CLIMATE CHANGE AND EMERGING ANIMAL DISEASES: NEW CHALLENGES FOR VETERINARY HEALTH

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Abstract

Climate change has become one of the significant factors influencing animal health across the globe. Rising global temperatures, altered rainfall patterns, prolonged droughts, floods, and other extreme weather events are affecting the distribution of pathogens, vectors, and hosts. These environmental shifts are creating favorable conditions for the emergence and re-emergence of infectious diseases in livestock, wildlife, and companion animals. Diseases that were once confined to specific geographical areas are now being reported in new regions, threatening animal welfare, food security, and public health. Climate-related stress can also weaken animal immune responses, increasing susceptibility to infections and reducing productivity. Changes in the ecosystem also enhance interactions, thereby increasing the likelihood of zoonotic disease transmission. In this context, veterinarians play an important role in disease surveillance, early detection, outbreak preparedness and development of effective climatic adaptation strategies. The One Health approach, which recognizes the interconnectedness of human, animal, and environmental health, provides a valuable framework for addressing these complex challenges. This article explores how climate change influences animal health and disease emergence and highlights the importance of strengthening veterinary systems to safeguard both animal and public health in a rapidly changing world.

Keywords: Climate change, veterinary health, emerging diseases, zoonoses, One Health, animal welfare

Introduction

Climate change is no longer viewed solely as an environmental issue, it has become a significant concern for animal and human health. Over the last few decades, scientific evidence has shown that changing climatic conditions are influencing the occurrence, distribution, and severity of many infectious diseases. Variations in temperature, humidity, and rainfall affect not only animal populations but also the pathogens and vectors responsible for disease transmission (IPCC, 2023).

For veterinarians and animal health professionals, climate change presents new challenges that extend beyond traditional disease management. Emerging disease threats, changing vector distributions and increased environmental stress on animals require innovative approaches to surveillance, prevention, and control. Understanding the relationship between climate change and disease emergence is therefore essential for protecting animal health and ensuring sustainable livestock production.

How Climate Change Influences Disease Emergence

Environmental conditions play a critical role in determining whether pathogens survive and spread. As temperatures increase, many microorganisms and disease vectors are able to reproduce more rapidly and expand into areas that were previously unsuitable for their

survival. Mosquitoes, ticks, and biting flies are particularly sensitive to climatic changes and are among the most important carriers of animal diseases.

Several vector-borne diseases have demonstrated links with changing climatic conditions. Bluetongue, West Nile fever, Rift Valley fever, and various tick-borne infections have shown shifts in their geographical distribution due to warmer temperatures and changing rainfall patterns (Leal Filho et al., 2025). Extended warm seasons can increase vector activity and create more opportunities for disease transmission among susceptible animal populations.Rainfall patterns play a significant role in the spread of diseases. Intense rainfall and flooding can increase mosquito breeding sites and pollute water sources with disease-causing microorganisms. In contrast, drought reduces water availability, causing animals to gather at limited water sources, which promotes the transmission of infectious diseases.These environmental disruptions can contribute to unexpected outbreaks and increase the difficulty of disease control.

Impact on Livestock Health and Productivity

Climate change affects animal health not only through infectious diseases but also through physiological stress. Heat stress is one of the most significant challenges facing livestock production systems worldwide. High temperatures can reduce feed intake, growth rates, milk yield, reproductive efficiency and overall productivity in cattle, sheep, goats, and poultry (FAO, 2023).

Prolonged exposure to heat stress may impair immune function, making animals more vulnerable to bacterial, viral, and parasitic infections. In addition, extreme weather events such as floods, storms, and droughts can disrupt feed supplies, damage housing facilities, and increase mortality. These impacts threaten food security and impose considerable economic burdens on farmers and livestock industries.

Wildlife, Ecosystem Changes, and Zoonotic Diseases

Climate change is also reshaping wildlife habitats and migration patterns. As species move in response to changing environmental conditions, new interactions may occur between wildlife, domestic animals, and humans. Such interactions increase opportunities for pathogens to cross species barriers and establish new transmission cycles.

Many emerging infectious diseases in humans originate from animal reservoirs. Changes in ecosystems, biodiversity loss, and habitat fragmentation can alter disease ecology and increase the likelihood of zoonotic spillover events (WHO et al., 2022). This highlights the importance of monitoring wildlife health as part of broader disease surveillance programs.

Healthy ecosystems often act as natural barriers against disease emergence. Therefore, environmental conservation and biodiversity protection can contribute significantly to disease prevention and long-term health security.

The Role of Veterinarians

Veterinarians are at the forefront of addressing climate-related health challenges. Their responsibilities increasingly include disease surveillance, outbreak investigation, risk assessment, and public awareness. Modern veterinary services are adopting climate-informed surveillance systems and predictive tools to identify potential disease threats before they become widespread outbreaks.

The One Health approach has become particularly important in this context. By promoting collaboration among veterinarians, physicians, environmental scientists, and policymakers, One Health strengthens the capacity to detect, prevent, and respond to emerging diseases. Such interdisciplinary cooperation is essential for building resilient health systems capable of adapting to future climatic changes.

Conclusion

Climate change is transforming the global landscape of animal health and infectious disease emergence. Rising temperatures, changing rainfall patterns, and increasing environmental disturbances are creating favorable conditions for pathogens and vectors while simultaneously increasing stress on animal populations. These changes have important implications for livestock production, wildlife conservation, food security, and public health.

Veterinary professionals play a crucial role in understanding and responding to these emerging challenges. Strengthening surveillance systems, adopting climate-resilient animal health practices, and promoting the One Health approach will be essential for minimizing disease risks in the future. As climate change continues to influence ecosystems worldwide, proactive and collaborative action will be necessary to safeguard the health of animals, humans, and the environment.

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