Forum: World Health Organization (WHO)

Issue: Examining the Effects of Climate Change on the Emergence of New Pathogens

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Personal Introduction

Dear Delegates,

My name is Bahar Mohammadi and I am currently an IGCSE student attending Byron College. My Model United Nations journey began around 3 years ago, when I was just a delegate trying out new committees and positions. MUN has truly helped me with my research skills, public speaking, social skills and a chance to express my authentic self. Discovering different cultures and their backgrounds widens your perspective on the real world. This is my 2nd time attending ACG MUN, and it is my utmost honor to be your Deputy President. This is my first time chairing, and I am excited to be supporting you all.

Based on this year's theme of "Shaping Tomorrow", topic 1 of the World Health Organization committee is "Examining the Effects of Climate Change on the Emergence of New Pathogens"; this issue is high rising, and needs careful solutions, especially in our current years. It follows the situation of rapidly developing climate change. I hope you all find this topic as interesting as I do, and I really look forward to an entertaining and productive debate!

Do not hesitate to contact me for any questions via email at: baharbvx@gmail.com

Best regards,
Bahar Mohammadi

Topic Introduction

The last 50 years, climate change has rapidly and increasingly been recognized as a significant factor to global public health risks, more specifically in relation to the emergence and spread of infectious diseases.[1] The rise of global temperature, shifting patterns in rainfall, and the intense growth of extreme weather events like floods, droughts and heatwaves have created environmental conditions that let pathogens and disease vectors to thrive and survive in new regions of our world. Moreover, South Asia has been experiencing flooding, which causes vast cholera outbreaks, while rising temperatures have allowed malaria and dengue to spread to areas considered low risk, such as higher altitude and temperate areas.[2]

As a result, serious threats have been caused by the developments of pathogens to global health security especially in Less Economically Developed countries (LEDCs) while they suffer from limited healthcare infrastructure, weak surveillance systems for diseases and most importantly restricted access to vaccines and treatments; outbreaks related to climate issues have immense tension on healthcare systems whilst engendering major economic burdens through the increasing healthcare costs, loss of productivity in the workforce, and societal collapse.[3]

Many complicated pathways are led through how climate change continues to contribute to the emergence of pathogens. The migration of animals and insects due to climate change established ecological patterns and increased opportunities for zoonotic spillovers. In addition, deforestation further escalates the risks of spreading diseases by bringing humans into closer contact with wildlife contaminated with diseases. The COVID-19 pandemic demonstrated how such ecological damage, combined with the inadequate preparedness of our world, can surge dramatically into a global health emergency.[4]

Definition of Key Terms

Climate change

[1] "Global Temperature Report for 2025." *berkeleyearth.org/global-temperature-report-for-2025/*, 14 Jan. 2026, berkeleyearth.org/global-temperature-report-for-2025/.
[2] "Climate Change." World Health Organization (WHO), 12 Oct. 2023, www.who.int/news-room/fact-sheets/detail/climate-change-and-health.
[3] "Health Emergencies." World Bank, 18 2025, www.worldbank.org/en/topic/pandemics.
[4] "Emerging Lessons From the COVID-19 Pandemic." UNDRR, 2021, www.undrr.org/media/72865/download?startDownload=20260204.

The long-term shifts in temperature and weather patterns are driven naturally and by mankind. Natural shifts are due to the sun's activity or volcanic eruptions. The burning of fossil fuels is caused by humans.[5]

Pathogens

"An organism causing disease to its host, with the severity of the disease symptoms referred to as virulence".[6] Any microorganism, such as a fungus, virus or parasite, that is capable of causing disease in its host.

Emergence of Pathogens

The appearance of new diseases, which are infectious or existing pathogens expanding into new regions/populations.[7]

Zoonotic Diseases

Diseases that are naturally transmitted from vertebrate animals to humans, caused by pathogens such as fungus, viruses or parasites.[8]

Zoonosis

"Any disease or infection that is naturally transmissible from vertebrate animals to humans".[9]

Vector-Borne Diseases

"Human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors".[10]

Pandemic

The global spread of an infectious disease across various countries or continents that affects a vast number of people simultaneously.[11]

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[5] United Nations. "What Is Climate Change?" *United Nations*, www.un.org/en/climatechange/what-is-climate-change
[6] "Q&A: What Are Pathogens, and What Have They Done to and for Us?" PMC Home, pmc.ncbi.nlm.nih.gov/articles/PMC5648414/.
[7] "Emerging Diseases." *WHO EMRO*, www.emro.who.int/health-topics/emerging-diseases/.
[8] "Zoonoses." *World Health Organization (WHO)*, 29 July 2020, www.who.int/news-room/fact-sheets/detail/zoonoses.
[9] ibid
[10] "Vector-borne Diseases." World Health Organization (WHO), 26 Sept. 2024, www.who.int/news-room/fact-sheets/detail/vector-borne-diseases.
[11] "Pandemics." World Health Organization (WHO), www.who.int/westernpacific/health-topics/pandemics.

Global Health Security

The development/building of new systems to detect and prevent the threats of diseases worldwide.[12]

One Health Approach

"An integrated, unifying approach that aims to sustainable balance and optimize the health of people, animals and ecosystems".[13]

Antimicrobial Resistance

"Antimicrobial Resistance (AMR) occurs when bacteria, viruses, fungi and parasites no longer respond to antimicrobial medicines. As a result of drug resistance, antibiotics and other antimicrobial medicines become ineffective and infections become difficult or impossible to treat, increasing the risk of disease spread, severe illness, disability and death."[14]

Background Information

Historical Context

Environmental change and infectious diseases have been connected for a long time, essentially, since the dawn of human existence.[15] Most of the major outbreaks have been related to times when new cities were rapidly built, farmland was expanded, and there was a general increase in human mobility. All these factors including urbanization, agriculture, and mobility, led to human animal interactions and the disruption of natural disease barriers. Today, climate change has increased these processes worldwide. Due to global warming, the temperature changes, rainfall variations, increased duration of heatwaves, and the escalation of extreme weather events have caused the disappearance of certain ecosystems that used to serve as natural barriers to the spread of diseases[16]. These changes, however, do not compare to the pace of climate change, which is happening so rapidly that little time

[12] "Health Security." *World Health Organization (WHO)*, 3 Apr. 2020, www.who.int/health-topics/health-security#tab=tab_1.
[13] "One Health." *World Health Organization (WHO)*, 9 May 2022, www.who.int/health-topics/one-health.
[14] "Antimicrobial Resistance." World Health Organization (WHO), 21 Nov. 2023, www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance.
[15] "INTERACTIONS BETWEEN GLOBAL CHANGE AND HUMAN HEALTH." *The Pontifical Academy of Sciences*, 2004, www.pas.va/content/dam/casinapioiv/pas/pdf-volumi/scripta-varia/sv106pas.pdf.
[16] Shivanna, K. R. "Climate Change and Its Impact on Biodiversity and Human Welfare." PMC Home, pmc.ncbi.nlm.nih.gov/articles/PMC9058818/.

is left to adapt to its effects by both the society and health sectors. Climate change is a threat multiplier as it aggravates health risks that are already there, and it unveils the vulnerabilities in public health systems, especially in the most under resourced countries.[17]

Animal and Insect Migration

Climate change has strongly changed the migration patterns of animals and insects resulting in a major health concern worldwide due to the spread of diseases. Due to rising temperatures and the instability of their natural habitats, many species are compelled to relocate in order to find suitable conditions for living. This leads to the introduction of disease vectors like mosquitoes and ticks to new areas where the local human populations may not have immunity or experience in handling these diseases. Consequently, diseases such as malaria, dengue, Zika, and chikungunya have spread to higher elevations and other previously unaffected areas.[18]

Moreover, deforestation and changes in land use further exacerbate these dangers as they eliminate the natural barriers existing between wildlife and human settlements, which results in more frequent interactions and a greater risk of zoonotic spillover.[19] Climate change-induced warming of the seas and the thawing of glaciers and permafrost have caused a rise in fears about the potential resurrection of long, frozen ancient microorganisms.[20] Although it is unclear at this stage how dangerous these pathogens could be, the fact that they might one day emerge demonstrates how climate change brings about unexpected and previously unheard of health risks that can disrupt our current surveillance systems.

Evolution of Pathogens

Climate change is a key factor affecting the evolution of pathogens and, therefore, outbreaks are becoming more unpredictable and harder to control. Warmer environments facilitate faster pathogen replication, thus mutation rates go up leading to new strains being developed. Out of these new strains, certain ones might have a higher transmission rate, severity or an improved ability to evade

[17] "Climate Change and Migration." *crisisresponse.iom.int/sites/g/files/tmzbdl1481/files/uploaded-files/Climate-Change-and-Migration-2025.pdf*, WHO, crisisresponse.iom.int/sites/g/files/tmzbdl1481/files/uploaded-files/Climate-Change-and-Migration-2025.pdf.
[18] https://www.worldwildlife.org/our-work/forests/disease-and-deforestation/, www.worldwildlife.org/our-work/forests/disease-and-deforestation/.
[19] "Could Microbes Locked in Arctic Ice for Millennia, Unleash a Wave of Deadly Diseases?" *UNEP*, 20 Jan. 2025, www.unep.org/news-and-stories/story/could-microbes-locked-arctic-ice-millenni,a-unleash-wave-deadly-diseases.
[20] "Science Direct." *ScienceDirect*, www.sciencedirect.com/science/article/pii/S2773049225000182.

existing treatments and vaccines.[21] Meanwhile, environmental stressors such as exposure to prolonged heat, air pollution, and food insecurity weaken the human immune system, which makes individuals more vulnerable to infections, and the severity of the diseases increases.

An increase in the emergence of diseases may result in an elevated use of antibiotics, especially in low-income settings where their regulation might be limited. This acts as a major factor driving the problem of antimicrobial resistance, which is diminishing the level at which existing drugs are effective, and hence, the success of modern healthcare is at stake.[22] In essence, these factors reflect that climate change is not only facilitating the spread of diseases but also influencing the biological evolution of pathogens in such a way that future outbreaks are going to become rapidly difficult to handle.

Moreover, antimicrobial resistance (AMR) is likely to be one of the most serious, long-lasting impacts of pathogen evolution driven by climate change. As temperatures rise and the environment becomes more infected, there will be an increase in infection rates in both humans and animals, which in turn means more use of antibiotics in healthcare systems and farming.[23] In areas where there is little regulation and people have limited access to diagnostic tools, antibiotics are often used excessively or incorrectly, thus the development of resistant strains is further accelerated. In addition to this, climate change supports the crossing of antimicrobial resistant pathogens from one country to another through global travel, trade, and environmental routes such as polluted water systems.[24] It is becoming increasingly difficult, expensive, and even dangerous to treat diseases that used to be simple, resulting in a significant threat to the health of the world and undermining medical achievements over the years.

Mechanisms Linking Climate Change and Disease Emergence

Climate change influences the emergence of infectious diseases by a combination of several environmental and biological mechanisms that are interrelated. The increase in temperature has a direct effect on how long pathogens can remain in the environment and on the efficiency of their transmission between them. Besides, it has been proven that warmer conditions speed up the reproduction cycles of pathogens, allowing diseases to spread quickly in a short time and remain longer throughout the year.[25]

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[21] "Science Direct." *ScienceDirect*, www.sciencedirect.com/science/article/pii/S2773049225000182.
[22] "Nature Articles." *Nature*, www.nature.com/articles/s44259-025-00123-1.
[23] "The Silent Microbial Shift: Climate Change Amplifies Pathogen Evolution, Microbiome Dysbiosis, and Antimicrobial Resistance." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC12616928/.
[24] *www.europarl.europa.eu/RegData/etudes/STUD/2024/754209/IPOL_STU(2024)754209_EN.pdf*, European Parliament, www.europarl.europa.eu/RegData/etudes/STUD/2024/754209/IPOL_STU(2024)754209_EN.pdf.
[25] "How Long Do Pathogens Persist and Survive in Water? A Systematic Review." Frontiers, www.frontiersin.org/journals/microbiology/articles/10.3389/fmicb.2025.1654785/full.

Changes in precipitation have a very important role to play along with temperature changes because heavy rains and floods can lead to the contamination of drinking water and thus the spread of waterborne diseases.[26] At the same time, droughts make people depend on unsafe or stagnant water sources. Events of extreme weather, such as hurricanes, floods, and heatwaves, magnify these problems because they not only damage healthcare facilities but also disrupt the vaccination programmes and reduce the capability of disease surveillance systems.

Moreover, along the coast, the increasing temperature of the ocean water stimulates the growth of bacteria, which in turn increases the chances of foodborne diseases resulting from the consumption of seafood. All these processes do not work separately; rather, they interact and mutually influence each other to change the disease patterns and make infections come out in areas that were considered low risk before.[27]

Human Behavior and Socioeconomic Factors

Human behavior and socioeconomic factors largely determine the variations in climate induced health risks among different populations. Over the past few decades, rapid urbanization has led to the development of overcrowded cities, especially in the context of developing countries, where there has been insufficient development of sanitation systems, housing, and waste management.[28] All these factors create habitats favourable for the spread of diseases. When these situations are accompanied by climatic events such as floods or heat waves, then diseases spread even more rapidly.

Furthermore, economic inequality escalates the level of vulnerability since poor communities do not have access to basic necessities such as healthcare, clean water, and vaccinations. Climate change has also resulted in large, scale displacement of people. This has caused millions to be relocated to makeshift settlements or refugee camps, where the double trouble of overcrowding and limited health facilities leaves them highly vulnerable to outbreaks of diseases.[29] Workers in certain industries, e.g. farming, are exposed to more frequent cases of vector, borne and heat related illnesses.

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[26] "Untangling the Impacts of Climate Change on Waterborne Diseases: A Systematic Review of Relationships Between Diarrheal Diseases and Temperature, Rainfall, Flooding, and Drought." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC5468171/.
[27] "Ocean Warming Increases Worries of Vibrio-related Foodborne Illnesses." *Global Seafood Alliance*, 28 Apr. 2025, www.globalseafood.org/advocate/ocean-warming-increases-worries-of-vibrio-related-foodborne-illnesses/.
[28] *DSpace*, iris.who.int/server/api/core/bitstreams/03cc4cb4-0036-48bd-9a02-2e16e07bd80d/content.
[29] "Climate Change." *IPCC — Intergovernmental Panel on Climate Change*, IPCC, www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter08.pdf.

Meanwhile, misinformation and lack of trust in government can turn public health systems ineffective and further hinder disease prevention efforts.[30]

Case Studies of Climate Driven Disease Emergence

Numerous real-life examples show how climate change is impacting the patterns of infectious diseases.

South Asia is the case where higher temperatures and more extreme monsoon seasons have increased both the geographical range and the duration of dengue outbreaks, thus severely overloading healthcare systems.[31]

In Sub-Saharan Africa, the changes in rainfall have shifted malaria transmission zones, which has led to the exposure of populations living in recently uncovered higher altitude areas to the disease.[32] Bangladesh has had several outbreaks of cholera after the flooding has caused contamination of the water used for drinking.[33] The coastal areas all over the globe have seen an upsurge of Vibrio infections due to warming ocean temperatures which has impinged not only public health but also food safety.[34] These examples are evidence that climate driven disease emergence is not a concern for the distant future but a present global problem with serious and immediate effects.

Economic Consequences

The economic impacts of infectious diseases related to climate are deep and long lasting. Epidemics cause tremendous pressure on the healthcare systems and lead to higher government expenditure on treatment, emergency response, and surveillance. At the same time, loss of productivity can be seen when the workers become ill, take care of sick family members, or are forced not to work due to lockdowns and travel restrictions.

Moreover, the climate sensitive sectors such as agriculture, fisheries, and tourism are very much exposed to these types of disturbances. In developing countries, frequent epidemics can slow down

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[30] "Infodemics and Misinformation Negatively Affect People's Health Behaviours, New WHO Review Finds." *World Health Organization (WHO)*, 1 Sept. 2022, www.who.int/europe/news/item/01-09-2022-infodemics-and-misinformation-negatively-affect-people-s-health-behaviours--new-who-review-finds.

[31] "Indian Ocean Temperature Index Signals Dengue Outbreaks." *Gavi, the Vaccine Alliance*, 7 June 2024, www.gavi.org/vaccineswork/indian-ocean-temperature-index-signals-dengue-outbreaks.

[32] "Impact of Climate Change on Malaria Transmission in Africa: A Scoping Review of Literature." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC12421463/.

[33] *https://www.pnas.org/doi/10.1073/pnas.0237386100*, PNAS, www.pnas.org/doi/10.1073/pnas.0237386100.

[34] "Vibrio Bacteria in Seafood: Increased Risk Due to Climate Change and Antimicrobial Resistance." *European Food Safety Authority*, 23 July 2024, www.efsa.europa.eu/en/news/vibrio-bacteria-seafood-increased-risk-due-climate-change-and-antimicrobial-resistance.

economic growth and increase poverty, resulting in a situation where recovery becomes especially hard.[35] The risk of diseases that is causing the concern, and hence uncertainty, prevents people from investing and trading, thus destabilizing national economies even further.

The mentioned economic repercussions indirectly represent an argument for prevention and preparedness, because the price of proactive measures being taken is generally much lower than the price of dealing with major epidemics.[36]

Social and Environmental Consequences

Besides health and economic impacts, the emergence of diseases due to climate change also leads to serious social and environmental consequences. Frequent outbreaks may lead to a decline in citizens' trust towards their governments and international institutions, particularly if the authorities' actions are seen as slow or ineffective. Fear and erroneous information may become the causes of stigmatization and discrimination of the affected communities, thus deepening social cleavages. On the environmental front, some disease control measures, such as the extensive use of pesticides, may lead to damaged ecosystems, a decline in biodiversity, and the onset of long, term environmental degradation. This cycle of harm to the environment resulting in a higher risk of disease and the disease control measures harming the environment again goes on. Solutions to these consequences must be based on a tripartite framework of public health, environmental protection, and social stability rather than treating them as separate entities.[37]

The Global Perspective

Climate change induced disease outbreaks are a worldwide problem that goes beyond national limits. Diseases can travel fast from one continent to another because of international travel and trade in the highly interconnected world. Mainly, low and middle income countries suffer a lot because they do not have many resources, but the rich countries are also at risk if the outbreak starts from a foreign country. It is hard to work together globally because different countries have different capabilities in surveillance, healthcare infrastructure and political priorities.[38] So, climate change is a common danger that needs international cooperation, long term planning, and fair distribution of resources. To make

[35] "Science Direct." *ScienceDirect*, www.sciencedirect.com/science/article/pii/S1059056025002102.
[36] "Pandemics: Risks, Impacts, and Mitigation - Disease Control Priorities: Improving Health and Reducing Poverty - NCBI Bookshelf." *National Center for Biotechnology Information*, 27 Nov. 2017, www.ncbi.nlm.nih.gov/books/NBK525302/.
[37] *ScienceDirect*, www.sciencedirect.com/science/article/pii/S2405844024051594.
[38] "COVID-19 and Global Income Inequality." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC8301493/.

sure that the measures are successful, universal, and able to deal with both current and future health threats, a worldwide outlook is crucial.

Impact of Emerging Pathogens

The appearance of both new and old pathogens has a variety of consequences which go far beyond only health effects. At the first level, these pathogens cause sickness and death rates to rise, thus they put pressure on healthcare services that might already be feeling the strain. Malaria, dengue, cholera, and new respiratory infections have not only become more frequent but have also spread to new areas where people who hardly had any immunity and who had very limited access to healthcare have become more exposed.[39] However, in high income countries with well-equipped healthcare systems, vulnerable populations such as young children, the elderly, pregnant women, and the immunocompromised are still at the highest risk. Moreover, repeated outbreaks cause the disruption of routine healthcare services, thus non communicable diseases treatments get delayed, and vaccination coverage lowers, which may in turn cause a secondary health crisis.[40]

Emerging pathogens are thus placing an enormous pressure on health systems; they also have a very significant social and economic impact. People who get sick, need caregivers or are frightened of infection, reduce the workforce productivity, whereas education, travel, and trade can be negatively affected by infection fears. Also, in many low, and middle, income countries, the outbreak response costs use up money which should have been invested in long term development, resulting in increased inequality and poverty.[41] Disease outbreaks cause stigma, discrimination, and misinformation, thereby breaking down people's trust in public institutions and damaging social cohesion. In severe cases, repeated or poorly handled outbreaks may lead to political instability and a humanitarian crisis. The above impacts are a clear indication that emerging pathogens are not only a medical concern but a wider threat to social stability, economic resilience, and global security, thus making their prevention and management a top priority for the international community.[42]

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[39] "Diseases." *ClimaHealth*, 17 Dec. 2024, climahealth.info/hazard/diseases/.
[40] "Increases in Vaccine-preventable Disease Outbreaks Threaten Years of Progress, Warn WHO, UNICEF, Gavi." *World Health Organization (WHO)*, 24 Apr. 2025, www.who.int/news/item/24-04-2025-increases-in-vaccine-preventable-disease-outbreaks-threaten-years-of-progress--warn-who--unicef--gavi.
[41] "Impacts of COVID-19 on Global Poverty, Food Security, and Diets: Insights from Global Model Scenario Analysis." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC8251321/.
[42] "Pandemics: Risks, Impacts, and Mitigation - Disease Control Priorities: Improving Health and Reducing Poverty - NCBI Bookshelf." *National Center for Biotechnology Information*, 27 Nov. 2017, www.ncbi.nlm.nih.gov/books/NBK525302/.

Major Countries and Organizations Involved

United States of America (USA)

The United States plays a crucial role in leading global health security by enhancing its biomedical research, being prepared for pandemics and disease surveillance; American institutions like the National Institution of Health (NIH) and the Centers of Disease Control and Prevention (CDC) being established in 1946, have been conducting advanced research deeply on topics like the emergence of pathogens, antimicrobial diseases and climate related diseases for our world.[43] A lot of the funding of international health initiatives and response to emergencies has been by the USA, following the 2014 outbreak of Ebola.[44]

The investments made by America, more specifically in 2020, have led to major disease research which links to the rapid vaccine development against pathogens, treating more individuals and trying to lower the emergence of pathogens, during and after the COVID-19 pandemic. Planning more and improved outbreak modelling and enhancing the early warning systems for such diseases has also been led by the USA, with its now advanced technology, research materials and personnel.[45]

The success rate has been high, however, due to political issues and the fluctuation of global funding commitments towards medical situations, contributions globally have not been as efficient as our world needs them to be.[46]

India

India's health situation has become more complicated with the increasing temperatures and changing rainfall patterns, particularly since the 1990s. The heatwaves in 2015, 2019, and 2022 were accompanied by a significant upsurge of dengue and malaria cases, which were most common in urban areas such as Delhi and Mumbai.[47] The impact of climate change has extended beyond mosquito breeding seasons and has led to disease transmission to low-risk areas.

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[43] "Historical Perspectives History of CDC." *Centers for Disease Control and Prevention | CDC*, www.cdc.gov/mmwr/preview/mmwrhtml/00042732.htm.
[44] "CDC's Response to the 2014–2016 Ebola Epidemic — Guinea, Liberia, and Sierra Leone | MMWR." *Centers for Disease Control and Prevention | CDC*, 8 Apr. 2019, www.cdc.gov/mmwr/volumes/65/su/su6503a3.htm.
[45] "US Public Investment in Development of MRNA Covid-19 Vaccines: Retrospective Cohort Study." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC9975718/.
[46] "Enhancing the Role of Innovative Financing in Global Health." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC12661668/.
[47] *ScienceDirect*, www.sciencedirect.com/science/article/pii/S240588072300095X.

To mitigate these dangers, India increased the budget of the National Vector Borne Disease Control Programme in 2003 and improved digital disease reporting through the Integrated Disease Surveillance Programme (IDSP).[48] Besides that, India is a major vaccine manufacturer in the world, producing more than 60% of the total vaccines globally, and it was a significant contributor to COVID-19 vaccine production from 2021 onwards.[49]

Because of these measures, the number of malaria cases has been declining gradually since 2017.[50] Despite that, there is still a regional difference in climate, related issues, overcrowding in cities, and inequality in the healthcare system, which affects progress. The problem of climate change puts public health in danger and therefore calls for the implementation of climate adapted disease control strategies.

China

In response to the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic (which progressed to pneumonia), China overhauled its public health system, recognizing that the outbreak had revealed serious deficiencies in disease surveillance and transparency.[51] Since that time, China has poured resources into laboratory networks, early warning systems, and digital reporting platforms. As of 2010, nationwide disease reporting systems were in place, thereby enabling faster detection of outbreaks.[52]

China initially carried out extensive containment operations for COVID, 19 in 2019. From 2021, it shifted focus to international vaccine distribution, and the country has also been active in climate, health research collaborations.[53]

Nevertheless, the global community has questioned the timeliness of information sharing during the very early stages of the outbreak. Although the capacity for domestic response has been elevated,

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[48] Research Gate, https://www.researchgate.net/publication/23974109_Integrated_Diseases_Surveillance_Project_IDSP_through_a_consultant's_lens

[49] "India's Pharma Exports Grow over 125% in Last 9 Years Investment of Rs. 21,861 Crore Received Under PLI Schemes." *Press Information Bureau*, www.pib.gov.in/PressReleasePage.aspx?PRID=1931918®=3&lang=2.

[50] "Current State: The Malaria Situation Worldwide." *World Malaria Report Global Briefing Kit 2024*, worldmalariareport2024.org/current-state.

[51] "Severe Acute Respiratory Syndrome (SARS) - Multi-country Outbreak - Update 25." *World Health Organization (WHO)*, www.who.int/emergencies/disease-outbreak-news/item/2003_04_09-en.

[52] "Integrated Health Surveillance and Early Warning Systems in China Under the One Health Perspective: Progress and Challenges." *EurekAlert!*, www.eurekalert.org/news-releases/1114703.

[53] "Archived: WHO Timeline - COVID-19." 27 Apr. 2020, www.who.int/news/item/27-04-2020-who-timeline---covid-19.

the issue of transparency and international trust still needs to be addressed in order to be effective in global disease control.

UNICEF

UNICEF has been the advocate of the most disadvantaged groups since it came into existence in 1946, with a particular focus on children.[54] Over the last several years, the organization has extended its involvement in health crises caused by climate change to include activities such as vaccination, water and sanitation programmes, and the delivery of aid in times of emergencies.

Through its programmes, UNICEF has been able to achieve a decrease in the number of children who have died during disease outbreaks. However, the growing number of climate related emergencies is putting a heavy strain on the available resources, which in turn is calling for continuous support from the international community.

United Nations Environment Programme (UNEP)

Since its foundation in 1972, UNEP has been progressively emphasizing the relationship between environmental damage and the emergence of diseases.[55] In 2020, the organization issued a report titled "Preventing the Next Pandemic, " in which it identified deforestation and loss of biodiversity as the most significant contributors to spillover of zoonotic diseases.[56]

The United Nations Environment Programme is mainly an advisory body, and the execution of its recommendations is in the hands of national governments. Still, the increased collaboration between environmental and health sectors is a prerequisite for achieving desired results.

Word Health Organization for Animal Health (WOAH)

The World Organization for Animal Health (WOAH) is a key organ to the discussion on how climate change, animal health, and new pathogen emergence are interconnected.[57] Changes in temperature, loss of habitats, and environmental degradation are causing changes in wildlife and

[54] "UNICEF." *www.unicef.org/who-we-are*, www.unicef.org/who-we-are.
[55] *UNEP - UN Environment Programme*, www.unep.org/who-we-are/about-us.
[56] *United Nations Sustainable Development Group*, unsdg.un.org/sites/default/files/2020-07/UNEP-Preventing-the-next-pandemic.pdf.
[57] "One Health." *WOAH - World Organisation for Animal Health*, 21 Oct. 2025, www.woah.org/en/what-we-do/global-initiatives/one-health/.

livestock migrations, thus increasing the risk of zoonotic spillover events. To help contain such risks, WOAH collaborates closely with national veterinary authorities in disease surveillance, early detection, and animal diseases reporting that could be dangerous to human health.[58] Besides that, WOAH is responsible for international standards for animal health and biosecurity which serve as a guide for countries to equip themselves with better disease prevention and control measures in their livestock systems, especially those that are vulnerable to climate change. The organization also partners with WHO and FAO in the One Health approach to tackle health risks at the human, animal, and environmental interface.[59] Through support of capacity building, sharing of data, and coordinated worldwide responses, WOAH plays a significant part in the reduction of the possibility of future outbreaks and enhancing global preparedness against emerging pathogens influenced by climate.

Blocs Expected

Alliance 1: This alliance is anticipated to mark the membership of the states that are supportive of strong international cooperation, highly advanced scientific research, and strict global health regulation. These countries are inclined to invest in disease surveillance, early warning systems, vaccine development, and collaborative antimicrobial resistance fighting measures. e.g. United States, Germany, France, United Kingdom, Japan.

Alliance 2: This alliance will probably be made up of countries that focus on strengthening their own national capacity, setting development priorities, and leaving room for flexibility when implementing global health measures. Although they acknowledge the dangers from new pathogens, these countries emphasize the importance of financial help, technology transfer, and fair access to healthcare solutions. e.g. Bangladesh, India, Pakistan, Kenya, Ethiopia.

Timeline of Events

Date	Description of Event
5th of June 1972	UN Conference in Stockholm on the Human Environment. It was the first time internationally

[58] "Wildlife Health." *WOAH - World Organisation for Animal Health*, 14 Jan. 2026, www.woah.org/en/what-we-do/animal-health-and-welfare/wildlife-health/.
[59] "One Health Partners." *OneHealth*, 12 Nov. 2025, www.fao.org/one-health/partners/en.

	where degradation of the environment created many threats to us humans.[60]
9th of November 1988	Formation of the Intergovernmental Panel on Climate Change; was formed to evaluate climate science which led to the emergence of pathogens as climate risks. [61]
6th of November 2002	The beginning of the Severe Acute Respiratory Syndrome (SARS) outbreak associated with zoonotic transmission/zoonosis, which exposed the vulnerability and fragility of disease surveillance systems and preparedness to such diseases.[62]
23rd of May 2005	International Health Regulations adopted (IHR), a legally binding framework was made to detect international diseases, report diseases and find suitable responses to act upon them.[63]
March 2014	The beginning of the Ebola outbreak in Africa, which displayed the weakness of healthcare systems and pushed to create more advanced healthcare systems.[64]
12th of December 2015	The Adoption of the Paris Climate Agreement, aimed to stop global warming.[65]
30th of January 2020	The emergence and beginning of spread of

[60] United Nations. "United Nations Conference on the Human Environment, Stockholm 1972." *United Nations*, www.un.org/en/conferences/environment/stockholm1972.
[61] "History — IPCC." *IPCC — Intergovernmental Panel on Climate Change*, www.ipcc.ch/about/history/.
[62] "Severe Acute Respiratory Syndrome - StatPearls - NCBI Bookshelf." *National Center for Biotechnology Information*, 22 May 2023, www.ncbi.nlm.nih.gov/books/NBK558977/.
[63] "International Health Regulations." *World Health Organization (WHO)*, 11 Dec. 2019, www.who.int/health-topics/international-health-regulations#tab=tab_1.
[64] "Factors That Contributed to Undetected Spread." *World Health Organization (WHO)*, www.who.int/news-room/spotlight/one-year-into-the-ebola-epidemic/factors-that-contributed-to-undetected-spread-of-the-ebola-virus-and-impeded-rapid-containment.
[65] "Paris Agreement." unfccc.int/process-and-meetings/the-paris-agreement.

	COVID-19 worldwide, resulting in one of the biggest pandemics in history, killing millions of people.[66]
2022-Current	Increasing climate linked disease outbreaks all around the word, more measures being adapted to prevent the spread of diseases, leading to the major research and effort into finding cures and vaccines for such diseases.[67]

Relevant UN Resolutions, Treaties & Events

Paris Climate Agreement (2015)

The Paris Climate Agreement is a legally binding international treaty adopted on 12 December 2015 to limit global warming to well below 2 degrees Celsius.[68]

By cutting emissions, the Agreement intends to lessen climate change impacts that contribute to the emergence of diseases, in particular, increasing temperatures, extreme weather events, and ecosystem disruption. Countries like the EU and Japan have pledged emission reduction targets that will eventually lead to a decrease in the spread of vector-borne diseases such as malaria and dengue.[69]

Nevertheless, the incomplete implementation of the Agreement and the decisions of some states to withdraw or delay their commitments have reduced the health-related benefits of the Agreement, especially in vulnerable regions.

Sustainable Development Goals (SDGs) 3 and 13

The Sustainable Development Goals (SDGs) offer a global framework for sustainable development through SDG 3 (Good Health and Well Being) and SDG 13 (Climate Action).[70] SDG 3

[66] "The Origin of COVID-19 and Why It Matters." *PMC Home*, pmc.ncbi.nlm.nih.gov/articles/PMC7470595/.
[67] "Article: 'Creeping Catastrophe': Climate Change is Driving Global Rise in Infectious Diseases, Leading Health Experts Warn • Global Outbreaks Research." *Welcome • Global Outbreaks Research*, globalhealthoutbreaks.tghn.org/articles/creeping-catastrophe-climate-change-driving-global-rise-infectious-diseases-leading-health-experts-warn/
[68] "Paris Climate Agreement." unfccc.int/process-and-meetings/the-paris-agreement.
[69] "Mosquito-borne Diseases Are Spreading in Europe Due to the Climate Crisis, According to an Expert." *Glycoscience – Natural Enhanced Release Technology*, glycoscience.es/en/2024/04/26/mosquito-borne-diseases-are-spreading-in-europe-due-to-the-climate-crisis-according-to-an-expert/.
[70] "Goal 3: Good Health and Well-being." *The Global Goals*, 23 Jan. 2024, globalgoals.org/goals/3-good-health-and-well-being/.

focuses on the strengthening of health systems, vaccination programmes, and disease prevention, whereas SDG 13 supports climate adaptation and mitigation policies.[71]

The two goals have been used to support measures like climate, resilient healthcare infrastructure in small island states and the establishment of early warning systems for heat related disease outbreaks. Unfortunately, a shortage of finances and insufficient coordination have been obstacles to the implementation of the goals in many low-income countries despite the progress that has been made.

The International Health Regulations

The International Health Regulations (IHR), updated on 23 May 2005, represent a legal commitment whereby states must report and respond to public health situations that constitute international emergencies.[72] They have facilitated quicker outbreak notifications in the cases of Ebola and COVID, 19, for instance, and have strengthened international surveillance systems.

Nevertheless, the advent of diseases related to climate change has highlighted the poor adherence to IHR, especially in those regions that have no sufficient laboratory facilities and healthcare structures. Consequently, there have been delays in reporting and the ability to stop the transmission across borders has been diminished. In many poor and climate vulnerable countries, it is hard to detect new pathogens early and confirm them, because of limited diagnostic capacity, shortage of trained healthcare professionals, and weak disease surveillance systems.

Additionally, political instability, lack of funding, and fear of economic consequences such as restrictions on trade or travel often discourage states from promptly sharing outbreak data, even though they are obligated to do so under IHR.[73] These delays give diseases the opportunity to spread across borders without being detected, especially through channels of global travel and trade. With climate change causing more outbreaks related to floods, heatwaves and vectors, the flaws in IHR implementation are getting increasingly obvious, thus, there is a pressing need for stronger compliance mechanisms, technical assistance and international support to secure global health.

Previous Attempts to Solve the Issue

Early Warning and disease surveillance systems led by the WHO

[71] "Goal 13 | Department of Economic and Social Affairs." | *Sustainable Development*, sdgs.un.org/goals/goal13.
[72] "International Health Regulations (2005) – Third Edition." *World Health Organization (WHO)*, 1 Jan. 2016, www.who.int/publications/i/item/9789241580496.
[73] "International Health Regulations." *Global Health*, 9 Oct. 2024, www.cdc.gov/global-health/topics-programs/ihr.html.

The WHO has played the main role in strengthening disease surveillance systems globally; detecting and responding to rising infectious diseases, including those emerging due to climate change also included. The Global Outbreak Alert and Response Network (GOARN), which was established in the 2000s, interrelates international proficiency and resources to quickly respond to disease outbreaks.[74] Additionally, the Integrated Disease Surveillance and Response (IDSR) framework has been implemented in many LEDCs to improve the monitoring of diseases which are climate sensitive, such as malaria, dengue, cholera and yellow fever.[75] These systems have improved early detection and response timings in various nations, particularly in parts of Africa and Southeast Asia.

However, their effectiveness isn't shown as well because of the lack of reporting in countries, limited laboratory space/capacity, lack of experienced people and not enough unification across borders for climate and environmental data, which all link to the inequality of our world. This all lowers the ability to anticipate disease emergence driven by climate instead of just reacting on the spot to these emergencies.

Coalition for Epidemic Preparedness Innovations (CEPI) and Gavi, the Vaccine Alliance

The Coalition for Epidemic Preparedness Innovations (CEPI) is a new organization formed in 2017, and Gavi, the Vaccine Alliance, a major player in global public health issues since 2000, are two of the most important global initiatives to fight and prevent infectious disease outbreaks through vaccine research, development, and distribution.[76] CEPI is the initiative that mainly finances and accelerates the development of new vaccines for those diseases that may lead to epidemics or pandemics in the future, and among these are pathogens whose spread is exacerbated by climate change.[77] To some extent, Gavi's work goes hand in hand with that of CEPI, ensuring that newly developed vaccines remain accessible and affordable in low income and climate vulnerable countries, thus strengthening global immunization systems.

Moreover, the significance of these programs during the COVID-19 pandemic, CEPI funded research has been instrumental in the development of vaccine candidates at unprecedented speed. As the main coordinator of the global immunization campaign, Gavi arranged for vaccines to be made available around the globe through the availability of vaccines for all.

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[74] "Global Outbreak Alert Response Network." *World Health Organization (WHO)*, www.who.int/southeastasia/outbreaks-and-emergencies/Response-coordination/goarn.
[75] "Early Warning and Response System for Climate-sensitive Diseases (EWARS-csd)." *TDR*, 21 Sept. 2023, tdr.who.int/activities/ewars-csd.
[76] "CEPI Officially Launched." *CEPI*, cepi.net/cepi-officially-launched.
[77] *Gavi, the Vaccine Alliance*, www.gavi.org/.

Nevertheless, if we look at the implementation of these responses to the pandemic, there are still some critical issues: vaccine nationalism, keen access disparities between the rich and poor countries, feeble cold, chain infrastructures, and lateness of delivery to climate, vulnerable regions. CEPI and Gavi have thus gone a long way in improving global preparedness, but their effectiveness has been compromised by political, logistical, and economic barriers that need to be removed if we are to have a more potent reaction to future climate related disease outbreaks.

Cross national and regional health and cooperation

Recognizing that climate driven infectious diseases are not limited by national borders, various regional and cross border cooperation mechanisms have been put in place to improve disease surveillance and response. The Africa Centers for Disease Control and Prevention (Africa CDC) has created regional surveillance networks and laboratory systems to facilitate early detection and coordinated responses to outbreaks.[78] In a similar vein, regional frameworks in Southeast Asia and Latin America have encouraged data sharing and joint response strategies. These initiatives have strengthened communication and coordination during the periods of major outbreaks, such as Ebola and COVID-19.

Nevertheless, differences in national capacities, irregular data sharing, political tensions, and scarcity of long-term funding have still been some of the factors that impede sustained cooperation. Consequently, cross, border responses are mostly still reactive and fragmented, thus lacking preventive and integrated features.

Possible Solutions

Strengthening global surveillance systems for diseases

Strengthening global disease surveillance is undoubtedly one of the most essential steps to mitigate the climate driven rise in novel pathogens. It is imperative to expand not only the existing WHO led systems like the Global Outbreak Alert and Response Network (GOARN) and national surveillance programs but also the scope of their surveillance.[79] These systems should figure out not only the cases of human diseases but also environmental and climatic factors that usually precede outbreaks.

[78] "Africa CDC Establishes Central Data Repository to Strengthen Public Health Surveillance – Africa CDC." *Africa CDC*, 2 Feb. 2026, africacdc.org/news-item/africa-cdc-establishes-central-data-repository-to-strengthen-public-health-surveillance/.

[79] "Strengthening the Global and Regional System for Outbreak Preparedness, Alert, and Response - The Neglected Dimension of Global Security - NCBI Bookshelf." *National Center for Biotechnology Information*, 16 May 2016, www.ncbi.nlm.nih.gov/books/NBK368395/.

Generally speaking, the rising temperatures, the heavier precipitations, the flooding, and the changes in land use may all become factors leading to vector borne and waterborne diseases spreading. Governments in partnership with epidemiological surveillance which synthesizes, collects and analyses health related data; further used to plan and implement public health practices and research. This can use climate data, satellite imagery, and ecological monitoring to go beyond reactive outbreak responses; they can, in fact, adopt public health strategies that are predictive and preventive.

This implementation would require the creation of early warning systems that keep track of the sounds of mosquitoes, the purity of the water, the diseases that affect animals, and extreme weather events. To name an instance, in several regions of East Africa, the pairing of precipitation data with malaria surveillance has enabled the forecasting of outbreaks. This can be possible through low-cost environmental sensors, monitoring satellites and disease surveillance systems that already exist. The data needed for mosquito activity and other data mentioned can be combined with meteorological data and AI to find patterns in outbreaks (worldwide and generally), thus issuing early warning systems.

Nevertheless, we are still far from having these systems on the whole planet. There are numerous low income and climate vulnerable countries, in which the insufficiency of laboratory capacity, the lack of digital infrastructure, and the scarcity of trained personnel to gather and analyze such data cannot be unnoticed. Moreover, the possible political issues around data sharing, national sovereignty and economic consequences of outbreak reporting may confine transparency at its worst. Solving these problems creates a necessity for continuous international funding, technology transfer, capacity building programs, and more trust among countries and from countries towards international organizations.

Protecting biodiversity to decelerate zoonosis and less human interactions

Environmental protection is a key preventive measure that helps limit the occurrence of new pathogens. Activities such as deforestation, loss of biodiversity, and changes in land use increase the frequency of human to wildlife interactions and interfere with natural disease control systems. The preservation of ecosystems, especially in biologically diverse areas like tropical rainforests, can effectively lower the risk of the transmission of diseases from animals to humans. Hence, policies promoting sustainable land use, forest conservation, and biodiversity protection should be considered as public health investments that will pay off in the long run.

On the other hand, initiatives for environmental protection are met with resistance from the economic and political spheres. Countries reliant on agriculture, mining, or logging might take the path

of accelerating their economic growth at the expense of health risks in the long run. To facilitate conservation efforts, there will be a need for international assistance, financial incentives, and mechanisms for the provision of compensation. Delegates are required to find a compromise between the need for development and global health security, understanding that environmental degradation is a source of danger not only for the affected areas but also for the entire world via the emergence of pathogens.

Making vaccines accessible to everyone in need (equal access)

Vaccines remain one of the most reliable methods of preventing infectious diseases, including those that have been affected by climate change. It is vital to broaden vaccine research and development through projects like CEPI and secure fair distribution via Gavi and WHO, led by mechanisms to lower the planet's susceptibility to novel pathogens. The risks of climate change make it possible for spikes of infections to occur in areas that have hardly any access to vaccines, thus making equity the core issue of global health security.[80] In this case, building up the regional vaccine production capability could cut the need for high income countries and thus allow fast access even when outbreaks take place.

Developing warning systems (early) using AI and climate data

Advanced early warning systems that integrate artificial intelligence (AI) and climate data are essentially a next generation solution to the rise of new pathogens as a result of climate change. AI powered models, by analyzing datasets such as temperature trends, rainfall patterns, land use changes, animal migration routes, and even the historical outbreak data, can pinpoint the places where the risk of disease emergence is highest long before a cluster of cases is found. The technology is especially useful for the prediction of the spread of vector, borne and waterborne diseases, both of which are extremely vulnerable to changes in the environment. The earliest of warnings can allow governments and international organizations to take measures which will prevent such eventualities, e.g., implementing vaccination campaigns in the most vulnerable communities, carrying out vector control, and informing the public, thereby reducing the human and economic costs. Many pilot projects have shown that AI based systems are feasible and have great potential. For instance, machine

[80] *Gavi, the Vaccine Alliance*, www.gavi.org/sites/default/files/programmes-impact/our-impact/Immunisation-a-critical-pillar-of-climate-adaptation.pdf.

learning models have been employed to forecast dengue outbreaks from climate variables in some parts of Latin America and Southeast Asia.

Despite this, a global network of such systems faces the issue of most developing nations not having access to reliable climate data, digital infrastructure, and technical know-how that are prerequisites for the functioning of AI based platforms. Furthermore, in addition to privacy issues, there is also the problem of unequal access to technology and the risk of too much reliance on predictive models without adequate human supervision. Therefore, delegates should weigh up the need for technology transfer, international data, sharing agreements, and capacity building as measures that could help AI powered early warning systems achieve universal access.

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