PUBLIC POLICY PROJECTS

INSIGHTS

The climate crisis and its health impacts

CHAIRED BY SEB DANCE
WRITTEN BY FRANCESCO TAMILIA

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ABOUT PUBLIC POLICY PROJECTS

Public Policy Projects (PPP) is a global policy institute offering practical analysis and development across sectors, including net-zero and climate change. At PPP, we believe good public policy is the essential foundation of an open, liberal society. Most public policy issues are complex and involve difficult choices and trade-offs. There is scope for honest disagreement about how to balance conflicting interests; it is the role of political leaders to make those choices and accept responsibility for the choices they make. But that system only works when political rhetoric is connected to reality and the programmes that are presented to voters represent real options. If voters' sense that the ideas are unrealistic, or that the implications have not been thought through, they conclude that the political class is, at best, self-serving and, at worst, corrupt.

Good public policy addresses the trade-offs and makes the choices explicit so political leaders can be held to account for the implications of the choices they make. This process requires an understanding of international context. In the age of the internet, Covid and climate change the list of issues that can be addressed at the purely national level is growing shorter all the time. The mission of PPP is to learn both from our own experience and from the experience of others and to make contributions to the policy debate that address real-world choices based on real-world evidence.

ACKNOWLEDGEMENTS

PPP is grateful to all those who have contributed so generously to the production of this report: including our roundtable, webinar and feature participants, who are detailed as an appendix to this report. In recognition of his support throughout this programme of work, PPP thanks former Deputy Chair of PPP and chair of this report Seb Dance for his insights. Other valuable contributions came from former PPP Policy Director Dan Male. The interviews, roundtables, webinars and features that informed this report were project-managed by Francesco Tamilia.

ABOUT THE AUTHOR

Francesco Tamilia is a Policy Analyst specialising in climate change, environment and energy transition at PPP. He is a health and climate change feature writer and has covered topics in public health. During the Covid-19 pandemic, Francesco has produced several features looking at the impacts of the virus in Colombia, Italy, and the refugee crisis. Francesco has studied in the United States and the United Kingdom, obtaining a Bachelor's Degree in journalism at the University of Westminster.

Foreword

FOREWORD BY SEB DANCE

Each of us has a unique perspective on the climate crisis. It might arise from the point at which we realised our own individual impact on the planet and decided to do something about it. It might be a broader recognition that weather patterns and seasonal events, once seemingly so familiar, are different now. We all hope that a sudden and personal impact of climate change – a loss of one's livelihood, home or even of a life of a loved-one – is something we never experience. Of course, we know the longer the problem persists and the global response to it is inadequate our chances of suffering an immediate impact increase. The reality is each of us is already experiencing the direct impact of climate change as it affects our personal health and health systems on which we rely.

It is difficult for the human mind to divorce direct experience from changes to systems around us. We might instinctively understand the general mechanics of climate change, yet our lives are not geared towards the introspection that enables each of us to come to a rational understanding of the risk we face from the climate crisis. When faced with a myriad of daily pressures – from work to travel to family – the wider environment, though always in the back of our minds, does not always get the attention we know it deserves.

Our health, and the health of our loved ones, does command our attention on a regular basis, however. Every day we take action to mitigate damage to ourselves. We avoid certain foods and limit our intake of harmful substances. We exercise, quit smoking and subscribe to gyms and nutritional programmes that guide us down a healthier path. But none of us can avoid climate change, much less those with the fewest resources for whom – as with every public health crisis – the options to mitigate are not always readily available. It is time to put a health warning on the biggest global challenge we face: climate change kills.

This report from PPP represents an amalgamation of testimony and input from organisations in the public and private sector. In the course of its creation, we have heard from medical staff and practitioners in fields from cardiology to mental health. We have brought experts from around the world together to discuss different approaches and to suggest ways forward. PPP is grateful for the contributions of these experts in their fields, named in the appendix, whose time was so generously given and whose insights have proved invaluable.

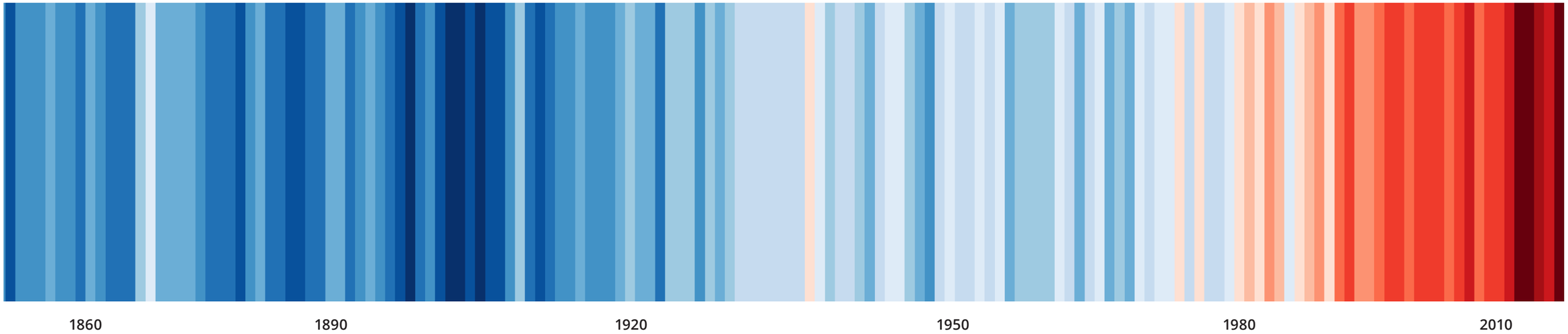
The report serves not just to highlight the extent and awareness of the link between climate change and health, but also to demonstrate the steps we can take and solutions in our grasp. In addition, the work we must do is not just about adding costs and additional burden but can be part of a general transition to a healthier and more sustainable future. In other words, when we take action on climate, we take action on health. They are two sides of the same coin.

Seb Dance
Chair of the report

Introduction

Annual global temperatures from 1850-2021

Source: Professor Ed Hawkins



As we look forward to COP27 in Egypt, inevitable questions will be raised as to what the likely focus should be. It is increasingly clear that incorporating public health into every climate policy decision is more critical than ever and should be a key focus for leaders when they next convene. Although no country, rich or poor, is immune to the health impacts of climate change, countries in the Global South are experiencing the worst effects.

The World Health Organization (WHO) has previously expressed grave concern, particularly for African countries. "They have a high burden of climate-sensitive diseases and poor public health capability to respond; the effects of climate change on socio-economic development will seriously undermine the health and wellbeing of people in such countries."[1]

Climate change threatens to hamper African countries' short- and long-term economic and social progress. A healthy population and a strong workforce are essential requirements if African countries are to develop their economies based on renewable energies and transition away from fossil fuels. Mitigating and preventing the catastrophic health impacts of the climate crisis they face becomes imperative, not just to ensure their future, but to enable their contribution to the global fight against climate change. How can the Global North support the Global South in the transition to become more sustainable economies while building healthy populations?

September 2021 saw an unprecedented move by more than 200 health journals worldwide in which world leaders were urged to take action to keep global temperature increases below 1.5C and protect health.[2] Although climate change is slowly being recognised as a health emergency, health does not yet have an established, leading position in the climate debate. The relationship between the climate crisis and health is still widely underappreciated by policymakers and the public.

Building on the worldwide recognition they rightly received during the Covid-19 pandemic, health professionals across the world have made clear their position on tackling climate change. Ahead of COP26, more than 45 million health workers from across the world wrote an open letter to world leaders calling for urgent climate action to protect people's health.

This report, *The climate crisis and its health impacts*, highlights the public health challenges of climate change and calls for reframing climate change as a health issue.

By comprehensively addressing some of the deadliest direct health impacts of climate change on people's health, this report seeks to shed light on the links between our natural environment and health. Understanding and explaining that connection is vital in appreciating the full impact of the climate crisis on our health.

This report draws on a series of extended features, case studies, webinars, interviews and roundtables carried out throughout 2021 with stakeholders from the UK and international communities in world-leading organisations, including the WHO, US Environmental Protection Agency (EPA), European Centre for Disease Prevention and Control (ECDC) and The Lancet Countdown.

The scope of the report, which builds on the WHO's October 2021 report *The health argument for climate action*, is to discuss actionable policy interventions to prevent and mitigate the health impacts of climate change, and to place health at the heart of the climate crisis debate at a local, national and international level, and in every COP meeting to come.

The Covid-19 pandemic and the development of world-saving vaccines in record time have shown humanity's strength and ability to overcome a common enemy. As opposed to the Covid-19 pandemic, we have everything it takes to tackle climate change. Governments must act as fast and decisively as they did during the pandemic if we are to protect our individual health and collective health systems.

Key Insights

CHAPTER ONE – HEATWAVES

- Governments should carry out cross-sector awareness campaigns on the impacts of the heatwave on human health, targeting policymakers, health professionals and the public. These campaigns should include relevant information depending on the audience.
- Health professionals need training so they can swiftly identify heat-related conditions.
- The public needs to know what steps and measures they can take ahead of a heatwave, so they can get ready and better protect themselves during the heatwaves.
- Policymakers must recognise the urgency of this issue and work towards effective policy changes such as introducing strong early-system warnings. This should include a naming system for heatwaves similar to storms, to raise public awareness of this 'silent killer'.

CHAPTER TWO – AIR QUALITY

- Increase the public and policymakers' understanding of the multiple public health benefits of switching to clean energy, and how this will subsequently improve air quality and ultimately improve health outcomes. Such benefits should be amplified within governments' strategies on climate change mitigation and adaptation.

CHAPTER THREE – INFECTIOUS DISEASES

- Public health communities should be incentivised to undergo training in infectious diseases. They should reduce the knowledge gap and promptly identify infectious disease cases and treat them accordingly. As first responders, this is particularly important for those health professionals in geographical areas where experts have predicted an increase in environmental suitability for certain infectious diseases.
- Early-warning systems have proved critical in tackling climate-sensitive infectious diseases. Governments should invest in these technologies and establish support groups that seek to identify emerging diseases, where possible.

CHAPTER FOUR – MENTAL HEALTH

- Emerging new studies are drawing a worrying picture on how climate change is impacting people's mental health. Governments should conduct an in-depth study to reveal the full extent of the problem.
- Governments should investigate whether health professionals, in particular psychologists and psychotherapists, have the expertise and the means to deal with something on the scale of the climate crisis. Potential future training and continuing professional development will be required within the healthcare system to prepare for climate-related exacerbation of mental health conditions.

CHAPTER FIVE – A PUBLIC HEALTH EMERGENCY?

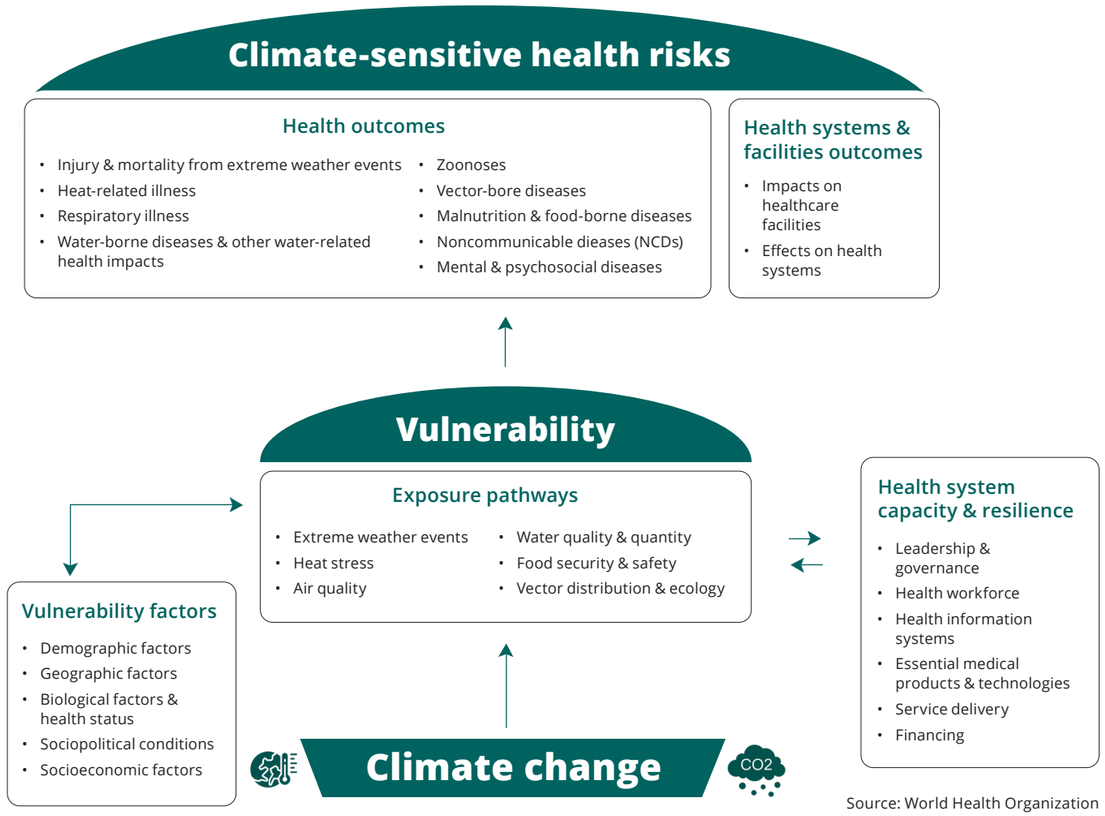
- WHO should consider revising the narrow disease-specific definition of public health emergency of international concern (PHEIC) to include climate change.
- National governments should develop effective strategies to identify, address and review the health impacts of climate change in their countries. National Adaptation Plans (NAP) should give a greater focus to health and support national governments with the development of their climate- and health-related plans.
- Medical schools should include climate change and its corresponding health impacts in the medical curricula. Health professionals including doctors, nurses and midwives should undertake, as part of their studies, modules that explain the various links between climate change and health and its health consequences.

HOW DOES CLIMATE CHANGE IMPACT HUMAN HEALTH?

According to the WHO, climate change is the single greatest threat to global health in the 21st century. It will adversely affect some of the most important determinants of health, including food, air and water.[3, 4] Climate change also threatens to reverse many of the advances in global health over the past 50 years and further widen existing health inequalities.[5]

Greenhouse gas emissions from burning fossil fuels have been trapping heat in the atmosphere since the beginning of the industrial era. As a result, average global temperatures have risen by 1.2C.[6] This 1.2C temperature change is already causing significant disruption to the health and wellbeing of people around the world. The health impacts are already unfolding across every continent and causing thousands of deaths every year. For instance, 166,000 people died due to extreme temperatures between 1998 and 2017.[7] The WHO estimates that between 2030 and 2050, increased global temperatures will result in about 250,000 additional deaths per year.[8] From more frequent and severe heatwaves, broadening the range of vectors that spread infectious diseases to poor air quality and rising levels of climate anxiety, the impact of climate change on humans' physical and mental health is unequivocal. The effects of climate change will continue to worsen without significant interventions.[9]

Climate change impacts health both directly and indirectly, and is strong mediated by environmental, social and public health determinants.



Source: World Health Organization

While no country or region around the world is immune to the impacts of climate change, the most vulnerable populations and those already experiencing the worst health impacts are people in low-income and disadvantaged countries and communities. The United Nations Environment Programme (UNEP) defined climate change as the ultimate "threat multiplier", exacerbating already fragile situations and potentially contributing to further social tensions.[10]

Although the known and future estimated number of deaths due to climate change should alone justify proactive actions, it is essential not to underestimate the financial cost associated with the health impacts of climate change. US experts projected that the health costs of climate change are likely to exceed $800 billion USD per year in the USA alone, with the overall costs set to rise higher without a solid societal response.[11] Countries that are proposing billions of pounds worth of climate investments are being met with scepticism. Though the costs might seem high at first glance, it is tiny compared with the financial and economic costs of climate inaction.[12] The Lancet Countdown 2021 Report found that "295 billion hours of potential work were lost due to extreme heat exposure in 2020, with 79 per cent of all losses in countries with a low human development index occurring in the agricultural sector".[13]

However, there is a growing consensus on the need to harness the health co-benefits of climate mitigation. Several studies have outlined how climate actions lead to direct public health benefits, potentially preventing millions of premature deaths.[14] The energy sector is the prime example of this. Moving to clean energy will improve air quality and thus bring benefits to public health, including reducing respiratory and cardiovascular diseases.

The following sections of this report will explore some, although by no means all, of the worst health impacts of climate change, including heatwaves, poor air quality and infectious diseases. The report will address these separately and comprehensively to understand how they impact human health, who is most at risk and, crucially, what policy solutions should be considered to mitigate or prevent their impacts. Insights on policy interventions to tackle each of these impacts were gathered by PPP through interviews, features, webinars and roundtables carried out throughout 2021.

Chapter One

CLIMATE CHANGE IMPACT ON HEATWAVES

The link between human-induced climate change and heatwaves is becoming increasingly evident. A report by World Weather Attribution (WWA) found that the 2019 heatwave in western Europe "would have been extremely unlikely without climate change".[15] Equally, in 2020, WWA found "with high confidence" that the January to June 2020 prolonged heat in Siberia, which hit a record-breaking temperature of 38C, "was made at least 600 times more likely by human-induced climate change".[16]

Of all the health impacts of climate change, heatwaves are one of the deadliest. However, because their effect is not as visual as a storm, and the death toll is not so obvious to determine, they have hardly ever received adequate attention from policymakers and the public. Yet, it is a deadly issue that is causing thousands of deaths every year. More than 70,000 excess deaths were reported across 12 European countries during the 2003 heatwave in Europe.[17] In the summer of 2020, as the UK was grappling with Covid-19 pandemic, the government estimated that heatwaves caused a record 2,556 excess deaths.[18] Again, in July 2021, a similar story: the record-breaking temperature in British Columbia, Canada, resulted in a 195 per cent increase in sudden deaths for a total of more than 450 deaths over five days of unprecedented heatwaves.[19]

Studies in the US and UK have concluded that exposure to extreme heat has adverse health outcomes on human health.[20] The leading cause of illness or deaths during heatwaves are cardiovascular and respiratory diseases and heatstroke. Other less severe heat-related illnesses are heat exhaustion, heat cramps, heat rash and heat oedema.[21] From premature births and low birthweight to increased risk of stillbirth, extreme heat can also have a detrimental effect in early life and during pregnancy.[22]

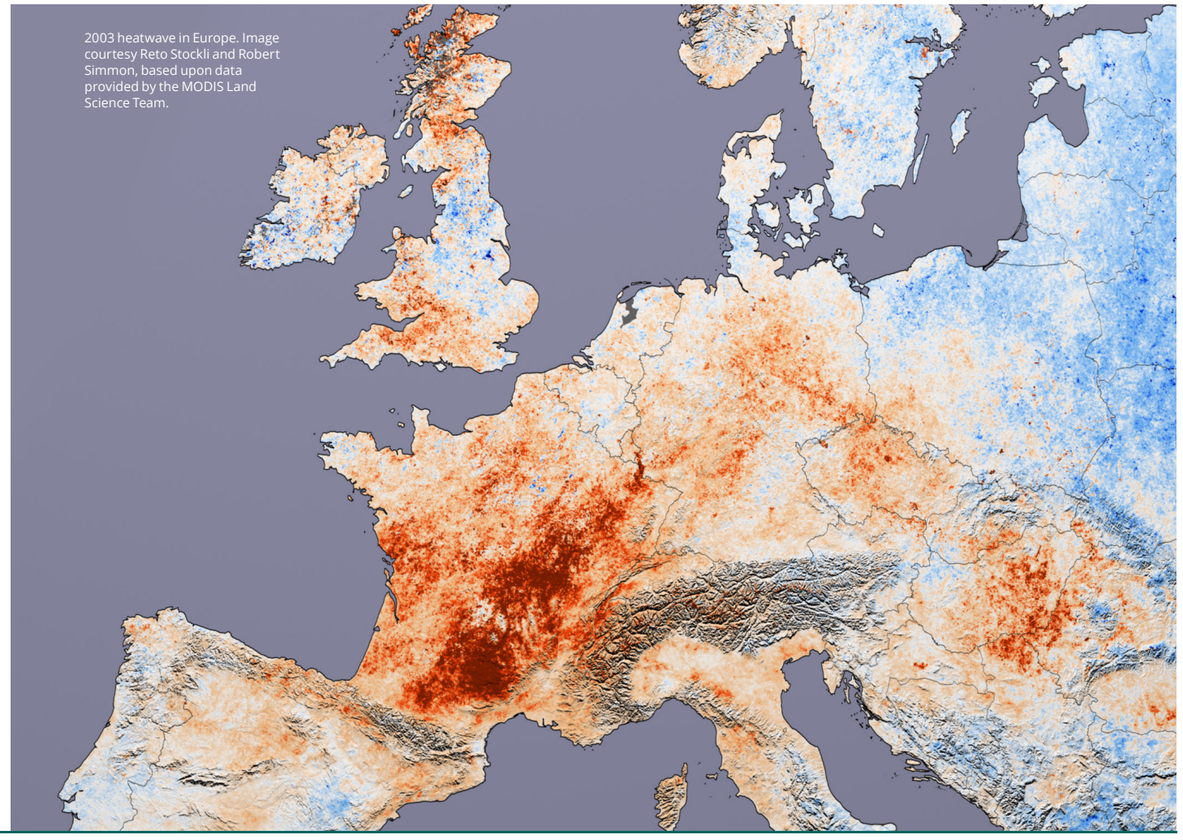
Heatwaves not only impact people's physical health, but they can also be harmful to our mental health. Speaking at the PPP webinar in October 2021, Dr Emma Lawrance, Mental Health Innovation Fellow at Imperial College London, said: "Studies show that with about a one-degree temperature increase, you get about a one per cent increase in suicides. This would mean that by 2050, in the US and Mexico alone, it has been estimated that if we do not act on climate change, 22,000 additional people would die by suicide because of the effects of heat."

HIGH-RISK FACTORS AND VULNERABLE GROUPS OF PEOPLE

Certain factors increase an individual's risk during a heatwave. These include:

- **Older age:** Especially over 75 years old, or those living on their own who are socially isolated or in a care home
- **Chronic and severe illness:** Heart conditions, diabetes, respiratory or renal insufficiency, Parkinson's disease or severe mental illness. Medications that potentially affect renal function, the body's ability to sweat and its thermoregulation
- **Infants** are vulnerable to heat due to immature thermoregulation, smaller body mass and blood volume, high dependency level, dehydration risk in case of diarrhoea
- **Homelessness:** Higher rates of chronic disease (often poorly controlled), smoking, respiratory conditions, substance dependencies and mental illness are more frequent in homeless populations than in the general population. These risk factors increase the risks of heat-related morbidity and mortality, on top of social isolation, lack of air conditioning, cognitive impairment, living alone and being exposed to urban heat
- **People with alcohol dependence and drug dependence** often have poorer overall health and increased social isolation, which can increase their risk of heat stress
- **Inability to adapt** behaviour to keep cool such as having Alzheimer's, being bed-bound, drug and alcohol dependencies, babies and the very young
- **Environmental factors and overexposure:** Living in urban areas and south-facing top-floor flats, being homeless, activities or jobs that are in hot places or outdoors and include high levels of physical exertion

(Source: NHS England, Heatwave Plan for England, 2015)



2003 heatwave in Europe. Image courtesy Reto Stockli and Robert Simmon, based upon data provided by the MODIS Land Science Team.

CASE STUDY 1 – TACKLING EXTREME HEAT IN AFRICA

Climate change is causing global temperatures to rise, resulting in life-threatening heatwaves and record highs that have devastating short- and long-term consequences. The World Meteorological Organization predicts, in the long term, that Africa will experience continued warming and decreasing rainfall over the next years.[23] If global temperatures increase from 1C to 4C relative to pre-industrial levels, the continent's overall GDP is expected to decrease by between 2.25 per cent to 12.12 per cent, respectively. Sierra Leone's capital city Freetown is also particularly vulnerable to extreme heat, with more than 35 per cent of the city's estimated 1.2 million residents living in low-income informal settlements.

In October 2021, Freetown Mayor Yvonne Aki-Sawyerr began the heat season awareness campaign in West Africa by naming Eugenia Kargbo as Freetown's first Chief Heat Officer (CHO), delivering on her commitment as a founding member of City Champions for Heat Action (CCHA) and making Kargbo the first to be appointed to this position on the African continent. CCHA is a cornerstone initiative of the Extreme Heat Resilience Alliance (EHRA), a global team led by the Atlantic Council's Adrienne Arsht-Rockefeller Foundation Resilience Center (Arsht-Rock) committed to providing one billion people with resilience solutions by 2030.

As Africa's first Chief Heat Officer, Eugenia Kargbo's role is to manage the growing risk of extreme urban heat, raise awareness of extreme heat risk among citizens, co-ordinate among disparate stakeholders to prompt better planning and response to heatwaves, and support the implementation of long-term strategies and projects to protect people and livelihoods from heat.

Miami-Dade County and Athens in Greece have also welcomed this pioneering initiative to tackle extreme heat and heatwaves, and have both appointed chief heat officers.

Source: Atlantic Council

Heatwaves are not affecting everyone equally. Instead, they exacerbate existing health inequalities. Researchers at the University of California in 2017 mapped racial divides in the US by proximity to trees. They found that black people were 52 per cent more likely than white people to live in areas of unnatural "heat risk-related land cover," while Asian people were 32 per cent more likely and Hispanics 21 per cent.[24]

Kathy Baughman McLeod, founding member of the Extreme Heat Resilience Alliance (EHRA) and SVP and Director of the Adrienne Arsht–Rockefeller Foundation Resilience Center at the Atlantic Council, noted in a PPP webinar that there is also a link between hot communities and lack of trees. "Low-income communities don't have trees, whereas suburbs do. Trees help keep the temperature down and, more importantly, they absorb pollution."

In addition to impacting health, extreme heat and heatwaves has a significant economic impact by reducing the labour capacity of paid work. The 2003 heatwave in Europe was estimated to have cost £41 million in health-related costs and productivity losses in the UK alone.[25]

The Lancet Countdown 2021 Report found that heat-related labour capacity reduction impacted workers' earnings equivalent to four to eight per cent of GDP in the low Human Development Index country group in 2020.[26]

NATIONAL TEMPERATURE RECORDS THAT WERE BROKEN OR EQUALLED IN 2021:

- Lytton, Canada: 49.6C
- Sidi Slimane, Morocco: 49.6C
- Siracusa, Italy: 48.8C
- Cizre, Turkey: 49.1C
- Taimali, Taiwan: 40.6C
- Joba, Oman: 51.6C
- Swiehan, UAE: 51.8C
- Kairouan, Tunisia: 50.3C
- Canefield, Dominica: 35.8C
- Furnace Creek, US: 54.4C

Source: World Meteorological Organization

Tackling the health impacts of extreme heat and heatwaves is not a straightforward task. During PPP webinars and interviews, discussions have highlighted policy interventions that could make a difference. Attendees and participants identified awareness campaigns on the impacts of the heatwave on human health, targeting policymakers, health professionals and the public as an essential move to seek a comprehensive societal response to this threat.

Kathy Baughman McLeod, who defined heatwaves as a "silent killer", asked: "How can you solve a problem people don't know about?" Lack of awareness in communities, especially among health workers, of the various health implications of heat is a critical issue.

A report published by the WHO in 2021 outlined how "the risk perception of heat among healthcare providers may be significantly lower than it should be, given the objective risks faced by their patients." It added: "While heat awareness and knowledge may be high among the public, the perception of risks from heat is generally low."[27]

Enhanced early heat warning systems and elevated communication were identified as essential policy interventions that could help mitigate the impacts of heatwaves. The UK Met Office only introduced an extreme heat warning system in the summer of 2021. The Extreme Heat Resilience Alliance (EHRA) launched a new initiative in 2020 to name and or rank heatwaves. According to one interviewee, naming and ranking hurricanes has created a culture of preparation and prevention that saved lives. This same or similar methodology could potentially do the same with heatwaves.

The EHRA has now collected an independent science advisory panel to explore the methodology around its proposal, as there are still debates in the science communities on the idea of naming and raking heatwaves. A senior adviser of the EHRA told PPP: "We believe that an elevated communication and a naming of a heat event will bring more protection. We are now working on how the methodology could be light enough to go all the way around the world but robust enough to bring the rigour that allows all communities, nations and subregions to be able to name heatwaves and rank them."

Other long-term initiatives that could help minimise heatwaves impact include a budget linked to the heat warning system. Once triggered, money is paid to the Treasury to try to get ahead of

the heatwave. This move could lead to prevention activities such as urban search-and-rescue that goes door-to-door to visit older adults alone in apartments without air conditioning or set up cooling stations.

Although heatwaves already pose a significant threat to the health and wellbeing of the people, researchers estimate heatwaves will become more frequent and severe in the future. A 2020 report by the Climate Coalition estimated that future heatwaves threaten the health of 12 million people in the UK, and there could be up to 5,000 deaths a year because of heat by 2050.[28] As record-breaking temperatures continue to unfold every year worldwide, adaptation strategies must be enhanced focusing mainly on early warning systems and improvement of urban planning.

INSIGHTS

- Governments should carry out cross-sector awareness campaigns on the impacts of the heatwave on human health, targeting policymakers, health professionals and the public. These campaigns should include relevant information depending on the audience.

- Health professionals need training so they can swiftly identify heat-related conditions.

- The public must know what steps and measures they can take ahead of a heatwave, so they can get ready and better protect themselves during the heatwaves.

- Policymakers must recognise the urgency of this issue and work towards effective policy changes such as introducing strong early system warnings. This should include a naming system for heatwaves similar to storms, to raise public awareness of this 'silent killer'.

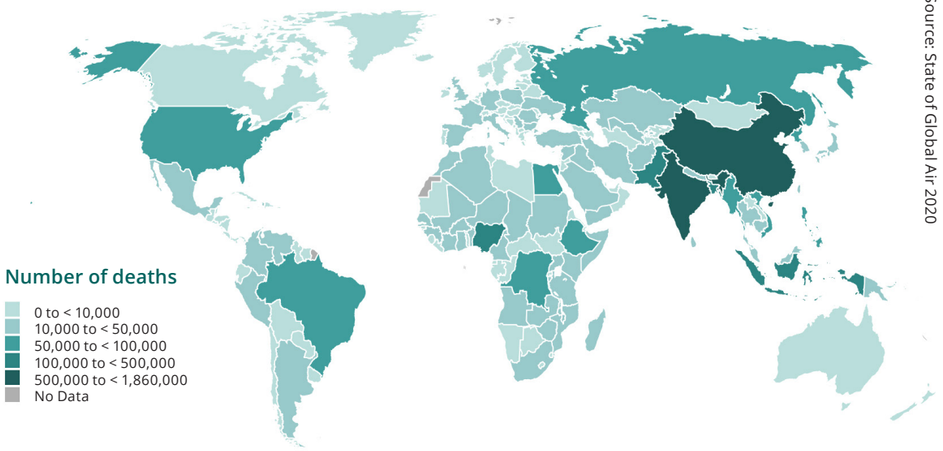
Chapter Two

CLIMATE CHANGE IMPACT ON AIR QUALITY

According to the WHO, air pollution is responsible for nearly 20,000 premature deaths a day – up to 7 million a year globally.[29] Unlike many other environmental policies, air pollution has become a mainstream issue in recent years, particularly among European countries where, despite some advances, poor air quality still causes hundreds of thousands of premature deaths every year.[30] The overwhelming majority of air pollution-related deaths, more than 90 per cent, occur in low- and middle-income countries, mainly in Asia and Africa, followed by low- and middle-income countries of the eastern Mediterranean region, Europe and the Americas.[31] An overwhelming amount of scientific evidence suggests that air pollution damages every organ in the human body, impacting human life even before we take our first breath. Researchers from Queen Mary University of London have even found air pollution particles in mothers' placentas.[32]

Climate change and air pollution are closely connected as they are driven mainly by the same sources. Action on one tends to have corresponding benefits on the other. The combustion of fossil fuels is responsible for greenhouse gas emissions such as carbon dioxide (CO2) and air pollutants. Though the link between climate change and air

Number of deaths attributable to Air Pollition in 2019



Source: State of Global Air 2020

quality extends beyond this commonality. Interviewed by PPP, Marcus Sarofim, Contributing Author of the US Climate and Health Assessment, explained that he classifies climate air quality links into four groups:

- **Climate penalty:** the idea that global warming creates conditions conducive to more air pollution episodes
- **Co-benefits opportunities:** greenhouse gases and air pollution often come from the same sources, and by mitigating climate change, you can have direct public health benefits
- **Some pollutants have a climate effect:** ozone is both an air pollutant and a greenhouse gas. Ozone pollution is accelerated by – and contributes to – climate change. The aerosols, black carbon, and sulphate all influence climate and health
- **Greenhouse gases have chemical effects on air pollution:** the most important one is methane, which in the atmosphere oxidises to create ozone. Methane serves as an ozone precursor, the same way other volatile organic carbons do.

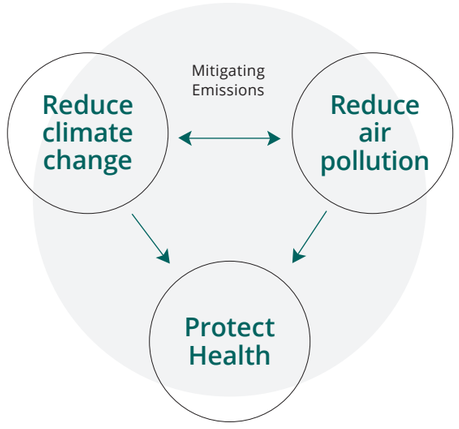
The concept of climate penalty was first introduced by Darrell Winner, Senior Science Advisor at the US Environmental Protection Agency (EPA). Speaking to PPP's publication World Healthcare Journal, Winner said: "Climate is a penalty because it makes it harder to attain the air quality levels you want to achieve for public health."[33]

Wildfire smoke is also having devastating impacts on air quality. With climate change projected to increase the number of wildfires and exacerbate their intensity, rising emissions of air pollutants will result in adverse health outcomes. The US Climate and Health Assessment established with "high confidence" that wildfires "emit fine particles and ozone precursors that in turn increase the risk of premature death and adverse chronic and acute cardiovascular and respiratory health outcomes".[34] US experts have warned that wildfires smokes, intensified by the climate crisis, are reversing decades of gains in cutting air pollution.[35]

The health impacts of air pollution result in staggering economic losses. The Lancet Countdown 2021 Report outlined how "the greatest economic costs of mortality due to air pollution fall on countries in the medium and high HDI country groups; costs relative to GDP decreased between 2015 and 2019 globally, except for costs in southeast Asia".[36]

As described earlier, air pollution is driven mainly by the same sources that contribute to greenhouse gas emissions and climate change. Thus, if governments tackle those emissions and cut down on fossil fuel burning, we will also cut down on air pollution – particularly important in urban areas where much of the air pollution comes from cars and fossil fuel burning by road transport and ammonia from farming which causes eight billion pounds a year in health damage in the UK alone.[37]

Reducing air pollution and mitigating climate change, together help to protect our health.



Source: World Health Organization

This concept is referred to as "health co-benefits of climate change mitigation". As an example, limiting the global temperature rise to 1.5C rather than 2C could help to avert more than 100 million premature deaths over the 21st century globally due to improvements in air quality, with about 40 per cent of the benefit occurring during the next 40 years.[38]

Further evidence of the health co-benefits of climate mitigation was offered by the UNEP report published in 2021, which found that achieving a 45 per cent reduction in methane emissions within this decade would prevent more than 250,000 premature deaths.[39]

Methane is responsible for about 40 per cent of global warming, but it is also a key precursor gas of harmful air pollutants.[40] A significant step forward in tackling methane emissions was made at COP26 with the European Commission President Ursula von der Leyen announcing that at least 80 countries, including those in the EU, pledged to regulate and reduce methane emissions by 30 per cent by 2030.

The health co-benefits of climate mitigation could extend beyond the energy sector. Researchers at the Lancet Countdown found that prioritising health in reaching the Paris Agreements goals could have vast public health benefits. "There are many ways in which we can reach Paris Agreements goals if we do it right. But prioritising health and health benefits in that response could avoid millions of premature deaths," said Dr Marina Romanello, Executive Director at the Lancet Countdown, during a PPP webinar in April 2021.

CASE STUDY 2 – ENJOY WALTHAM FOREST

The London borough of Waltham Forest has had air pollution levels consistently above legal limits, yet 40 per cent of the borough's residents do not have access to a private vehicle.

In 2014, Waltham Forest Council won a £27 million bid awarded by Transport for London and launched its 'Enjoy Waltham Forest' project, a bold initiative to improve the air quality of the area while simultaneously reducing congestion.

The Enjoy Waltham Forest project transformed the landscape of Waltham Forest to make way for a future-looking region in which active travel is prioritised over the needs of private vehicles to create a more liveable borough. The infrastructure improvements included the redistribution of road space to make way for 22 km of cycle lanes, the introduction of 37 modal filters, two part-time road closures and 104 improved pedestrian crossings. There were several objectives of this initiative, including making active travel safer, improving public health by reducing air pollution and reducing the carbon footprint of local transport.

In terms of impact, air quality has vastly improved, with harmful air pollutants NOx reducing by 12 per cent and PM2.5 reducing by 14 per cent. This improvement in air quality directly benefits the cardiovascular health of residents, with a King's College London impact assessment discovering that life expectancy for the region had increased by 1.5 months due to the project. Moreover, increased access to safe active travel routes brought about by road infrastructure changes, combined with

a walking and cycling public engagement programme, saw increased cycling and walking.

Through a reallocation of road space from private vehicles into the hands of pedestrians and cyclists as well as a significant citizen engagement process to raise awareness among residents of the importance, methods and wider co-benefits of active travel, this project allows for congested areas to be adapted to reduce air pollution while providing wide-ranging benefits to the local population.

By encouraging residents to replace short car journeys with active transport, this project directly reduces the carbon footprint of transportation in the region.

Example of cross-sector benefits from this action:

Sectors	Benefit achieved
Carbon	Carbon emissions are reduced in the region by the decrease in private vehicle use among residents.
Health	By reducing air pollution, specifically exposure to NOx, NO2, PM2.5 and PM10, this project reduced the risk of respiratory illness among the local population.
Health	By increasing awareness and the accessibility of active travel, this project increased the amount of physical activity that locals carried out.
Commercial	The pedestrianisation of two high streets allowed increased community activity in areas that previously consisted of congested roads.
Economic/ commercial	Reduced congestion in the area delivered economic benefits for businesses and residents through increased access to more cost-effective travel within the region.
Cohesion	Increased connection to place and wider community cohesion is delivered by the project as locals are given better access to key areas such as high streets, leisure facilities and green spaces.
Economic	The project brought increased opportunities for local businesses by pedestrianising high streets and reducing congestion by their businesses.

Source: Ashden.org

The WHO has recognised the importance of elevating health into the climate narrative. In October 2021, it launched the COP26 Special Report on Climate Change and Health, highlighting 10 priorities for "safeguarding the health of the people".[41] WHO has offered technical support to countries to strengthen the inclusion of health in their nationally determined contributions (NDCs).[42] Specifically regarding air pollution, in 2021, WHO updated its global Air Quality Guidelines outlining how achieving these air quality levels "will deliver substantial health benefits globally". For instance, as suggested by the WHO's COP26 report, about 80 per cent of premature deaths attributed to particulate matter (PM2.5) exposure in the world could be avoided if countries attain the annual guideline levels for PM2.5."[43]

Speaking to PPP, Dr Maria Neira, Director of Public Health, Environmental and Social Determinants of Health at the WHO, spoke about an additional intervention that could play a pivotal role in the fight against air pollution, the "white coat revolution". She argued that raising awareness among health professionals is essential. "We need to make sure that doctors and our health professionals are not just treating patients, but they are as well preventing those patients from being sick and then creating the conditions for a healthier environment."

As countries representing a combined total of 90 per cent of global GDP have now made net-zero pledges, governments are now focusing on developing their plans.[44] As many studies have pointed out, health must be placed at the centre of these plans. The public health case is clear: such a move would not only help countries reach their net-zero goals, but it would also prevent potentially hundreds of thousands of premature deaths each year.

INSIGHTS

- Increase the public and policymakers' understanding of the multiple public health benefits of switching to clean energy and how this will subsequently improve air quality and ultimately improve health outcomes. Such benefits should be amplified within governments' strategies on climate change mitigation and adaptation.

Chapter Three

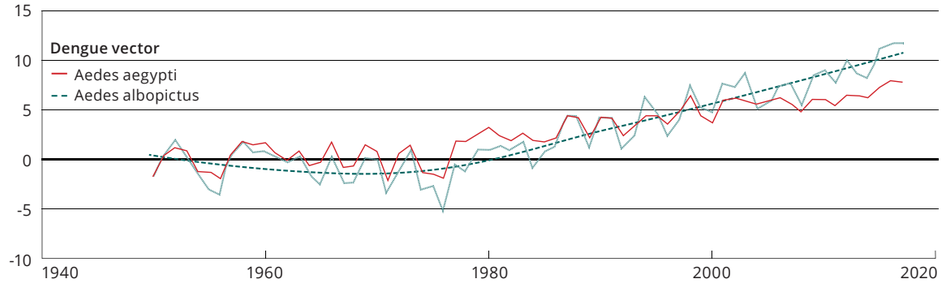
CLIMATE CHANGE IMPACT ON INFECTIOUS DISEASES

Increasing cases of infectious diseases, resulting in adverse health outcomes, is yet another impact of climate change. Several studies have shown how a changing climate aggravates the negative health impacts of several infectious diseases by broadening the range of vectors that spread them, putting millions more at risk of diseases such as malaria and dengue.[45]

The ECDC ranks climate change among the biggest drivers of infectious diseases. In a report published in 2020, the UNEP claimed that climate change represents "a major factor" in disease emergence. The report states that "the survival, reproduction, abundance and distribution of pathogens, vectors and hosts can be influenced by climatic parameters affected by climate change".[46] According to WHO's The 1.5 Health Report, "there is strong evidence that changing weather patterns associated with climate change are shifting the geographic range, seasonality, and intensity of transmission of climate-sensitive infectious diseases."[47]

Climate change is affecting the distribution of several infectious diseases, including arthropod-borne, food-borne and water-borne diseases.[48] Dengue, a vector-borne disease, is only one of the many infectious diseases that have proliferated in recent years due to climate change. The infections have doubled every decade since 1990.[49] According to the WHO, there are an estimated 100-400 million dengue infections each year, and about half of the world's population is now at risk. In 2019, ECDC reported a total of 4,363 cases of dengue in the EU/EEA.[50]

Aedes albopictus, also known as the Asian tiger mosquito, can transmit dengue, chikungunya and Zika.



Courtesy of The Lancet Countdown

CASE STUDY 3 – D-MOSS DENGUE EARLY WARNING SYSTEMS IN VIETNAM

Dengue is the fastest spreading mosquito-borne viral disease in the world. About half of the global population lives at risk of the disease. Dengue is disproportionately linked to poverty and inequality in many low- and middle-income countries and has an annual global economic cost of about $9 billion USD.

Vietnam is affected by dengue. There are about 95,000 dengue cases reported annually to the Ministry of Health. The economic impact of dengue in Vietnam is estimated at $30 to $95 million USD per annum. Dengue control in Vietnam typically involves community engagement and mobilisation to reduce the number of breeding sites, and outdoor insecticide spraying in areas where dengue cases have been reported to reduce the number of circulating adult mosquitoes. One limitation of these control measures is that they are reactive, meaning they take place after cases have occurred and potentially devastating outbreaks have started. If accurate predictions of potential dengue risk are made available to public health professionals, they could design and deploy interventions more effectively.

A London School of Hygiene & Tropical Medicine (LSHTM) team developed a probabilistic dengue early-warning system formulated using Earth observations and driven by seasonal climate forecasts. The system, called D-MOSS, generates accurate probabilistic forecasts of dengue incidence and outbreak risk up to six months in advance. These forecasts have potential for guiding policy- and decision-making processes in Vietnam. This is one of the first early-warning systems informed by Earth observations to demonstrate predictive ability for prospective year-round dengue prediction using a robust prediction framework.

There is potential to expand the system to the regional scale to provide measures of risk across multiple countries. There is also potential to downscale the system at the sub-national level to generate more geographically relevant measures of risk. Both up-scaling and downscaling the system would require the use of

supercomputer facilities given the high computational cost of the underlying statistical models. Scaling the system will also require strong stakeholder engagement efforts with different levels of governance and a live stream of epidemiological surveillance data.

This forecasting system has helped public health officials in Vietnam to bridge the gap between early warning and early action. The system is also helping policymakers to develop dengue prevention and control strategies in advance of an outbreak. The National Institute of Hygiene and Epidemiology (NIHE), and the Center of Disease Control and Prevention in Vietnam's province Nghe An use the results of the D-MOSS system to improve their cooperation and to implement dengue prevention activities more effectively.

At the Institute of Hygiene and Epidemiology of Tay Nguyen, D-MOSS has been helpful to develop action plans, take dengue response actions, make recommendations and issue warnings of dengue risk. D-MOSS has also improved co-ordination and timely decision-making at regional and provincial levels. At the Pasteur Institute of Ho Chi Minh City, Vietnam, D-MOSS is allowing the preparation of comprehensive and meaningful actions, responses and interventions.

Stakeholder engagement has been crucial to ensure D-MOSS provides public health officials and planners with information that is tailored to their needs. The system has been co-designed with stakeholders from the World Health Organization (WHO), the United Nations Development Programme, the Vietnamese Ministry of Health, the Pasteur Institute Ho Chi Minh City, the Pasteur Institute Nha Trang, the Institute of Hygiene and Epidemiology of Tay Nguyen, and the NIHE.

The system is under constant improvement. For example, the possibility of downscaling the system at the district level to generate metrics of risk that are more geographically relevant to stakeholders at the local dengue control programmes is being explored.

Source: London School of Hygiene & Tropical Medicine (LSHTM)

In addition to increasing the environmental suitability for infectious diseases, climate change threatens to undermine the public-health progress made on tackling malaria. Although there have been significant advances in the fight against malaria, climate change is exacerbating the struggle. A study has estimated that changes in temperatures could result in at least an additional 3.6 billion people being at risk from malaria by 2071, relative to the at-risk population in 1970-99.[51]

The most significant burden is expected to fall into low income countries, particularly those with little to no access to healthcare. Speaking to PPP, Kris Murray, Associate Professor of Environment and Health at Imperial College London, argued that it is important to consider the social risk factors. "We know that in places where you have healthcare systems that are better funded and better functioning, you can often reduce the worst impacts of infections. Whereas in areas where you have very limited access to healthcare or quality of care, that's when the same disease has a bigger impact," Murray said.

Even if the world were to reach net-zero tomorrow, many countries would still feel the devastating impacts of climate change for years to come because of the changes in temperatures that already occurred. Therefore, investing in climate adaptation strategies is crucial to protect millions of people's health. Enhanced disease surveillance systems have been highlighted in various discussions at PPP events as an essential policy intervention that can make a meaningful difference.

Jan Semenza, former Head of the Health Determinants Programme at the ECDC, was among those who support such intervention. He told PPP that increasing disease monitoring, what he called a "21st century surveillance" approach, can play a crucial role. Semenza argued it is crucial to act proactively to minimise the public health impacts of infectious diseases. A way to prevent or minimise those risks could be to detect a signal in the environment or in the climate that can predict an increase in the diseases, Semenza said. Such an approach has been successful in monitoring Vibrio bacterial infections.

CASE STUDY 4 – ECDC INTERVENTION TO CONTROL VIBRIO

Vibrio bacteria are marine pathogens that thrive in brackish water during hot summer days. They can cause gastroenteritis, wound infections and blood poisoning that can be fatal. An increase in sea surface temperature due to climate change can alter vibrio abundance, distribution, and patterns of infection. However, there is no European-wide surveillance of these infections to monitor trends over time. Once the sea surface temperature has surpassed a 15 degrees threshold, they start to multiply and proliferate, which can put beachgoers at risk for vibrio infections. Due to a climate change-related increase in sea surface temperature, the area of coastline suitable for Vibrio bacterial transmission has increased by 35 per cent in the Baltics, 25 per cent in the Atlantic Northeast, and 4 per cent in the Pacific Northwest, according to the Lancet Countdown 2021 Report.

To minimise those health impacts of Vibrio, Jan Semenza and his team at the ECDC developed a real-time, web-based platform called ECDC Vibrio Map Viewer to monitor environmentally suitable marine areas for Vibrio growth. The ECDC Vibrio Map Viewer displays coastal waters with environmental conditions that are suitable for Vibrio growth internationally and it is based on a real-time model that uses daily updated remotely sensed sea surface temperature and sea surface salinity of coastal waters. Analysts working with the interactive map can see a five-day forecast and, if certain conditions are met, they send out alerts to the local health officials to make them aware of the potential risk in this area. Officials can then take public health actions such as closing the beach and informing local physicians that they should look out for such infections. This system allows ECDC team to intervene before the impacts.

For example, in 2018, the model detected a significant increase in the geographic extent of environmental suitability for vibrio bacteria in coastal areas of the Baltic Sea and the Gulf of Bothnia, using both daily and forecasted values. This was linked to abnormally high temperatures and drought conditions in several countries around the Baltic Sea. At the beginning of August 2018, ECDC sent a notice to state epidemiologists around the Baltic Sea through the Epidemic Intelligence Information System for Food- and Waterborne Diseases and Zoonoses, alerting them to the possibility of an increase in vibrio cases.

The ECDC Vibrio Map Viewer provides global environmental suitability maps for vibrio bacteria that are based on a real-time model that has been calibrated to the Baltic region in northern Europe. It uses daily updated remote sensing data to provide information about environmentally suitable conditions such as salinity and sea surface temperature for Vibrio bacteria. However, the model can also be used and calibrated for any other region of the world.

Source: European Centre for Disease Prevention and Control

Another intervention that came out of PPP discussions relates to awareness campaigns on the impact of climate change on infectious diseases among the public and health professionals. A survey in 2020 assessed the perception and knowledge of the effect of climate change on infectious diseases within the public and found clear evidence that the public is not fully aware of the role of climate change.[52] Nearly 50 per cent of the respondents in the study did not understand the link between climate change and infectious diseases. Awareness among the public health community also remains low, with the British Medical Journal recommending updated and expanded health professional educational programming.[53]

With some estimates suggesting that up to 5.2 billion people are at risk of malaria in 2050, out of a predicted global population of 8.5 billion, strengthening the global response to adverse health impacts of climate-sensitive infectious disease becomes imperative.[54]

INSIGHTS

- Public health communities should be incentivised to undergo training in infectious diseases. They should reduce the knowledge gap and promptly identify infectious diseases cases and treat them accordingly. As first responders, this is particularly important for those health professionals in geographical areas where experts have predicted an increase in environmental suitability for certain infectious diseases.

- Early warning systems have proved to be critical in tackling climate-sensitive infectious diseases. Governments should invest in these technologies and establish support groups that seek to identify emerging diseases, where possible.

Chapter Four

CLIMATE CHANGE IMPACT ON MENTAL HEALTH

Climate change is not only having severe implications for our physical health, but is fuelling a mental health crisis, particularly among young people. An increasing number of studies are shedding light on the profound burden that climate change poses on people's mental health. From exacerbating existing mental distress to an increased number of suicides due to rising temperatures, climate change is having adverse effects on the mental health and emotional wellbeing of people around the world.[55] Despite the climate crisis and mental health receiving growing attention as a separate issue by researchers, policymakers and the media, the relationship between the two is still underappreciated, according to Dr Emma Lawrance, Mental Health Innovations Fellow at Imperial College London. For instance, she told PPP: "In the last decade in the New York Times, there have been tens of thousands of articles on both topics separately and only 257 that looked at this intersection."

One of the most direct impacts of the climate crisis on mental health is experienced by people exposed to climate-related extreme weather events. Experiencing such events can lead to post-traumatic stress disorder (PTSD), depression and general anxiety. However, people do not have to live through

a natural disaster to suffer the mental health consequences of climate change. Reading or watching about climate change, witnessing an extreme weather event, or simply listening to friends who have experienced such events can significantly affect one's mental health.[56]

More broadly, Dr Lawrance highlighted other impacts of climate change on mental health, including increasing numbers of suicides or suicidal thoughts, worsening symptoms or new cases of diagnosable mental illness or severe distress, deteriorating physical health or death even for people with pre-existing symptoms and worsening mental health and emotional wellbeing on the broader population. According to the US Climate and Health Assessment report, extreme heat can worsen existing psychiatric conditions: "The impact of extreme heat on mental health is associated with increased incidence of disease and death, aggressive behaviour, violence, and suicide and increases in hospital and emergency room admissions for those with mental health or psychiatric conditions".[57]

CASE STUDY 5 – CBM NIGERIA: THE CONTEXT – FORCED MIGRATION AND INSURGENCY

Climate change is causing huge changes in Sub-Saharan Africa, which affect the political and economic environment. The Sahara is fast expanding and encroaching into the arable lands while Lake Chad is shrinking. This is of particular importance in the countries that make up the Chad Basin – Nigeria, Cameroon, Chad Republic and Niger Republic. These are also the countries mostly affected by the Boko Haram insurgency, which is itself in part provoked by a long-term reduction in economic opportunities for young people, made worse by the effect of climate change on the main means of income. Indigenous people of this region are mainly migrant herders, farmers and fishermen. As the Sahara spreads and the Lake Chad basin shrinks, the herders and fishermen have started to migrate toward southern Nigeria in greater numbers.

Herders have always travelled south on foot, feeding their cattle and sheep as they go, but through well-marked and agreed spaces, and in limited numbers. As populations grow, and there is more need to move south, the cattle trample and feed on the farm crops, destroying them as they move south. This is made worse by greater population density reducing the free space for cattle to move. The destruction of livelihoods is resisted by the farmers, leading to outbreaks of conflict and loss of animals. The herders have mounted reprisal attacks on the farmers, killing families in the process and destroying their farms. The farmers flee their homes to huge internally displaced persons (IDP) camps in Nigeria, and in turn have responded with violence against herdsmen.

These issues of violence, conflict and forced migration had led to distress and mental health problems, including precipitation of conditions including acute stress, grief, depression, PTSD, harmful use of alcohol and drugs, suicide, and more. Some people receiving treatment for existing mental health conditions such as psychoses may flee their homes, risking relapse without their medications.

The programme

CBM Nigeria works with two partners in both northeast and north-central Nigeria to deliver community mental health and mental health and psychosocial Support services in transitional aid programmes. The aim of the project, funded by BMZ, is to help the persons returning to their homes to settle quickly by rebuilding the destroyed infrastructure in the communities. CBM focus is the proper integration of mental health care into primary and secondary care services, which are being redeveloped after many years of insurgency. In addition, it works at community level to build understanding of mental health, reduce stigma, and facilitate participation of people with psychosocial disabilities in community life. The main mental health activities in the two projects include:

1. The rebuilding and re-equipping of destroyed health centres
2. The training, retraining and support of health care workers to integrate mental health care into the services in the health centres
3. The training and support of the community structures such as family members, village health workers, junior community health extension workers and community volunteers to support people with mental health conditions in the community
4. The provision of essential medicines and establishment of drug revolving funds
5. The provision of water, sanitation and hygiene software and hardware in the community
6. The support of livelihood ventures in the communities
7. Ensuring the inclusion of people with a disability in the community – for example, being members of the water committee and training them to maintain the water pumps
8. Raising awareness on the availability of mental health services in the community

Source: CBM – cbmuk.org.uk

A 2021 study by the University of Bath, which surveyed more than 10,000 young people in 10 countries about climate change and mental health, has revealed the extent to which young people are suffering the mental health impacts of climate change.

THE DEPTH OF THE CRISIS IN NUMBERS

- 8 out of 10 respondents worry that climate change is threatening people on the planet
- 45 per cent worldwide and 28 per cent in the UK reported a negative impact on their daily functioning (eating, concentrating at work, school, sleeping etc)
- 55 per cent worldwide and 53 per cent in the UK thought they would not have access to the same opportunities their parents had
- 52 per cent worldwide think their family security is threatened
- 55 per cent worldwide, 47 per cent in the UK, believe the things they most value will be destroyed
- 8 out of 10 think that people have failed to take care of the planet
- 75 per cent worldwide, 73 per cent in the UK, think that the future is frightening

- 39 per cent worldwide, 38 per cent in the UK are hesitant to have children because of the climate crisis
- 56 per cent worldwide, 51 per cent in the UK, think that humanity is doomed
- 48 per cent of children and young people said they had been dismissed or ignored by other people when they tried to talk about the climate crisis
- 65 per cent believe that governments are failing young people dismissing and betraying them

(Based on responses from 10,000 participants aged 16–26. Source: Hickman et al, 2021)[58]

An important factor that significantly contributes to young people's climate anxiety is perceived inaction from governments. Caroline Hickman, lead author of the study and Executive Committee of the Climate Psychology Alliance (CPA), told PPP that many young people she spoke to said they would feel more content if governments were taking rapid actions.

Sacha Wright, Research and Curriculum Coordinator at Force of Nature, a youth non-profit organisation that mobilises mindsets for climate action, expressed the same view doing a PPP event. "Many of the most difficult emotions related to climate change for young people come not just from the depth of the crisis, rather from the perceived inaction that we can see from people in positions of power. A feeling of impotence that comes from being stigmatised, discredited for feeling so strongly about it. We're not met with the same urgency and vulnerability from decision-makers and policymakers, and this is largely fuelling eco-anxiety," she said.

CASE STUDY 6 – REACH NOLA – HEALING A COMMUNITY

Experiencing and witnessing first-hand a natural disaster can lead to several mental health challenges, which most of the time emerge sometime after the traumatic event. In August 2005, Hurricane Katrina struck in the southeastern United States, claiming more than 1,800 lives and more than $100 billion USD in damages. One of the most enduring, and often overlooked, effects of Katrina is its impact on families, neighbourhoods and individuals' mental health. One-third of the people affected by Katrina reported symptoms of depression or PTSD one year later.

A group of local health and social service agencies, along with academic partners at Tulane, RAND, and UCLA, joined forces to assess the health needs in post-disaster New Orleans. Operating under the umbrella name REACH NOLA, the organisation, which has since become a 501(c)3 non-profit agency, aims to improve health through community-academic partnered projects. Through interviews and community discussions, team members learned that depression and PTSD were among the community's most pressing health concerns.

The collaborative approach to treating mental health issues brings together community health workers, case managers, therapists, primary care physicians, and psychiatrists to co-ordinate care and help clients navigate the healthcare system. Although the collaborative approach is usually implemented by large health care agencies where all members of the care teamwork under the same roof, REACH NOLA leveraged the strengths of health and social services providers city-wide by supporting collaboration across agencies.

Thanks to generous support, REACH NOLA put its plan into action by beginning the Mental Health Infrastructure and Training (MHIT) Project in the summer of 2008.

The project delivered more than 80,000 client services over one year and more than 300 counsellors, social workers, primary managers, community health workers received REACH NOLA MHIT training. Throughout the project, community health workers and case manager trainees gradually assumed greater responsibility for conducting different parts of the training, so that by the end, they were recognised as experts.

The connections that project participants made at REACH NOLA MHIT training sessions sometimes had novel results. For example, when Angie, a participant of the initiative, found her neighbour in the Holy Cross area living in a gutted home with no basic services, she remembered someone at the training with "access to grant money to help residents complete their houses". Within just a few weeks, James, a case manager at a local faith-based agency, was helping Angie's neighbour to renovate the damaged home. Meanwhile, Angie made sure the neighbour received the mental health care he needed so that he would no longer feel so alone.

Although Hurricane Katrina has not been directly linked to the climate crisis, scientists across the world agree that climate change is already leading to more extreme weather events. Therefore, it is important to learn from New Orleans' community-based response to Katrina and prepare for the next natural disasters and their mental health consequences.

Source: The REACH NOLA – Mental Health Infrastructure and Training

Participants of the PPP events agree that further research is needed to fully understand the extent of the crisis. A few interventions have emerged out of the PPP discussions that could help young people alleviate the levels of anxiety experienced. At a societal level, several participants believe that transforming those feelings of anger and powerlessness into actions can have multiple benefits, not only because actions can lead to positive climate-related outcomes, but also action itself can relieve some of this anxiety.

As described before, climate actions can lead to direct public health benefits, and this also seems to be the case for mental health. "Studies shows that on a government, local council and community level when we take climate actions such as increasing access to green space and reducing air pollution, we're not only creating a safer climate future, but we're also creating a world that has the underpinnings of a mentally healthy society," said Dr Lawrance. At a policy level, she argued, it is essential that policymakers consider the hidden costs of climate inactions on mental health and the multiple mental health benefits of climate action, particularly on the individual, community and government levels.

INSIGHTS

- Emerging new studies are drawing a worrying picture on how the climate crisis is impacting people's mental health. Governments should conduct an in-depth study to reveal the full extent of the problem.
- Governments should investigate whether health professionals, particularly psychologists and psychotherapists, have the expertise and the means to deal with something on the scale of the climate crisis. Potential future training and continuing professional development will be required within the healthcare system to prepare for climate-related exacerbation of mental health conditions.

Chapter Five

CLIMATE CHANGE: A PUBLIC HEALTH EMERGENCY?

In the WHO's own words: "Climate change is the greatest challenge of the 21st century, threatening human health and development. The longer we delay action, the greater the risks to human lives and health."[59] To meet such a challenge, existing business-as-usual healthcare policy interventions will fall short. As the Lancet Countdown concluded in its report, "an unprecedented challenge demands an unprecedented response". [60]

The WHO must play a central co-ordinating role in global health, just as it has done throughout the pandemic. Just as WHO was able to declare Covid-19 a public health emergency of international concern (PHEIC), there is an increasingly strong case that it should take unprecedented action and declare climate change to also have become one. This must be done with reference to an evidence-based framework that demonstrates clearly the deteriorating global public health impacts of the climate crisis.

Climate change is already taking the lives of many people. According to WHO estimates, "between 2030 and 2050, it is expected to cause about 250,000 additional deaths a year, from malnutrition, malaria, diarrhoea and heat stress." Deaths from climate change already eclipse most of the previous PHEICs declarations by WHO. Yet estimating the real death toll of climate change remains difficult.

THE SIX PUBLIC HEALTH EMERGENCIES OF INTERNATIONAL CONCERN DECLARED BY WHO

- 2009: H1N1 influenza –18,449 deaths
- 2014: Ebola virus disease (West Africa) –11,310 deaths
- 2014: Poliomyelitis – in 2019 there were 173 cases of wild poliovirus type 1 and 323 cases of circulating vaccine derived poliovirus
- 2016: Zika virus disease: As of May 2017, there were 200,000 infections and 3,000 congenital syndromes associated with the virus in the Americas
- 2018: Ebola virus disease (Kivu, Democratic Republic of Congo) – 1,743 deaths
- 2019: Covid-19 – 5,974,0131 deaths as of 3 March 2022

Source: British Medical Journal

Such a declaration by the WHO would be beneficial for different reasons. The WHO is arguably one of the most influential international organisations, as shown during the Covid-19 pandemic, and could mobilise political will while also receiving significant attention from international mainstream media. According to a participant of the roundtable, it could also advance the movement and motivate efforts on climate and health substantially. The climate crisis might be considered a cross-border emergency and will affect, to a different degree, nearly all nations. As a result, an effective and co-ordinated international response is needed. Above all, under the 2005 International Health Regulations (IHR), states would have a legal duty to respond promptly to a PHEIC. With so many different approaches to the climate crisis, mostly depending on the domestic politics of each country, the WHO could work through those differences and lead the response.

However, according to the WHO, climate change does not constitute an event appropriate for consideration as a public health emergency. Under the current regulation, PHEIC has a narrow disease-specific definition. So far, previous PHEICs have only been declared for infectious diseases. According to the IHR, a PHEIC "means an extraordinary event which is determined … to constitute a public health risk to other states through the international spread of disease and to potentially require a co-ordinated international response". And by the term "event", the IHR means "a manifestation of disease or an occurrence that creates a potential for disease".[61] As described in the previous chapter on infectious diseases, the climate crisis is already having a significant impact on the terms of infectious diseases by increasing the environmental suitability for some disease vectors, making millions more people at risk. Climate-induced infectious diseases could, therefore, trigger international public health emergencies. According to the WHO, climate change could trigger health emergencies rather than being an emergency in its own right.[62]

STEPWISE APPROACH TO DETERMINING AN EVENT A PHEIC

In determining whether an event constitutes a PHEIC, the director-general shall consider:

(a) information provided by the state party

(b) the decision instrument contained in Annex 2

(c) the advice of the emergency committee

(d) scientific principles as well as the available scientific evidence and other relevant information

(e) an assessment of the risk to human health, of the risk of international spread of disease and of the risk of interference with international traffic.

Source: Article 12(4) International Health Regulations, 2005.

The steps that the director-general needs to follow in determining whether an event constitutes a public health emergency of international concern are set up by the IHR. Regarding point A, the WHO already has information on several countries as part of its monitoring of national and global progress on health and climate change.[63] Once detailed information has been collected and analysed by the WHO, the director-general can then consult the emergency committee and assess the risk of climate change to human health.

There are less technical but equally important issues that must be addressed when exploring the possibility for the WHO to declare climate change a public health emergency. One of these was raised by Dr Maria Neira, WHO's Director for Public Health and the Environment. She expressed her concerns that if WHO was to declare climate change a PHEIC, this would only generate attention in the short-term for an issue where constant government action is required. "When you declare a public health emergency, you will have attention. You will have resources for a few days, a few months, and then it's over. This will require very important decisions," she told PPP. Despite the concerns, Dr Neira did leave open the possibility of declaring the climate crisis a PHEIC in the future. "If we think that this will generate the reaction that is needed, yes, but this has to be an action that will be maintained in the long-term and not just acute," she said.

Another issue relates to WHO funding. There is no question that if the WHO was to lead the global response to climate change by declaring this a public health emergency, a review of its funding must be prioritised. As mentioned by an attendee of the PPP roundtable: "WHO is pitifully underfunded by member states, the same amount being given each year in assessed contributions as was given 25 years ago".

Former prime ministers of the UK Gordon Brown and New Zealand Helen Clark have also stressed the importance of adequate funding for the WHO. In a joint article, they said: "Without sustainable funding from its member states, the World Health Organization cannot succeed in its mission to deliver health for all.[64] This was also acknowledged by the G20 leaders during their meeting in Rome in 2021, where they showed support for "an adequately and sustainably funded WHO", arguing this is needed to lead and coordinate global health.[65] Overall, there are clear caveats that the WHO must consider if it is to declare the climate crisis a public health emergency.

However, given the scientific evidence and the experiences from the front line, there is a pressing need to revise the narrow disease-specific definition of an international public health emergency to include climate change. There are other international emergencies, such as poverty, obesity or antimicrobial resistance (AMR), that are also of global concern. However, as opposed to climate change, none of them could be defined as an "existential threat" to humanity, as described by the UN secretary-general.[66]

The Covid-19 pandemic has shown how drastic measures to protect public health, although unthinkable and unprecedented until a few months earlier, can be understood and welcomed by the public and make a real difference. The climate crisis is no different. If the WHO was to declare it a public health emergency, it could truly be a turning point in our collective fight against climate change.

According to the British Medical Journal (BMJ), the WHO could provide a strong signal by declaring climate change a public health emergency. In an analysis article for BMJ, Andrew Harmer, senior lecturer in global health wrote: "By doing so, it would protect and respect its mandate, global public health, the planet, and the wellbeing of present and future generations; it would mobilise political will and funding needed for climate action; and it would convey the urgency of the reality of climate change that we now face. If ever there was a public health emergency of international concern, it is this."[67]

Not only would such a declaration itself be extremely important, what would follow would also be valuable. According to Article 13 of the IHR: "Each state party shall develop, strengthen and maintain, as soon as possible but no later than five years from the entry into force of these regulations for that state party, the capacity to respond promptly and effectively to public health risks and public health emergencies of international concern."[68]

There is also a strong need to incorporate climate change and health into the medical curricula. Health professionals including doctors, nurses, midwives should undertake, as part of their studies, modules that look at the intersection between climate change and health. As described throughout the report, the health impacts of climate change will become ever more prevalent and having a prepared medical workforce can be incredibly beneficial to population health. Medical students, both in the UK and US, are also demanding that medical schools include climate change and the corresponding health impacts in the medical curricula.[69] A survey of 12 US medical schools found that more than 80 per cent of the respondents believe climate change and its health effects should be included in the core medical school curriculum.[70]

Arguably, greater recognition of the term 'climate health', as a sub-set of global health, could also have a similar positive impact internationally as the adoption of the concept 'global health' has had on some of the poorest communities across the world. There are important parallels to be drawn with Sir Michael Marmot's work on the 'social determinants of health' to aid the understanding of the wider societal causes of healthcare inequalities, a framework that PPP has been involved with its publication, *Addressing the national syndemic*.[71] Concepts and new forms of definition can aid conceptual understanding and concern, leading to innovative policy frameworks that aid locally and nationally based decision-making on healthcare.

National governments should give a greater focus to the health impacts of climate change and work towards effective solutions to identify, address and review the health impacts of climate change in their countries. An existing framework that could be adapted to incorporate this is the United Nations Framework Convention on Climate Change (UNFCCC)'s National Adaptation Plans (NAP). A 2021 survey by WHO on health and climate change found that only 45 out of 91 countries surveyed have a national health and climate change plan or strategy, with up to 69 per cent reporting insufficient financing as a barrier to imploring these plans.[72]

INSIGHTS

- WHO should consider revising the narrow disease-specific definition of public health emergency of international concern (PHEIC) to include climate change.
- National governments should develop effective strategies to identify, address and review the health impacts of climate change in their countries. National Adaptation Plans (NAP) should give a greater focus to health and support national governments with the development of their climate- and health-related plans.
- Medical schools should include climate change and its corresponding health impacts in the medical curricula. Health professionals including doctors, nurses and midwives should undertake, as part of their studies, modules that explain the various links between climate change and health and its health consequences.

Conclusion

This report highlights how the climate crisis is not a future-generation-only issue. Instead, a deadly public health emergency that is already causing deaths and suffering around the world and exacerbating existing inequalities in already vulnerable communities and countries. A view that came out throughout the report's development is that despite the health implications of the crisis being already devastating, these will only worsen without swift and meaningful interventions.

Within the scope of this report, it has not been possible to address all the health impacts of climate change. There are other equally important health impacts of the climate crisis that seriously threaten the health and wellbeing of people, such as food security and undernutrition, sea-level rise and droughts.

As governments work to limit the world temperature rise to 1.5C, it is important to remember that the climate has already changed – with the IPCC report estimating that earth's surface temperature has increased by about 1.1C compared with the average in 1850-1900.[73] The implications of these temperature changes are something many countries are already struggling to cope with, as described in the report.

Despite some good progress at COP26, addressing the health impacts of climate change remains a vital, and unanswered, part of the future climate change policy agenda. A view shared by many during the roundtable process is that COP meetings are built too much around mitigation and, instead, they should give greater attention to adaptation and resilience. "There's remarkably little focus on the suffering of hundreds of millions of people," a roundtable attendee said. Other participants of the roundtable agreed there should be more investments in adaptation. However, one attendee warned that, although societies are extraordinarily resilient, it doesn't mean to say that they should be pushed to the edge of adaptation. "It's a question of getting the balance right," the attendee said.

With the WHO Health Pavilion at COP26, public health has resonated more than any other UN climate summits before. Egypt, the next host of the UN climate summit, COP27, has already experienced some of the deadly impacts of climate change. In 2015, heatwaves caused more than 100 deaths, according to the Egyptian Ministry of Health.[74] In that same year, dozens had lost their lives in the abnormal winter floods. WHO has also defined Egypt as "highly vulnerable" to climate change, with estimates that see more than two million Egyptian citizens affected by floods between 2070 and 2100.[75] Integrating and prioritising health in adaptation and mitigation strategies can save millions and must be a priority focus of COP27.

Throughout the discussions organised by PPP, it became clear that the health argument for climate actions is essential. The coronavirus pandemic has shown how much of a global priority public health is for every nation in the world. Record-breaking funding and government legislations meant that countries took unprecedented steps to protect people's health. A similar urgency to tackle the health consequences of climate change and framing this as a health issue can be the turning point needed from society.

According to participants of PPP roundtables and webinars, the most significant pushback against the health argument often comes from the economic perspective: the 'we-cannot-afford-this' narrative. To tackle such a narrative, many researchers and policymakers are now giving greater attention to the co-benefits of climate actions. As described before, climate action aims to stabilise a safe climate future and offers multiple cross-sector benefits. One attendee at a roundtable said: "We need to create a cost-benefit analysis where we can prove that the current trajectory is too expensive. Economically, it has huge impacts not only on health but on all of society at large. We then can step back and offer an option with co-benefits and much-decreased costs." The social cost of carbon was also highlighted by several roundtable participants as a possible way to contrast the health and climate against the economic narrative. "Climate legislation is both the right thing to do and is economically beneficial," argued one attendee.

Although research is now shedding light on the economic benefits of climate actions, there is still more work to be done that teases out where those cost savings are seen if we take steps to have access to healthier foods, more physical activity in people's lives, healthier and cleaner air. "We need to build out that aspect of how we talk about the relationship between the health beneficent solutions to climate change and the health cost savings that come from that," said one roundtable attendee. Climate action does not only make economic sense, but it's the right thing to do if we are to protect people's health right now and in future generations.

Participants

CASE STUDY LIST

CHAPTER ONE – HEATWAVE

Case Study 1
Tackling extreme heat in Africa

CHAPTER TWO – AIR QUALITY

Case Study 2
"Enjoy Waltham Forest" project in London

CHAPTER THREE – INFECTIOUS DISEASES

Case study 3
D-Moss Dengue early warning systems in Vietnam

Case Study 4
ECDC Intervention to control Vibrio

CHAPTER FOUR – MENTAL HEALTH

Case Study 5
CBM Nigeria: The context – Forced migration and insurgency

Case study 6
REACH NOLA – healing a community

APPENDIX

This report draws on extended features, webinars, interviews and roundtables carried out throughout 2021. PPP is grateful to the below participants who gave their time and shared their expertise. Their unparalleled insights have contributed significantly to the development of this report.

WEBINAR SERIES SPEAKERS

THE HEALTH CONSEQUENCES OF CLIMATE CHANGE – MARCH 2021

Dr Jeni Miller
Executive Director, Global Climate and Health Alliance

Kathy Baughman McLeod
Senior Vice President and Director, Adrienne Arsht–Rockefeller Foundation Resilience Center

BUILDING A GREENER NHS: REACHING NET-ZERO – APRIL 2021

Dr Nick Watts
Chief Sustainability Officer, NHS England/ Improvement

Dame Jackie Daniel
CEO, Newcastle Upon Tyne Hospitals NHS Foundation Trust

HEALTH IMPACTS OF CLIMATE CHANGE IN THE EU – MAY 2021

Jan Semenza
Head of the Health Determinants Programme, European Centre for Disease Prevention and Control (ECDC)

Dr Marina Romanello
Executive Director, Lancet Countdown

CLIMATE CHANGE, AIR QUALITY AND HEALTH – JULY 2021

Professor Sir Stephen Holgate
UKRI Clean Air Champion and Special Advisor on Air Quality, Royal College of Physicians

Dr Maria Neria
Director of the Public Health, Environment and Social Determinants of Health, World Health Organization (WHO)

ECO-ANXIETY – CLIMATE CHANGE IMPACTS ON MENTAL HEALTH – OCTOBER 2021

Dr Emma Lawrance
Mental Health Innovations Fellow, Imperial College London

Caroline Hickman
Executive Committee, Climate Psychology Alliance (CPA)

Sacha Wright
Research and Curriculum Coordinator, Force of Nature

ROUNDTABLE PARTICIPANTS

UNDERSTANDING AND TACKLING THE HEALTH IMPACTS OF CLIMATE CHANGE – NOVEMBER 2021

Dr David Nabarro
Strategic Director, 4SD

Jeni Miller
Executive Director, Global Health and Climate Alliance

Professor Sir Andy Haines
Environmental Change and Public Health, London School of Hygiene & Tropical Medicine

Professor Anthony Costello
Co-Chair, Lancet Countdown

Marcus Sarofim
Physical Scientist, Environmental Protection Agency (EPA)

Dr Frances MacGuire
Policy Manager, Lancet Countdown

Dr Emma Lawrance
Mental Health Research Fellow, Imperial College London

Elaine Mulcahy
Director, UK Health and Climate Alliance

Jan Semenza
Head of the Health Determinants Programme, European Centre for Disease Prevention and Control (ECDC)

Rt Hon Chris Skidmore MP
Former Energy Minister, Member of Parliament

Geraint Davies MP
Chair, All Party Parliamentary Group on Air Pollution

Seb Dance
Former Deputy Chair, PPP

FULL SERIES INTERVIEWEES

Dr Maria Neria
Director of the Public Health, Environment and Social Determinants of Health, World Health Organization (WHO)

Dr Neil Jennings
Partnership Development Manager, Grantham Institute – Climate Change and the Environment

Kathy Baughman McLeod
Senior Vice President and Director, Arsht–Rockefeller Foundation Resilience Center

Darrell Winner
Senior Science Advisor, US Environmental Protection Agency (EPA)

Marcus Sarofim
Physical Scientist, US Environmental Protection Agency (EPA)

Kris Murray
Associate Professor of Environment and Health, Imperial College London

Gillian Pritchard
Project Officer, Canadian Public Health Association

Jan Semenza
Former Head of the Health Determinants Programme, European Centre for Disease Prevention and Control (ECDC)

Dr Nick Watts
Chief Sustainability Officer, NHS England/ Improvement

FEATURE SERIES ARTICLES

"Climate change: a human health crisis" – World Healthcare Journal – July 2021

"Heatwaves killing thousands every year – it will get worse" – March 2021

"Climate change is aggravating the spread of infectious diseases" – April 2021

"Climate change is not only about our planet, it is also about our lungs" – June 2021

"Health professionals and the battle against climate change" – July 2020

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