RUBRICA
CONSEGUENZE DEL CAMBIAMENTO CLIMATICO

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EMERGING INFECTIOUS DISEASES IN THE ERA OF CLIMATE CHANGE: A GLOBAL PERSPECTIVE

ABSTRACT

Climate change has emerged as a major determinant of global health, profoundly influencing the transmission dynamics and distribution of infectious diseases. Increasing global temperatures, shifting precipitation patterns, extreme weather events, and ecological alterations have collectively affected the occurrence, spread, and severity of vector-borne, water-borne, airborne, and zoonotic infections.

This review synthesizes current scientific evidence to examine the relationship between climate change and the emergence, transmission, and geographical expansion of infectious diseases. Relevant literature published between 1995 and 2025 was systematically collected from major databases, including PubMed, Scopus, Web of Science, Google Scholar, and Springer Nature, together with peer-reviewed articles, books, global surveillance reports, and climate–health assessments.

The available evidence demonstrates that climate-driven environmental changes are reshaping infectious disease epidemiology by altering vector ecology, pathogen survival, and host–pathogen interactions. Rising temperatures, changing rainfall patterns, ecosystem disturbances, and increasingly frequent extreme weather events have expanded the geographic distribution and seasonal activity of disease vectors such as mosquitoes and ticks, facilitating the emergence and resurgence of diseases including dengue, malaria, influenza, Lyme disease, and Zika virus infection. These findings underscore the urgent need to integrate climate considerations into infectious disease surveillance, prevention, and control strategies.
This review provides a comprehensive overview of climate-sensitive infectious diseases, the mechanisms linking climate variability to disease transmission, emerging global risks, epidemiological trends, future research priorities, and their implications for public health policy and healthcare systems.

RIASSUNTO

Il cambiamento climatico è emerso come un fattore determinante per la salute globale, influenzando profondamente le dinamiche di trasmissione e la distribuzione delle malattie infettive. L'aumento delle temperature globali, le variazioni nei regimi di precipitazione, gli eventi meteorologici estremi e le alterazioni ecologiche hanno inciso collettivamente sull'insorgenza, sulla diffusione e sulla gravità delle infezioni trasmesse da vettori, veicoli idrici o per via aerea, nonché delle zoonosi.

La presente revisione sintetizza le attuali evidenze scientifiche per esaminare la relazione tra cambiamento climatico ed emergenza, trasmissione ed espansione geografica delle malattie infettive. La letteratura pertinente, pubblicata tra il 1995 e il 2025, è stata raccolta sistematicamente dalle principali banche dati – tra cui PubMed, Scopus, Web of Science, Google Scholar e Springer Nature – includendo articoli sottoposti a revisione paritaria, libri, rapporti di sorveglianza globale e valutazioni sul rapporto clima-salute.

Le evidenze disponibili dimostrano che i cambiamenti ambientali indotti dal clima stanno rimodellando l'epidemiologia delle malattie infettive, alterando l'ecologia dei vettori, la sopravvivenza dei patogeni e le interazioni ospite-patogeno. L'aumento delle temperature, le variazioni delle precipitazioni, le perturbazioni degli ecosistemi e la crescente frequenza di eventi meteorologici estremi hanno ampliato la distribuzione geografica e l'attività stagionale di vettori di malattie come zanzare e zecche, favorendo l'insorgenza e la ricomparsa di patologie quali dengue, malaria, influenza, malattia di Lyme e infezione da virus Zika. Tali risultati sottolineano l'urgente necessità di integrare le considerazioni climatiche nelle strategie di sorveglianza, prevenzione e controllo delle malattie infettive. Questa revisione offre un quadro completo delle malattie infettive sensibili al clima, dei meccanismi che collegano la variabilità climatica alla trasmissione delle malattie, dei rischi globali emergenti, delle tendenze epidemiologiche, delle priorità di ricerca future e delle relative implicazioni per le politiche di sanità pubblica e i sistemi sanitari.

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INTRODUCTION

One of the most foreseeable and harmful global threats, climate change has substantial long-term effects on human life and health. Health implications are obvious on every continent when temperatures increase, sea levels rise, and there is a higher frequency of drought and flooding[1] [2].

These changes are important because they pose a threat to individual health emergencies and also pose a serious risk to the public health. Climate change is causing an increase in conditions like respiratory illnesses, hunger, heat-related morbidity, and mortality[2].

With significant effects on human health, climate change has emerged as one of the world's most urgent issues. Between 2030 and 2050, the World Health Organization projects that climate-related factors will cause an additional 250,000 deaths annually, mostly from malnutrition, heat wave, dengue, and malaria. While many disease categories are impacted by climate change, infectious diseases are particularly vulnerable because pathogens, vectors, and reservoirs react quickly to imbalance in the environment[3] [4].

The complex interaction between infectious illnesses and climate change necessitates a variety of perspectives. As the climate warms and biodiversity declines, more animal species and vectors contribute to the emergence of diseases[5].

The circulation and occurrence of infectious diseases are clearly impacted by the changing environment and seasonal variation, but it is important to acknowledge the indirect consequences as well. Climate-driven migration into overcrowded shelters is caused by increased flooding in some parts of the world, which raises the risk of communicable diseases [6].

Similarly, more severe weather conditions lead to food and water insecurity, which increases the risk of malnutrition and infectious diseases.

Given the current global health emergencies, particularly the coronavirus disease 2019 (COVID-19) pandemic, a more comprehensive understanding of the global onset of infectious diseases impacted by climate change is important[7].

This article focuses at how climate change impacts the spread of infectious illnesses, with particular attention to vector-borne, water-borne, zoonotic, and environmental infections. It also discusses highly affected regions, such as tropical regions experiencing rapid climate change.

METHODOLOGY

This narrative review was conducted to synthesize existing evidence on the relationship between climate change and the emergence, transmission, and distribution of infectious diseases, and to examine associated global health implications.

A comprehensive but non-systematic literature search was performed to identify relevant peer-reviewed researches, reports, and review articles. Search key words including 'climate change and global warming, causes of infectious diseases, vector-borne diseases, water-borne diseases, zoonotic infections, emerging diseases, infectious disease transmission, climate variability and infectious diseases, and global health impact. Electronic searches were done through major scientific databases including PubMed, Scopus, Web of Science, Google Scholar, and Embase.

Inclusion criteria:

- Literatures addressed associations and causes between climate change or climatic variability and infectious disease dynamics
- Literatures focused on human and animal infectious diseases
- Literatures published in English
- Original research articles, reviews, meta-analyses, policy reports, surveillance studies or relevant website

Exclusion criteria:

- Publications were excluded if they focused solely on non-infectious diseases
- Veterinary-only outcomes without human relevance
- Preprint and Conference paper

Data extraction:

First, titles and abstracts were checked for relevancy. After then, full-text articles were examined to verify eligibility. Infectious disease types, geographic location, climatic mechanisms, transmission pathways, seasonal fluctuation, and public health

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consequences were among the important information that were carefully collected.

RESULT AND DISCUSSION

Mechanisms linking climate change and infectious disease:

Climate change has emerged as one of the biggest risks to global health in the twenty-first century due to its significant influence on the spread of infectious illnesses as well as its effects on extreme weather, food security, and biodiversity. Rising temperatures, shifting rainfall patterns, and an increase in the frequency of climate-related disruptions are altering the ecology of diseases, vectors, and hosts (**Table 1**). As a result, distribution of diseases, severity, and seasonality are shifting, which presents a problem for public health worldwide. Understanding how climate change affects infectious disease dynamics is essential for forecasting future trends and developing effective mitigation strategies.

Temperature is one of the environmental factors that most significantly affect the ecology of disease. In warmer climates, many diseases and vectors have higher rates of metabolism and reproduction. For example, mosquitoes that transmit dengue, chikungunya, malaria, and Zika breed faster and exhibit shorter incubation times for the illnesses they carry in warmer climates. As a result, both vector density and transmission efficiency increase. Additionally, many vector species may survive all year round in warmer winters, expanding infection windows that were previously limited by seasonal temperature drops[(8) (10)].

Climate change is causing a change in the global distribution of organisms. As temperatures rise, vector species like sandflies, ticks, and mosquitoes are expanding into previously unsuitable regions like temperate zones and higher elevations. In recent years, tick-borne diseases like Lyme disease and tick-borne encephalitis have increased in frequency in northern Europe and North America due to milder winters that allow ticks to thrive. In a similar vein, reports of Aedes mosquitoes—which were formerly limited to tropical and subtropical regions—have been made in parts of the United States and southern Europe. Dengue and Zika outbreaks have been found to be connected with these mosquitoes[(11) (12)].

Changes in precipitation patterns, such as excessive rainfall, long droughts, or unpredictable monsoons, affect diseases that proliferate in stagnant water or spread through contaminated water. Heavy rains and flooding can pollute water supplies with bacteria that cause cholera, typhoid, and leptospirosis. However, by pushing animal and human populations closer together or concentrating diseases in decreasing water sources, drought circumstances can raise the risk of transmission. Rainfall has an impact on mosquito breeding sites for diseases carried by vectors; large rainfall can create new habitats, while intermittent rains can sustain continuing breeding cycles[(13) (14)].

Humidity is essential for the survival and spread of many pathogens. Increased humidity can extend the lives of airborne diseases like influenza viruses, which can explain changes in illness seasonality. Conversely, low humidity during heatwaves can increase the transmission of some respiratory viruses and dry up mucosal surfaces, making patients more susceptible to illness. In vector-borne diseases, moisture levels alter the likelihood of transmission by influencing mosquito survival rates and egg development[(15) (16)].

Climate change modifies ecosystems in ways that could promote the introduction or re-occurrence of infectious illnesses. Deforestation, desertification, and altered vegetation patterns—all of which are commonly caused by or made worse by climate change—disrupt the natural habitats of species and vectors. This disruption increases human-animal contact, which facilitates the transmission of zoonotic diseases like coronaviruses, Ebola, and Nipah. Additionally, displaced wildlife may relocate into urban areas, creating additional avenues for the spread of infections[(17) (18) (19)].

Hurricanes, heat waves, and floods are examples of natural disasters that are becoming more common and severe due to climate change. These incidents could disrupt health infrastructure, disease surveillance systems, and sanitation systems. Displaced populations living in crowded, unhygienic conditions are more susceptible to vector-borne

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infections, diarrheal illnesses, and measles outbreaks. Stagnant water after floods provides mosquitoes with an ideal breeding ground, leading to an increase in diseases like dengue and malaria[20] [21].

TABLE 1
CLIMATE CHANGE AND HOW THEY AFFECT INFECTIOUS DISEASES

Climatic factors	Environmental effect	Impact on pathogen/vector	Affected diseases
Rising temperature	Warmer ecosystems, extended warm seasons	Faster vector growth, higher biting rate, shorter incubation periods	Dengue, Malaria, Chikungunya
Irregular rainfall	Water scarcity, flooding, and stagnation	Increased mosquito breeding; water contamination	Dengue, Cholera, Hepatitis E
Increased humidity	Higher moisture retention	Increases the survival of viruses in mosquitoes and encourages the growth of bacteria and fungi	Zika, Chikungunya
Drought	Water storage in containers	Ideal artificial breeding sites for Aedes mosquitoes	Dengue, Zika
Extreme weather events (cyclones, floods, heatwaves)	Sanitation interruption and population displacement	Promotes diarrheal diseases, respiratory infections	Typhoid, Cholera
Habitat loss and ecological shifts	Wildlife migration and human–animal contact	An increased chance of zoonotic transmission	Nipah virus, Hantavirus
Ocean warming	Increase in sea-surface temperature	Proliferation of Vibrio species	Cholera like Infections, Campylobacter, rotavirus, and parasites like giardia
Urban heat islands	Localized higher temperatures	Increased mosquito populations in urban areas	Dengue, Chikungunya

Problems with climate change forecasts:

Station data, satellite data, and paleo-climate data from tree rings, ice cores, and lake and ocean sediment are examples of climate data and reconstructions. These data are crucial for understanding past climate change as well as for verifying climate models[22].

For instance, the Pliocene and Eocene epochs could serve as great comparisons for certain climate scenarios, offering an idea of what the future climate would entail[23]. GCMs, or general circulation models, are mathematical depictions of the planet's climatic systems and are effective instruments for combating climate change forecasts. GCMs are constantly being enhanced through computational developments and confirmed by new data.

There have been recent advancements in modeling surface temperature trends at the continental scale and multidecadal patterns. But the models still don't work as well for precipitation and symbolizing the aerosol and cloud-related processes. Although there are still significant challenges in simulating the dynamics of the Greenland and Antarctic ice sheets, the potential to model glaciers and ice sheets, ocean thermal expansion, and sea level has increased[24].

Climate and pathogens:

Temperature is one of the most obvious ways that climate affects infections. Snails, ticks, mosquitoes, and many other microbes and vectors are highly sensitive to temperature changes. Warmer climates speed up the metabolism, reproduction, and biting rates of vectors like *Aedes* and *Anopheles* mosquitoes, which transmit dengue, Zika, malaria, and chikungunya. As a result, illnesses that were formerly exclusive to tropical regions are now spreading to temperate regions. Rising temperatures can increase the risk of illnesses by enabling some viruses to survive winters that previously confined them [25] [26].

Changes in precipitation patterns also influence pathogen dynamics. Heavy rains and flooding can contaminate water supplies with bacteria, viruses, and parasites, leading to epidemics of cholera, leptospirosis, and other water-borne diseases.

On the other hand, prolonged droughts force people and animals to gather close to limited water supplies, which, encourages the spread of diseases between species. Moisture levels also affect the survival of fungal diseases; for example, variations in

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temperature and humidity have been linked to the emergence of multidrug-resistant fungal infections such as *Candida auris*[27] [28].

Climate change also modifies ecosystems in ways that indirectly affect infections. Deforestation, habitat fragmentation, and changing food supplies push wildlife closer to human settlements, increasing the danger of zoonotic transfer of illnesses from animals to humans. The spread of Lyme disease, the Nipah virus, and hanta-virus has been strongly associated with such ecological disruptions. Additionally, rising water level increase the chance of harmful algal blooms and marine infections which subsequently affects fisheries and fisherman health[29] [30].

Impact on major infectious disease:

Vector borne disease: The rate at which dengue has spread over the world is astonishing. Warmer temperatures decreases the extrinsic incubation period of the dengue virus and prolong mosquito life. In Bangladesh, India, and Brazil, record-breaking outbreaks have been documented; these outbreaks are strongly linked to prolonged heat waves and unpredictable monsoon patterns[31].

Temperature has a significant impact on malaria transmission. Climate change in South America, Nepal, and East Africa can cause *Anopheles* mosquitoes to migrate to higher altitudes.

Higher rainfall in some places further promotes vector breeding[32]. The Zika and Chikungunya viruses are carried by climate-sensitive *Aedes* species. In the Americas, parts of Europe, and Asia, outbreaks have become more frequent due to rising temperatures and humidity[33].

Water borne disease: Many water-borne pathogens are directly impacted by rising global temperatures in terms of survival and reproduction. In warmer waters, bacteria that cause cholera, like *Vibrio cholerae*, proliferate more quickly.

Additionally, higher temperatures promote algal blooms, which create the perfect environment for the growth of harmful microorganisms. Warm water can lower dissolved oxygen levels, which further deteriorates water quality and promotes the growth of pathogens. Therefore, more frequent and severe outbreaks of diseases like cholera, typhoid, and gastroenteritis are caused by warmer climates[34] [35].

When excessive rainfall overwhelms sanitary facilities, sewage can contaminate sources of drinking water. Additionally, flooding carries diseases from garbage, soil, and animal excrement into ponds, rivers, and abandoned wells. In these circumstances, bacteria, viruses, and parasites multiply rapidly. Giardiasis, leptospirosis, hepatitis A and E, and diarrhea outbreaks are common in communities during and after floods[36] [37].

Rising sea levels cause saltwater intrusion into freshwater supplies, especially in coastal locations. This can reduce the supply of safe drinking water and alter the chemical composition of water, making it more favorable to few kinds of bacteria. For instance, *Vibrio* bacteria thrive in brackish water, increasing the risk of cholera-like infections among coastal populations[38].

Zoonotic disease: Rising temperatures have an effect on the distribution and activity of vectors that transmit zoonotic pathogens, such as fleas, ticks, and mosquitoes. Diseases like West Nile virus, dengue, Zika, Lyme disease, and malaria can spread to colder regions and higher altitudes due to warmer weather. Heat also accelerates vector breeding cycles, boosts feeding rates, and encourages pathogen replication within the vector, all of which raise the risk of transmission[39] [40].

Bat migration and feeding habits are altered by food scarcity and habitat changes brought on by climate change. Increased outbreak has been linked to heat wave and changing breeding seasons in Bangladesh and India[41]. Climate drivers often collaborate with human actions such as deforestation, land-use change, and agricultural growth.

These combined stresses reduce biodiversity and disrupt ecological balances, making it easier for zoonotic viruses to spread. When habitats are reduced, species that thrive in the wild environments—such as rats, bats, and mosquitoes—tend to take over populated areas. Furthermore, these animals often act as reservoirs for zoonotic diseases[42] [43].

Air borne disease: The pathogen *Neisseria meningitidis* causes meningococcal meningitis, an infection of the meninges that result in high mortality rates among people in developing nations.

It is considered that greater concentration of dust, heavy winds, heightened temperatures, and low

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humidity may induce damage to nasopharyngeal mucosa leading to greater susceptibility to meningitis [(44)].

Tick borne disease: Lyme disease is the most common vector-borne disease in North America and Europe. It is caused by the *Borrelia burgdorferi* spherocyte bacteria that are primarily spread by *Ixodes pacificus* [(45)]. Like mosquitoes, ticks are influenced by weather, and the frequency and severity of Lyme disease may be caused by climate change.

The growth cycle, population density, egg development, and tick spread are all impacted by high temperatures. Given the rise in disease occurrence in recent years and the estimated 213% increase in suitable habitat by the 2080s, studies show that temperature is the most significant determinant in tick colony establishment in Canada[(46)]. In the upcoming decades, a 20% rise in disease prevalence is predicted, assuming a 2°C increase in the average temperature. As improved environmental suitability promotes tick breeding which, in turn increases the tick population and the chance of disease transmission. In the upcoming decades, it is predicted that a 2-4°C increase in the average temperature in the United States will result in a 20% rise in Lyme disease cases[(47)].

Regional trends: In recent years, dengue transmission has risen to all-time highs in the Americas, with significant outbreaks taking place in Brazil, Mexico, and other countries.

Warmer temperatures and higher humidity lengthen Aedes mosquito seasons and expand appropriate areas, while urbanization and unhygienic circumstances enhance risk (**Table 2**). Public health solutions now include vector control, immunization where needed, and community involvement[(48)].

In East Africa, Rift Valley fever (RVF), a mosquito-borne zoonosis closely associated with flooding, severe rainfall, and El Niño occurrences, has become more widespread. RVF epidemics are caused by unusual rainfall, which leads to explosive mosquito reproduction and livestock-to-human transmission, resulting in both animal deaths and human illness. Climate change early warning systems have prioritized surveillance[(49)]. Warming has been linked to tick and mosquito range expansions northward and altitudinally in temperate regions, altering the risk of Lyme disease and the West Nile virus. Although socioecological factors (land cover, host abundance, surveillance) confound attribution, climate is a strong enabling factor for observed range changes and prolonged transmission seasons[(50)].

Brazil has frequently had widespread dengue outbreaks. Urban congestion, water storage methods, and environmental conditions (e.g., higher mean temperatures, irregular rainfall patterns) combine to create *Aedes aegypti* breeding habitats. By experimenting with Wolbachia mosquito releases and increasing surveillance, the country has shown a combined biological and systems response to climate-amplified arboviral risk[(51)]. Bangladesh has a recurring cholera epidemic due to its seasonal monsoons, tidal dynamics, and regular floods. Recent national cholera control strategies especially incorporate investments in WASH infrastructure, preemptive immunization in hotspots, and climate-sensitive surveillance to reduce the frequency and severity of outbreaks[(52)].

Public health implication:

One of the most significant effects on public health is the expansion of vector-borne diseases into new regions. Mosquitoes that transmit dengue, chikungunya, Zika, and malaria thrive in warmer and more humid climates. As climatic conditions improve in temperate zones and higher elevations, populations with little to no prior experience are more vulnerable. This expansion will require new surveillance systems, more comprehensive immunization and vector-control programs, and health worker training in regions that have never dealt with such infections before[(53) (54)].

Another major public health concern is water-borne infections. Variations in rainfall, flooding, and contaminated water sources facilitate the spread of diarrheal diseases such as cholera, typhoid, and hepatitis A. Rising temperatures promote the growth of bacteria in surface waterways, and extreme weather regularly disrupts sanitation systems. As a result, outbreaks frequently occur in communities, especially those with inadequate WASH infrastructure. Climate change-related water scarcity also makes it necessary to rely on contaminated water sources, which accelerates the spread of illness.

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TABLE 2
GLOBAL MAP OF CLIMATE-SENSITIVE DISEASE EXPANSION

Region	Climatic driver	Expanding diseases	Comments
South Asia	Rising temperature, heavy rainfall, flooding	Dengue, Chikungunya, Malaria, Cholera	Bangladesh, India, Sri Lanka experiencing rapid vector spread into new districts
Southeast Asia	Heat, El Niño cycles, sea-level rise	Dengue, Malaria, Leptospirosis	Warmer monsoon seasons increasing mosquito breeding
Sub-Saharan Africa	Temperature rise, drought–flood cycles	Malaria, Rift Valley Fever, Cholera	Particular concern as a result of inadequate medical facilities
North Africa and Middle East	Extreme heat, desertification, water scarcity	Leishmaniasis, Cholera, Middle East respiratory syndrome coronavirus	Sandfly vectors expanding with warming
Europe (Southern and Central)	Increased temperature, mild winters	Dengue, West Nile Virus, Tick-borne diseases	First local dengue cases in France, Italy, Spain
North America	Changes in humidity, forest conditions, and warming	Lyme disease, West Nile Virus, Valley Fever	Ticks expanding northwards into Canada
Latin America and Caribbean	Increased rainfall, storms, heatwaves	Dengue, Zika, Chikungunya, Cholera	Urban heat islands amplify vector populations
Australia and Pacific Islands	Heatwaves, cyclones, flooding	Dengue, Ross River Virus	Coastal flooding increases water-borne outbreaks

Because of this, public health systems must simultaneously cope with contamination during floods and lack of water during droughts[13] [55] [56].

Infectious diseases driven by climate change have complicated and increasingly pressing effects on public health. Healthcare infrastructure, monitoring systems, and emergency readiness are all severely strained by these challenges. To protect the world's population, public health frameworks must prioritize early detection, integrate climate resilience, enhance cross-sector collaboration, and provide equal access to clean water, sanitation, and healthcare. Climate change is making the worldwide landscape of infectious disease risk, and future community resilience will depend on capacity of public health systems to adapt[57] [58] [59].

Climatic pollution and biodiversity loss:
Pesticides are used by humans to reduce the negative effects on plants by insects, hence boosting agricultural output. Despite their short-term advantages, pesticides seriously damage the essential elements of the environment[60]. Certain fungi and bacteria can withstand the toxicity of pesticides by metabolizing them to make them less harmful. By breaking down pollutants and complex chemicals, biodegrading microorganisms reduce the impact of pesticides in sewage and ecosystems.
However, since animals lack the specific enzymes required to reduce the toxicity of these pesticides, people and animals are unable to metabolize hazardous compounds that have accumulated gradually in their bodies leading to different diseases [61] [62]. Farmers that use organophosphate-containing insecticides increase the risk of quickly developing altered gene. People who live near or eat agricultural products that have been treated with pesticides or insecticides are also more likely to suffer genetic problems and chronic illnesses[63] [64].
In the ecosystem, fresh water serves as a medium for several crucial biological interactions[65].
Natural disasters and manufacturing operations both have an impact on fresh water by raising the prevalence of certain infectious diseases.

Microplastics (MPs) are produced with a diameter of less than 5 mm. In order to eliminate dangerous bacteria through employment or food acquisition activities, humans have willingly introduced insecticides and microplastics. These harmful chemicals released into the aquatic ecosystem have

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a significant negative impact on marine biodiversity. Although fresh water is a natural resource for people, animals, and plants, it is now at risk due to a number of biohazardous compounds. Microorganisms are obviously essential for maintaining the ecosystem's sustainability and safety. MPs continue to present an environmental threat, which has prompted numerous climate experts to conduct in-depth research on this issue. MPs are produced from waste plastic or fossil fuel, and these substances have the potential to harm not just plants, animals, and humans but the entire marine ecosystem[(66) (67) (68)].

In both urban and rural settings, socioeconomic factors influence the onset of infectious diseases during global climate disasters (**Figure 1**). Notably, compared to persons in industrial settings, those living in urban areas are far more likely to experience incidence of infectious diseases. More resilient health systems will be required to withstand the current global trends if tropical climate shifts, pandemic illnesses, and restricted access to medical treatment in urban areas continue to increase.

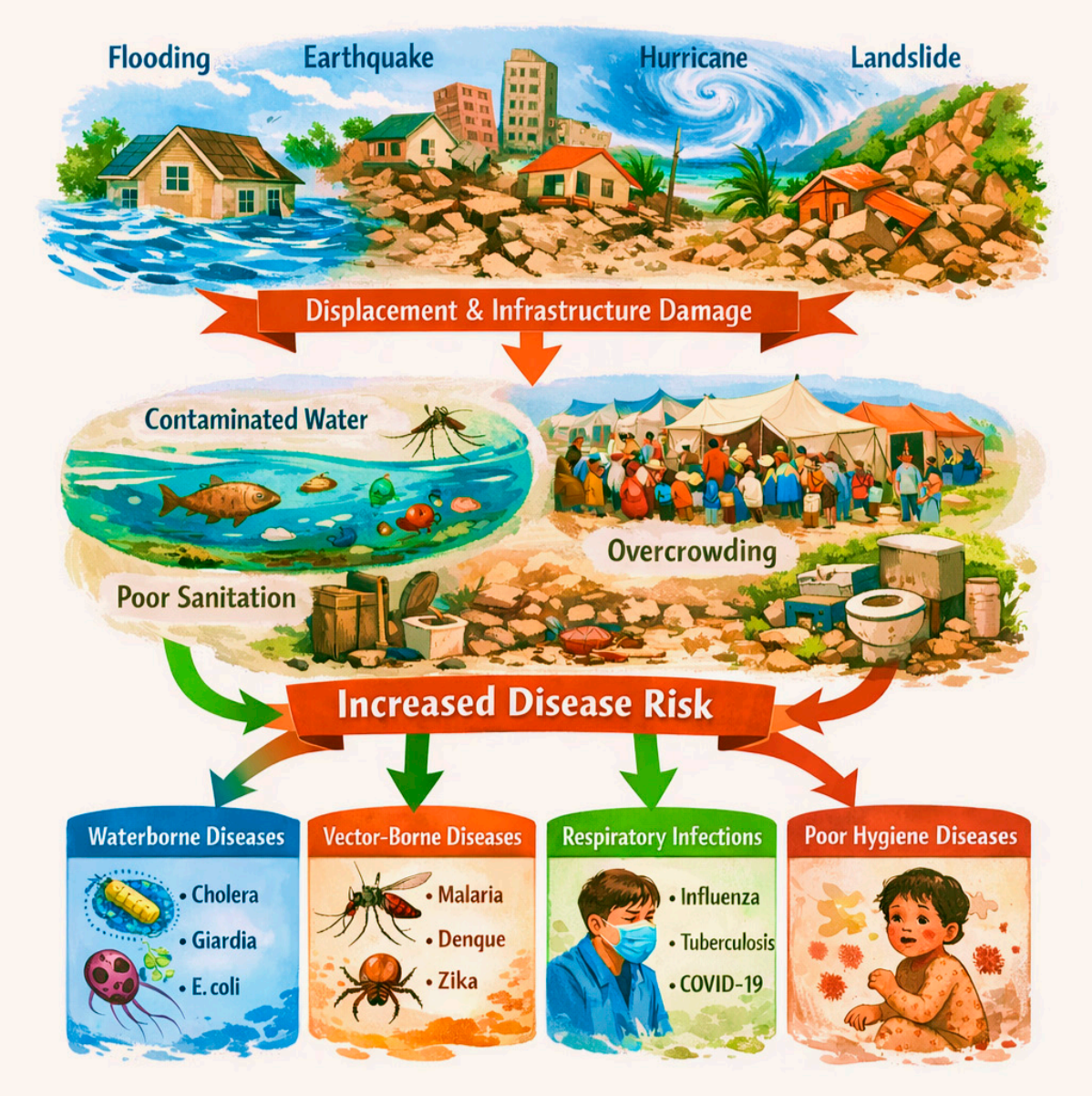

Figure 1
Natural disaster significantly promote infectious diseases outbreak

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Future directions:
Although the implications of infectious diseases and climate change are frequently studied in wealthy nations, underdeveloped nations must also be taken into account, as they frequently suffer more severe consequences from an increasing disease frequency. Studying the complex relationships between various vectors and infections and other climate variables in regard to their impact on human health is becoming more and more important (**Figure 2**).

To fully comprehend the long-term effects of climate change on human health, longitudinal research is necessary. Current research has concentrated on the patterns and made an effort to forecast how the burden of infectious disease would increase due to climate change in the future. Additionally, assessing practical strategies like expanding access to antibiotics and antiviral drugs, the function of socioeconomic level, and accurately assessing how a change in human behavior makes us susceptible to infections is quite significant. These restrictions can be taken into account when integrating evidence-based therapies to minimize the negative consequences.

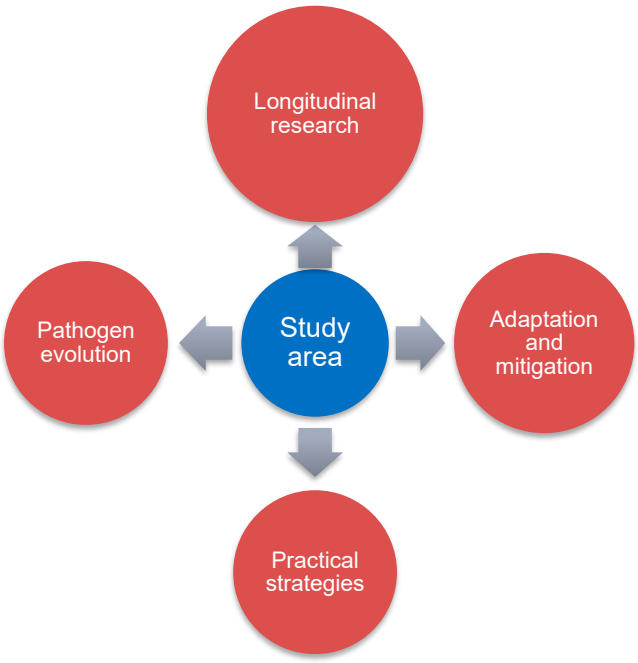

Figure 2
Possible study area about climate change and disease outbreak

CONCLUSION

Climate change is one of the major drivers of emerging and re-emerging infectious diseases.
It modifies host susceptibility, pathogen survival, and vector ecology by changing environmental conditions.
Addressing this challenge requires global cooperation, interdisciplinary research, and adequate public health infrastructure. In order to protect vulnerable populations and reduce future disease risks, immediate action is crucial.

This article highlights how climate change may affect the incidence and transmission of certain infectious diseases, which should be carefully taken into account when creating successful preventative initiatives.

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