

# **Climate Change and the Emergence of Infectious Diseases**

Infectious diseases can be influenced by a variety of factors, including climate, human behavior, biology, and ecology. Climate change is a critical factor that is increasingly coming into focus, as global temperatures continue to rise. Meteorologists predict that we could see an unprecedented increase of 2°C by the year 2100, which could have significant implications for the spread of serious infectious diseases, some are new and some are re-appearing.

It is important to understand how these changes could impact disease transmission, and to take proactive steps to mitigate the risks. Mosquito-borne diseases, such as malaria, dengue, and viral encephalitides, are particularly vulnerable to changes in climate. As the climate shifts, the geographic range of disease vectors is expected to change, and the reproductive and biting rates are expected to increase. Additionally, climate change may shorten the pathogen incubation period, leading to a higher incidence of disease transmission. These changes pose a significant threat to public health and underscore the need for proactive measures to mitigate the risks.

As the world continues to change, it is essential that the scientific community adapt their approach to evaluating the risks of infectious diseases. This means not only examining how traditional factors such as demographic changes, climate shifts, and technological advancements influence disease dynamics, but also exploring how these factors may interact and collectively impact the emergence, transmission, and global spread of pathogens. While it is widely recognized that global changes are major determinants for infectious diseases, there is still some debate as to the extent to which climate change specifically contributes to disease risk. To better understand and address these challenges, future research must take a more holistic and multidisciplinary approach.

The relationship between climate change and communicable diseases is multifaceted and involves a range of determinants, including environmental, social, and political factors. While climate change is recognized as an important driver of disease dynamics, it is just one of many factors that can impact the transmissibility of infectious

diseases. As such, it is important to take a comprehensive and integrated approach that considers all relevant factors when studying and addressing the impacts of communicable diseases. By doing so, we can improve our understanding of these complex relationships and develop more effective strategies for preventing and controlling the spread of infectious diseases in the future.

Bangladesh is a low-lying river delta with an extensive coastline and floodplains that cover 80 percent of the country. As a result, the country is highly vulnerable to the adverse effects of climate change, which are well-documented and include cyclones and floods. However, the impacts of climate change in Bangladesh extend beyond these traditional areas of concern. The changing and erratic weather patterns have also had a significant impact on the physical and mental health of the population. For example, there has been a notable increase in respiratory diseases and mosquito-borne illnesses like dengue fever. These findings underscore the urgent need for proactive measures to address the health impacts of climate change in Bangladesh and other similarly vulnerable regions.

To prepare better for and respond to climate-sensitive diseases, improved data collection systems are needed to track disease evolution and predict potential outbreaks. By leveraging data and analytics, public health officials can be better informed about the risks and take proactive measures to mitigate or prevent the spread of infectious diseases and other climate-sensitive illnesses. Strengthening health systems is critical to anticipating and mitigating outbreaks of infectious and other emerging or reemerging climate-sensitive diseases. This includes enhancing public health infrastructure, improving disease surveillance systems, and investing in research and development to identify new treatments and vaccines. By building a robust health system, countries can better protect their populations from climate-related health risks.

Responding to mental health issues is also an important part of addressing the impacts of climate change. This includes building awareness of mental health challenges

associated with climate change, improving assessment mechanisms to identify those at risk, and facilitating access to resources to address the inadequacies such as counseling or mental health support groups. By taking a comprehensive approach to mental health, we can better support the well-being of individuals and communities impacted by climate change.

To better prepare for future disease outbreaks, it is important to shift focus towards forward-looking research in addition to the retrospective analyses that currently dominate the literature. As we make progress in the fight against long-term endemic infections, we can leverage the institutional structures that were built to address these challenges and adapt them to emerging threats. These structures can be repurposed to provide a framework for identifying and responding to new and emerging disease threats. Additionally, new technologies such as advances in data collection and surveillance can be harnessed to improve our ability to detect and respond to outbreaks in a timely and effective manner. By building on our past successes and embracing new technologies, we can better prepare ourselves for the challenges of the future.

Future research must adopt a global perspective on disease risk. In an interconnected world, the risk of infectious diseases is a shared concern. The COVID-19 pandemic, with the rapid spread of evolved strains across the globe, highlights the need for a collaborative and coordinated approach to infectious disease research and control. Developing a worldwide framework for infectious disease research and control is essential to identify and respond

to emerging threats in a timely and effective manner. By working together, we can leverage our collective expertise and resources to minimize the impact of infectious diseases on global health security.

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