

# The One Health Approach to Zoonotic Diseases

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## ABSTRACT

One Health is concerned with challenges regarding health risks and the prevention of zoonotic disease transmission. The transmission of diseases from one species to another results in zoonoses. One Health focuses on the control of the emergence and re-emergence of diseases by taking preventive measures. Humans and animals live in the same environment, and they also share similar pathogens that affect them. Zoonotic diseases spread when humans and animals interact, and this is due to urbanization, which involves other factors as well. For instance, environmental change, inadequate sanitation, human encroachment into urban areas, and the clearing of natural habitats. The interaction with wildlife or domestic animals causes infectious diseases. Therefore, proper management and awareness among people mitigate the effects of diseases. One Health approach is crucial as it assists in strategies to handle the threats to health and how to be prepared enough at that time to handle infectious disease outbreaks, and which preventive measures should be taken at that time. With proper coordination among society and sharing data, information enhances the impact of surveillance, whether the disease is acute or chronic, or it is transmitted from which species, and affects individuals and prevents the outbreak of the disease.

**Keywords:** Disease transmission, one health, animals, human health, environment.

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## Introduction

Zoonotic diseases have significant importance in public health. Humans, animals, and other species are widely affected, and their health is the major concern. Infections spread through interactions between humans and animals. More than 75% of the diseases that cause infections in humans originate from animals. [1]. The spillover and spillback of diseases in humans and animals are increasing rapidly. Domestic animals serve as bridging hosts that facilitate the transmission of parasites. Thus, 25% of the diseases originate from domestic animals [2]. The affected animals suffering from infectious diseases also affect the workers. Therefore, this is the transmission of an infectious disease through direct contact. Some of the infectious diseases are spread through food. Contaminated vegetables and undercooked meat lead to food-borne diseases. The spread of infection can occur through the air by inhalation of aerosols. The transmission of infectious diseases can occur through mosquitoes, ticks, and fleas. Infectious diseases widely affect humans, animals, wildlife, and livestock production. One Health acts as a bridge between animal and human health [3]. The spread of disease is due to increased human-animal interaction, climate change, urbanization, and transport of animals. In accordance with the One Health perspective, the main objective of this article is the maintenance of environmental integrity and prevention of disease transmission from pets, wild and domestic animals to humans. It emphasizes the balance among the ecosystem, animal welfare, and human health.

## Climate Change:

The health of humans and animals is affected by changes in the weather. Moreover, the immunocompromised are widely affected due to the bipolar weather. Hailstorms, floods, drought, and heatwaves result in heat stroke, and extreme weather affects the health of individuals. One Health approach has adopted precautionary measures to overcome the effects in the future. It results in severe health problems and takes too much time to recover. Contaminated water and poor sanitation conditions give rise to pathogens that survive in the rainy season and cause diarrhea, for instance, *Giardia* and *Cryptosporidium* in children who are under the age of five years. One Health has taken preventive measures to overcome water-borne diseases over time, and gradually there is improvement in it, but sometimes there are unpredictable results with adverse effects on health [4]. Thus, malaria is quite prevalent in the rainy season, and it results in the development of vectors. The survival of mosquitoes in the environment causes vector-borne diseases, which affect health [5]. Therefore, the necessary precautionary measures should be taken to prevent the transmission of infectious diseases

## Urbanization:

The shift of the human population to urban areas involves the clearing of natural ecosystems. The population grows, and the city develops, which leads to the clearing of the natural habitat of animals. Thus, the movement of animals also takes place in urban areas. The changes in the environment took place due to human activities. The animals are affected due to pollution, chemicals, aerosols, and changes in the environment. The transmission of pathogens could be direct and indirect, and it leads to the emergence and re-emergence of diseases [6]. People are shifting from rural to urban areas, which leads to a disconnection from nature as well as the clearing of the forest and the creation of new infrastructure for people. As the population grows, it needs more space and area to reside in the city. Therefore, isolating from nature leads to anxiety, depression, and health problems. Due to human activities, they will have to face severe problems. The natural environment is also polluted due to air pollution, and people will have to face respiratory issues and allergies.

## Human-Animal Interaction:

Human-animal interactions are intertwined. Zoonotic diseases are transmitted when humans come in contact with wildlife, pets, and domestic animals. Most of the people have pets, and they spend quality time with them. Pets provide their owners with social and emotional support. There are positive changes in behaviour and improved mental health. Stress and anxiety are reduced due to their presence all the time. The daily walk with their pets improves physical activity and mood [7]. Therefore, proper maintenance and grooming, attention, clean water, an adequate amount of feed at the proper time, proper disposal of animal waste safely, and behaviour training should be given to them. Therefore, routine vaccinations and clinical checkups are necessary for pets. On the other hand, they cause zoonotic diseases. Physical injuries, scratches, and bites can cause the spread of infection. A parasite that causes toxoplasmosis, found in cat feces, is a threat to pregnant women and can lead to miscarriage [8]. The other diseases that can spread are rabies and cat scratch disease, salmonellosis, and skin infection. Therefore, preventive measures should be taken while handling the animals that will mitigate the risk of infectious disease transmission.

## Wildlife:

The natural habitat destruction, deforestation, and disruption of ecosystems lead to the movement of wild animals to urban areas. The hosts mostly aggregate at the seepage and waste sites. Some species act as a bridge that transmits diseases. The rodents particularly play a crucial role in the spread of diseases, and humans are considered accidental hosts. The interaction of wildlife with humans leads to the spread of zoonotic diseases. The changes in the environment occur due to the clearing of the forest and the reduction

in biodiversity. The animals lost their natural habitat, and the social circle of animals is disrupted, and there are changes in behaviour such as anxiety, stress, and aggression [9]. The development of infrastructure and deforestation causes problems for animals. Therefore, One Health focuses on maintaining the ecosystem, conserving wildlife species, and creating a better environment for them.

#### Domestic Animals:

Most of the pathogens can be transmitted from domesticated animals to humans. Cattle, sheep, goats, horses, cats, dogs, and other domestic animals act as a reservoir [10]. They cause infectious diseases in humans. For instance, brucellosis, cryptosporidiosis, anthrax, giardiasis, rabies, and trypanosomiasis [11]. We obtain milk and meat from animals; we also get diseases from them. As the population grows, there is not only increased demand for land to live on but also for food as well at the same time. The workers who are taking care of the animals also get infected. If they are wounded or have any cuts, they are more prone to skin infections. The farmers are not aware of the infections that they will get from the animals. The disease will be spread to farmers when they draw milk from a cow or buffalo [12]. This is due to unhygienic sanitary conditions, consumption of unpasteurized raw milk, and direct contact with the infected animal. They are susceptible to diseases like mastitis, brucellosis, and *Escherichia coli* contamination. The infected animals are not quarantined and are placed directly with a healthy group of animals, which spreads the disease.

#### Changes in Environment:

The changes in the environment are taking place due to deforestation and clearing of natural habitats. However, the environment plays a crucial role in the spread of infectious diseases. Humidity, rainfall, hot and cold weather, and global warming are the major factors. Human activities cause adverse effects on the environment by reducing carbon dioxide through deforestation [13]. Temperature and wind fluctuations occur due to reduced vegetation and plants in an area. In a warmer environment, there is a rapid disease outbreak. For instance, the mosquito outbreak causes dengue. Flooding also causes an outbreak of cholera. Humidity also plays a significant role, and it increases the survival rate of insects and airborne pathogens [14]. The increase in global temperatures causes extremely hot weather to prevail, which disrupts the ecosystem and human well-being. Therefore, it is necessary to plant trees that provide shade to the animals and create a better environment. The conservation of forests is crucial as it creates a balanced environment that is sustainable for both animals and humans.

#### Role of One Health:

One Health involves coordination, collaboration, and communication among humans, animals, and the environment. It addresses the risks to global health. One Health sustains the health of animals, humans, and ecosystems by sustaining factors like nutritious food, clean water, and air to create a healthy environment. One Health focuses on the prevention of disease spread. Vaccination of the people will mitigate the disease and reduce the risk of infection in humans. Early detection of zoonotic disease outbreaks can prevent the spread of infection by taking precautionary measures and proper management. Therefore, effective communication with people and sharing information about disease prevalence will control the transmission of diseases [15]. To manage global health risks, proper coordination and cooperation are required among humans, animals, and the environment. By working together with management and strategies, the emergence and re-emergence of zoonotic diseases could be prevented. The

effective reduction in zoonotic diseases is due to the strategic coordination of public health preparedness [16].

#### Preventive Measures:

To create a better environment, protective measures should be taken for a sustainable and balanced ecosystem. Animals should be provided with shelter, and proper vaccination should be done for the prevention of zoonotic diseases [17]. The workers and staff are efficient enough to handle the animals appropriately and know how to restrain them. Therefore, animals should be prevented from stress, overcrowding, and isolation. Sometimes animals behave aggressively when they are handled improperly, dehydrated, have insufficient space, and food. It can lead to animals being stressed, which causes immune system suppression and low production, which causes economic losses. Thus, poor health leads to poor welfare. One Health focuses on animal welfare and provides a better environment through proper management and integrated surveillance.

#### Conclusion:

Animal welfare and environmental health need to be considered as they are the consequences of human activities. At the same time, human health is also affected. Therefore, One Health prioritizes proper surveillance and other protective measures. The One Health paradigm includes environment, animal welfare, and human health. There is a need to control the transmission of zoonotic diseases from one species to another. One Health prioritizes the emerging threats that are environmental changes, habitat destruction, and increased interaction with animals. Proper guidelines and awareness, adequate sanitation, and reduced spread of infectious diseases. The coordination of individuals can create a healthy environment and ecosystem that has significant importance to animal welfare and human health. It is crucial for a balance in nature as we rely on food security, health, livelihood and economy, which depend on a healthy ecosystem.

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