



Review Article

Copyright © All rights are reserved by Erhan OKTAY

One Health: The Indivisible Unity Of Humans, Animals And The Environment

Erhan OKTAY*

Turkish Armed Forces General Staff G.A.T.A. Command, Ankara, Turkey

Corresponding authors: Erhan Oktay, Specialist Biochemical-Senior Colonel, G.A.T.A. Command, Ankara, Yaşamkent Mahallesi 3272. Cadde, Basın Kulüp-1 Sitesi A13 Çayyolu-Çankaya-Ankara 06810, Turkey

Received Date: July 24, 2026**Published Date:** July 29, 2026

Introduction

In recent years, the world has faced a succession of major health crises. The COVID-19 pandemic, avian influenza, monkeypox, antibiotic resistance, the effects of climate change on health, and the loss of biodiversity have clearly demonstrated that health is not shaped solely by hospitals or individuals' lifestyles. Human health is directly linked to animal health, environmental health and the balance of ecosystems. The approach that forms the basis of this understanding is known as 'One Health'. One Health is an interdisciplinary and multi-sectoral approach that addresses the health of humans, animals, plants and the environment not in isolation, but within a framework of mutual interaction. Under this model, medicine, veterinary medicine, environmental sciences, public health, biology, ecology, agriculture, food safety and policymakers work together towards a common goal. The aim is not merely to treat diseases, but to prevent their emergence, protect healthy ecosystems and create a sustainable way of life and future [1].

Keywords: Zoonosis; Antibiotic Resistance; One Health; Food Safety; Pandemic

The Historical Development of the 'One Health' Concept

Recognition of the link between human and animal health is by no means a recent phenomenon. Since ancient times, it has been observed that many infectious diseases are transmitted from animals to humans. However, the 'One Health' concept, in its modern sense, gained prominence particularly in the late 20th century and early 21st century. The 'One Medicine' approach, put forward by the veterinary surgeon Calvin Schwabe, advocated for collaboration between human and veterinary medicine. Subsequently, the 'One Health' concept was developed by incorporating environmental factors into this relationship. Today, the World Health Organisation (WHO), the World Organisation for Animal Health (WOAH), the Food and Agriculture Organisation of the United Nations (FAO) and

the United Nations Environment Programme (UNEP) support the "One Health" approach [2].

The Fundamental Principles of the One Health Approach

Collaboration lies at the heart of the One Health approach. No single discipline can solve all health problems on its own. More effective results will be achieved when public health experts, veterinary surgeons, environmental engineers, epidemiologists, microbiologists, ecologists and public administrators work together. Other key principles of this approach include the establishment of early warning systems, controlling diseases at source, ensuring environmental sustainability, sharing scientific data and raising public awareness [2].

The Importance of Zoonotic Diseases

One of the most important areas of focus within the One Health approach is zoonotic diseases. Zoonoses are infectious diseases that can be transmitted from animals to humans. Scientific studies show that the majority of new infectious diseases observed in humans are of animal origin. Examples of the most deadly diseases include COVID-19, SARS, MERS, Ebola, rabies, avian influenza, swine flu and Crimean-Congo haemorrhagic fever. Factors contributing to the emergence of these diseases include increased contact between humans and wildlife, habitat loss, global travel, climate change and intensive livestock farming practices. Through the One Health approach, the aim is not only to treat humans but also to identify animal reservoirs of disease, reduce environmental risks and prevent new outbreaks [3].

Antimicrobial Resistance and One Health

The indiscriminate use of antibiotics is one of the greatest health threats of our time. Just as the unnecessary use of antibiotics in humans does, the uncontrolled use of antibiotics in the livestock sector also contributes to the development of resistant bacteria. Resistant bacteria can circulate between humans, animals, food products and the environment. For this reason, antimicrobial resistance is not merely a medical problem. The 'One Health' approach aims to establish coordination between human and veterinary medicine by promoting the prudent use of antibiotics. Furthermore, the sharing of laboratory data, the creation of resistance maps and the establishment of joint surveillance systems play a significant role in combating resistance [4].

One Health from a Food Safety Perspective

The production of healthy food is fundamental to human health. The food chain comprises the stages of agriculture, livestock farming, processing, storage, transport and consumption. A problem arising at any link in the chain can affect the health of millions of people. Bacteria such as Salmonella, E. coli, Listeria and Campylobacter can cause serious outbreaks under unsuitable production conditions. The 'One Health' approach aims to strengthen biosecurity measures throughout the entire process, from farm to fork. Regular inspections by veterinary surgeons, hygiene standards, reliable production techniques and consumer education are key components of this process [2,4].

Environmental Health and the Protection of Ecosystems

When environmental health is compromised, human and animal health are also adversely affected. Deforestation, air pollution, water pollution, the loss of biodiversity and climate change facilitate the emergence of new diseases. The destruction of natural habitats causes wild animals to venture closer to human settlements. Consequently, the risk of transmission of zoonotic diseases increases significantly. At the same time, polluted air and water increase the incidence of chronic diseases. The One Health approach regards environmental protection as an integral part of health policies [5].

The Impact of Climate Change on Health

Global warming is not only an environmental issue but also a serious public health concern. Rising temperatures are expanding the habitats of mosquitoes, ticks and other vectors. This situation may affect the spread of diseases such as malaria, dengue fever, Zika and West Nile virus. In addition, extreme weather events, droughts, floods and forest fires have a negative impact on both physical and mental health. A decline in agricultural production threatens food security. The One Health approach regards combating climate change as a key component of health systems [5].

Lessons Learned from Pandemics

The COVID-19 pandemic has strongly highlighted the necessity of the One Health approach. During the pandemic, it was not enough simply to strengthen hospitals; laboratories, veterinary research, epidemiological surveillance systems, international data sharing and environmental research also took on great importance. The pandemic has shown that health systems must invest not only in treatment but also in disease prevention – that is, in preventive medicine. Early warning systems, rapid diagnostic methods and interdisciplinary collaboration will help to mitigate the impact of future outbreaks [1].

The Role of Vets

Veterinarians are not merely healthcare professionals who treat animals. They play a critical role in the control of animal diseases, food safety, the prevention of zoonoses, biosecurity practices and the conduct of epidemiological research. Under the 'One Health' approach, collaboration between veterinarians and human doctors enables the early detection of outbreaks. In particular, the monitoring of wild animal populations contributes to the identification of infections that may emerge in the future. In this respect, veterinary surgeons also provide preventive healthcare services-that is, public health services-and, by serving human medicine in this way, demonstrate just how valuable the One Health doctrine is [1,2].

The Importance of Education in Public Health

The level of public awareness directly influences the success of health policies. Education is essential on topics such as hand hygiene, safe food consumption, pet care, the importance of vaccinations, the responsible use of antibiotics and environmental protection. Teaching the 'One Health' approach in schools can help ensure that younger generations grow up to be individuals who are more mindful of the environment and health [1].

Technology and Digital Health

Artificial intelligence, big data analysis, genome sequencing technologies and geographic information systems are enhancing 'One Health' applications. Thanks to technological advancements, the early detection of outbreaks, the modelling of disease spread and the conduct of risk analyses are being carried out more successfully. Satellite imagery enables the monitoring of environmental changes, whilst genomic analyses assist in the identification of new pathogens [1,2].

The One Health Approach in Turkey

Due to its geographical location, Turkey lies along migratory bird routes and has diverse climatic characteristics. This makes the monitoring of certain zoonotic diseases particularly important. The Ministry of Health, the Ministry of Agriculture and Forestry, universities and research centres are carrying out joint projects in various fields. Rabies control programmes, avian influenza surveillance studies, Crimean-Congo haemorrhagic fever surveillance and food safety initiatives are among the examples of the One Health approach. However, increasing inter-institutional data sharing, expanding joint training programmes and investing more in scientific research will contribute to strengthening this approach [4].

Challenges Faced

There are certain challenges in implementing the One Health approach. These include a lack of coordination between institutions, insufficient funding, limitations on data sharing, and communication issues between different disciplines. Furthermore, inadequate laboratory infrastructure and a shortage of specialist staff in developing countries can reduce the effectiveness of these initiatives. To resolve these issues, it is necessary to develop national policies, enhance international collaboration and make long-term investments in health systems [6].

Recommendations for the Future

To strengthen the One Health approach, interdisciplinary education must first be supported. Students of Medicine, Veterinary Medicine, Environmental Sciences and Public Health should participate in joint projects. Early warning systems should be developed, data sharing between laboratories should be accelerated, and international collaboration should be increased. As part of the fight against antimicrobial resistance, antibiotic use policies should be strengthened. Combating climate change, protecting biodiversity and promoting sustainable agricultural practices should be made an integral part of health policies [7].

Conclusion

The One Health approach offers a holistic solution to today's complex health challenges. It is no longer possible to consider human health in isolation from animals and the environment. Pandemics, antimicrobial resistance, food safety, climate change and environmental degradation are interrelated processes. It is therefore of the utmost importance that health policies are implemented on the basis of interdisciplinary collaboration. The One Health philosophy supports not only the treatment of diseases but also their prevention, the conservation of natural resources and

sustainable development. When future health systems are built upon this approach-which views humans, animals and the environment as a single, integrated whole-the health standards of societies will rise whilst the impact of global pandemics can be reduced. In conclusion, One Health is not merely a scientific approach but also a comprehensive philosophy of life and governance aimed at leaving a healthier, safer and more sustainable world for future generations. Health professionals, researchers, decision-makers and all members of society are part of this shared responsibility. The joint protection of human, animal and environmental health will continue to be one of the cornerstones of global health security; as an approach that must be established and targeted not only locally and regionally but across all continents, the One Health philosophy will continue to grow in importance. Consequently, the common and sole objective in the field of health is to ensure that the 'One Health' approach is implemented for the benefit of humans and all living beings; we must never deviate from this objective [8].

Acknowledgements

Thanks for publishing: I would like to express my sincere gratitude to my dear daughter Tuğçe Oktay Güneş, for her financial support.

References

1. Atlas RM, Maloy S (2016) One Health: People, Animals, and the Environment. *Emerging Infectious Diseases* 22(4): 766-767.
2. Bronzwaer S, Geervliet M, Hugas M, Url B (2021) EFSA's expertise supports One Health policy needs. *EFSA Journal* 19(5): e190501.
3. Delesalle L, Sadoine ML, Mediounia S, Denis-Robichaud J, Zinszer K, et al. (2022) How are large-scale One Health initiatives targeting infectious diseases and antimicrobial resistance evaluated? A scoping review. *One Health* 14: 100380.
4. Kelly TR, Machalaba C, Karesh WB, Crook PZ, Gilardi K, et al. (2020) Implementing One Health approaches to confront emerging and re-emerging zoonotic disease threats: lessons from PREDICT. *One Health Outlook* 10(2):1.
5. Mwangi W, de Figueiredo P, Criscitiello MF (2016) One Health: Addressing Global Challenges at the Nexus of Human, Animal, and Environmental Health. *PLoS Pathogens* 12(9): e1005731.
6. Sinclair JR (2019) Importance of a One Health approach in advancing global health security and the Sustainable Development Goals. *Revue scientifique et technique. (International Office of Epizootics)* 38(1): 145-154.
7. Wolf MJ, Emerson JW, Esty DC, de Sherbinin A, Wendling ZA, et al. (2022) 2022 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law & Policy. epi.yale.edu
8. Zhang XX, et al. (2022) Towards a global One Health index: a potential assessment tool for One Health performance. *Infectious Diseases of Poverty* 11(1):57.