

## Review Article

# One health approach: an integrated strategy

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### ABSTRACT

The One health approach is a collaborative and integrated strategy that recognizes the close interconnection between human, animal, and environmental health, promoted by global health organizations including the World health organization (WHO). It emphasizes multisectoral coordination to prevent, detect, and respond to emerging and re-emerging diseases resulting from human-animal interactions. One health strategy plays a vital role in the present context of increasing threats of zoonotic diseases, antimicrobial resistance (AMR), environmental degradation and climate change throughout the world. India's National one health mission further reinforces this approach by promoting inter-ministerial collaboration and digital surveillance to ensure sustainable health security and improved public health outcomes.

**Keywords:** One health approach, National one health mission, Antimicrobial resistance, Zoonotic infections, Re-emerging infections, Emerging infections, World health organization

### INTRODUCTION

One Health is a newer initiative launched by the Quadripartite partnership comprising the World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), United Nations Environment Programme (UNEP) and World Organisation for Animal Health (WOAH), to address the concept of health in a comprehensive way involving humans, animals and the environment.<sup>1</sup> It is an integrated and unifying approach that recognizes the close interconnection among all the 3 domains and is based on the principle that the health of humans, animals, and the environment is intrinsically interconnected. Humans and animals coexist within shared ecosystems and depend on the same environmental resources for survival and well-being. So, disturbances in any of these domains can have significant implications for human health.<sup>1</sup> A substantial proportion of emerging and re-emerging infectious diseases in humans originates from animal sources,

highlighting the importance of addressing health risks at the human–animal interface. In addition, environmental factors such as water contamination, air pollution, biodiversity loss, and climate change play a critical role in the development and spread of various diseases.<sup>2</sup> So to address all these issues/problems, it requires coordinated efforts of multiple sectors and disciplines at local, national, and global levels to prevent, detect, and respond to health threats, to achieve optimal health and well-being for all.<sup>1</sup>

As per the WHO, "One Health" is an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. The One Health approach promotes interdisciplinary collaboration among medical professionals, veterinarians, environmental scientists, and public health experts to prevent, detect, and respond to

health threats in a comprehensive and coordinated manner.<sup>3</sup>

## HISTORY

The roots of the One health concept can be traced back to the nineteenth century, when Rudolf Virchow emphasised the close relationship between human and animal medicine.<sup>4</sup> However, the modern One health approach gained attention in the early 2000s due to the increasing number of outbreaks of diseases such as COVID-19, SARS, avian influenza, and Ebola. In 2004, the Manhattan Principles were outlined in New York for the One Health approach. Following this, global organizations such as the WHO, the Food and agriculture organization (FAO), and the World organisation for Animal health (WOAH) also adopted and promoted this concept as a global public health strategy.<sup>5</sup>

## RATIONALE

Over the past few decades, the world population has increased and is likely to increase in the future, placing greater demands on healthcare systems, with basic necessities of life like water, food and shelter. Other than this, nearly 75% of emerging human infectious diseases have originated from animals, highlighting the need for integrated disease prevention and control strategies.

Environmental factors such as pollution, contamination, and climate change also further influence the emergence and spread of new infectious diseases affecting both humans and animals. These interconnected challenges made it necessary to adopt a collaborative One health approach, where multiple sectors work together to protect and promote health at the human–animal–environment interface.<sup>6</sup>

## IMPLICATIONS OF ONE HEALTH

Applying this approach to the healthcare system facilitates timely surveillance, early detection, accurate diagnosis, and coordinated management of emerging and re-emerging health threats. Integrated disease surveillance systems strengthen early warning mechanisms and enhance rapid response to emerging health threats. Timely detection of diseases in animal populations plays a critical role in preventing spillover and outbreaks among humans.

Through intersectoral collaboration, the One health approach also contributes to the formulation of effective, evidence-based public health policies. Collectively, these efforts will help in achieving the Sustainable development goals (SDGs).<sup>7,8</sup> Therefore, these preventive measures reduce healthcare costs and disease burden in all three sectors, especially in humans and also contribute to improving food safety, environmental protection, and focusing on achieving sustainable development goals.

## FUTURE PERSPECTIVE

In the present era of artificial intelligence, the integration of digitalization into disease surveillance and healthcare delivery proves a major boon for the One health approach. Advanced digital surveillance systems enable real-time data collection, integration, and analysis across human, animal, and environmental health sectors, allowing early identification of potential health threats. It can further enhance predictive modelling, outbreak forecasting, and pattern recognition, supporting timely decision-making and targeted interventions. By strengthening early warning systems, improving diagnostic accuracy, and facilitating intersectoral data sharing, AI-driven digital health solutions significantly reinforce the effectiveness of One health strategies and preparedness for future health challenges.<sup>9,10</sup>

In 2023, the Government of India initiated the National one health mission, directed by the Office of the Principal scientific adviser to the government of India. It is a coordinated national and global initiative that aims to achieve optimal health outcomes by recognising the close link between human health, animal health, plant health, and the environment. The mission focuses on collaboration among multiple sectors such as public health, veterinary sciences, agriculture, wildlife, environment, and climate change to prevent, detect, and respond to health threats in an integrated manner.<sup>11</sup> It will be directed to strengthen disease surveillance and early warning systems at the human–animal–environment interface. It aims to reduce the risk of emerging and re-emerging diseases, especially zoonotic diseases, antimicrobial resistance, food-borne illnesses, and health impacts related to climate change and environmental degradation.

This One health mission emphasizes inter-ministerial coordination among the Ministry of health and family welfare, the ministry of agriculture and farmers' welfare, the ministry of fisheries, animal husbandry and dairying, and the ministry of environment, forest and climate change. By promoting data sharing, joint outbreak investigations, and coordinated response strategies, the mission helps in improving preparedness and rapid response to public health emergencies.<sup>12</sup> Capacity building is a key component of the One health mission. It supports the training of medical professionals, veterinarians, environmental scientists, and frontline workers in One health principles. It also encourages research, innovation, and the use of modern technologies for integrated disease surveillance and risk assessment.<sup>13</sup>

To conclude, the National one health mission aims to move from a reactive, disease-specific approach to a proactive, preventive, and holistic health system. Addressing health challenges in all of these domains, it contributes to achieving sustainable development.

## ROLE OF COMMUNITY IN THE ONE HEALTH APPROACH

Active community involvement plays a very crucial role in ensuring the successful implementation of this mission. For example, in Assam, a pilot project was conducted on a mobile-based infectious disease surveillance system that demonstrated over 72% people participation from rural areas, resulting in the timely reporting of fever cases and early outbreak alerts.<sup>15</sup> Similarly, in Maharashtra, an intervention study was conducted among tribal areas showing 40% rise in care-seeking behaviour after an animal bite within 1 year of an awareness session/intervention.<sup>16</sup> These examples reflect the essentiality of community-participation models designed with the local context. So, the government and all stakeholders should sensitise and encourage the community to frequently self-report unusual health events.

## CONCLUSION

As prevention is always better than cure, the One health approach follows this by promoting integrated surveillance, early warning mechanisms, and risk reduction at the source—whether in animals, humans, or the environment. Strengthening collaboration between medical, veterinary, environmental, and agricultural sectors improves policy formulation, optimizes resource utilisation, and reduces the overall disease burden and healthcare costs. Overall, adopting the One health approach in public health practice can enhance health security, promote sustainable development, and contribute significantly to achieving the goal of “Health and Wellness for All,” ensuring a safer and healthier future for present and future generations.

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