

INFLUENCE OF CLIMATE CHANGE ON THE EMERGENCE AND DISTRIBUTION OF DISEASES IN ANIMALS

INFLUÊNCIA DAS MUDANÇAS CLIMÁTICAS NO SURGIMENTO E DISTRIBUIÇÃO DE DOENÇAS EM ANIMAIS

INFLUENCIA DEL CAMBIO CLIMÁTICO EN LA APARICIÓN Y DISTRIBUCIÓN DE ENFERMEDADES EN LOS ANIMALES

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ABSTRACT

Climate change has significantly impacted ecological systems and global health, influencing the dynamics of infectious disease transmission in animals, particularly vector-borne diseases. This study aimed to analyze, through a literature review, the influence of climate change on the emergence and distribution of animal diseases. National and international databases were consulted, and studies published over the last ten years were selected. The results indicate that rising temperatures, changes in precipitation patterns, and extreme climate events favor vector expansion, modifications in transmission cycles, and the emergence of zoonoses. It is concluded that climate change represents a major challenge to animal and public health, requiring integrated strategies based on the One Health concept.

Keywords: One Health. Vectors. Zoonoses.

RESUMO

As mudanças climáticas têm impactado significativamente os sistemas ecológicos e a saúde global, influenciando a dinâmica de transmissão de doenças infecciosas em animais,

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particularmente as doenças transmitidas por vetores. Este estudo teve como objetivo analisar, por meio de uma revisão da literatura, a influência das mudanças climáticas no surgimento e na distribuição de doenças animais. Foram consultadas bases de dados nacionais e internacionais e selecionados estudos publicados nos últimos dez anos. Os resultados indicam que o aumento das temperaturas, as alterações nos padrões de precipitação e os eventos climáticos extremos favorecem a expansão vetorial, as modificações nos ciclos de transmissão e o surgimento de zoonoses. Conclui-se que as mudanças climáticas representam um grande desafio para a saúde animal e pública, exigindo estratégias integradas baseadas no conceito de Saúde Única.

Palavras-chave: Saúde Única. Vetores. Zoonoses.

RESUMEN

El cambio climático ha impactado significativamente los sistemas ecológicos y la salud global, influyendo en la dinámica de transmisión de enfermedades infecciosas en animales, en particular las transmitidas por vectores. Este estudio tuvo como objetivo analizar, mediante una revisión bibliográfica, la influencia del cambio climático en la aparición y distribución de enfermedades animales. Se consultaron bases de datos nacionales e internacionales y se seleccionaron estudios publicados en los últimos diez años. Los resultados indican que el aumento de las temperaturas, los cambios en los patrones de precipitación y los eventos climáticos extremos favorecen la expansión de vectores, las modificaciones en los ciclos de transmisión y la aparición de zoonosis. Se concluye que el cambio climático representa un desafío importante para la salud animal y pública, que requiere estrategias integradas basadas en el concepto de Una Salud.

Palabras clave: Una Salud. Vectores. Zoonosis.

1 INTRODUCTION

Over recent decades, climate change has become one of the main factors altering ecological systems and global health. Increases in average temperatures, changes in precipitation patterns, and the intensification of extreme climate events have influenced several biological and ecological processes, including the dynamics of infectious disease transmission (Leal Filho *et al.*, 2022).

In this context, veterinary medicine plays a fundamental role in understanding the relationship between climate, environment, and animal health. Several infectious diseases affecting domestic, wild, and production animals are sensitive to climatic variables, especially those transmitted by arthropod vectors such as mosquitoes, ticks, and fleas. Environmental changes resulting from global warming may favor the geographic expansion of these vectors, modifying the epidemiological patterns of associated diseases (Pacheco; Coello, 2025).

Furthermore, climate change can directly influence interactions among hosts, pathogens, and the environment, favoring the emergence of new zoonoses or the reemergence of previously controlled diseases. The spread of viruses such as West Nile virus and the dissemination of mosquito and tick species into new regions are frequently associated with global environmental changes (Leal Filho *et al.*, 2022).

In Brazil, a country characterized by high biological and climatic diversity, the impacts of climate change on the epidemiology of infectious diseases are particularly relevant. Environmental changes may contribute to increased incidence of vector-borne diseases and influence the distribution of pathogens across different regions of the national territory (Santos *et al.*, 2026).

Thus, the present study aims to analyze, through a literature review, the impacts of climate change on the emergence and distribution of diseases affecting animals.

2 METHODOLOGY

This study consists of a literature review addressing the influence of climate change on the occurrence of animal diseases. The search was conducted using the PubMed, ScienceDirect, SciELO databases, and international scientific journals in the fields of health and veterinary medicine. Descriptors in Portuguese and English were used, including “climate change,” “animal diseases,” “zoonoses,” “vector-borne diseases,” and “veterinary medicine.”

Studies published within the last ten years that discussed the influence of climatic variables on the distribution of vectors, pathogens, or animal hosts, as well as studies related to the emergence of zoonoses associated with environmental changes, were included.



Studies that did not meet these criteria or exceeded the established time frame were excluded.

3 DEVELOPMENT

3.1 CLIMATE CHANGE AND THE DYNAMICS OF INFECTIOUS DISEASES

Among the main factors associated with climate change are the increase in global average temperatures, changes in precipitation patterns, and the increased frequency of extreme climate events. These conditions can affect both pathogen survival and the geographic distribution of hosts and vectors involved in disease transmission (Alves; Leal; Vidal, 2023).

Global warming may favor the territorial expansion of vector species such as mosquitoes and ticks, allowing these organisms to colonize regions previously unsuitable for their survival. Consequently, diseases transmitted by these vectors may emerge in areas where they were not previously reported (Leal Filho *et al.*, 2022).

These environmental changes directly impact the epidemiological dynamics of infectious diseases, as many pathogens depend on specific climatic conditions to survive and spread.

3.2 VECTOR-BORNE DISEASES

Vector-borne diseases represent one of the main examples of the influence of climate change on animal health, as vectors such as mosquitoes, ticks, and sandflies have life cycles strongly dependent on environmental factors, especially temperature and humidity.

Rising temperatures can accelerate vector development, increase reproductive rates, and expand their geographic range. As a result, diseases such as arboviral infections, tick-borne diseases, and other zoonoses may show increased incidence in certain regions (Mesquita; Rosa; Borges, 2021).

In addition, climate change may alter the seasonality of these diseases, prolonging transmission periods and increasing epidemiological risk. Climatic variations directly influence vector survival and pathogen replication, which are essential factors for maintaining transmission cycles (Alves; Leal; Vidal, 2023).

3.3 IMPACTS ON ANIMAL HEALTH AND PUBLIC HEALTH

Domestic animals, especially dogs and cats, may act as reservoirs for several infectious agents of epidemiological importance. In this context, understanding the dynamics



of these diseases becomes essential for the development of control and prevention strategies (Elsohaby; Villa, 2023).

Moreover, climate change can also affect the health of wild animals, compromising ecosystem stability and favoring the emergence of new emerging diseases. Alterations in natural habitats and species migration may increase contact between different animal populations, facilitating pathogen spread (Greening *et al.*, 2025).

Given this scenario, the need for integrated approaches based on the One Health concept which recognizes the interdependence between human, animal, and environmental health has become increasingly evident.

4 CONCLUSION

Climate change significantly influences the epidemiology of animal diseases by altering the distribution of vectors, pathogens, and hosts, thereby favoring the emergence and reemergence of diseases, particularly those transmitted by arthropods. These environmental transformations increase the risk of zoonoses and impact both animal and public health, reinforcing the role of veterinary medicine in epidemiological surveillance and sanitary control. In light of this scenario, the adoption of integrated approaches based on the One Health concept, as well as the strengthening of scientific research and surveillance systems, is essential to address the challenges posed by climate change.

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