



CLIMATE CHANGE IMPACTS ON HUMAN HEALTH AND THE HEALTH SECTOR

March 2022

Health and the environment are inextricably linked. Although the impacts of climate on health have been well documented in the literature for decades, attention to and efforts in this space often fall short of commitments. The Lancet recently called climate change the largest global health threat of the 21st century — further underscoring that climate change can no longer be ignored, but also recognizing the opportunities that exist to redefine our perspectives and approaches at this critical juncture (Morfeld et al., 2021). The World Health Organization (WHO) estimates climate change will cause an additional 250,000 deaths per year between 2030-2050 from malnutrition, malaria, diarrhea and heat stress alone. Additionally, the direct cost to the health sector could reach \$4 billion per year, with 80% of the cost being shouldered by Sub-Saharan Africa (WHO ref 2). The unfortunate reality is that low- and middle-income countries (LMICs) experience a higher portion of adverse health effects from increasing climate variability despite their minimal contributions to global greenhouse emissions (Ruble et al., 2021).

President Biden called U.S. climate leadership “more necessary and urgent than ever,” and has placed the climate crisis “at the forefront of this Nation’s foreign policy and national security planning.” (Executive Order, 2021) In April 2021, USAID committed to developing a new Agency Climate Strategy that will guide efforts through 2030 and target climate change resources to meet the most urgent, immediate demands of the climate crisis as well as the long-term, transformative shifts. The strategy will expand USAID’s unique role to lead resilience and climate adaptation in development assistance, help us better respond to climate-related conflict and disasters, and elevate key and emerging issues around social and environmental justice and equity.

Observed climate impacts on health can be categorized in the following ways:

- **Direct impacts** from increased frequency and severity of extreme weather events, including heat, that can lead to physical injuries, death and mental health challenges.
 - **Ecosystem mediated impacts**, such as through air pollution, shifting temperature or precipitation patterns that can alter prevalence and distribution of vector-, water- or food-borne diseases and/or impact health outcomes related to nutrition.
 - **Socially mediated effects** that occur via impacts on social and human systems, like increased poverty, migration or conflict which can impact the ability to access care or negatively influence care seeking behavior.
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UNDERSTANDING THE SEVERITY AND IMPACTS OF CLIMATE CHANGE ON HEALTH SYSTEMS

FIGURE 1: CLIMATE RISKS ON HEALTH SYSTEM RESILIENCE

Graphic description: There are many hazards associated with climate change. Climate change is expected to increase the frequency and intensity of climate shocks and stressors. Risk is calculated through the strength of exposure and amount of vulnerability. These climate related impacts directly and indirectly affect the health system. The ability to adapt, respond, and recover from these risks is considered resilience.

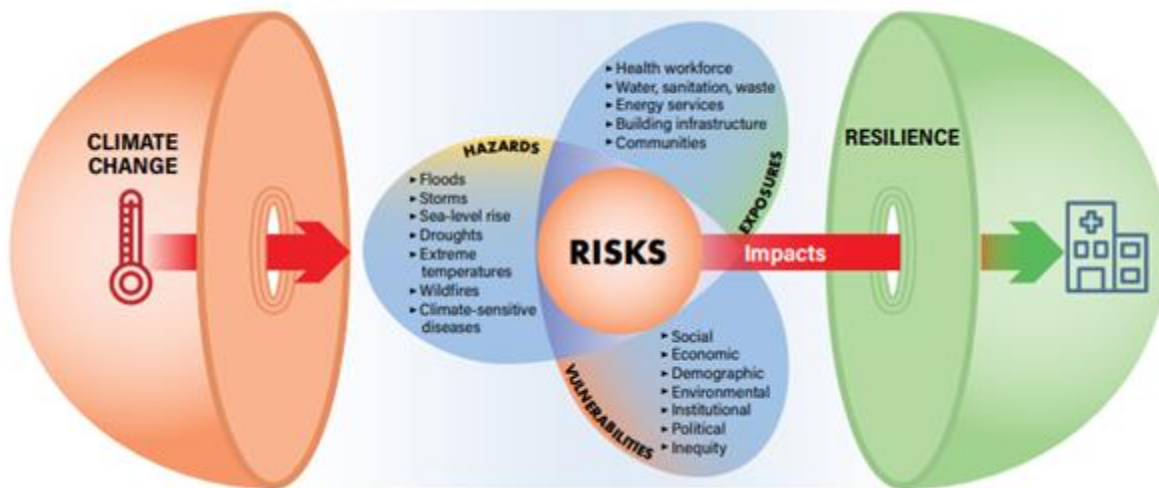


Image Source: Checklists to assess vulnerabilities in health care facilities in the context of climate change. Geneva: World Health Organization; 2021.

Integrating climate change into health programming is central to achieving the President’s ambitious climate goals and our partner countries’ development objectives. Yet, practitioners often disregard the breadth and severity of impacts that climate change can have on the performance and sustainability of a health system. Better understanding the intrinsic link between climate and health systems is essential to improve efforts to strengthen health systems and ensure they remain resilient. Climate change threatens health care availability, access, quality, and financial viability by applying direct and indirect pressure that reduces the capacity of health systems to manage and adapt accordingly to shocks and stressors. The climate is already changing and the context in which health services are delivered and consumed must also adjust to meet the immediate and future challenges.

Intensified and frequent extreme weather events can halt or hinder access to and quality of care for patients and providers, which can result in substantial resource losses (i.e. financial, human, material) for health systems. Extreme weather events can disrupt supply chains and destroy infrastructure. Forest fires can lead to facility destruction or extended closure for clean-up (Chen et al., 2019). In extreme cases, entire populations will need to move from climate vulnerable areas due to destruction from extreme weather events or changes in viable livelihoods. Mental health in affected communities is also greatly impacted due to the stress of the event and recovery.

For instance, climate-related migration — for internally displaced persons and refugees — is a major source of suffering, disability and loss of life (McMichael, et al, 2012). Lack of access to health services, water, food and shelter along the migration route pose serious health risks to migrants. Cross-border climate refugees face additional challenges, including not seeking care driven by mistrust and fear of deportation, financial and structural barriers, stigma and discriminatory treatment from health workers,

and lack of familiarity with health insurance enrollment and entry points. Migrant-sensitive health systems and programs should deliberately incorporate the needs of migrants into financing, policy, planning, and implementation of interventions from the national level down to communities — this approach will ensure that health systems are able to additionally care for migrants without overburdening the system (WHO Africa Region, 2018).

Climate-sensitive diseases, such as malaria, dengue, and many food and waterborne diseases, are rising at an alarming rate expanding geographic range, seasonality and increasing incidence due to changes in temperature and precipitation. For example, ticks and mosquitoes now thrive in places they'd never ventured before. Rising temperatures over the last decade in Colombia and Ethiopia resulted in malaria reaching the highland populations — infecting a totally new population group; and in Europe, the West Nile virus easily spread to new regions (Hess et al, 2020). Infectious disease impacts are likely to worsen as the climate continues to vary drastically and creates favorable conditions for disease vectors or pathogens to proliferate, which renders countries at risk of backsliding against the health gains made to combat such diseases. In 2007, the Intergovernmental Panel on Climate Change (IPCC) noted that the global population at risk from vector-borne diseases will increase by between 220 million and 400 million in the next century. If disregarded, health systems globally can face enormous strain on their systems, exposing long-standing gaps in public health and further exacerbating chronic inequities.

Three ways climate influences emerging diseases include: (i) Increased transmission of novel pathogens attributed to changes in land use and loss of biodiversity as humans encroach on forests and increase their contact with animals. (ii) Increased cases of vector-borne disease due to warming weather and variable precipitation; Changes in geographic regions vulnerable to contagion due to shifts in climate. (iii) Re-emergence of old viruses, or zombie contagions, specifically bacteria and viruses preserved for centuries in the frozen ground as the Arctic's permafrost starts to thaw.

The intertwined relationship among environment, climate change, human health and health systems is further exemplified as we assess the global shifts in air quality and impacts of soaring temperatures (Singh et al, 2020). Over time, urbanization and rapid expansion has intensified changes in the physical landscape, which in return has altered several meteorological variables including temperature, wind speed, and air quality. For example, urban heat island (UHI) effect is the phenomenon where cities experience much warmer temperatures than nearby rural areas as a result of their development, which replaces natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat (EPA). This phenomenon contributes to a range of public health issues, particularly from heat exposure and can result in an above-average rate of mortality. UHI's impact is far greater on more vulnerable social groups in urban areas (e.g. elderly, children, low income populations). Vulnerability is increased in populations with underlying health conditions and mobility limitations, poor housing conditions and small living quarters, and inadequate resources to access alternatives for safer living environments with cooling (Heaviside et al, 2017). Additionally, pregnant women and newborns are extremely vulnerable to the direct or indirect impacts of climate change through heat stress, extreme weather events and air pollution, potentially impacting both the immediate and long-term health including preterm birth, low birth weight, developmental anomalies and preeclampsia (Roos et al, 2021).

Ambient air pollutants also show evidence of negatively impacting air quality and leading to pulmonary and cardiovascular diseases — causing premature death. For example, recent studies have highlighted that cities with poorer air quality are prone to a higher death rate of COVID-19 (Frontera, et al, 2020). In China, air pollution accounts for more deaths than from AIDS, malaria and tuberculosis. Additionally,

those with underlying health conditions, children, elderly, and other vulnerable populations are at greater risk on account of their weaker immune systems and lack of access to affordable and high-quality care (Singh et al, 2020). In countries with poor air quality, health systems are seeing an uptick of health conditions caused by air pollution but may lack the capacity and resources to effectively care and manage conditions in the long-term.

Additionally, climate change will impact the cost of providing services to its target population. As temperatures rise there will be an increased demand for electricity in order to provide air conditioning in facilities as well to ensure commodities that need to be temperature controlled are stored at appropriate temperatures. Due to sea-level rise, coastal areas may need to find alternative sources of potable water or consider desalination due to saltwater intrusion raising the cost of water. Changes in water availability will also have implications for agricultural production, which can contribute to undernutrition. Loss of agricultural productivity can also lead to reduction in income, which will then impact ability to pay for health services (Ebi et al, 2017).

Climate change is expected to significantly increase health risks — particularly in LMICs, and disproportionately affect vulnerable groups including the poor, women, children, the elderly and those with pre-existing medical conditions. Health systems will need to adapt to challenges. It is imperative that governments, local partners, and global actors not only recognize these interrelated issues but move as swiftly and strategically as possible in concert to address them.

Climate change's impact on the health and well-being of people globally is reaching catastrophic levels. As the earth continues to warm, tens of millions of more people are at increased risk from rapid and unpredictable spread of infectious diseases, heatwaves, water and food insecurity and scarcity, air pollution, and poverty and homelessness. Health services are often regarded as a first line defense in preventing adverse health outcomes, especially from those caused by climate impacts. Health systems are the foundation for individual and community level resilience. They serve as a critical structure for protecting all global citizens by providing accessible, affordable, accountable and reliable care when climate hazards strike. It's time we move with urgency to prepare for climate change by building climate resilient health systems. This includes promoting and capacitating effective and iterative risk management across all levels, fostering multi-sectoral engagement, and identifying actions and investments over the short- and long-term to increase system resilience.

Addressing current gaps and improving the current health system performance is simply not enough to prepare a health system to tackle the effects of the climate crisis. Health systems globally should increasingly take steps to understand how climate change will affect their ability to manage and protect population health; evaluate the effectiveness of their interventions and systems under diverse climatic conditions and mediated impacts; and identify opportunities to enhance institutional capacity (WHO Ref 1). USAID supports health systems to adapt to all hazards, including climate change by strengthening their capacity to absorb, adapt to, and transform if necessary to ensure acceptable, accessible, quality care to the communities they serve every day, not just during times of shocks (see Figure 2).

FIGURE 2: CORE RESILIENCE CAPACITIES AND ASSOCIATED FACTORS TO CONSIDER

Graphic description: When evaluating a shock/stress to the individual, community or system level, one must consider the following factors: (i) the relative intensity and cost of the shock/stressor; and (ii) the required and appropriate response considering the transactional costs to implement and sustain the response. Ultimately the trade-offs between these dynamics will shape the short- and long-term outcomes of the system.

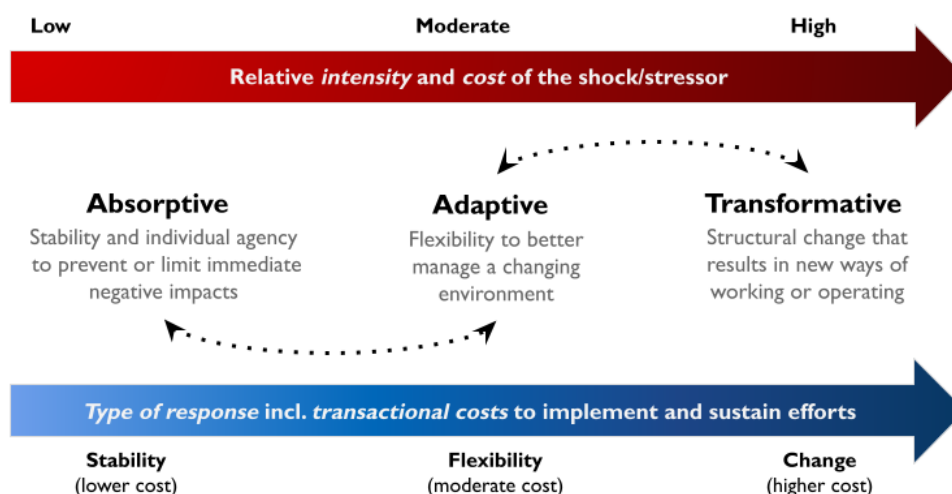


Image Source: Adapted from Béné, Christophe. (2013). Towards a Quantifiable Measure of Resilience. IDS Working Papers. 2013. 10.1111/j.2040-0209.2013.00434.x; and “The Future is a Choice : The Oxfam Framework and Guidance for Resilient Development”.

ADAPTATION AND MITIGATION

Integrating climate change adaptation into development work does not require implementing development activities in a completely new way. It instead requires considering the climate impacts and identifying opportunities to adapt and transform as necessary. Adaptation and mitigation are two strategies for addressing climate change. Mitigation refers to reducing the emissions sources or enhancing the sinks of greenhouse gases. The health sector (globally) is a significant contributor to global emissions, contributing 4.4% of global emissions. This would make it the fifth largest polluter on Earth if it was a country. Sources of the climate footprint vary by country, but include energy consumption, transport and product manufacture, use and disposal, with the majority (71%) coming from the supply chain (Healthcare Without Harm, 2019). Reducing greenhouse gas emissions from the health sector would be a significant step towards protecting the health and well-being of the population and overall environment. Immediate impacts of reducing greenhouse gas emissions locally can mean improved air quality (especially in areas near emission sites) and decreased health risk, particularly to vulnerable populations (e.g. children, elderly, those with chronic conditions). In the long term, reduction in greenhouse emissions can improve other climatic variables (e.g. temperature, wind, rainfall) critical to and impacting health. This may include, reducing UHI effect, decreasing negative impacts on crop production and yield, minimizing spread of infectious diseases or establishment of new variants.

Climate risks cannot be eliminated, but negative impacts on people and economies can be reduced or managed. Adaptation refers to making adjustments in natural or human systems in response to expected or unexpected climatic events and their effects. For example, implementing early warning systems and preparedness plans for extreme weather events; ensuring flexibility in current policies and practices to cope with contextual changes such as prevalence in disease, demographics, or responding to large scale emergencies; and integrating disease surveillance into existing information systems to improve responsiveness and ensure availability of required commodities and medical products. Building systems that are flexible and can adapt to contextual changes helps minimize the costs and consequences of climate impacts, so they do not hinder progress toward development goals.

It is important to note that mitigation and adaptation strategies can be used in concert. Conducting assessments is necessary to understand the breadth and depth of the climate challenge within the local country context on the health system prior to determining the approaches that should be considered. Climate risk management is a required and important component of USAID project design and implementation. It helps USAID assess, address and adaptively manage climate risks as well as realize opportunities to further contribute to climate change adaptation and mitigation. Climate risk management considers different vulnerability assessments, government laws, and policies as well as projected health and environmental impacts from climate change that may reduce effectiveness of the intervention if ignored. Additionally, looking at historical data to see how the target area has already changed should be considered to inform sustainable development. Climate risk assessments should be conducted early in the program and continually reviewed in evaluation and follow up activity design.

At COP26 the President's Emergency Plan for Adaptation and Resilience (PREPARE) — a whole-of-government initiative to support developing countries and communities in vulnerable situations around the world, in their efforts to adapt to, and manage the impacts of climate change — was announced. USAID will play a central role in implementing this new initiative and its ambitious set of targets, including programs to support half a billion people to adapt to and manage the impacts of climate change through locally led development by 2030. One way to build on ongoing investments is to support countries' implementation of commitments aligned with the implementation of Health National Adaptation Plans (H-NAP). The H-NAP process aims to support countries to identify medium- and long-term adaptation planning needs to respond and adapt to climate change. These plans highlight and address the health risks of climate change. The WHO also launched an initiative to Build Climate Resilient and Environmentally Sustainable Health Systems through reducing greenhouse gas emissions and increasing adaptive capacity.

CONCLUSION

Climate change is threatening the sustainability of health systems performance and development goals through increased pressure from increased heat, extreme weather events, droughts, shifts in duration and prevalence of diseases, and the potential for increased novel diseases being introduced. Integrating climate change adaptation into development work does not require implementing development activities in a completely new way. It requires considering the climate impacts and identifying opportunities to adapt and transform as necessary. Health systems need to act now by promoting and building capacity for effective and iterative risk management across all levels, fostering multi-sectoral engagement, and identifying actions and investments over the short- and long-term to increase system resilience. Please review the programming guidance document entitled "Considerations to integrate climate change mitigation and adaptation into HSS programming" for additional information on how existing and new activities can adapt to address climate change.

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