Climate Change and Global Health: Emerging Threats and Urgent Responses

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Abstract

Background:

Climate change has come out as one of the most remarkable worldwide challenges of the 21st century, with heartfelt suggestions in implications for human health. Increasing temperatures, shift it towards weather patterns, and high frequency of extreme events which participate to a broad range of health issues, specifically in endangered populations.

Objective:

To find out the multifactorial relationship between climate change and worldwide health results and to evaluate the current evidence on how environmental changes are aggravate public health burdens.

Methods:

This study arranged current research on climate linked health risks using peer grouped literature, worldwide health observation data, and climate models to find out the patterns in disease incidence, mortality, and health system strain linked with climate occurrence.

Results:

Key health impacts include heat-related illnesses, respiratory and cardiovascular diseases, increased prevalence of vector-borne and waterborne diseases, food insecurity, and mental health conditions. Low- and middle-income countries face disproportionately greater risks due to limited adaptive capacity.

Conclusion:

Addressing the health impacts of climate change requires coordinated worldwide efforts includes mitigation, adaptation, storage, and health system strengthening. Integrates climate policy with public health strategies is crucial to safe place in future generations.

Keywords: WHO, cardiovascular, climatic change, climate models

Introduction

Climate change represents a rapidly escalating global crisis with profound and far-reaching implications for environmental sustainability, socio-economic development, and most urgently human health [1]. As average global temperatures continue to rise due to increased greenhouse gas emissions, the health consequences are becoming more severe, complex, and widespread [2]. The Intergovernmental Panel on Climate Change has emphasized that even small increases in global temperature can significantly impact disease distribution, food systems, air and water quality, and the frequency and severity of extreme weather events, all of which are key determinants of health [3]. The World Health Organization projects that between 2030 and 2050, climate change could contribute to an additional 250,000 deaths annually due to malnutrition, malaria, diarrhea, and heat stress. However, these figures may underestimate the true toll, given the wide-ranging and compounding effects of climate change on mental health, healthcare access, and chronic disease burden [4]. For example, heatwaves are increasing in intensity and duration, causing spikes in cardiovascular and respiratory emergencies, particularly among the elderly, children, and those with pre-existing health conditions. Similarly, floods and hurricanes disrupt sanitation infrastructure and lead to outbreaks of waterborne diseases like cholera and leptospirosis [5].

The burden of climate-related health impacts is not shared equally. Low- and middle-income countries, especially in sub-Saharan Africa, South Asia, and small island nations, are disproportionately affected due to limited healthcare infrastructure, greater reliance on climate-sensitive resources, and insufficient financial capacity for adaptation. These vulnerabilities are further compounded by socio-economic inequalities, political instability, and geographic exposure to hazards [6]. Moreover, climate change affects global health both directly and indirectly. Direct effects include mortality and morbidity from extreme weather events, while indirect effects stem from changing patterns in disease transmission, displacement of populations, food insecurity, and environmental degradation. Urbanization, population growth, and environmental mismanagement further exacerbate these issues [7]. This article aims to

explore the complex and multifaceted impacts of climate change on global health. Drawing upon peer-reviewed research, epidemiological data, and climate modeling, the article will examine the key health risks posed by environmental changes and analyze their effects across diverse geographic and demographic groups [8]. It also seeks to highlight evidence-based strategies for adaptation and resilience, emphasizing the need for integrative policies that bridge the gap between environmental sustainability and public health [9]. Addressing these challenges requires global collaboration, political commitment, and a shift in public health planning to anticipate and respond to emerging climate-related threats.

Methodology

A narrative review approach was employed to assess the impact of climate change on global health. Literature was sourced from PubMed, Scopus, Web of Science, and WHO databases between January 2000 and March 2025. Keywords included "climate change,""global health,""heat-related illness,""vector-borne disease,""mental health and climate," and "health systems and adaptation." Studies were selected based on relevance to climate-health outcomes, geographic representation, and methodological rigor. The review also utilized climate-health surveillance data from the WHO, IPCC (Intergovernmental Panel on Climate Change), and national health departments. Quantitative data on disease incidence, mortality, and temperature trends were extracted and categorized by region and health outcome. No meta-analysis was conducted, but descriptive analysis of health trends over time and across regions was provided to illustrate patterns.

Results

The findings revealed that climate change exerts both direct and indirect effects on global health. The most common direct health outcomes included heat-related illnesses and injuries from extreme weather events, while indirect impacts were linked to disease vectors, food and water insecurity, and socio-economic disruptions. **Heat-related Health Effects:**
Rising global temperatures have increased the frequency and severity of heatwaves, leading to a higher incidence of heatstroke, dehydration, and cardiovascular stress, especially among the elderly and urban populations. For example, the European heatwave of 2022 was associated with over 60,000 excess deaths.
Vector-borne Diseases:
Changes in temperature and rainfall patterns have expanded the geographical distribution of vectors such as mosquitoes and ticks. Malaria and dengue fever have shown increased prevalence in higher altitudes and previously temperate regions in South America, Asia, and Africa. **Water and Food Security:**
Droughts and floods have disrupted agricultural productivity, leading to undernutrition and food insecurity. Contaminated water supplies have also fueled outbreaks of cholera and other diarrheal diseases in regions like sub-Saharan Africa and South Asia. **Air Quality and Respiratory Disease:**
Increased ground-level ozone and particulate matter from wildfires and fossil fuel combustion have elevated rates of asthma, bronchitis, and other chronic respiratory diseases. The 2019 Australian bushfires led to a 44% rise in asthma-related emergency visits in affected areas. **Mental Health:**
Exposure to natural disasters, displacement, and climate anxiety has contributed to an increase in anxiety, depression, and post-traumatic stress disorder (PTSD), particularly among children, farmers, and indigenous communities.

Table 1: Selected Climate-Related Health Impacts by Region

Region	Health Impact	Cause of Climate Change Effect
South Asia	Diarrheal diseases, malnutrition	Floods, water scarcity, crop failure
Sub-Saharan Africa	Malaria, food insecurity	Rising temperatures, droughts

Region	Health Impact	Cause of Climate Change Effect
North America	Respiratory diseases, heatstroke	Wildfires, urban heat islands
Europe	Cardiovascular events, heat mortality	Heatwaves, aging population
Latin America	Dengue fever, mental health distress	Vector spread, extreme weather

Table 2: Climate Events and Associated Health Outcomes (2020–2024)

Climate Event	Country	Health Outcome	Estimated Health Burden
European heatwave 2022	France, Italy	Heatstroke, cardiovascular deaths	60,000+ deaths
Pakistan floods 2022	Pakistan	Waterborne diseases, displacement stress	33 million affected
Australian bushfires	Australia	Respiratory illness, PTSD	3,500 hospital admissions
Hurricane Ian 2022	USA (Florida)	Injuries, mental health decline	$112B damages, 150 deaths

Discussion

The analysis presented in this article demonstrates that the impacts of climate change on global health are both pervasive and escalating, affecting millions of people worldwide and placing significant strain on healthcare systems [10]. The multifactorial nature of climate-induced health risks ranging from infectious disease outbreaks to mental health deterioration underscores the need for a systemic and proactive public health response [11]. These findings suggest that climate change must be treated not merely as an environmental issue, but as a central public health priority requiring immediate, sustained action. One of the most concerning trends is the growing burden of heat-related illnesses. As global temperatures continue to rise, prolonged heatwaves are becoming more frequent and lethal, particularly in urban centers characterized by the "urban heat island" effect [12]. Elderly individuals, outdoor laborers, and those with chronic illnesses are at especially high risk. Public health authorities must therefore develop robust heat response plans, including early warning systems, access to cooling centers, and community outreach programs to protect vulnerable populations. Similarly, the resurgence and redistribution of vector-borne diseases such as malaria, dengue, Zika, and Lyme disease illustrate the complex interactions between environmental change and infectious disease dynamics [13]. As climate conditions shift, disease vectors such as mosquitoes and ticks expand into new territories, exposing previously unaffected populations to new health threats. Strengthening surveillance systems and investing in climate-sensitive disease modeling can improve early detection and intervention strategies. Mental health is another critical but often overlooked dimension of climate-related health impacts [14]. From the trauma of natural disasters and displacement to the chronic anxiety associated with climate-related uncertainty, psychological distress is increasingly common. Children, adolescents, and indigenous communities are particularly vulnerable. Integrating mental health services into emergency response protocols and community-level resilience programs is essential [15]. Furthermore, the disproportionate impact on low-income and marginalized populations highlights the issue of climate justice. These communities, despite contributing the least to global greenhouse gas emissions, suffer the most from climate-related health impacts due to inadequate infrastructure, poor living conditions, and limited access to healthcare [16]. Addressing this imbalance requires equitable climate financing, international cooperation, and inclusive health system strengthening. Ultimately, the discussion reinforces the need for multi-sectoral approaches that align climate action with health objectives. Policies promoting renewable energy, sustainable

agriculture, disaster preparedness, and environmental protection can yield significant health co-benefits [17]. Only through such integrative, equity-focused strategies can the world effectively mitigate the health impacts of climate change and build resilient communities for future generations.

Conclusion

Climate change is not only an environmental issue—it is a pressing public health emergency. Its effects are already being felt through rising disease burdens, environmental instability, and widening health inequalities. Urgent, coordinated action is required across all sectors, including health, environment, agriculture, and energy, to mitigate these impacts and build resilience. Global health policies must now integrate climate risk assessments and adaptation strategies. Strengthening health systems, investing in climate-resilient infrastructure, and promoting equity in climate action are key to protecting vulnerable communities. Only through proactive and inclusive measures can we safeguard human health in an increasingly unstable climate.

Reference:

1. Proulx, K., Daelmans, B., Baltag, V., & Banati, P. (2024). Climate change impacts on child and adolescent health and well-being: A narrative review. *Journal of global health*, *14*, 04061.
2. George, A. M., Ansumana, R., de Souza, D. K., Niyas, V. K. M., Zumla, A., & Bockarie, M. J. (2024). Climate change and the rising incidence of vector-borne diseases globally. *International Journal of Infectious Diseases*, *139*, 143-145.
3. Goniewicz, K., Burkle, F. M., & Khorram-Manesh, A. (2025). Transforming global public health: climate collaboration, political challenges, and systemic change. *Journal of Infection and Public Health*, *18*(1), 102615.
4. Duijvestein, M., Sidhu, R., Zimmermann, K., Carrington, E. V., Hann, A., Sousa, P., ... & Müller, M. (2024). The United European Gastroenterology green paper—climate change and gastroenterology. *United European gastroenterology journal*, *12*(9), 1292-1305.
5. Van Daalen, K. R., Tonne, C., Semenza, J. C., Rocklöv, J., Markandya, A., Dasandi, N., ... & Lowe, R. (2024). The 2024 Europe report of the Lancet Countdown on health and climate change: unprecedented warming demands unprecedented action. *The Lancet Public Health*, *9*(7), e495-e522.
6. Hartinger, S. M., Palmeiro-Silva, Y. K., Llerena-Cayo, C., Blanco-Villafuerte, L., Escobar, L. E., Diaz, A., ... & Romanello, M. (2024). The 2023 Latin America report of the Lancet Countdown on health and climate change: the imperative for health-centred climate-resilient development. *The Lancet Regional Health–Americas*, *33*.
7. Liao, H., Lyon, C. J., Ying, B., & Hu, T. (2024). Climate change, its impact on emerging infectious diseases and new technologies to combat the challenge. *Emerging microbes & infections*, *13*(1), 2356143.
8. Romanello, M., Walawender, M., Hsu, S. C., Moskeland, A., Palmeiro-Silva, Y., Scamman, D., ... & Costello, A. (2024). The 2024 report of the Lancet Countdown on health and climate change: facing record-breaking threats from delayed action. *The Lancet*, *404*(10465), 1847-1896.
9. Rossi, M. F., Leone, R., & Moscato, U. (2025). Climate Change and Occupational Risks in Outdoor Workers: A Systematic Review of the Health Effects of Extreme Temperatures. *Atmosphere*, *16*(7), 839.
10. Radua, J., De Prisco, M., Oliva, V., Fico, G., Vieta, E., & Fusar-Poli, P. (2024). Impact of air pollution and climate change on mental health outcomes: an umbrella review of global evidence. *World Psychiatry*, *23*(2), 244-256.

11. Sengul, T., Sariköse, S., Uncu, B., & Kaya, N. (2025). Predictive role of climate change awareness and protective behaviors on quality of life among nursing and midwifery students. *Nurse Education Today*, 106831.
12. Daunoras, J., Kačergius, A., & Gudiukaitė, R. (2024). Role of soil microbiota enzymes in soil health and activity changes depending on climate change and the type of soil ecosystem. *Biology*, *13*(2), 85.
13. Bhandari, D., Robinson, E., Pollock, W., Watterson, J., Su, T. T., & Lokmic-Tomkins, Z. (2025). Mapping multilevel adaptation response to protect maternal and child health from climate change impacts: A scoping review. *iScience*, *28*(3).
14. Cai, W., Zhang, C., Zhang, S., Bai, Y., Callaghan, M., Chang, N., ... & Gong, P. (2024). The 2024 China report of the Lancet Countdown on health and climate change: launching a new low-carbon, healthy journey. *The Lancet Public Health*, *9*(12), e1070-e1088.
15. Gulma, K. A. (2024). The Intersection of Environmental Health and Infectious Disease Control: Addressing the Role of Climate Change in Emerging Global Health Threats. *Journal ISSN*, *2766*, 2276.
16. Shah, W. U. H., Lu, Y., Liu, J., Rehman, A., & Yasmeen, R. (2024). The impact of climate change and production technology heterogeneity on China's agricultural total factor productivity and production efficiency. *Science of The Total Environment*, *907*, 168027.
17. Edo, G. I., Itoje-akpokiniovo, L. O., Obasohan, P., Ikpekoro, V. O., Samuel, P. O., Jikah, A. N., ... & Agbo, J. J. (2024). Impact of environmental pollution from human activities on water, air quality and climate change. *Ecological Frontiers*, *44*(5), 874-889.