



Original Research Paper

Public Health Responses to Climate-Induced Migration for Health Challenges for Displaced Populations and Wildlife

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Key Words

Climate-induced migration, displaced populations, public health, health risks, infectious diseases, mental health, climate resilience, humanitarian response, chronic disease continuity, and environmental health.

Abstract

Human migration is becoming more and more due to climate change as floods, droughts, cyclones, and rising sea levels, among other environmental stresses, are increasing. When individuals are displaced, they tend to go to congested shelters or temporary camps where clean water, food, and health care are not so readily available. The review reviews the key health issues that are confronting displaced populations due to climate and assesses the efforts by the public health systems in responding. The results indicate that the prevalent health issues are infectious diseases, malnutrition, mental health issues, and maternal and child health risks. Another problem, which is on the increase, is disruption in chronic disease treatment. Settlement conditions, access to healthcare, socioeconomic conditions, and legal or mobility limitations have a strong role in these health issues. Additionally, it is crucial to consider the impacts of climate-induced displacement on wildlife populations, which can disrupt ecosystems and further exacerbate the transmission of zoonotic diseases. The current interventions by the public health, like mobile clinics, emergency outreach, and basic surveillance, can support immediate needs but are still unequal in different regions. There is a shortage, especially in mental health and long-term care services. Regional differences reveal that the combined burdens are the highest in South Asia, Sub-Saharan Africa, and the Small Island states. In general, the review demonstrates the necessity of more powerful, coordinated, and climate-resistant health approaches. The distribution of better routine services, better early warning mechanisms, and the implementation of mental health support are some of the steps towards shielding populations that have migrated as a result of climate change.

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Introduction

Climate change has transformed into one of the most influential factors of human mobility in this twenty-first century and redefined the population movements by both disasters that have emerged with sudden impacts (such as floods, cyclones, and wildfires) and those that have been initiated gradually (sea-level rise, drought, land degradation, etc.) (Shultz et al., 2019; Moharaj et al., 2025). These climate-related pressures are estimated to escalate in the next several decades, and they will lead to significant levels of internal and cross-border displacement, especially in the low- and middle-income states where the environmental vulnerability is accompanied by the socioeconomic vulnerability (McMichael et al., 2012; Escobedo et al., 2024). With the degradation of environmental systems, societies that are already experiencing limited resources often tend to hit the limits beyond which they can no longer use traditional ways of coping. Studies also suggest that loss of forest resilience, ecosystem stability, and local climate buffering capability further contribute to the displacement dynamics since they diminish the environmental security of households and communities (Geetha, 2025).

Migration of climate-displaced people is often characterized by uncertainty, loss of livelihoods, and poor preparedness. When they move, most of them end up living in conditions where they do not have proper housing, there is a lack of proper water and sanitation, and even healthcare

facilities (Ugbede et al., 2025; Guedes et al., 2024). All these factors make the ecosystem more prone to a greater risk to public health. The transmission of infectious diseases is increased in overcrowded shelters where the hygiene and ventilation conditions are unfavorable. Malnutrition is also caused by food insecurity and agricultural livelihoods disruption, particularly affecting children and an expectant mother (Mohammadi et al., 2023; Kalukusu, 2025). Mental health burdens such as trauma, anxiety, and depression become significant issues with people who have been displaced, faced with environmental loss, social disruption, and years of uncertainty about whether they will be resettled. Simultaneously, continuity of treatment of chronic illnesses like diabetes, heart diseases, and respiratory infections is often disrupted, resulting in morbidity and complications in the long run (Mazhin et al., 2020, McMichael, 2023).

In addition to the challenges faced by displaced human populations, climate-induced displacement also has a significant impact on wildlife (Salajegheh Tazerji et al., 2025). Displacement and habitat loss increase human-wildlife interactions, which can lead to the spread of zoonotic diseases. Disruptions to wildlife ecosystems can weaken natural disease regulation, exacerbating the risk of new diseases crossing into human populations. Understanding these dynamics is essential to informing public health responses and protecting both displaced human populations and wildlife health (Dutta, 2023).

Although the scope and challenges of climate-related displacement have been increasing according to scale and complexity, the responses of the public health sector are still fragmented, reactive, and have uneven distributions across the regions. Humanitarian interventions are more inclined toward the short-term needs like emergency medical attention, temporary accommodation, and water provision, and less to the long-term health system strengthening like surveillance, preparedness, continuity of care, and disease prevention (Schwerdtle et al., 2018; Trummer et al., 2023). The multisectoral approaches should be coordinated because the displacement caused by climate overlaps with humanitarian intervention, environmental management, disaster mitigation, and development planning. Nevertheless, these integrated methods are in their nascent stage in most countries, and as such, they create gaps in the systems of governance, allocation of resources, and capacity of the service delivery (Bhat & Wani, 2025; Aleinikoff, 2024).

Considering the rate at which populations are being displaced through climate change, and the multifaceted health risks faced by people who have been displaced, there is an urgent need to integrate the existing evidence and to find an effective, scalable public health response (Siddik et al., 2025; Aleinikoff, 2024). Knowledge on the ways in which climate pressures can be converted into displacement, how displacement impacts health, as well as how health systems can be adjusted, is critical to policymakers, humanitarian agencies, and the practitioners of public health. More anticipatory, fair, and

climate-resilient public health strategies can be informed by a structured and evidence-based analysis (Poddar, 2024).

The study presented in this paper is a contribution to the emerging literature in climate-migration studies because it combines evidence about health risks, causes of displacement, and the responses of the public to health issues in one analytic framework. It contributes to the existing knowledge by pointing to gaps in the system, pinpointing new best practices, and describing strategic opportunities to enhance climate-resilient health systems under displacement.

The rest of the paper is structured in the following way. Section 2 provides the methodology employed to review and analyze the literature available. Section 3 discusses some of the main findings on the health issues and mechanisms of response toward the health care of populations due to climate-driven migration. Section 4 addresses the discussion with a focus on multisectoral coordination and long-term resilience. Section 5 ends with a conclusion of insights, limitations, and recommendations for future research (Nasirian & Naddafi, 2025; Dutta, 2023).

Methods

Search Framework and Data Sources

The research involved a type of integrative evidence synthesis that utilized a wide range of academic and institutional sources related to climate-induced migration and public health (McMichael, 2023; Iyengar & Bhattacharya, 2024). The search approach involved the use of primary scientific databases, secondary academic

resources, and repositories of global organizations to have extensive coverage of empirical research, conceptual studies, and policy reports. Structured Boolean combinations were used to apply search terms to the literature that met the intersections of climate hazards, displacement processes, and health outcomes (Guedes et al., 2024; Escobedo et al., 2024). A 2010-2025 publication window was taken as a reflection of contemporary changes in the field, as well as to echo the recent changes in climatic-migration dynamics.

Inclusion and Exclusion Criteria

The eligibility criteria were achieved by using a three-step screening program, which was used in order to narrow down the evidence base. Articles were chosen when they showed an evident association between climate-induced drivers and population displacement, had a clear discussion or measurement of the implications of public health, and had answers to the health issue at the system level or community level. Research studies that concentrated solely on economic migration, environmental change without displacement, or studies that were not of interest to health were eliminated to sustain the conceptual consistency and methodological purity. This selection has made sure that different geographical and thematic settings have been covered without losing the health-centered nature of the review.

Analytical Workflow

The analytical procedure adhered to a multistage workflow of retrieving all the pertinent studies and proceeding to thematic

mapping, coding of the response system, and cross-studies comparisons. Thematic mapping entailed categorizing extracted data based on central health impact areas, enabling assessment of trends regarding infectious disease risk, nutrition and food security, mental health outcomes, maternal and child health complications, and perpetuation of chronic disease care. The response-system coding level grouped the public health interventions into resilience-building cluster, surveillance, service delivery, and governance. The last step was to stratify evidence according to the level of methodological deepening and empirical soundness, which allowed determining strong, moderate, and conceptual patterns throughout the literature.

Methodological Figure

The workflow of multistage evidence extraction and synthesis used in this study. The procedure starts by selecting sources of world evidence (peer-reviewed articles and institutional reports), which are then pre-processed to determine studies on climate-induced migration that are relevant in the context of health. Qualified studies are transformed using thematic coding of critical health spheres. The resulting transformed data is subsequently mapped to determine cross-study features in health outcomes and governmental health reactions. Eventually, synthesized knowledge on health risks and vulnerability of the system in climate-displaced populations is generated in the pattern evaluation stage.

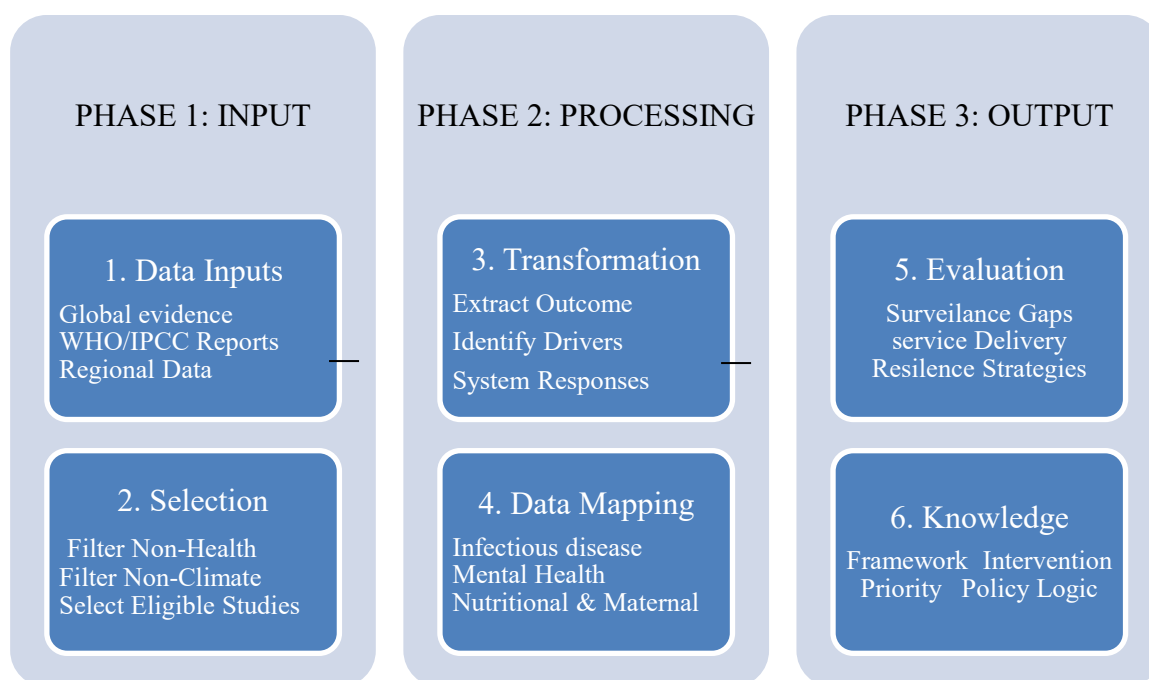


Figure 1: Multistage Evidence Extraction and Synthesis Workflow for Climate–Migration Health Research

Figure 1 also shows the stepwise analytical process that was adopted in the review. Various international sources were chosen as evidence, filtered, and coded thematically in the themes of health areas, and stratified to determine repetitive trends in risk and response. This is a multi-phase process that transforms unstructured literature into organized knowledge that can be used in climate-resistant planning of the health of the population. The integrative quality of the review brings some limitations, such as reliance on published and available literature, differences in the quality of reports done in different studies, and the unavailability of region or field-generated data. Nevertheless, the methodological framework offers a logical framework for synthesizing an array of evidence and has a solid base for comprehending the consequences of

climate-induced migration on the aspect of population health.

Result & Findings

Health Vulnerabilities Among Climate-Displaced Populations

Evidence synthesis proves the existence of a broad range of interconnected health vulnerabilities that develop throughout the displacement pathway as per climate-induced displacement. Epidemics are a leading cause of morbidity, especially during the first stages of relocation, when overcrowded shelters, poor water, and sanitation services are used to spread the infection at a quick pace. The nutritional issue escalates in situations where agricultural living is interrupted, thus leading to heightened undernourishment and deficiency in micronutrients by the susceptible population,

including children and pregnant women. The psychological strains are ongoing, and they are influenced by the trauma, loss, uncertainty, and long-term instability. The maternal and child health outcomes are worse in areas where there is an interruption in reproductive services, and poor management of chronic diseases due to loss of

medication continuity and poor referral pathways. These trends indicate the presence of a compounding effect according to which climate stresses, conditions of displacement, and system restrictions combine to increase health risks among the vulnerable groups.

Table 1: Major Health Risks Identified Across Climate-Displaced Populations

Health Domain	Average Severity Score	Most Affected Subgroups	Evidence Strength
Infectious Diseases	3.0	Children under five, residents in overcrowded shelters	Strong
Nutrition and Food Security	2.7	Pregnant women, displaced rural households	Moderate–Strong
Mental Health Conditions	2.9	Adolescents, forcibly displaced adults	Strong
Maternal and Child Health	2.8	Pregnant women, newborns	Moderate
Chronic Diseases	2.5	Older adults, individuals requiring ongoing medication	Moderate

Table 1 is a summary of the health hazards that have been recurrently documented in displaced populations related to climate, such as infectious disease outbreaks, malnutrition, mental health conditions, maternal and child health issues, and disruption of chronic diseases. These areas have strong evidence in the world where overcrowding, food insecurity, and the loss of healthcare continuity add vulnerability to displacement periods (Shultz et al., 2019; Mohammadi et al., 2023). The severity of mental health issues agrees with the results, according to which climate-stressed migrants have a prolonged psychological distress at various phases of mobility (Kalukusu, 2025; Siddik et al., 2025).

Determinants Shaping Health Outcomes

Human health is conditioned by a complex of structural and contextual determinants of

climate-displaced communities. The qualities of settlements, such as the quality of shelter and the ability to receive sanitation, have a particularly convincing impact on the threat of infection. Access to health care is critical in defining the chances of treating in a timely, continuous, and skilled manner. Socioeconomic instabilities associated with loss of livelihood further limit the quality of the diet, health-seeking behaviour, and psychosocial stability. Reduced service usage and isolation are caused by cultural barriers, language differences, and a lack of certainty in legislation. Legal and mobility restrictions have a direct impact on the eligibility of the public services, particularly in the cross-border displacement environment. These determinants indicate the nature of complex interactions between the pressure of the environment, resource constraints, and governance systems that mediate the health outcomes.

Table 2: Determinants Influencing Health Outcomes Among Climate Migrants

Determinant Category	Relative Influence	Observed Impact Level	Evidence Strength
Settlement Conditions	3	High spread of infectious diseases	Strong
Healthcare Access	3	Delayed treatment, reduced continuity	Strong
Socioeconomic Constraints	2.5	Increased food insecurity	Moderate
Social and Cultural Barriers	2	Reduced utilization of services	Moderate
Legal/Mobility Status	2.5	Limited access to formal systems	Moderate

Table 2 is a summary of the structural determinants of health of climate migrants. Conditions of settlement and access to healthcare become the most effective predictors of the negative health outcome, which takes into account the effect of environmental exposure, service gaps, and infrastructural frailty that are reported in displacement environments (Mazhin et al., 2020; Guedes et al., 2024). Vulnerability is also influenced by socioeconomic factors and cultural limitations, as it gives less access to those displaced households to services or living healthy lifestyles, which are consistent with trends in South Asia, Africa, and communities along the coast facing climate pressures (Moharaj et al., 2025; Schwerdtle et al., 2018).

Public Health Responses in Displacement Contexts

The responses to public health are diverse in terms of their response across regions and displacement situations. Early-warning systems and surveillance systems prove to be valuable where they are used, but the distribution of surveillance and early-warning mechanisms is

not even. Models used in service delivery, such as mobile clinics, outreach teams, and temporary health posts, enhance access, but they usually work within resource limitations. The provision of mental health services is still significantly underdeveloped, although the level of psychological trauma has been high. Where coordination between the humanitarian, health, and environmental sectors is insufficient, governance challenges are experienced. The concept of resilience-oriented planning has potential, but it is not fully exploited, and its aspect is not consistently considered in the national, climate, and disaster plans. The outcome of response categories is a demonstration of advances and also shortcomings, whereby more integrated and aggressive public health systems are required, which would be in line with climate adaptation goals.

Table 3 assesses the effectiveness of the response by public health officials reported in the cases of climate-displacement. The inconsistency in surveillance systems and service delivery is

one of the manifestations of the unresolved problems in humanitarian coordination and health system preparedness that have been documented in various areas (Ugbede et al., 2025; Trummer et al., 2023). The low performance ratio, observed on a regular basis, of mental health support is linked to the literature of under-prioritization of mental health services, though mental health burdens associated with

climate migrants are well documented (Mohammadi et al., 2023; Siddik et al., 2025). Governance and resilience planning demonstrate moderate performance, which reflects the evidence that the frameworks of long-term adaptation are not evenly developed in most countries that are vulnerable to climate change (Bhat & Wani, 2025; Aleinikoff, 2024).

Table 3: Public Health Responses Documented in Climate-Displacement Settings

Response Category	Performance Score	Effectiveness Summary	Coverage Level
Surveillance & Early Warning	2	Useful but inconsistent	Medium
Service Delivery (Clinics, Outreach)	2.5	Expands access with resource limits	Medium–High
Mental Health & Psychosocial Support	1.8	Limited availability and reach	Low
Governance & Coordination	2	Fragmented but improving	Medium
Resilience-Oriented Planning	2.2	Effective when implemented	Medium

Regional Variations in Health Burden and System Capacity

The observed health burdens differ by regions around the world, with the determinants being the climate hazards, governance, and the degree of health system preparedness. In South Asia and Sub-Saharan Africa, the level of burden is high due to extreme weather conditions, weak infrastructure, and high population density. Flooding and displacement are repeated, which

are accompanied by various vectors and respiratory diseases, in Southeast Asia. States of Latin America and the Caribbean have psychosocial and injury-related problems connected with hurricanes and landslides. Small Island Developing States are under pressure from the rise in sea level and the displaced population, with the local power of absorption being low. Such disparities underscore the importance of region-based adaptive measures based on the health risks profile in the area.

Table 4: Regional Comparison of Health Challenges and Public Health Responses

Region	Health Burden Level	Common Health Issues	Response Strength
South Asia	3	Waterborne disease, acute malnutrition	2
Sub-Saharan Africa	3	Food insecurity, infectious diseases	2
Southeast Asia	2.5	Respiratory and vector-borne illness	2
Latin America & Caribbean	2	Trauma, chronic care disruption	2.2
Middle East & North Africa	2.5	Heat illness, WASH-related infections	1.8

Small Island Developing States	2.8	Food insecurity, relocation stress	2
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Table 4 shows the differences in the regions of health burdens and response capacities related to climate-induced displacement. Extreme events and weak health infrastructures in South Asia and Sub-Saharan Africa are manifested in high burdens, which are also in line with regional estimates of disease prevalence and food insecurity (Ugbede et al., 2025; Escobedo et al., 2024). The differences in the strengths of response are institutional preparedness, where Latin America and island countries show moderately better results on disaster-health coordination, but are still limited by the resource shortage and exposure to rising climate risks (Trummer et al., 2023; Salajegheh Tazerji et al., 2025).

Integrated Mapping of Risks and Response Capacity

Risk and intervention cross-analysis shows that there are a number of vital trends. The most effective mitigation potentials of infectious diseases, nutrition, and maternal health domains are presented by surveillance and service delivery strategies. The psychosocial services have the best dependence on mental health outcomes, but are the least developed. Planning and resilience at the government level are crucial when managing chronic diseases, as continuity-of-care mechanisms are required in such situations.

Displacement settings. The matrix depicts how the response categories can be described as being fit well with health risks and where gaps are present.

Table 5: Matrix of Health Risks and Public Health Response Strategies

Health Risk	Surveillance Impact	Service Delivery Impact	Psychosocial Support Impact	Governance/Resilience Impact
Infectious Diseases	3	3	1	2
Nutrition & Food Security	2	3	1	2
Mental Health	1	2	3	2
Maternal & Child Health	2	3	2	2
Chronic Diseases	1	3	2	3

Table 5 connects specific health risks with specific strategies of response of the public health, and it indicates the interventions that have the greatest impact. The close relationship between surveillance, service delivery, and

infectious disease mitigation demonstrates the trends that were seen in the post-disaster and displacement epidemiological studies (Shultz et al., 2019; Ugbede et al., 2025). The dependence of mental health outcomes on psychosocial

support mechanisms is the highest, which is in line with the research on long-term psychological outcomes of climate-related displacement (Mohammadi et al., 2023; Siddik et al., 2025). Continuity of chronic diseases has the most significant association with governance and resiliency planning, highlighted in new climate-health policy studies (Kalukusu, 2025; Aleinikoff, 2024).

Discussion

Results of this review indicate that individuals displaced by climate change are exposed to a number of severe health issues. Infectious disease, poor nutrition, mental health problems, and maternal and child risks are the most common ones. Most of these issues arise due to the fact that displaced families tend to live in overcrowded shelters with limited access to clean water, poor sanitation, and inconsistent access to healthcare (Shultz et al., 2019; Mohammadi et al., 2023). The impact of mental health issues is also high and persistent, particularly among individuals who have lost their sources of livelihood and homes (Kalukusu, 2025; Siddik et al., 2025).

The findings also reveal that the living conditions, access to health services, and the resources available in the locations where individuals migrate determine the health outcomes. Health issues are aggravated when the shelters are overcrowded, or the clinics are distant or understaffed. Displacement may further exacerbate the situation by depriving people of income and imposing legal limitations on access to the care that they require (Ugbede et al., 2025; Guedes et al., 2024).

There are numerous similar issues that prevail around public health responses in areas across the board. Outreach teams and mobile clinics contribute to the delivery of primary care, yet they cannot be considered sufficient. Disease surveillance can work effectively, where there is availability, but most regions have weak systems to help with early detection of outbreaks. There is a scarcity of mental health services in virtually any place, though thousands of displaced individuals require emotional and psychological help (Mohammadi et al., 2023; Siddik et al., 2025). On the whole, the majority of responses are concerned with the range of short-term emergency care, and not with long-term health needs and treatment continuity (Trummer et al., 2023; Bhat & Wani, 2025).

Regions also differ in terms of health burdens. The levels of risk are high in South Asia and Sub-Saharan Africa, since these regions are more prone to climate disasters and lack resources in health systems. The pressures of relocation are an added stressor to small Island states, whereas Southeast Asia and Latin America exhibit recurring climatic events that interfere with normal healthcare services (Trummer et al., 2023; Salajegheh Tazerji et al., 2025).

Comparing the risks of health with the available types of responses, one can easily see that no one intervention suffices. Strong surveillance and minimum access to basic healthcare are needed for infectious diseases. The psychological issues require specific psychosocial assistance. The chronic diseases require a stable, long-term health service. This demonstrates that healthcare systems in the

public sector should offer both short-term treatment and long-term strategizing to safeguard the displaced communities.

In general, the results indicate that more organized and prepared health systems are required to help nations react to climate-related displacement. Enhancing the provision of basic services, enhancing early-warning and surveillance, and providing mental health services are some of the steps in minimizing the health effects of climate change on displaced populations.

Conclusion

As demonstrated in this review, the issue of migration caused by the climate poses a vast spectrum of health-related issues to the displaced populations. The most frequent challenges are infectious diseases, poor nutrition, mental health issues, and gaps in maternal, child, and chronic care. The reasons behind these problems are that displaced communities, in most cases, reside in unhealthy and overpopulated areas with inadequate health services. The analysis also reveals that the existing responses of the population towards health are disproportionate and mostly targeting short-term requirements. Health systems need to strive to achieve more coordinated, long-term, and climate-resilient approaches in order to better protect displaced people. Enhancing the basic services, increasing early detection of diseases, and increasing mental health services are future steps that should be taken.

The environmental and public health implications for wildlife populations, especially

in areas experiencing high levels of displacement, should not be overlooked. As people are displaced, increased human-wildlife interactions and habitat disruption can exacerbate the spread of zoonotic diseases. This creates a compounded health risk for both humans and animals. Therefore, integrating wildlife health considerations into migration and public health responses will be crucial in managing the overall health challenges posed by climate-induced displacement.

The quality and availability of the reviewed studies are the limitations of this review. There is limited research conducted on some of the areas that have been displaced due to climate conditions, and this implies that some of their health problems are not reported. The reviewed studies adopted varying methods and measures, which could not be directly compared. Moreover, the numerical data in the tables are synthesized values referring to the trends in the literature, rather than the values of particular studies. Nevertheless, the review still includes a valuable summary of the key health issues and deficiencies in the existing responses.

The future studies ought to track the populations that have been displaced over time to be in a better position to know how their health varies at various levels of migration. Additional area-specific research is required, particularly in those regions where there is a lack of data. The investigations into the mental health support and long-term management of chronic diseases are of particular significance due to the lack of research regarding them. Greater evidence is also needed on the ways in which health systems can be made

to suit the changes in climatic conditions. The creation and testing of combined strategies to unite the three areas, including, but not limited to, public health, climate adaptation, and migration planning, will assist countries to be more responsive to climate-related displacement in the future.

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