stakeholders will to support OH to contribute funds to implement specific OH programmes. Need for national and subnational governments to provide budget lines for OH activities. Need to secure greater government commitment in sustained annual budgetary provisions for OH.
- 15. Adaptive Management:** Need to embrace an adaptive management approach that allows for flexibility in exploring and responding to evolving human, animal and environmental health threats.³⁵ Need to learn by exploring social and institutional issues and from experiences and continuously deploy them to improve the OH framework.

CONCLUSION

A One Health approach is currently being accepted by many as the most effective approach of managing any emerging infectious diseases (EID) threat because the various aspects of the disease is understood across multiple disciplines prompting a holistic approach in tackling it. As has been x-rayed in this commentary, OH approach requires strong government involvement, political will, structured funding that supports intersectoral collaboration, breaking down siloes and building stronger, and more collaborative relationships between departments.

RECOMMENDATION

For effective and successful implementation of OH approach, political commitment, policy formulation, good resource mobilisation, information and knowledge sharing, institutional collaboration, capacity building, civil society and community engagement must be embedded into the approach. OH, promotes interdisciplinary collaboration, this means that several actors from different domains (human, animal and environmental health) must work together. A situation where there are divergent interests, siloes, conflicting priorities, and lack of trust among the interdisciplinary stakeholders, will definitely compromise the success of OH approach.

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