CLIMATE CHANGE IN THE CLINIC: WHEN WEATHER DECIDES WHAT THE VET TREATS

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ABSTRACT

Climate change is increasingly affecting animal health by altering disease patterns, increasing heat stress, and expanding the range of vector-borne and zoonotic diseases. This article explores the environmental dimensions of veterinary medicine, highlighting how rising temperatures, droughts, and extreme weather challenge animal care and clinical practice. It emphasizes the role of veterinarians in climate adaptation through the One Health approach, sustainable practices, and disease surveillance. By integrating science, public health, and environmental awareness, veterinarians can play a key role in building climate-resilient animal health systems and protecting both animal and human populations.

KEYWORDS: Climate change and animal health, Veterinary adaptation strategies, One Health approach

INTRODUCTION

Climate change significantly affects animal health, especially within the field of veterinary medicine, by altering disease patterns and increasing environmental stress on livestock. Both animal and human populations are at risk from infectious diseases, including zoonotic and vector-borne illnesses, which are brought on by rising temperatures, unpredictable rainfall, and changing weather patterns. These changes have both direct and indirect effects, such as increased parasitic loads and vector prevalence, as well as direct effects like heat stress, reproductive issues and weakened immunity. With climate change affecting growth productivity, fertility, milk yield, and animal welfare the livestock industry is especially vulnerable. The adoption of climate-resilient breeds increased veterinary disease surveillance and better preventive healthcare services are all necessary to address these issues. Addressing these interrelated problems requires the One Health approach, which connects environmental, animal and human health. Veterinarians are essential because they promote biosecurity, put early warning systems into, place and direct sustainable livestock practices. In addition, lowering methane emissions, improving nutrition, and enhancing housing and animal care are important ways to lessen the stress caused by climate change. The veterinary industry can contribute to the development of a more robust and sustainable future for animal health in the face of climate change by incorporating these solutions.

HEAT STRESS IN LIVESTOCK

Livestock, especially cattle and poultry, are severely impacted by heat stress, which lowers their productivity, ability to reproduce, and general health. Rectal temperatures above 39°C cause heat stress in cattle, which lowers feed intake and milk production. As temperatures rise, losses may reach 15%. Among the physiological effects are oxidative stress, hyperthermia, and heightened vulnerability to illnesses as a result of compromised immunity. Management techniques such as dietary changes, environmental modifications, and genetic selection for heat tolerance are essential for reducing these effects. Effective management, for example can lower mortality rates in feedlots where localized heat stress events can result in large losses. All things considered, managing heat stress is essential to preserving livestock productivity and guaranteeing food security in the face of climate change.

Table1: Climate Change Effects on Animal Health

Climate Factor	Animal Health Impact	Veterinary Intervention
Heatwaves	Heat stress, reduced fertility, low milk yield	Cooling systems, electrolyte therapy
Drought	Feed/water scarcity, poor condition	Nutritional planning, drought-resilient breeds
Floods	Waterborne diseases, displacement	Sanitation, emergency shelters
Vector expansion	Tick/mosquito-borne disease outbreaks	Surveillance, vector control, vaccination
Habitat loss	Wildlife spillover, zoonotic threats	One Health surveillance, education

CLIMATE-DRIVEN VECTOR-BORNE DISEASES

The global map of vector-borne diseases (VBDs) is changing due to climate change, posing new threats to human and animal populations. Vectors such as ticks, mosquitoes, and biting midges have been able to spread into previously uninhabitable geographic areas due to rising temperatures, altered rainfall patterns, and fluctuating humidity levels. Because of this, illnesses that were previously only found in tropical areas—like lumpy skin disease and bluetongue virus—are now being reported in temperate regions, endangering both the health of animals and the trade. In addition to promoting increased vector survival and reproduction, warmer climates also shorten the time that pathogens must incubate within these insects, hastening the cycles of disease transmission. This trend implies increased clinical uncertainty, new pathogens in uncharted territory and more outbreaks for veterinarians and animal health officials. Adaptive management techniques that react to shifting risk zones vector surveillance and early-warning systems must all be used in tandem to meet this challenge. In order to stop widespread livestock losses due to climate disruption, veterinarians must act as frontline defenders by bridging science, surveillance, and public health.

CLINICAL VETERINARY CHALLENGES

Veterinary clinical challenges are greatly impacted by climate change, especially when it comes to seasonal variations, weather-related morbidity, and animal disease diagnosis. Unpredictable weather patterns and rising temperatures are changing the animal health landscape, increasing farm animal morbidity and disease transmission. In order to protect animal health, these changes call for a thorough approach to veterinary practice that incorporates mitigation and adaptation techniques for the changing climate. Seasonal Variation in Veterinary Clinical Cases: Warmer temperatures and different precipitation patterns have an impact on disease vectors and transmission rates, which in turn affect the prevalence of some diseases. Studies conducted in China have demonstrated that wind speed and temperature worsen the development of disease, underscoring the necessity of seasonal disease surveillance. Weather-Related Morbidity in Farm Animals Heat stress and increased susceptibility to diseases are two conditions that have a direct impact on animal health and are brought on by extreme weather events like heat waves and heavy rainfall.

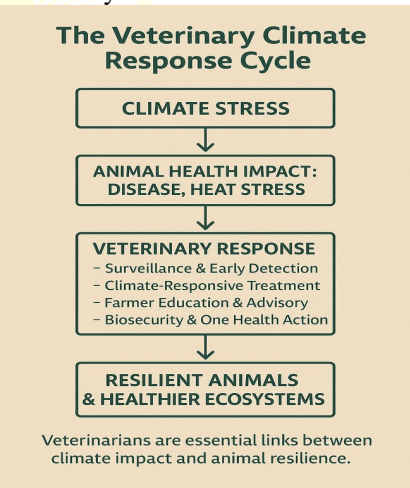

Fig. 1: The diagram below illustrates how veterinarians play a critical role in responding to climate-induced animal health challenges through surveillance, treatment, education, and ecosystem support.

Animal health management is made more difficult by the indirect effects of climate change, such as feed and water scarcity, which calls for strong adaptation measures. Climate Change and Animal Disease Diagnosis. By changing established disease patterns and bringing in new pathogens, climate change makes diagnosing animal diseases more difficult (The Study and Classification of Climate-Associated Diseases in

Animals 2022). In order to increase diagnostic precision and create successful preventative measures, climate data must be integrated with disease monitoring systems. Veterinary medicine faces many obstacles as a result of climate change but there are also chances for creativity and cooperation. Veterinarians can spearhead initiatives in disease surveillance, biosecurity, and sustainable farming methods to lessen the effects of climate change on animal health by embracing a One Health approach. This proactive approach supports larger public health and environmental sustainability objectives in addition to safeguarding animal populations.

ZOONOSES AND ONE HEALTH

Climate change is having a major impact on zoonotic diseases, which are diseases that humans contract from animals, raising serious public health issues. Addressing the complexity of zoonoses made worse by environmental changes requires the One Health approach, which combines environmental, animal, and human health. The relationship between zoonotic diseases and climate change, the function of One Health in reducing these risks, and the influence of environmental changes on the emergence of epidemics will all be covered in this response. Climate Change and Zoonotic Diseases The risk of zoonotic spillover events is increased as a result of climate change, which modifies the geographic distribution of pathogens and their vectors. For example, between 1951 and 2021, the spread of vector-borne illnesses like dengue increased by 12% as a result of climate change. Deforestation and other forms of ecosystem destruction make it easier for zoonoses like Ebola to spread because they disturb the habitats of wildlife. One Health Approach To properly manage zoonotic risks the One Health framework encourages cooperation between the environmental veterinary and public health sectors. For the early detection and response to zoonotic outbreaks especially in susceptible areas integrated surveillance systems are essential. Moreover, this strategy tackles antimicrobial resistance which affects both human and animal health and is made worse by climate change. Epidemics Caused by Environmental Change Environmental changes such as increased agricultural intensity and urbanization are factors that lead to the development of environmentally driven zoonoses (EDZs). Owing to ecosystem interdependence, disturbances may result in heightened disease transmission, thereby presenting serious risks to public health (The Need for a One Health Approach to Zoonotic Diseases and Antimicrobial Resistance, 2022). Implementing efficient policies and surveillance systems is still difficult even though the One Health approach provides a comprehensive strategy to combat zoonotic diseases. This is especially true in low-income areas where health systems are already under stress. It takes international collaboration and a dedication to sustainable practices to address these problems.

VETERINARIANS AT THE FOREFRONT OF CLIMATE RESILIENCE

By addressing the negative effects of climate change on animal and ecosystem health, veterinarians play a critical role in climate adaptation. Their participation is crucial for putting policies into place that improve resilience to climate-related problems, especially in the areas of public health and disease control. This answer will examine the various ways that veterinarians contribute to climate resilience adaptation tactics and their handling of diseases brought on by climate change. Veterinarians' Role as Climate Resilience Public Health Advocates: As public health professionals, veterinarians uphold the veterinary oath, promote health, and address climate change as a pressing public health concern. Using the One Health framework, which acknowledges the interdependence of environmental, animal and human health they can address disease outbreaks brought on by climate change. Climate Change Adaptation Strategies Sustainable Practices: Two essential tactics for veterinarians to lessen the effects of climate change are the adoption of sustainable agricultural methods and the encouragement of biodiversity. Education and Advocacy for Policies: To influence laws that aid in climate adaptation veterinarians should take part in advocacy and education campaigns. Improved Surveillance in Veterinary Response to Climate-Induced Disease: Vaccination programs and strong disease surveillance systems can help control the elevated risk of vector-borne and zoonotic diseases brought on by climate change. Proactive Steps: You can stop the spread of disease and safeguard animal populations by putting biosecurity measures and habitat management into practice. Although veterinary professionals play a crucial role in mitigating the effects of climate change, some contend that the field may not have enough interdisciplinary cooperation and policy support to

reach its full potential in climate adaptation initiatives.

ENVIRONMENTAL EXTREMES AND ANIMAL HEALTH

The health of animals is greatly impacted by climate change, especially in light of drought, extreme weather conditions, and evolving agricultural methods. Immediate adaptation and mitigation measures are required because of the direct and indirect effects that these environmental factors have on wildlife and livestock. Animal Health Impacts of Drought conditions lead to a scarcity of feed and water, which negatively impacts the productivity and health of livestock. Without proper nutrition and hydration, animals may grow slowly, produce less milk, and have poor reproductive outcomes. Drought bull and other working animals' physical conditions deteriorate which reduces agricultural productivity. Climate Extremes and Animal Welfare Animals that experience extreme weather conditions, such as heat waves and floods, are more stressed and more prone to illness. Extremes in climate have an impact on the health and welfare of animals by increasing the emergence of vector-borne diseases. Natural disaster-related livestock displacement can result in a shortage of food and higher death rates. Changing Climate and Farm Animal Care. To lessen the negative effects of climate change on animal health, farmers are encouraged to implement sustainable agricultural practices. It is essential to put strong disease surveillance and biosecurity measures in place to shield livestock from health risks brought on by climate change. Veterinary education must change to emphasize a One Health approach and prepare practitioners for the challenges presented by climate change. However, some contend that improvements in veterinary care and farming methods can lessen the negative effects of climate change, even though it still poses serious risks to animal health. It is possible to improve animal populations' resilience and possibly mitigate some of the negative effects of climate change by combining cutting-edge technologies with sustainable practices.

CONCLUSION

Climate change is no longer a distant concern—it is now reshaping animal health across veterinary clinics, farms, and ecosystems. Rising temperatures, erratic weather, and ecological shifts are leading to heat stress in livestock, outbreaks of vector-borne and zoonotic diseases, and growing uncertainty in diagnosis and care.

Veterinarians face complex challenges as disease patterns evolve and environmental stressors intensify. But with these challenges come new responsibilities and opportunities. Veterinary professionals are uniquely positioned to act as both caregivers and climate responders—advocating sustainable practices, supporting resilient farming systems, and participating in integrated disease surveillance.

The One Health approach offers a powerful framework for coordinated action, recognizing the vital link between human, animal, and environmental health. By embracing this model, veterinarians can help prevent emerging health threats and build climate-resilient communities.

To meet the demands of a warming world, veterinary medicine must evolve. This includes innovation in clinical care, climate-focused education, and stronger engagement in health policy. In doing so, veterinarians will not only protect animal health but also contribute meaningfully to global sustainability.

In this era of planetary health, the veterinary profession stands at the crossroads of science, service, and climate action—ready to lead.

CALL TO ACTION

The veterinary profession stands at a crossroads—facing not only new clinical challenges but also an urgent moral and environmental responsibility. As climate change accelerates, the role of veterinarians must expand beyond treatment to include prevention, adaptation, and advocacy.

Veterinarians must now embrace their position as climate leaders. This includes adopting climate-smart clinical practices, promoting sustainable animal husbandry, and participating actively in One Health collaborations. Disease surveillance, biosecurity, and early intervention are no longer optional—they are essential tools for protecting both animal and public health.

Educational institutions must update curricula to include climate resilience training, and policymakers must integrate veterinary science into national climate strategies. Support for rural veterinary infrastructure, research in climate-linked diseases, and farmer education are critical investments in the future.

Every clinical decision, every farm visit, and every public awareness campaign now has the potential to shape how our food systems, communities, and ecosystems withstand climate stress. This is no longer just about treating animals—it's about safeguarding a shared future. Let the veterinary voice be loud, informed, and unstoppable in the fight for planetary health.

REFERENCES

Abdela, N., & Jilo, K. (2016). Impact of climate change on livestock health: A review. *Global Veterinaria*, *16*(5), 419-424.

Yan, G., Liu, K., Hao, Z., Shi, Z., & Li, H. (2021). The effects of cow-related factors on rectal temperature, respiration rate, and temperature-humidity index thresholds for lactating cows exposed to heat stress. *Journal of Thermal Biology*, *100*, 103041.

Pappaioanou, M., & Kane, T. R. (2023). Addressing the urgent health challenges of climate change and ecosystem degradation from a One Health perspective: what can veterinarians contribute. *Journal of the American Veterinary Medical Association*, *261*(1), 49-55.

Bozzo, G., Corrente, M., Testa, G., Casalino, G., Dimuccio, M. M., Circella, E., ... & Celentano, F. E. (2021). Animal welfare, health and the fight against climate change: One solution for global objectives. *Agriculture*, *11*(12), 1248.

Lacetera, N. (2019). Impact of climate change on animal health and welfare. *Animal Frontiers*, *9*(1), 26-31.

Akello, W. (2024). Climate Change and Veterinary Medicine: A Call to Action for a Healthier Planet. *F1000Research*, *13*, 1360. https://doi.org/10.12688/f1000research.158307.1

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