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Climate and Health Equity Briefing Series

Health Systems and Wider Infrastructure Strengthening

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Introduction

Rising global temperatures damage ecosystems, endanger coastal areas and increase the risk of extreme weather events, obstructing our right to a clean, healthy and sustainable environment through impacts on access to clean air, safe drinking water, shelter and nutritious food. Changes in climatic conditions also alter the incidence, transmission and distribution of infectious and non-communicable diseases (NCDs) across the world.

The impacts of climate change are felt disproportionately in low- and middle- income countries (LMICs) and, particularly, by communities living in coastal or mountainous regions and megacities, women and girls, youth, elderly, people living with disabilities, people with pre-existing medical conditions, those in poverty, and populations living in countries with lower socio-economic development and weaker health infrastructures. As a result, cross-sectoral and sustainably-financed strategies to strengthen resilience and infrastructure are vital to reduce the impacts of climate change on health and equity.

This paper outlines causes, themes, and intersections between climate change on health systems strengthening, wider infrastructure strengthening and global health. Aligned with the United Kingdom (UK) Government's commitment to put low carbon and resilient health systems at the core of its long-term approach – mitigating the impact of climatic change and improving health outcomes as priorities – the briefing identifies key linkages between climate change, health systems and wider infrastructure. Cross-sectoral case studies and recommendations for transformational change are presented.

The Inequitable Burden

There is clear evidence that health issues are disproportionately experienced (in volume and severity) by communities experiencing marginalisation across all parts of the world. These disproportionate experiences are also mirrored by the impacts of climate change. Women and girls, LBGTQIA+ people, indigenous peoples, disabled, elders, those living in poverty, and more, are often more greatly impacted.

For example, the onset of disaster is more severely experienced by women due to their gendered role placing them in more vulnerable geographical areas when a disaster occurs – whether it be a fast disaster onset, such as climate-induced flood, or a slower onset, such as increased temperatures. There are also increased impacts with the longer-term, and/or secondary impacts, such as increased gender-based violence, increase of early child forced marriage, decrease in girls education and deepening of poverty. All of which create direct and indirect impacts on their health.

Climate change and environmental degradation may deeply change and dramatically impact the conditions of people's lives because of natural disasters affecting infrastructures and services as well as slow onset phenomena that reshape – for instance – food availability, livelihood opportunities, and quality of life. Inequities are a huge concern: exposure to hazards change considerably around the world. "Low income countries will see themselves exposed to more volatile temperatures and more frequent temperature anomalies with potentially devastating effects on agricultural output, while regions with the highest responsibility for climate change may experience reduced temperature volatility."[1]

Inequities also persist within countries. Poverty, living in urban areas, lack of infrastructures and services (including weak health systems), and the absence of preparedness and response mechanisms could shape the impact of climate change among and within countries.

Social determinants of health (SDH) affected by climate change phenomena may configure unsafe, unhealthy and unsupportive environments – especially for the most at risk groups, such as children. This may result in higher mortality and morbidity rates among disadvantaged and marginalised groups. It is important to consider that SDH (how communities and societies organise their basic conditions like built environment, transports, food chains, etc.) impact on the local environment (in terms of risk of pollution, for example) and global phenomena (in terms of their carbon footprint).

Access to inclusive health information and services, lifestyle and social norms, commercial determinants, gender, stigma, discrimination and human rights violations create unfair differences in the impact of SDH on health outcomes. For instance, shocking disparities in life expectancy among people living with disabilities (on average living 10 to 20 years less than people without disabilities)[2] could even increase because of the effects of climate change on SDH.

Finally, those processes could generate negative externalities pushing forced migration, increasing conflict and violence (that result in physical and mental health impacts) and, at the social level, worsening community cohesion (worse wellbeing and communities less able to be resilient to climate change/take climate action).

1 https://wid.world/news-article/climate-inequality-report-2023-fair-taxes-for-a-sustainable-future-in-the-global-south/
2 https://www.themissingbillion.org/the-reports

Health Systems, Infrastructures, Climate and Health Equity: What Are The Connections?

Climate change is revealing infrastructure vulnerabilities far beyond the health sector and causing increasing global disruptions. For example, the burning of fossil fuels (coal, oil and natural gas) is projected to cause 250,000 additional deaths per year between 2030 and 2050.[3] As the burden of disease increases, developing climate-resilient infrastructure that can anticipate and adapt to shocks and change is increasingly needed in the short- and long-term.

Higher temperatures lead to an increase in allergens and harmful air pollutants, which create increased health issues. For instance, climate-induced longer warm seasons have also created longer pollen seasons which, in turn, increases allergic sensitisation and asthmatic episodes. In addition to the increased health risks this increase also diminishes productive work, which reduces an individual's socio-economic status and, therefore, ability to nourish and look after themself and their family/community.

Transport creates noise pollution, water pollution and affects ecosystems through multiple direct and indirect interactions. Private transport is one of the world's biggest sources of greenhouse gases, with emissions rising every year.[4] There are significant co-benefits to be reaped from improvement to active travel infrastructure (walking and cycling). With lower emissions also lowering pollution the switch to increased physical activity also creates direct health co-benefits towards a lower risk of a raft of diseases, including type 2 diabetes, CVD, many cancers, dementia, and mental health conditions to name but a few. Indeed, the changes made in many cities during the early days of COVID-19 outbreak, when this infrastructure was rapidly boosted, show it can be done quickly.

Food systems – the production, processing, transport, marketing and consumption of food – produce between 20-35% of global emissions[5], as food provisioning releases greenhouse gases into the atmosphere. According to The Lancet EAT commission, food is the single strongest lever to optimise human health and environmental sustainability on earth.[6]

Healthcare's climate footprint is equivalent to 4.4% of global net emissions (2 gigatons of carbon dioxide equivalent). Climate-smart healthcare, and the decarbonisation of health systems, are central to climate mitigation. In particular, healthcare in LMICs also has the opportunity to chart a course to zero emissions aligning the sector with the Paris Agreement ambition, decarbonising health care delivery, facilities and operations, as well as the supply chain.

Case Study

Two studies in the United States found the country's health care emissions to alternately have reached 89% and 9.8% of the national total respectively, with the latter estimate comprising 655 million metric tons of carbon dioxide equivalent (CO_2e).10 In the United Kingdom, the National Health Service (NHS) and Public Health England estimated the health and social care climate footprint in England in 2017 to be 27.1 Mt CO_2e, representing around 6.3% of the country's climate footprint.[7]

3 https://www.who.int/health-topics/climate-change
4 https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions
5 https://www.who.int/publications/i/item/9789241516648
6 https://www.foodnavigator.com/Article/2022/11/22/cop27-a-notable-disappointment-for-sustainable-food-systems
7 https://noharm-global.org/sites/default/files/documents-files/5961/HealthCaresClimateFootprint_092319.pdf

Climate change is already affecting water access for people around the world and causing more severe droughts and floods. Increasing global temperatures is one of the main contributors to this problem. Climate change impacts the water cycle by influencing when, where and how much precipitation falls.

"Salinity in drinking water across coastal belts has been associated with increased blood pressure and urinary protein excretion, progressive kidney disease, and (pre)eclampsia and gestational hypertension in pregnant women..."[8] – we might want to also stress that its not just 'access' to water that's an issue?

Case Study

Studies adopting those recommendations in Gambia showed the benefits of healthy diets by, for instance, focusing on the substitution of refined grains by wholegrains and reducing added sugar consumption. Translating such good practices into inpatient units, NYC hospitals opted for Plant-Based Meals as Primary Option for Patients, increasing benefits for environment and health.[9]

8 https://cdn.georgeinstitute.org/sites/default/files/documents/NIHR%20FS%20J181122_final.pdf
9 https://beansishow.org/

Looking Ahead

Research and Surveillance

The systematic collection, analysis and use of disaggregated data per age, sex, gender, disability and more for decision making is a crucial component of a resilient health system, facilitating the early detection of disease and outbreaks and enabling all levels of the system to monitor change over time and adapt interventions to the prevailing conditions, as well as the development of roads, transport, energy and water systems. Such studies and modelling will enable the identification of practical solutions to climate sensitive health risks in populations most vulnerable to climate change and ensure strengthened infrastructures that withstand both intensified climate impacts and heightened health impacts – such as pandemic preparedness, conflict and disaster.

The integration of real-time meteorological data into national and sub-national disease monitoring and surveillance systems will enable the tracking and anticipation of how climate change may influence disease exposure and transmission. The use of meteorological data for model-based risk assessment in health programming will enable tackling climate variability and weather anomalies that result in increased disease transmission risks and disrupts health service delivery.

Such research endeavours must lead to improvements to resources and local facilities where research takes place, including research connectivity, in order to enable the consistent and meaningful collection of data and its subsequent analysis.

Case Study: anticipating and responding to localised epidemics

Malaria is one of the most climate-sensitive vector borne diseases. Whether due to short-term deviations in the climate or natural external factors, climate change and variability can directly and indirectly impact on transmission.

Research suggests that climate change could increase the population at risk of acquiring malaria by 5 to 7 percent across Africa by 2100 and result in 60,000 additional malaria deaths per year between 2030 and 2050.[10]

Robust surveillance infrastructures including entomological data monitoring is increasingly important and allows for more accurate predictions of abnormal weather and insect patterns. Prolonged drought forces nomadic and internally displaced populations to move where they can access rainfall, increasing the risk of greater disease transmission. Anticipating malaria upsurges is made more challenging by climate induced variables – localised epidemics can occur because of failing to anticipate malaria upsurges and can cause a spike in deaths because of increased transmission, especially in populations with reduced or no immunity to the disease. Metrics like rainfall and temperature changes can help malaria planning and response.

10 https://www.malariaconsortium.org/blog/climate/

Cross-sector Collaboration

Greater coordination and collaboration between sectors are needed to mitigate the impact of climate change. While surveillance is important to monitor climate data in comparison with various disease outcomes and quality of life, a coordinated, multi-sectoral response is also required to effectively target the subsequent health risks. This means mainstreaming the climate response into the programmes, policies and plans of all health-determining sectors and departments.

Tools and Technologies

Efficient supply chain management of essential items, such as medicines and diagnostic tools, and regular assessment of their capacity to withstand and respond to unexpected disruption (e.g., water and electricity supplies) are integral to ensuring health facilities' climate resilience. Investment in new, locally appropriate and sustainable technologies specifically designed for building climate-health resilience may also help build a more timely and targeted response to anticipated health risks – this should include the development and expansion of telemedicine.

Supply chain management also includes the strengthening of roads, transport, water to ensure the route and delivery of essential items and to ensure communities' accessibility to healthcare and to socio-economic factors that can increase their health and decrease risk toward climate change impacts (such as the direct impacts of flooding) through improved access to safe and fair work and education.

Technology to raise awareness, make people feel involved and ultimately motivate them to take action is vital in the fight against climate change. This can't happen without good connectivity, decent mobile phone penetration and also ensuring equity of access and distribution of such technologies.

Capacity Building

Formal higher education and capacity building of the health workforce about the environmental-health nexus via the One Health and Planetary Health approaches is needed to increase awareness and empower them as trusted messengers for their patients and communities. The health workforce plays a key role in both prescribing and disseminating health messaging. Equally, the integration of Planetary Health approaches within higher education will support a dedicated network of motivated students with an ambitious goal to advance the agenda for the health of people and the planet.

Strengthening Community Health Responses

Health systems in LMICs with strong networks of community health workers and services can and should engage communities around the effects of climate change in efforts to mitigate and adapt to climate change.

The Community Dialogue Approach has been proven as an effective response to complex issues that impact public health. This approach has already been trialled to address antibiotic resistance in Bangladesh and neglected tropical diseases in Mozambique and could be a useful tool to facilitate locally led action to improve climate resilience.[11] Awareness campaigns – shaped by local knowledge and designed in collaboration with local champions– should also be developed and disseminated within existing community structures and networks.

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Case Study

In partnership with Imperial College London, the George Institute for Global Health has established the Global Health Research Centre on Non-Communicable Disease and Environmental Change. The centre will work alongside local communities in Bangladesh, India, and Indonesia to produce world-class implementation research. Collaboration with academics, policymakers, environmental organisations, local communities, and providers of health and medical services will be an integral component of the design process. The work programme focuses on a multifaceted strategy to improve primary healthcare provision in each country and reduce environmental challenges in each context: air pollution in Indonesia, agricultural diversity in India, and water salinity in Bangladesh.[12]

Financing

Adequate resources must be allocated – globally, nationally and locally – to mitigate and manage the health-related impacts of climate change. This is particularly important in regions where the risk of extreme weather events may intensify the incidence and spread of disease and place additional pressure on already-stretched health systems, as outlined above.

12 www.georgeinstitute.org/news/new-global-research-centre-to-combat-ncds-and-environmental-change

Recommendations

1. Develop and implement comprehensive surveillance systems to identify drivers, at risk populations and document weaknesses and gaps across the health system.

2. Strengthen the public and the health workforce capacity and skills to recognise and respond to the different effects of climate change on health.

3. Prioritise generating high-quality evidence on climate-sensitive health risks to inform national adaptation and mitigation plans.

4. Investments in health, water, transport (including roads) infrastructure adaptation should use an equity framework and universal design for health infrastructures, transport and services.

5. Promote Health in All Policies to ensure that health systems contribute to mitigation.

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