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Health Inequalities and Climate Change: Action for Global Health Position Paper

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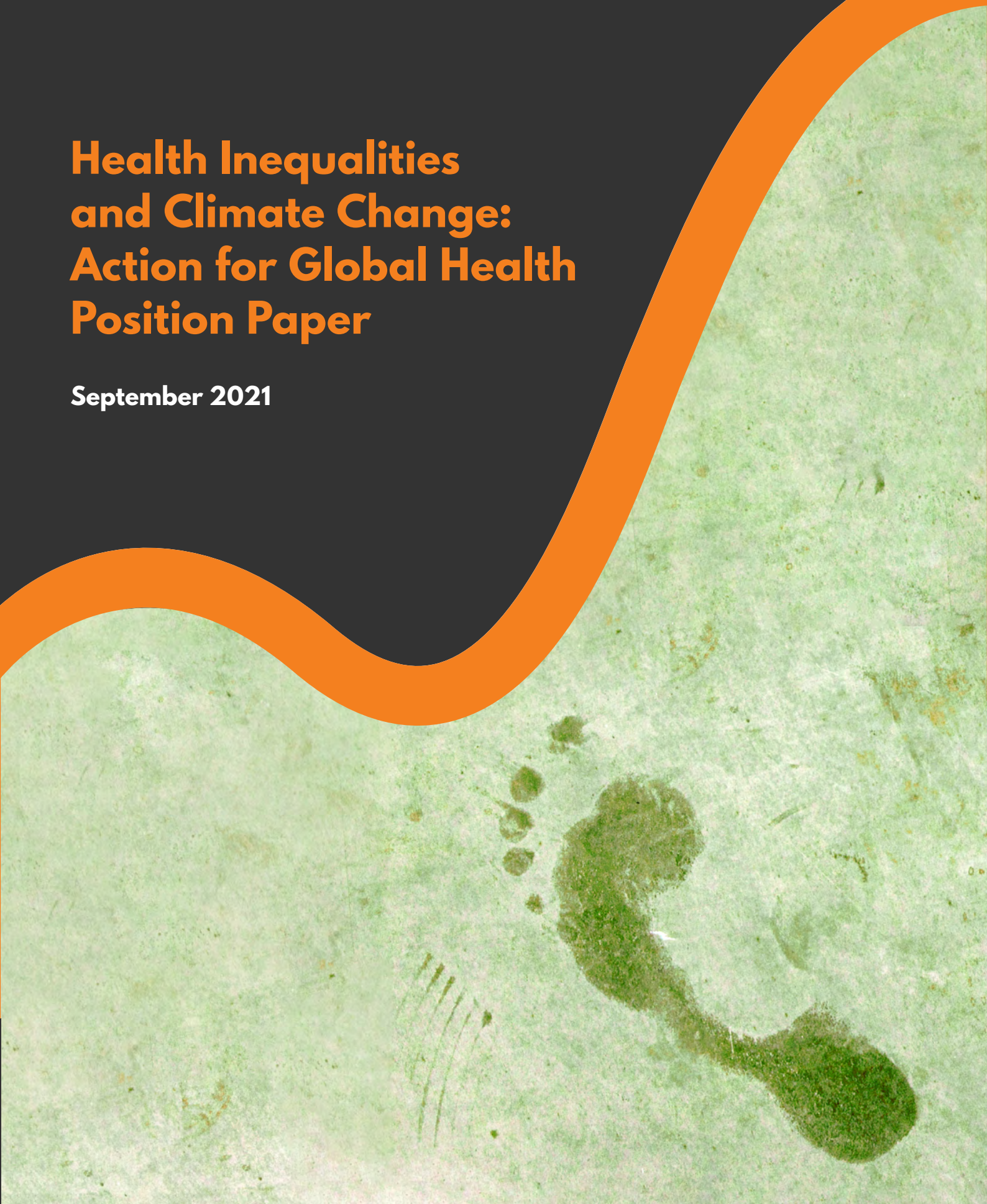


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1.

Introduction

1. Introduction

> *The life of every child born today will be profoundly affected by climate change. A child born today will experience a world that is more than four degrees warmer than the pre-industrial average, with climate change impacting human health from infancy and adolescence to adulthood and old age. Without accelerated intervention, this new era will come to define the health of people worldwide at every stage of their lives.*[i,ii]

Climate change represents the greatest threat to global health of the 21st century[iii,iv], and threatens to undermine decades of gains in development and global health.[v] The COVID-19 pandemic has demonstrated the scale of catastrophic impacts that can arise from international health threats. Recovery from the pandemic provides us with the unique opportunity to shape more sustainable societies and strengthen health systems. These changes will protect the health of people around the world for generations to come.

The health consequences that will result from inaction on climate change will have disastrous impacts on the most marginalised around the world. The communities that have contributed least to the climate crisis are also the most vulnerable to the impacts of climate change, worsening health and socioeconomic inequalities and shifting the goal of leaving no one behind further out of reach. Failure to act on climate change will severely jeopardise the realisation of universal health coverage (UHC) in various ways – including by compounding the existing burden of diseases on severely overstretched health services and exacerbating barriers to accessing health services at the times when they are most desperately needed.

The negative health impacts of climate change already span all world regions, with no population unaffected.[vi] However, low- and middle-income countries (LMICs) experience higher exposure to some risks while having access to dramatically lower resources to protect themselves, which results in heightened levels of vulnerability.

Conversely, whilst LMICs face the most dire consequences, it is the high- and upper-middle income countries that emit 86% of global CO2 emissions[vii] – a major cause of climate change. Centuries of colonisation followed by a highly inequitable global economic system have accelerated environmental degradation through extraction and deforestation, coupled with racial oppression and gender injustice, at severe and enduring cost to human and planetary health.[viii] This inequity and injustice underpins the root causes and impacts of climate change on global health, while corporate and other vested interests present a formidable barrier to progressive policymaking.[ix]

2.

The Impacts of Climate Change on Health Inequalities

2. The Impacts of Climate Change on Health Inequalities

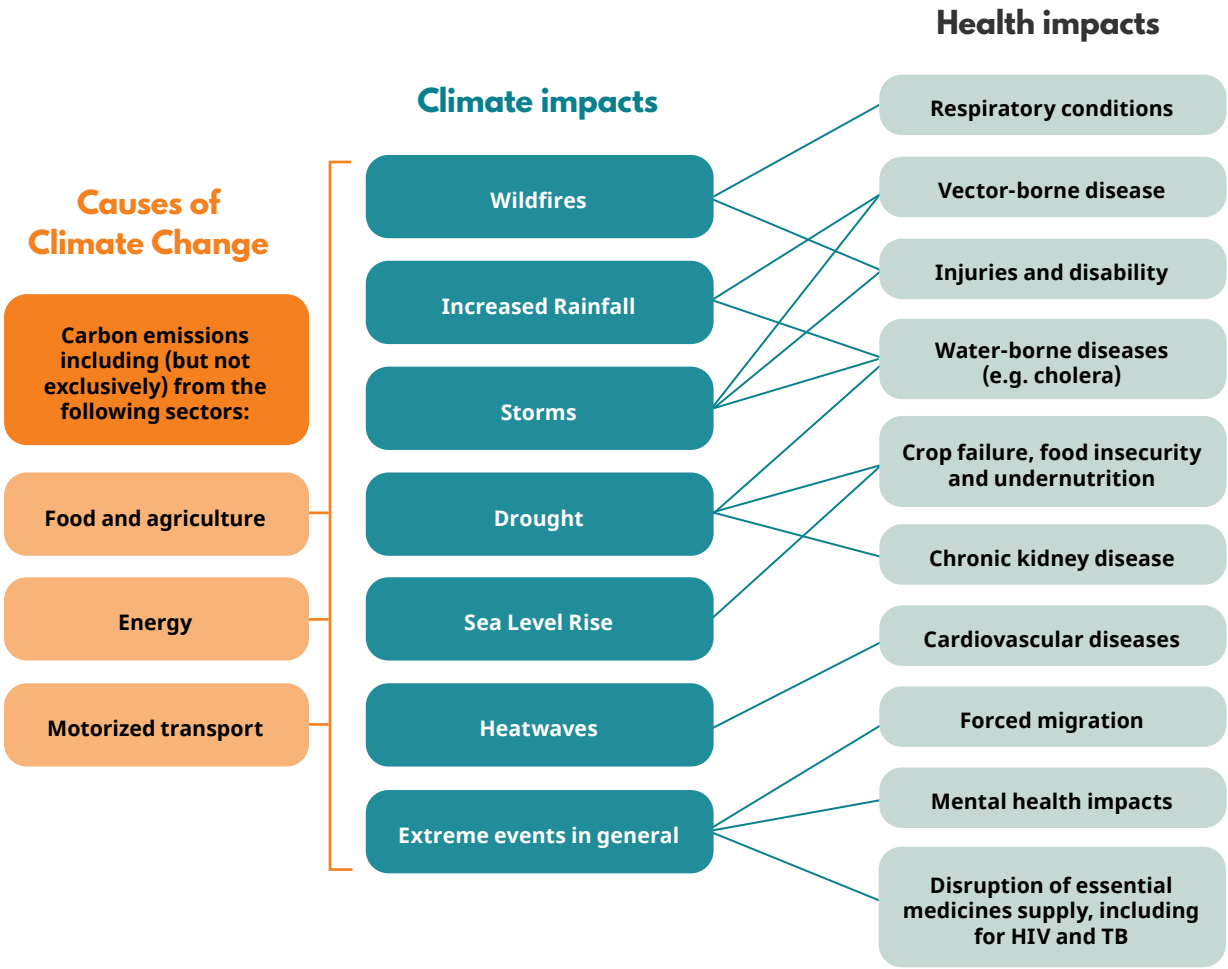
Climate change causes increased risk of a wide variety of health issues across regions, due to the differing manifestations of climate change and how these impact on and exacerbate a range of inequalities.

The below diagrams summarise some of the health impacts of climate change (figure 1) and the health co-benefits of climate mitigation (figure 2).

Socio-economic Risks

The impacts of climate change on health are strongly influenced by individual and population factors, including age, gender, income and prior health status. Older people and children are less able to respond and protect themselves from immediate hazards while older people, especially those living with pre-existing health conditions, are especially vulnerable to the health impacts of heat.

Figure 1: Impacts of Climate Change on Health



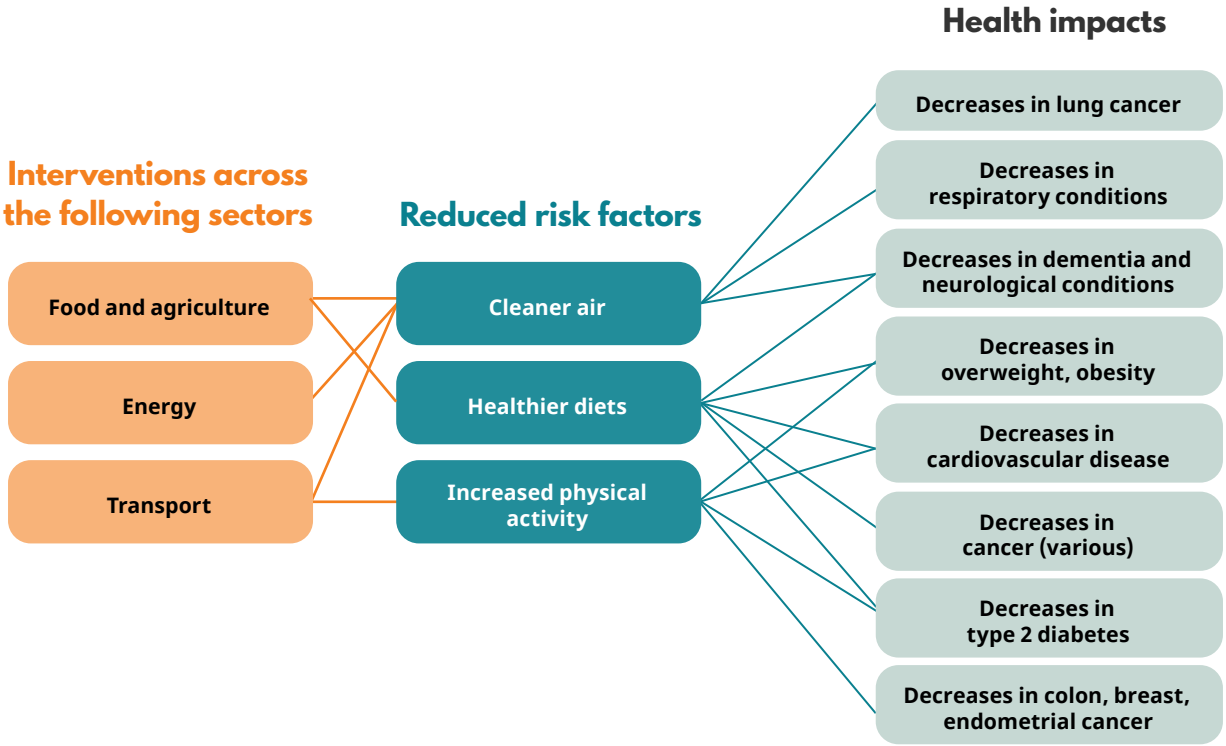
There is evidence that in some of the poorest populations female mortality associated with flooding events is several times higher and has a younger mean age than in males.[x] During droughts, women and children in LMICs are often the worst affected, as a consequence of their gender-based roles and subsequent status in household decision making and tasks (such as water collection). In contrast, male farmers have been found to be disproportionately likely to die by suicide during droughts.[xi]

People on lower incomes typically live in poorer housing which leaves them more exposed to the impacts of heat, flooding, storms and vector-borne disease than those in (often high-salaried) office jobs, which is further compounded by poor access to health services. Communities displaced by these extreme weather events and sea level rise are further exposed to disease risks associated with lack of stable housing and poor access to health services.

The health risks of climate change are at their highest when individuals experience multiple compounded vulnerabilities, demonstrating the need to take an inequalities lens to the connections between climate change and global health.

The impacts of climate change also have a detrimental effect on an individual's sexual and reproductive health and rights (SRHR), which has a significant impact on women and LGBTQIA+ peoples.[xii] There is strong evidence linking climate change to negative maternal health outcomes, an increased prevalence of gender-based violence (GBV) and, generally, a lack of access to SRHR services which in turn negatively impact family planning, safe abortion, and sexually transmitted infection (STI) outcomes. As noted by the United Nations Framework Convention on Climate Change (UNFCCC), women, especially those in poverty, face higher risks and experience a greater burden of climate change impacts.[xiii] Whilst there is still a need for greater gender

Figure 2: Health Co-benefits of Climate Mitigation



disaggregated data, some research shows that women are 14 times more likely to die after a disaster due to their gendered role situating them in more climate prone areas and, thus, more vulnerable to climate-related healthcare reductions.[xiv] Women and girls are also at a higher risk of physical, sexual, and domestic violence in the aftermath of disasters. LGBTQIA+ peoples are at increased risk of losing their (already limited) safe physical spaces and support services, including healthcare, in the immediate aftermath of a natural disaster.[xv]

Regional Risks

In many regions, climate change leads to increased rainfall and warmer temperatures creating ideal breeding conditions for mosquitoes, including those which serve as the vector for malaria, dengue and Zika. [xvi, xvii] This can widen the geographic distribution and seasonality of these diseases, as well as increase the likelihood of novel incidences in locations that have not previously reported the disease. Heavy flooding and sea level rise also frequently lead to the contamination of water supply and associated disease.[xviii, xix]

Conversely, in other areas rainfall may decrease leading to higher risk or severity of drought. This jeopardises both access to safe water supply and agricultural productivity and leads to loss of livelihood and food insecurity (for example, from 1981 to 2019 the crop yield potential for maize, winter wheat, soybean and rice has consistently decreased).[xx]

We've also seen how increased frequency and intensity of heatwaves leads to heatstroke and fatalities. For example, from 2000 to 2018 heat-related mortality in people over 65 years increased by more than half to 296,000 deaths, while rising temperatures were responsible for an excess of 100 bn potential work hours lost globally in 2019 compared with 2000.[xxi] A growing body of evidence suggests that temperatures also contribute to (chronic) kidney disease, particularly in rural communities.[xxii]

Research indicates that climate-induced heatwaves may be causing kidney damage among at-risk populations in India. High temperatures lead to the need for increased fluid intake, while insufficient fluid intake contributes to nephropathy. Agricultural labourers are especially at risk due to the outdoor nature of their work. Decreasing rainfall exacerbates this epidemic by reducing the available water supply and quality.[xxiii]

Climate-related Stress

Extreme weather events such as wildfires and storms lead to injuries and long-term disability. As well as the obvious mental health impacts of such traumatic outcomes, anxiety towards future climate-related impacts is also a growing phenomenon and can impact health workers as well as those living in climate-sensitive areas.[xxiv] In addition to physical health impacts, climate change and related events can impact psychological wellbeing – particularly among those with pre-existing conditions and/or those living in climate-sensitive areas.[xxv]

3.

The Impacts of Climate Change on Universal Health Coverage

3. The Impacts of Climate Change on Universal Health Coverage

The impacts of climate change are also evident at the systems level, particularly within health services and the provision of UHC, eroding progress towards its three dimensions of (i) coverage of the people in need of care, (ii) cost of treatment and (iii) the care services available (see Chart 1).

Cyclone Idai wrought havoc in Mozambique in 2019, with wide ranging and long-lasting health impacts intensified by climate change. In Sofala province, 28 out of 157 health facilities were damaged or entirely destroyed. In addition to the acute risks of flooding, longer-term impacts of cyclones, such as Idai, include disruption to supply for essential medicines (including for HIV and TB); increased risk incidence of malaria, dengue and cholera; poor maternal and child health outcomes; and food insecurity due to agricultural damage.[xxvii, xxviii]

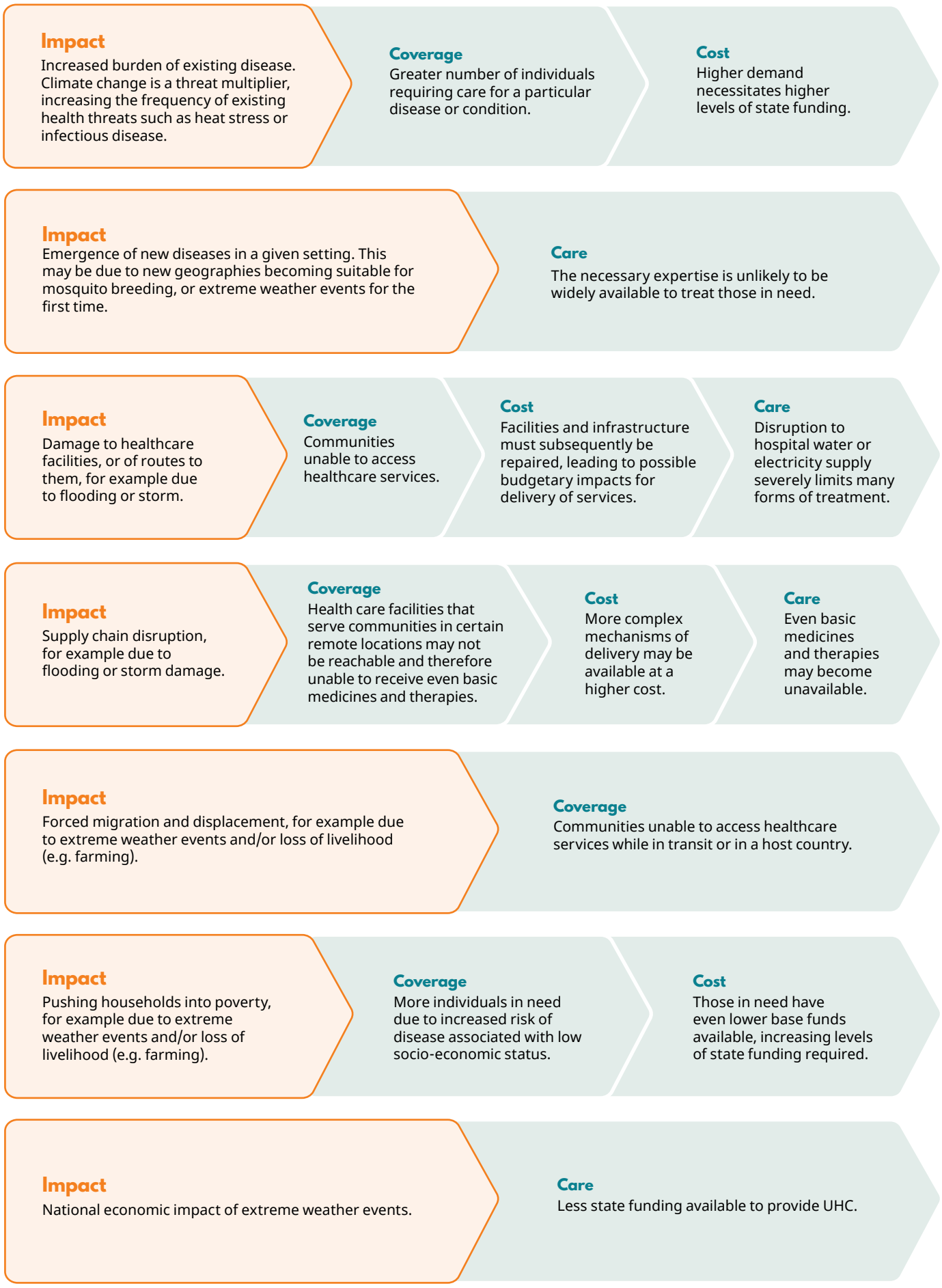
In Nepal, a health infrastructure project integrates climate resilience into design and planning as part of the Nepal Health Sector Support Programme (NHSSP3). Six out of Nepal's seven provinces have districts with the highest risk category of exposure to landslide, flood, storm, drought, hailstorm, cold wave and avalanche – many of which are exacerbated by climate change. The team identified over 30 health posts that could be destroyed if dams burst at two glacial lakes, with the cost to replace the facilities estimated at NPR 3 billion (GBP 2.5 million).[xxix]

Inadequate water supply presents clear challenges for water-reliant hygienic practices (such as handwashing and flush toilets) in healthcare settings. This leaves both patients and healthcare professionals vulnerable to infectious disease. Extreme weather events can cause supply chain disruption as well as infrastructure damage, including to buildings themselves[xxvi] – leaving people without health centres, road access to clinics or supply of medicines in the long term.

Both acute and chronic climate impacts can trigger migration and displacement, placing attainment of the right to health at additional risk (in 2020 there were almost 26,900 new weather-related child displacements every day[xxx]). At the same time, legal, economic and socioeconomic barriers, to name a few, emerge causing disruptions to access to health services. Planning and coordination are urgently required to mitigate the threat that climate change-related displacement and migration poses to health systems.

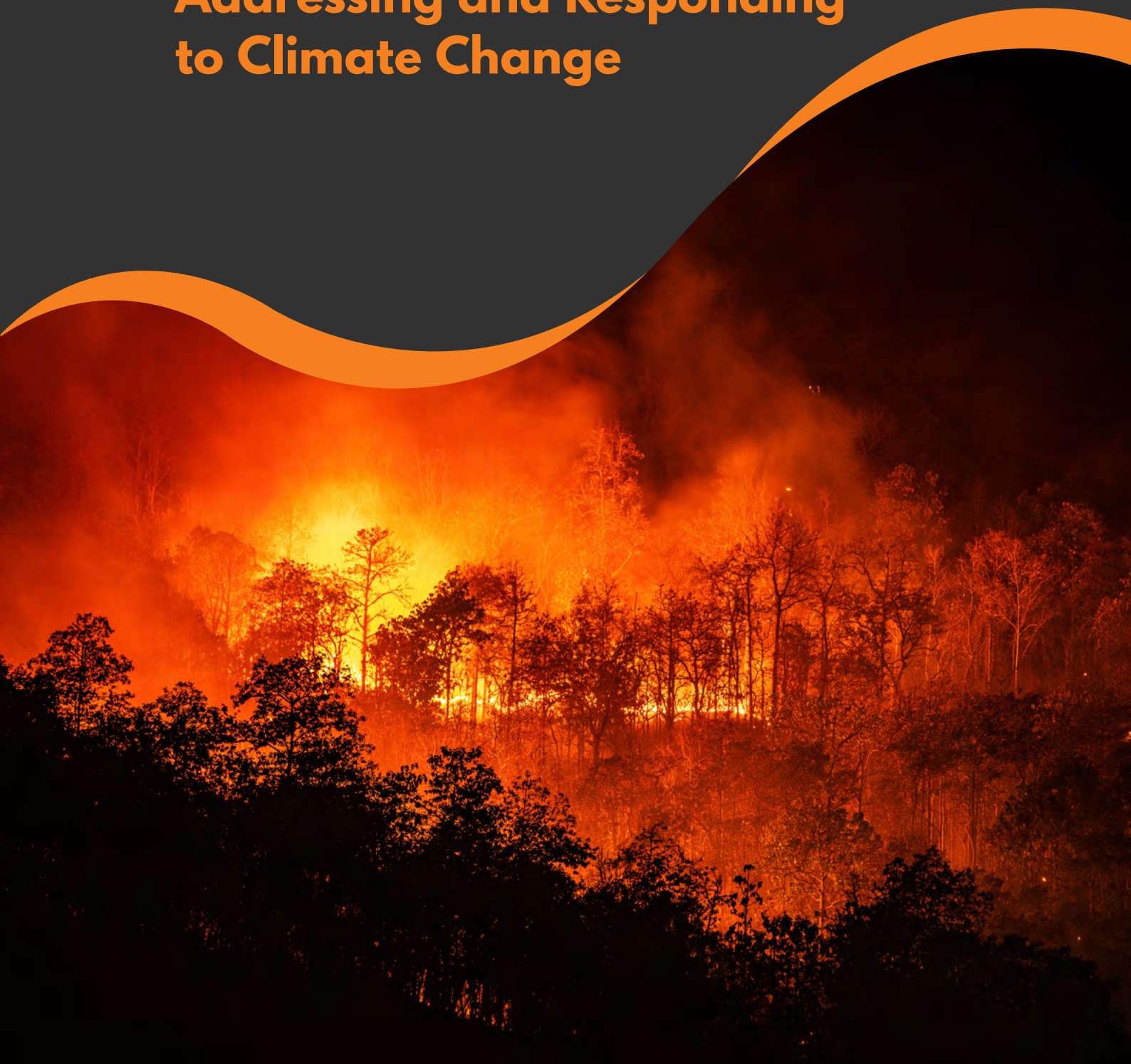
In Mexico, as well as in many other countries, climate-related environmental degradation has led to mass migration and displacement. Migrants have limited access to healthcare and are 'often trapped between erratic state institutions and normative frameworks, criminal gangs, and alarmed locals.' As well as physical dangers, ongoing uncertainties take a toll on mental health and wellbeing.[xxxi]

Chart 1: How climate change erodes progress towards UHC



4.

Addressing and Responding to Climate Change



4. Addressing and Responding to Climate Change

In order to tackle the impacts of climate change on health, we must adapt and strengthen health systems and broader infrastructure to build climate resilience, ensuring that healthcare can still be provided during climate crises and to account for evolving climate-related issues. In addition, reducing the impacts of climate change on health depends heavily on mitigating climate change. This is principally dependent on interventions across energy, food and agriculture, and transport sectors, as well as reducing the health sector's own climate change footprint – with climate sensitive changes made in these four sectors certain to yield clear health benefits due to improvements in air quality, diet and physical activity and more. Ambitious financing will be necessary to implement these interventions, including through COVID-19 response measures.

Health System Strengthening

Changes to the health system, such as adapting systems to incorporate climate resilience into facilities and supply chains, is a vital component in the fight against the impacts of climate change on health. When healthcare is most urgently needed – for example, during a climate-related extreme weather event – it may not be possible to provide it due to damage to the physical buildings from which healthcare is provided or due to disruption to water or electrical supplies, indicating the need for climate-resilient facilities.

In other instances, climate-related supply chain challenges may prevent essential medicines from being delivered to the healthcare facility, indicating a need for climate-resilient supply chains. Taking these needs into account, the World Health Organization (WHO) has developed checklists to assess vulnerabilities in healthcare facilities in the context of climate change[xxxii], as well as supporting countries in the development of Health National Adaptation Plans[xxxiii] – two vital approaches.

Given that climate change causes an increased risk of health issues, particularly

In the Pan American Health Organisation (PAHO) region, during 2016, 77% of the 17,600 health facilities were in disaster-prone areas, with many health facilities following outdated building codes focused on seismic resistance without considering the impacts of climate change.[xxxiv]

The Caribbean Smart Hospital Initiative implemented by PAHO, integrates climate change adaptation, resilience and environmental sustainability. A toolkit has been developed to support achievement of these objectives. In 2013, a severe storm cost St. Vincent and the Grenadines an estimated USD 2.1 million and left its only referral hospital unable to function. Many of the 39 district health clinics were flooded, while the 'smartened' Georgetown Hospital remained 100% functional during and after the event.[xxxv, xxxvi]

for the most marginalised, if UHC is to be attained (or improved in countries where it exists) then we cannot rely on previous strategies. Instead, we must work towards a climate-resilient health system to ensure we account for these evolving climate-related health issues and enable essential healthcare to be provided for all.

Climate change is poised to redefine the global health landscape and failure to anticipate and prepare for challenges and evolving disease burdens will render any level of UHC unviable. Additionally, a UHC framing of climate change impacts, such as those outlined in the above table, can help to illustrate the human impacts of climate change and drive forward the progressive action that is so urgently needed.

Wider Infrastructure Strengthening

A project in Bangladesh has successfully reduced the vulnerability of local people in low lying coastal areas to climate change. Prior to project implementation, there was minimal infrastructure or access to fresh water supplies and farming techniques were unsustainable. Women were especially vulnerable to impoverishment, gender-based violence and ill health. Since 2011, Mott MacDonald has provided technical assistance and training to support the development of infrastructure to provide protection from climate change. All families have their own latrines, which is essential to reduce incidences of diarrhoea. Microfinance and enterprise training has been provided which are helping communities to diversify and increase their income.[xxxvii]

Adaptation and building climate-resilient infrastructure far beyond the health sector is also vital to reduce the impacts of climate change on health. It is essential to update building codes and retrofit existing buildings to protect occupants from climate-related extreme temperatures (both hot and cold) and subsequent sickness. Interventions to improve the quality of water infrastructure and boost climate resilient agriculture also offer clear health benefits. In addition, clear disaster strategies are essential foundations for a rapid response to, for example, a wildfire or storm, for which early warning systems are a central component.

Energy

Energy use in buildings and industry accounts for more than half of global greenhouse gas emissions.[xxxviii] Ambient (outdoor) air pollution was estimated to cause 4.2 million premature deaths worldwide in 2016 (of which two thirds are attributable to burning fossil fuels[xxxix]), with a further 3.8 million deaths from household air pollution due to unsafe fuels and technologies for cooking, heating and lighting.[xl, xli]

Almost three in five deaths due to outdoor air pollution are a result of ischaemic heart disease and strokes, with a further one in five deaths due to respiratory conditions. Pneumonia and ischaemic heart disease each account for over a quarter of deaths from household air pollution, with the remainder due to chronic obstructive pulmonary disease (COPD), stroke and lung cancer. Exposure to household air pollution almost doubles the risk for childhood pneumonia and is responsible for 45% of all pneumonia deaths[xlii] in children less than five years old. Women and children are most vulnerable to household air pollution due to the long periods spent in the home, with women often responsible for cooking and household tasks. The health impacts of air pollution are disproportionately evident in LMICs, with 91% of deaths due to air pollution occurring in LMICs.[xliii]

The extraction of fossil fuels also has direct health impacts on local communities – from the creation of health issues from extraction pollution to violence towards local communities, and mental health concerns. **It is vital there is a just transition in the energy sector. This transition must move away from fossil fuel extraction and combustion, and towards renewable energy, while protecting health and livelihoods.** Fossil fuels, especially coal, must be phased down and phased out; individuals employed in fossil fuel-related industries should be supported to find new employment; and financial reform (including subsidies and investments) should be implemented to achieve fuel pricing reflective of health and environmental costs while ensuring maintenance of energy access for vulnerable communities.

In 1995, Nine leaders of the Movement for the Survival of the Ogoni People (MOSOP), in Nigeria, were killed while campaigning to protect their communities from the impacts of oil development. In the years since, corporations have continued extractivism in Nigeria, leading to oil spills, continued gas flaring and negative health and justice impacts on the local communities.[xliv]

Food and Agriculture

Both diet and agricultural methods contribute to climate change and health impacts with climate change projected to reduce dietary diversity, leading to increased child malnutrition. Diet-related risk factors accounted for 11 million deaths in 2017. Of these, three million are due to high sodium intake, three million due to low intake of whole grains and two million to low intake of fruits.[xlv] Another study notes that red meat contributes to almost one million deaths.[xlvi]

Agriculture accounts for approximately 20% of global greenhouse gas emissions[xlvii], with many of the products that are least beneficial for human health also having the highest carbon footprint.[xlviii] In addition, industrial, high-intensity agriculture is environmentally destructive as it relies on a myriad of methods – from the use of certain fertilisers to the razing of grounds – that creates further stress and damage to the environment, which can speed up the impact of climate change.

Some ways to combat these issues would be to promote locally sourced diets that are rich in whole grains, legumes, vegetables and fruits and low in red meat and processed products, produced using climate-sensitive and sustainable agricultural methods. This can be achieved through measures, including the incorporation of climate change considerations into food-based dietary guidelines; empowering consumers with information to facilitate dietary choices that are both healthy and sustainable; and the allocation of subsidies to support sustainable agricultural practices. Available food resources should be equitably distributed, minimising both malnutrition and food waste.

The FoodSwitch app uses data on the health and climate impacts of different products to empower consumers to make informed choices that benefit human and planetary health and ultimately change industry practice.[xlix]

Transport and Mobility

The World Health Organization estimates that one in four adults and 80% of adolescents do not meet recommended levels of physical activity. Up to five million deaths a year could be averted if the global population was more active.[l] Transport systems which are oriented to support motorised vehicles

rather than active and public transport options contribute to lower levels of physical activity, higher levels of air pollution, and traffic injuries. Energy consumption in the transport sector accounts for 12% of global greenhouse gas emissions.[li]

Policymaking should serve the majority of the global population who do not have access to a car, and who instead rely on walking, cycling and other active transport modes for mobility and access to essential services, by prioritising integration of active transport infrastructure. Close coordination is required between urban planners and transport planners to minimise transport duration at city level and ensure safe and equitable connectedness (to amenities, job opportunities, etc.) for all.

Under the Kigali Car Free Day initiative, cars and motorbikes are banned twice per month in many parts of the city to allow citizens to cycle, walk, and jog freely on the roads. The Rwanda NCD Alliance is an active civil society stakeholder within the initiative, and organises NCD screening during events, maximising opportunities for health promotion.[lii]

Health Sector Footprint

While the health sector treats people whose lives are impacted by climate change, it is also responsible for almost 5% of greenhouse gas emissions globally.[liii] **As a result, it is vital to build health systems that are climate sensitive and do not contribute to climate change themselves via consideration of the health sector's own footprint – from the buildings to transportation modes for medics and supplies.**

A project in Bungoma county, Kenya, identified that energy outages were widespread at all facilities and occurred up to three times a week for an average of six hours. Based on these findings, a solar system was designed to provide lighting and power to critical maternal and newborn health emergency equipment at 33 health facilities, thus simultaneously reducing greenhouse gas emissions by the healthcare sector and improving quality of care.[liv]

Financing

The Paris Agreement, a legally binding international treaty ratified by 191 countries, commits to limiting the global temperature rise to well below 1.5°C. Overall, alignment of national policies to the Paris Agreement target would enable 1.18 million air pollution-related deaths, 5.86 million diet-related deaths, and 1.15 million deaths due to physical inactivity to be avoided annually across just nine countries, by 2040.[lv]

In order to deliver on the goal of the Paris Agreement, governments must secure a 7.6% reduction of global emissions each year between 2020 and 2030. The world has already warmed by more than 1.2°C compared with pre-industrial levels, resulting in profound and rapidly worsening health effects.[lvi] As of the end of 2020, 75 countries responsible for 30% of global greenhouse gas emissions had submitted an updated commitment – sufficient to reduce

global emissions less than 1% by 2030.[lvii] **Additionally, under the Paris Agreement, high income countries committed to "provide financial resources to assist developing country Parties with respect to both mitigation and adaptation…[taking into account] the priorities and needs of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change and have significant capacity constraints."**[lviii] Despite this commitment, levels of funding have fallen short of the USD 100 billion annual target[lix] while fossil fuel subsidies in 2017 were projected to reach USD 5.2 trillion – equivalent to 6.5 percent of GDP.[lx]

Collective failure to meet targets for greenhouse gas emission reduction and climate financing will negate long standing investments in infectious disease, nutrition, and maternal and child health and impact urgently needed work on health systems strengthening. This will result in direct consequences for those in need of essential health services and severely impact hard-won progress towards the Sustainable Development Goals. **As such, funding should be channelled to countries with least capacity to mitigate and respond to climate change, contributing to the internationally agreed target of USD 100 billion from high-income countries to LMICs per year.**

To secure a sustainable future for all, health and climate change must also be central components of COVID-19 recovery plans. Whilst COVID-19 has had devastating impacts across the world, it provides us with the unique opportunity to apply climate resilience into our recovery plans and to truly build back better. At this time of pandemic response, impending climate disasters and economic uncertainty, win-win solutions that both protect health and mitigate the negative effects of climate change are more relevant than ever. However, to date, 31 major economies and eight multilateral development banks have pledged USD 336 billion to fossil fuel-intensive sectors – meaning that 42% of total public funds are committed to energy-producing and consuming activities.[lxi] Given the impacts of fossil fuels on climate change, and thereby health, this is counterproductive if we are to secure a sustainable and healthy future for all.[lxii] Action on health and climate change is a prerequisite for sustainable and resilient economies, and for equity, which in turn drives better physical and mental health.[lxiii]

5.

Conclusion and Recommendations

5. Conclusion and Recommendations

It is vital that the international community unites to ensure that ambitious action is taken to mitigate climate change and prioritise interventions that yield additional health co-benefits and tackle health inequalities, while also maximising adaptation and resilience of health systems. Concerted and collaborative action in response to climate change yields substantial health returns, such that tackling climate change offers the greatest global health opportunity of this century.[lxiv]

In order to be most effective, policymaking must be participatory and representative, from the planning phase through to implementation. **Those who are affected – particularly those who are vulnerable and experience multiple and intersecting forms of discrimination and oppression – must be meaningfully engaged and prioritised for active outreach, decision-making and control over resources.** This should come in the form of dialogue, gathering of disaggregated data, financing and ensuring an inclusionary approach with those with lived experience, ensuring the most marginalised have a meaningful seat at the table at all levels.

Lack of coordination across sectors presents a significant barrier to progress.

The Australian Senate received a submission highlighting lessons learned to reduce the impacts of future comparable events. These lessons included the importance of embracing Traditional Knowledges and collaborating closely with First Nations communities to develop response strategies and cross-government coordination including via a National Expert Committee on Air Pollution and Health Protection.[lxv]

Key to combating this is the design and implementation of a cohesive approach at all levels, with the need for national platforms to lead by example and coordinate across sectors. **National platforms should be established to support cross-sectoral coordination between ministries and departments, including across the climate change/environment, health, finance, energy, transport, urban planning, and food and agriculture sectors. This would ensure the reflection of health considerations and co-benefits across adaptation and mitigation priorities as part of a health in all policies approach.**

Recommendations

1. Integrate climate resilience into health systems strengthening.

2. Build climate-sensitive health sectors to mitigate their carbon footprint.

3. Strengthen infrastructure beyond the health sector – including updating building codes, retrofitting buildings, and improving the quality of water infrastructure.

4. Facilitate a just transition to renewable energy, while protecting livelihoods and ensuring maintenance of energy access for vulnerable communities.

5. Promote healthy & sustainable diets, rich in plant-based foods and sustainable agricultural methods. Encourage inclusion of climate change considerations in dietary guidelines and the equitable distribution of food resources.

6. Prioritise the integration of active transport infrastructure, which minimises emissions and duration of public transport at city level, and ensure safe and equitable connectedness for all.

7. Renew commitments to the Paris Agreement and secure 7.6% reduction in global emissions each year by 2030, with HICs to strengthen commitments to provide financial resources to assist climate adaptation and mitigation' in LMICs.

8. Embed climate mitigation and adaptation into COVID-19 recovery plans.

9. Activities must be researched, planned and implemented using an inequalities lens, including through participatory and representative policymaking.

10. National platforms must support cross-sectoral coordination to ensure the reflection of health considerations and co-benefits across adaptation and mitigation priorities.

i Watts et al (2019) The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. Lancet. 394(10211): 1836-1878)

ii The Lancet Countdown 2019 Report, describing the consequences of a business-as-usual approach to climate change.

iii Costello A et al (2009) Managing the health effects of climate change: Lancet and University College London Institute for Global Health Commission. Lancet 373 (9676): 1693-1733 III

iv Campbell-Lendrum D et al (2019) COP24 Special Report on Health and Climate Change. World Health Organization. https://www.who.int/globalchange/publications/COP24-report-health-climate-change/en/

v Watts N et al (2015) Health and climate change: policy responses to protect public health. Lancet 386 (10006): 1861-1914

vi Watts N et al (2021) The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. Lancet 397 (10269): 129-170 VI

vii Ritchie H (2018) Global inequalities in CO emissions. Our World in Data. https://ourworldindata.org/co2-by-income-region

viii Macmillen Voskoboynik D. (2018) To fix the climate crisis, we must face up to our imperial past. Open Democracy. https://www.opendemocracy.net/en/opendemocracyuk/to-fix-climate-crisis-we-must-acknowledge-our-imperial-past/

ix Frumhoff et al (2015) The climate responsibilities of industrial carbon producers. Climatic Change volume 132: 157–171

x World Health Organization (n.d) Strengthening Health Resilience to Climate Change. Submission to the UNFCCC. https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/684.pdf

xi Garimella S et al (2014) Gender, climate change and health. World Health Organization. https://www.who.int/globalchange/publications/reports/gender_climate_change/en/.

xii Women Deliver (2021) The Link Between Climate Change and Sexual and Reproductive Health and Rights: An Evidence Review. Women Deliver. https://womendeliver.org/publications/climate-change-and-srhr/

xiii Ibid

xiv Ibid

xv Ibid

xvi Campbell-Lendrum D et al (2015) Climate change and vector-borne diseases: what are the implications for public health research and policy? Philosophical Transactions, Royal Society B 370(1665): 20130552

xvii Blagrove M et al (2020) Potential for Zika virus transmission by mosquitoes in temperate climates. Proceedings of the Royal Society B 287:20200119

xviii McKenzie T et al (2021) Sea level rise drives wastewater leakage to coastal waters and storm drains. Limnology and Oceanography Letters

xix Andrade L et al (2018) Surface water flooding, groundwater contamination, and enteric disease in developed countries: A scoping review of connections and consequences. Environmental Pollution 236:540-549

xx Watts N et al (2020) The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. Lancet 397 (10269): 129-170.

xxi Ibid

xxii Borg M et al (2017) The impact of daily temperature on renal disease incidence: an ecological study. Environmental Health 16(1):114.

xxiii The George Institute for Global Health (2021) climate change may be causing chronic kidney disease by triggering dehydration and stress, https://www.georgeinstitute.org/media-releases/climate-change-may-be-causing-chronic-kidney-disease-by-triggering-dehydration-and

xxiv Bourque F & Willcox AC (2014) Climate change: the next challenge for public mental health? Int Rev Psychiatry 26(4):415-22

xxv Ibid

xxvi Corvalan C et al (2020) WHO guidance for climate resilient and environmentally sustainable health care facilities. World Health Organization. https://www.who.int/publications/i/item/9789240012226

xxvii BBC (2019) Cyclone Idai: What's the role of climate change? https://www.bbc.co.uk/news/science-environment-47638588

xxviii Reliefweb (2019) Health Risks Rise in the Wake of Cyclone Idai. https://reliefweb.int/report/mozambique/health-risks-rise-wake-cyclone-idai

xxix Options (2018) Recovery and Resilience to Climate Change. https://options.co.uk/news/recovery-and-resilience-to-climate-change

xxx UNICEF (2021) Futures at Risk: Protecting the Rights of Children on the Move in a Changing Climate. https://downloads.unicef.org.uk/wp-content/uploads/2021/05/FuturesAtRisk_Climate_Final.pdf?_adal_sd=www.unicef.org.uk.1627039068475&_

xxxi The Lancet (2019) The Lancet Countdown on Health and Climate Change: Policy brief on humanitarian impacts. https://storage.googleapis.com/lancet-countdown/2019/11/Lancet-Countdown_Humanitarian-Policy-Briefing_FINAL.pdf

xxxii World Health Organization (2021) Checklists to Assess vulnerabilities in Health Care Facilities in the Context of Climate Change. WHO. https://www.who.int/publications/i/item/checklists-vulnerabilities-health-care-facilities-climate-change

xxxiii World Health Organization (2021) WHO Publishes Quality Criteria for Health National Adaptation Plans. WHO. https://www.who.int/news/item/10-02-2021-who-publishes-quality-criteria-for-health-national-adaptation-plans

xxxiv Pan American Health Organization 55th Directing Council (2016) Plan of Action for Disaster Risk Reduction 2016-2021. CD55/17, Rev. 1. PAHO. https://www.paho.org/hq/dmdocuments/2016/CD55-17-e.pdf

xxxv Pan American Health Organization (2017) Smart Hospitals Toolkit. https://www.paho.org/disasters/index.php?option=com_docman&view=download&category_slug=smart-hospitals-toolkit&alias=2495-smart-hospitals-toolkit-2017-5&Itemid=1179&lang=en

xxxvi Pan American Health Organisation, PAHO/WHO Emergencies News, Caribbean Health Facilities Take the Next Step: Smart Hospitals. https://www.paho.org/disasters/newsletter/index.php?option=com_content&view=article&id=536:caribbean-health-facilities-take-the-next-step-smart-hospitals&catid=258&Itemid=350&lang=en

xxxvii Mott MacDonald (n.d.) Building a resilient and healthy society– the intersection of climate change, water and health. https://www.mottmac.com/download/file?id=38179&isPreview=True

xxxviii Ritchie H (2020) Sector by sector: where do global greenhouse gas emissions come from? Our World in Data. https://ourworldindata.org/emissions-by-sector

xxxix Lelieveld J et al (2019) Effects of fossil fuel and total anthropogenic emission removal on public health and climate. PNAS 116 (15) 7192-7197.

xl World Health Organization (2018) Fact sheet on ambient air pollution and health. https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

xli World Health Organization (2018) Fact sheet on household air pollution and health. https://www.who.int/en/news-room/fact-sheets/detail/household-air-pollution-and-health

xlii World Health Organization (2018) Household Air Pollution and Health. https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

xliii Watts N et al (2021) The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. Lancet 397 (10269): 129-170

xliv Oil Change International (2020) It's been 25 years since the Ogoni 9 — why are governments still funding fossil fuels? http://priceofoil.org/2020/11/10/25-years-ogoni-9-still-funding-fossils/

xlv Afshin A et al (2019) Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 393: 1958–72

xlvi Watts N et al (2021) The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. Lancet 397 (10269): 129-170

xlvii Ritchie H, 2020. Sector by sector: where do global greenhouse gas emissions come from? Our World in Data. https://ourworldindata.org/emissions-by-sector

xlviii Ritchie H (2020) You want to reduce the carbon footprint of your food? Focus on what you eat, not whether your food is local. Our World in Data. https://ourworldindata.org/food-choice-vs-eating-local

xlix The George Institute (2021) FoodSwitch. https://www.georgeinstitute.org/projects/foodswitch

l World Health Organization (2020) Fact sheet on household air pollution and health. https://www.who.int/news-room/fact-sheets/detail/physical-activity

li Ritchie H (2020) Sector by sector: where do global greenhouse gas emissions come from? Our World in Data. https://ourworldindata.org/emissions-by-sector

lii Bakambira, J., Bitwayiki, R., Mujawamariya, G., Lucero-Prisno, D., & Mucumbitsi, J. (2019). Kigali Car Free Day: An Innovative Model in the Fight against Non-Communicable Disease Pandemics. Rwanda Medical Journal, 76. http://www.bioline.org.br/pdf?rw19016

liii Watts N et al (2021) The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. Lancet 397 (10269): 129-170

liv Options (2019) Maternal and Newborn Improvement (MANI) project: Findings of an evaluation on the outcomes of green energy installations on maternal and newborn health services in Bungoma County. https://options.co.uk/sites/default/files/mani_impact_of_green_energy.pdf

lv Watts N et al (2021) The public health implications of the Paris Agreement: a modelling study

lvi Ibid

lvii United Nations Framework Convention on Climate Change (2021) Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat. UNFCCC. https://unfccc.int/documents/268571

lviii United Nations Framework Convention on Climate Change (2015) Paris Agreement. UNFCCC. https://unfccc.int/sites/default/files/english_paris_agreement.pdf

lix Roberts JT et al (2021) Rebooting a failed promise of climate finance. Nature Climate Change 11: 180–182

lx Coady D et al (2019) Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. Working Paper No. 19/89. International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509

lxi Gerasimchuk I et al (2021) Energy Policy Tracker. International Institute for Sustainable Development and Collaborators. https://www.energypolicytracker.org/

lxii This is also compounded from an economic perspective since every $1m spent supporting fossil fuel industries is estimated to generate only 2-3 full time jobs compared with an estimated 7-8 full time jobs for the same investment in renewables and energy efficiency

lxiii Beagley J (2021) Realising the health opportunities of COVID-19 recovery plans through Nationally Determined Contributions. Lancet Countdown. https://www.lancetcountdown.org/resources/

lxiv Watts N et al (2015) Health and climate change: policy responses to protect public health. Lancet 386 (10006): 1861-1914

lxv George Institute (2020) Lessons to be learned in relation to the Australian bushfire season 2019-20. https://www.georgeinstitute.org/lessons-to-be-learned-in-relation-to-the-australian-bushfire-season-2019-20